Housing Tenure, Expenditure, and Satisfaction Across Hispanic, African-American, and White Households

Evidence from the American Housing Survey

U.S. Department of Housing and Urban Development
Office of Policy Development and Research

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Prepared for
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February 2006

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Executive Summary

Recent U.S. Census information suggests that the proportion of Hispanic families has eclipsed that of African-Americans as the largest minority group. Yet, in looking at the housing literature, relatively little statistical analysis has been done to consider the housing situation of Hispanics compared to other racial/ethnic groups. This study pools the 1998, 2002, and 2004 MSA samples of the American Housing Survey to compare the housing situations of Hispanic, African-American, and white households. The full sample includes approximately 17,968 Hispanic households of which 6,446 were recent movers into the dwellings they occupied during the interview.

The analysis presented in this report has two primary components to it. In the first part of the study, the likelihood of ownership, levels of house prices (for owners), and contract rent (for renters) were considered across race/ethnicity for both the full sample and the subset of recent movers. Considering all households and recent movers separately brings a different perspective through which to evaluate the forces shaping the housing outcomes for each group. Specifically, the full sample shows us how everyone is housed at a given point in time. This allows one to observe differences in housing circumstances across income and racial groups that have come about as a result of decades of evolution in the housing market conditions experienced by these households. Alternatively, a recent mover sample allows one to observe differential outcomes for households who have recently, actively made adjustments in their housing consumption based on their current socio-economic characteristics, and the current housing and mortgage market conditions that exist. The second part of the analysis focuses on differences in ordinal rankings (on a scale of 1 to 10) of structural and neighborhood quality between Hispanic, African-American and white households. An ordinal probit model is used to estimate the impact of various specific structural and neighborhood characteristics on these overall rankings. This analysis also examines the average differences in these specific characteristics across racial-ethnic/income groups and draws implications regarding housing and neighborhood quality.

A number of interesting differences in housing circumstances between Hispanic, African-American, and white households are revealed as a result of this analysis. In particular, even when controlling for income and savings, level of education, age, marital status, family size, the housing market in which the unit was located, and (for a sub-sample where this information was available) the length of time non-natural born residents have been in the U.S., compared to whites both black families and Hispanic families had significantly lower likelihood of homeownership, lower house values (for owners), and lower rents (for renters) in both the full and recent mover samples. Comparing blacks and Hispanics, housing outcomes are generally worse for African American families in this sample than for Hispanics. Specifically, they are observed to have slightly lower rates of ownership and substantially lower valued homes and lower rents for both high- and low-income subgroups. In addition, when those identified as Hispanic were split into white and non-white subgroups, these outcomes appeared consistently worse for the non-white subgroup when employing the full sample. While it is not clear what combination of forces caused these differences for the two Hispanic groups, this result has not appeared previously in the literature. It suggests that over the years non-white Hispanic families' housing market experiences have been more comparable to African-American families than have those of their white Hispanic counterparts. Finally, recent immigrants to the U.S. are significantly less likely to be owners than earlier immigrants or those who did not immigrate, and

those who rent have a significantly lower level of expenditure on rent. On a positive note, rent subsidies appear to have a significant impact on lowering rental payments for both recent movers and the full sample of households.

In addition, Hispanic homeowners in the full sample, particularly low-income households, tend to have more mortgage debt than whites or blacks. This result is much less prominent for recent-movers suggesting the possibility of a dynamic process occurring over time in which housing debt is accumulated through junior mortgages, home equity loans, and/or refinancing. Alternatively, it could be the case that more recently the increased accessibility of a wider variety of mortgage instruments to Hispanic families has allowed them access to homeownership without having to carry as much debt as they might have in earlier periods. Also, Hispanic households are observed to be substantially more crowded in both owned and rented units than their racial/ethnic counterparts. Finally, because of higher mortgage debt levels, and/or, possibly, worse loan terms, black and Hispanic homeowners have relatively high monthly costs per square foot for owned homes as compared to their white counterparts. This result holds for both the full sample as well as recent movers.

Regarding both the dwelling unit and the neighborhood, the primary factor contributing to systematic differences in quality measures is housing tenure, regardless of race. Owners consistently rank both their structural housing characteristics and neighborhood quality higher than renters; hence the significance of the preceding analysis which demonstrates the lower likelihood of ownership for the minority households in the sample. Low-income households, particularly Hispanics, have the largest differentials between renters' and owners' average rankings of neighborhood and dwelling structural quality. For low-income Hispanics, average structural quality ranges from 8.36 for owners to 7.39 for renters and for neighborhood quality the difference is 8.02 (owners) compared to 7.34 (renters).

In considering specific structural and neighborhood characteristics, regardless of race, Americans are in basic agreement about what factors are important to having quality housing. Internal and external leaks, the quality of plumbing and water, major structural problems, and interior deterioration of the unit all have a significant impact on structural quality rankings. Similarly, issues of crime and police protection, noise problems, roads in need of repair, junk and abandoned buildings create an undesirable environment, while green space and newer buildings are associated with higher quality neighborhoods.

However, substantial differences are apparent when comparing the mean quality levels for individual characteristics by minority status. Major structural problems and interior deterioration (e.g., cracks in wall, holes in floor) appear to be worse for both minority groups as compared to whites. Having unsafe drinking water is much more likely for Hispanic households than black or white households as is the presence of the poorest quality heating. Similar comments apply for the determinants of neighborhood quality. Most notable is the fact that the perception of crime problems and inadequate police protection is worse for both minority groups as compared to whites. Particularly with owned units, green space is less likely to be near minority homes. Consistent with the inner city locations associated with many of the units occupied by African-American families, whether owners or renters, their units are located such that a higher proportion of them have abandoned buildings nearby. Finally, minority rental units appear to be located in neighborhoods in which road repairs are more likely to be a concern.

To summarize, minority households, whether Hispanic or African-American, are observed to have substantially worse housing outcomes than comparable white households. Also, the factors that determine good structural and neighborhood quality appear consistent across all household types, i.e., they agree on what makes good housing. If mean house values and rental expenditure levels of blacks and Hispanics are compared, the African-American families in the sample have somewhat less desirable housing outcomes than their Hispanic counterparts. However, several unique issues have been identified for the Hispanic households in the sample, e.g., crowding, high debt levels and high annual housing costs per square foot for owners, bad water, and low quality heating. This study represents a first step in understanding the way in which the housing circumstances of Hispanic families compare to other household types. A clear understanding of the nature of housing similarities and differences across different racial/ethnic groups is critical to designing housing policies that promote equal housing opportunities for all Americans.

1. Introduction[1]

In its proposed budget for fiscal year 2005, the Department of Housing and Urban Development (HUD) laid out its primary area of policy emphasis, which continues to be promoting affordable homeownership and stronger communities.[2] In developing the details of such programs, Secretary Alphonso Jackson acknowledged the increasing importance of the Hispanic American population, particularly as a component of low-income households, whose housing options need improvement.

According to data from the Current Population Survey (published in U.S. Department of Housing and Urban Development, 2006), in 1983 approximately 69.1 percent of white households, 45.6 percent of black households, and 41.2 percent of Hispanic households were homeowners. As of the 3rd quarter of 2005, these figures have improved for all the racial/ethnic groups, specifically, 75.7 percent for whites, 48.7 percent for blacks, and 49.1 percent for Hispanics.[3] However, the gap between whites and minorities has not narrowed significantly. Given the importance of owned housing as an asset, particularly for lower-income families, as well as the service and externality benefits associated with homeownership, this is a cause for concern.[4]

Even though the percentage of Hispanic households in the country now exceeds the comparable figure for African-American households as the largest minority group in the United States, it is surprising how little academic work appears in the housing economics literature focusing on the housing choices of Hispanic households (particularly, lower-income) as compared with those of white and black families. This is particularly true for a primary research question considered in this study, namely the current state of housing quality and household satisfaction with their housing situation.

There has been a significant amount of recent academic and policy research examining how to expand the homeownership opportunities for Hispanic families. What becomes quite clear from the literature is that in addressing this question from a policy perspective, analysts and policymakers need to develop a better understanding of differences in the housing situations faced by households with different racial/ethnic backgrounds (i.e., Hispanic, black, and white). That is to say, how much better is the quality of housing services provided by owned housing as compared to rental housing, and what is it specifically about families' housing that gives rise to observed differences in the perceived quality of the housing services they receive? In particular, how do perceptions of service quality differ for Hispanics as compared to other households? Utilizing recent MSA samples of the American Housing Survey (AHS) we address these issues and investigate how they differ for Hispanics as compared to other racial groups across a number of different housing markets.

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1 This study is part of a series of papers commissioned by HUD examining Hispanic homeownership. See Cortes et al. (2006) for references to the complete series of reports.

2 For more details see HUD News Release No. 04-0101, Feb. 2, 2004.

3 See HUD U.S. Housing Market Conditions 3rd Quarter 2005, p.85. Also, see Herbert et al. (2005) for a thorough discussion of trends in homeownership differences by race/ethnicity and a review of the literature examining the causes of these gaps and policies designed to address them.

4 See Boehm and Schlottmann (1999 and 2002) for further development of these issues.

The analysis presented in this paper has two broad thrusts. A primary point of focus is the consideration of differences in the perceived quality of the structural and neighborhood components of housing services by households in the sample. The AHS data contains detailed information on the structural characteristics of the house, the characteristics of the neighborhood in which the house is located, the demographic characteristics of the resident of the dwelling at the time of the interview, and two indices that measure the resident's satisfaction with their neighborhood and the quality of the structure in which they reside on an ordinal scale from one to ten. In general, we look across racial groups to compare Hispanic satisfaction with their housing situation as compared to black and/or white households by tenure type and income category. Taking this idea one step further, we also investigate the relative importance of various individual structural and neighborhood attributes in determining households' perceptions of overall dwelling and neighborhood quality.

However, in order to place the results for housing quality within both the context of the literature and our data, we initially analyze the likelihood of homeownership for Hispanic households and their pattern of housing expenditures, i.e., house value for owners and rental payments for renters. Differentials in household assessment of "quality" do not, of course, occur within a vacuum but rather within the basic household homeownership decision. For example, an important observation one can make about structural (i.e., dwelling unit) and neighborhood quality is that, across racial/ethnic groups and income levels, for owners (as compared to renters) both are substantially higher. Thus, understanding the forces that influence the likelihood of homeownership and expenditure level are important to understanding differentials in housing satisfaction. As noted in the literature, different racial/ethnic groups may have different understanding of, access to, and proclivity to use financial markets and institutions for both saving and borrowing. For Hispanic families attempting to accumulate wealth in order to purchase a home, such differences, along with differentials in household income and other socio-economic factors, could have a significant impact on the timing and likelihood of homeownership and the value of the housing they purchase.[5]

This study is organized into seven sections. Following this introductory section, Section 2 presents an overview of the data upon which the study is based and the two data sets (the full sample and a sub-sample of recent movers) used in the analysis. Various aspects of housing quality and characteristics are presented and discussed. These results are shown along the dimensions of low-income, high-income, and minority household status. Results for the likelihood of ownership and expenditure for the full sample and recent movers are presented in Section 3. The impact on homeownership and expenditures of time in the U.S. (for non-native born residents) is presented in Section 4 for the 2002 and 2004 data. A discussion of the study's methodology for assessing housing and neighborhood quality differentials is shown in Section 5. Empirical results regarding these quality differentials are summarized in Section 6. Conclusions follow in the last section.

[5] As noted, the main emphasis of this study is the assessment of housing quality. Thus, we do not suggest that our analysis is a detailed study of the dynamics wealth accumulation and housing choice. However, it is important to consider the fundamental issues of homeownership and housing expenditure to have a contextual basis. For more detailed examination of wealth accumulation and housing dynamics, see Boehm and Schlottmann (2004) and the series of papers in Retsinas and Belsky (2002).

2. Quality, Size, and Cost of Housing: The American Housing Survey 1998, 2002, 2004

The data presented and analyzed in this report are from recent American Housing Survey (AHS) samples for 41metropolitan statistical areas (MSAs). Information is gathered for samples of approximately 5,000 households in each MSA. Approximately 14 MSAs are selected for each sampling year.[6] The most recently available MSAs are for the sampling years 1998, 2002, and 2004 information from all of these MSAs are combined for this analysis.[7] There are two primary reasons for using the MSA samples as apposed to the national version of the dataset. First, for the national sample, of the almost 50,000 units included in the dataset, only about 4,000 are occupied by Hispanic families, and slightly less than half of these are owner-occupants. By using the MSA samples of the AHS, a larger total Hispanic sample size is possible. Specifically, there are approximately 17,968 Hispanic households in the full sample used in this study.[8] Second, by using the MSA samples we can identify the specific market in which housing decisions are being made. This is not possible with the national sample.

Table 1 utilizes the unique characteristic of the AHS in that it provides measures of the household's perceptions of the quality of the environment in which they live. Specifically, households are asked to rank the quality of both their structures and their neighborhood on an ordinal scale from 1 to 10 (where a rank of 1 is worst and a rank of 10 is best).[9] Table 1 also reports values for several other variables of interest related to a household's housing experience. Specifically, tenure choice (own versus rent), housing value (for owners) or annual rent (for renters), total monthly housing costs, amount of mortgage debt, and household size are considered. In order to facilitate meaningful comparisons, based upon our previous work with the AHS and the literature, the data is disaggregated along three additional dimensions. Specifically, information is provided by income (relative to median income), owner versus renters, and for recent movers into the area (approximately 6,446 of which are Hispanic households) who it might be assumed made a recent "active" housing choice.[10]

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6 The majority of these MSAs are also re-sampled periodically.

7 The MSAs included in the sample are: for 1998 – Baltimore MD, Birmingham AL, Boston MA, Cincinnati OH, Houston TX, Minneapolis MN, Norfolk/Newport News VA, Oakland CA, Providence RI, Rochester NY, Salt Lake City UT, San Francisco CA, San Jose CA, Tampa FL, and Washington DC; for 2002 – Anaheim-Santa Ana CA, Buffalo NY, Charlotte NC-SC, Columbus OH, Dallas TX, Fort Worth-Arlington TX, Kansas City MO-KS, Miami-Ft. Lauderdale FL, Milwaukee WI, Phoenix AZ, Portland OR-WA, Riverside-San Bernardino-Ontario CA, San Diego CA. For 2004, the MSA's include Memphis, Pittsburgh, Atlanta, Hartford, New Orleans, San Antonio, Cleveland, Indianapolis Denver, Oklahoma City, St. Louis, Sacramento, and Seattle-Everett.

8 Because of the large numbers of white households in the sample assembled in this way, a random sub-sample of these households was selected to make the analysis more tractable.

9 The determinants of these rankings are explored later in the paper.

10 The definition of low-income was based upon authors' prior work at 80 percent or less of the median income. Results are not sensitive to moderate changes in this definition. Recent movers engaged in a move within the previous 12 months prior to the date of their interview.

Table 1.a

Housing Characteristics by Household Type[a]

Household Type: All Families	Number of Obs.	Mean Structural Quality	Mean Neighbor-hood Quality	% with Inadequate Housing	% Rank Neighbor-hood Poor	% Rank Structure Poor	% of Each H'hold Type that Own	Mean House Value or Annual Rent	Mean Monthly Housing Cost[b]
White High Income Owners	15764	8.46	8.22	0.53%	1.18%	0.40%	85.98%	$ 221,475	$ 1,253
Black High Income Owners	4302	8.43	7.99	1.19%	2.00%	0.67%	74.31%	$ 142,664	$ 1,038
Hispanic High Income Owners	5308	8.48	8.16	0.87%	1.45%	0.60%	74.49%	$ 204,248	$ 1,289
White Low Income Owners	9856	8.44	8.14	1.13%	2.00%	0.89%	60.84%	$ 147,289	$ 683
Black Low Income Owners	4781	8.31	7.71	2.11%	3.62%	1.40%	35.55%	$ 95,055	$ 654
Hispanic Low Income Owners	4121	8.36	8.02	2.11%	2.74%	1.14%	38.01%	$ 128,681	$ 774
White High Income Renters	2571	7.46	7.55	1.40%	2.84%	2.18%	na	$ 865	$ 972
Black High Income Renters	1487	7.41	7.33	2.69%	5.31%	3.50%	na	$ 694	$ 806
Hispanic High Income Renters	1818	7.49	7.54	2.75%	3.74%	2.81%	na	$ 807	$ 906
White Low Income Renters	6343	7.56	7.45	2.73%	4.41%	2.73%	na	$ 606	$ 663
Black Low Income Renters	8666	7.30	6.98	3.83%	8.55%	5.27%	na	$ 496	$ 547
Hispanic Low Income Renters	6721	7.39	7.34	3.33%	6.00%	4.48%	na	$ 592	$ 647
Total Families	**71738**								
Recent Movers									
White High Income Owners	2548	8.52	8.31	0.55%	0.90%	0.24%	64.46%	$ 240,004	$ 1,504
Black High Income Owners	803	8.75	8.44	1.12%	1.37%	0.50%	52.76%	$ 172,381	$ 1,221
Hispanic High Income Owners	1151	8.61	8.36	0.61%	1.04%	0.52%	54.32%	$ 211,303	$ 1,451
White Low Income Owners	1156	8.27	8.00	1.38%	2.34%	0.78%	26.55%	$ 148,350	$ 893
Black Low Income Owners	635	8.54	8.12	1.10%	1.89%	0.94%	12.68%	$ 107,547	$ 804
Hispanic Low Income Owners	784	8.47	8.10	2.68%	1.66%	0.77%	18.12%	$ 120,694	$ 896
White High Income Renters	1405	7.51	7.53	1.85%	2.42%	1.71%	na	$ 892	$ 995
Black High Income Renters	719	7.55	7.42	1.95%	5.98%	3.06%	na	$ 720	$ 830
Hispanic High Income Renters	968	7.53	7.59	2.58%	3.20%	2.48%	na	$ 840	$ 934
White Low Income Renters	3198	7.48	7.33	2.41%	4.38%	2.53%	na	$ 632	$ 688
Black Low Income Renters	4372	7.32	6.99	3.34%	8.60%	4.85%	na	$ 521	$ 571
Hispanic Low Income Renters	3543	7.44	7.38	2.71%	5.84%	4.06%	na	$ 601	$ 662
Total Recent Movers	**21282**								

[a] Low Income households are defined as 80% or less of the Median Income for the SMSA in which the household resides.

[b] Housing cost includes the cost of all utilities, property taxes, insurance, rent, all mortgage payments, and other fees associated with occupancy
For additional detail see the definition in Table 2 of this paper

Table 1.b

Housing Characteristics by Household Type

Household Type: All Families	Number of Obs.	Mean Housing Cost to Income Ratio	% of H'holds Spending > 30% of Inc. on Housing	Mean Amount of Debt on Owned Units	Mean Unit Size in Square Feet	Mean Household Size	Mean Unit Sq.Ft. to Household Size	Mean Housing Cost[b] to Unit Sq. Ft.
White High Income Owners	15764	16.30%	8.16%	$ 90,404	2338	2.95	948	$ 0.64
Black High Income Owners	4302	16.12%	7.88%	$ 69,442	2262	3.15	901	$ 0.72
Hispanic High Income Owners	5308	18.07%	11.27%	$ 93,160	2041	3.63	687	$ 0.75
White Low Income Owners	9856	32.98%	40.44%	$ 35,509	1806	1.98	1130	$ 0.49
Black Low Income Owners	4781	34.92%	46.29%	$ 35,164	1820	2.35	1062	$ 0.68
Hispanic Low Income Owners	4121	36.20%	49.36%	$ 45,871	1558	3.17	681	$ 0.63
White High Income Renters	2571	15.82%	3.19%	na	1262	2.40	635	$ 0.93
Black High Income Renters	1487	14.98%	2.56%	na	1232	2.93	522	$ 1.02
Hispanic High Income Renters	1818	15.38%	2.42%	na	1157	3.51	413	$ 0.95
White Low Income Renters	6343	39.62%	51.73%	na	955	1.81	640	$ 0.91
Black Low Income Renters	8666	40.51%	52.90%	na	998	2.32	574	$ 0.92
Hispanic Low Income Renters	6721	39.80%	56.10%	na	902	3.07	391	$ 0.91
Total Families	**71738**							
Recent Movers								
White High Income Owners	2548	19.38%	12.72%	$ 131,055	2395	2.88	969	$ 0.75
Black High Income Owners	803	18.59%	11.96%	$ 105,751	2348	3.17	929	$ 0.70
Hispanic High Income Owners	1151	21.04%	17.38%	$ 122,094	2046	3.57	689	$ 0.83
White Low Income Owners	1156	36.44%	49.67%	$ 64,821	1775	2.18	1049	$ 0.63
Black Low Income Owners	635	34.83%	53.21%	$ 63,428	1773	2.66	927	$ 0.72
Hispanic Low Income Owners	784	38.27%	58.19%	$ 65,687	1519	3.51	563	$ 0.74
White High Income Renters	1405	16.25%	3.84%	na	1238	2.38	612	$ 0.93
Black High Income Renters	719	15.44%	3.06%	na	1231	2.89	524	$ 0.95
Hispanic High Income Renters	968	16.10%	3.31%	na	1165	3.28	440	$ 0.94
White Low Income Renters	3198	40.16%	53.49%	na	941	1.89	617	$ 0.91
Black Low Income Renters	4372	41.24%	54.49%	na	1003	2.39	567	$ 0.89
Hispanic Low Income Renters	3543	40.38%	57.41%	na	906	3.03	392	$ 0.91
Total Recent Movers	**21282**							

[a] Low Income households are defined as 80% or less of the Median Income for the SMSA in which the household resides.

[b] Housing cost includes the cost of all utilities, property taxes, insurance, rent, all mortgage payments, and other fees associated with occupancy. For additional detail see the definition in Table 2 of this paper

There are several interesting points that appear in Table 1 above. Irrespective of either minority status or level of income, the primary differential in both perceived neighborhood quality and housing quality stems from ownership status. Renters clearly perceive their situation as worse. As shown for the quality dimensions of structure and neighborhood in Table 1a, the difference between renters and owners appears particularly important for the structural quality of the housing unit. The largest differentials between renters and owners in neighborhood quality and structural quality occur for low-income households. Some of the largest differentials occur for low-income Hispanic households. For low-income Hispanics, comparing owners to renters, neighborhood quality ranges from 8.02 (owner) to 7.34 (renter). For structural quality the difference is 8.36 to 7.39. Given this structural quality differential, it is not surprising that rental units were classified as "inadequate" more often than were owner-occupied units.[11] In particular, for low-income renters, 2.73 percent of whites, 3.83 percent of blacks and 3.33 percent of Hispanics were categorized as living in inadequate housing. For low-income owners these percentages are 1.13 percent, 2.11 percent, and 2.11 percent respectively.

Given these positive factors associated with ownership, it is important to note that Hispanics and African-American households have a similar likelihood of owning which is substantially lower than their white counterparts, and this difference is much greater for lower-income individuals. For the full sample, among low-income households, only 35.6 percent of blacks and 38.0 percent of Hispanics own as compared to 60.8 percent of white households. For higher-income households these probabilities are 74.3 percent, 74.5 percent and 86.0 percent respectively.

In addition to whites' higher likelihood of ownership, it is important to note that both house value and rental cost for Hispanic and African-American households are lower than for white households. However, for Hispanics homeowners' monthly housing cost is higher than for whites, even though their house value is lower.[12] This observation is particularly true for low-income owners. Specifically, for the full sample, low-income Hispanic families' average monthly housing cost is $774, whereas low-income whites spend an average of $683. Conversely, comparable average home values are $128,681 for Hispanics and $147,298 for whites. Note that this relationship holds for recent movers, but the housing cost differential is not as great. These facts suggest some significant differentials in financing may exist. The amount of mortgage debt could be higher and/or the terms, points and fees, etc. associated with the loans obtained by these households could be less favorable. Developing this point further, low-income Hispanic owners have relatively high mortgage debt on owned units as compared to other households. For the full sample, low-income Hispanic owners average over $10,000 more in debt collateralized by their homes relative to comparable white households ($45,871 to $35,509).[13] However, in this regard Hispanic recent movers do better, with little difference in debt levels compared to whites. Is this higher debt among all Hispanic owners

[11] A variety of specific structural deficiencies are considered when designating a unit as being "moderately" or "severely" inadequate. For details of the way in which this categorization is made see the definition of the variable ZADEQ in version 1.77 of the AHS codebook.

[12] As defined subsequently in Table 2, monthly housing costs include the cost of electricity, gas, and other heating fuels, water and sewer, real estate taxes, property insurance, condominium fees, mobile home park fees, homeownership association fees, rent, mortgage and home equity loan payments, other mortgage fees paid periodically, and routine maintenance.

[13] These debt totals represent loan amounts at origination for all types of mortgage lending (i.e., 1st mortgages, junior mortgages and home equity loans).

related to differentials in the amount borrowed using home financing related to home equity loans and junior mortgages, less financial expertise in obtaining such loans, etc.? Whatever the reason, there is a suggested negative dynamic facing longer-term Hispanic homeowners in this sample.

Considering another factor that might be expected to influence housing satisfaction, Hispanic households appear to be much more crowded than other households, and in addition, like black low-income homeowners, Hispanic low-income homeowners pay significantly more in monthly housing cost per square foot than their white counterparts. For low-income households in the full sample, Hispanic homeowners average 681 square feet per person. Comparable blacks and whites average 1,062 and 1,130 feet per person respectively. For renters, the square feet per person are 391, 574, and 640 respectively. For recent movers these differences are very similar. Interestingly, in several instances average square feet per person is higher for low-income owners than for high-income owners. It is likely the case that there are a higher proportion of retirees in these samples who are still living in owner-occupied homes that they bought many years earlier when their families were larger and/or their incomes higher. Regarding monthly mortgage cost per square foot, for the full sample, low-income Hispanic and black owners pay $0.63 and $0.68 per square foot, whereas whites pay only $0.49. For recent movers the comparable numbers are $0.74, $0.72, and $0.63 respectively.

Generalizations of data are, of course, difficult to do. However, overall the results in Table 1 do suggest that low-income black households are doing somewhat worse in terms of housing outcomes than Hispanics. This statement is based on the observation that across the board African-American households have by far the lowest housing values and annual rents than other race/ethnicities and slightly lower homeownership rates. In addition, for the full sample, all black households have slightly lower rankings of structural and neighborhood quality. Based on these same criteria, both African-American and Hispanic households appear to have less favorable housing outcomes than white households.

As noted, because housing tenure and value/rent influence the quality of housing services a household receives, in the next section we analyze the likelihood of homeownership for Hispanic households and their pattern of housing values/rents as compared to other racial/ethnic groups. The regression analysis allows consideration of the significance and magnitude of being in a particular racial/ethnic group controlling for other socio-economic factors that might be expected to influence these outcomes. In addition, the analysis will allow us to see how various socio-economic control variables differ across these groups and therefore affect their housing outcomes.

3. The Likelihood of Homeownership and Differences in Housing Values and Rents

Our estimation approach to the likelihood of homeownership follows the original work of Boehm (1993) and the development of the logit approach contained in the exhaustive set of references in, for example, Boehm and Schlottmann (2004) and Retsinas and Belsky (2002). The likelihood of a household being an owner versus a renter is hypothesized a function of a standard set of socio-economic variables including income, savings, minority status, and dummy variables for the year in which the housing choice was made and the market in which the unit is located.[14] For the AHS surveys in 2002 and 2004, an additional variable is available, namely the time spent living in the U.S. The complete set of variables included in the analysis is shown in Table 2 below.[15]

We utilize the entire sample and a sample restricted to recent movers. These two approaches bring a different perspective through which to evaluate the forces shaping the housing outcomes of households in the sample. Specifically, the full sample shows us how everyone is housed at a given point in time. This allows us to observe differences in housing circumstances across income and racial groups that have come about as a result of decades of evolution in the housing market conditions experienced by our households. Alternatively, a recent mover sample allows us to observe differential outcomes for households who have recently, actively made adjustments in their housing consumption based on their current socio-economic characteristics, and the current housing and mortgage market conditions that exist. Each of these analyses will be presented in turn below.

Entire Sample

Three separate sets of regression results are shown (pair-wise) in the six columns of Table 3. These include separate analyses for the probability of ownership versus renting, the determinants of house value stratified by low-income and high-income households, and the determinants of monthly housing cost stratified by high- and low-income renter households. The specification of the probability of homeownership, house value for owners, and monthly gross rental payment for renters are consistent with the general specifications in the literature.

[14] Because the AHS follows housing units (rather than households) over time, the definition of homeownership cannot be used to determine housing transitions or the number of homes the household has owned or rented. However, as noted above, given the large differences illustrated in Table 1, our intent is to explore the extent to which such large differentials appear within a regression analysis of homeownership.

[15] Note that some selected variables are available only for selected sub-samples. For example, the concept of "owned prior to the move" is available only for recent movers.

Table 2
Variable Names and Definitions

Variable Name	Variable Definition
Own Home	1 = if homeowner; 0 = renter
Current House Value	Current House Value in thousand dollar units
Monthly Housing Cost	Included are the costs of electricity, gas, other heating fuels, water and sewer, real estate taxes, property insurance, condominium fees, mobile home park fees, homeownership association fees, rent, mortgage and home equity loan payments, other mortgage fees paid periodically, and routine maintenance
Monthly Rent	Monthly rent in dollars
Rent Subsidy	1 = if rent is subsidized by the government; 0 = otherwise
Total Mort. Payments	Total dollar amount of mortgage payments including up to 4 mortgages and/or 3 home equity lines of credit
Unit - Condominium	1 = if housing unit is a condominium; 0 = otherwise
Unit - Owned Manf.	1 = if unit is manufactured housing; 0 = otherwise
Not High School Grad.	1 = did not graduate from high school; 0 = otherwise
High School Grad.	1 = high school graduate; 0 = otherwise
Post High School	1 = Some education after high school, but not a college graduate; 0 = otherwise
College Graduate	1 = College graduate or more; 0 = otherwise
Married	1 = Married couple or partner present; 0 = otherwise
Single Female	1 = Household head a single female; 0 = otherwise
Single Male	1 = Household head a single male; 0 = otherwise
Family Size	Number of persons in household
Hosuehold Income	Household income in $10,000 units
Age 24 or less	1 = Age of household head less that 24 years of age; 0 = otherwise
Age 25 - 44	1 = Age of household head 24 to 44 years of age; 0 = otherwise
Age 45 - 61	1 = Age of household head 45 to 61 years of age; 0 = otherwise
Age 62 or more	1 = Age of household head 62 years of age or greater; 0 = otherwise
Savings 25k or more	1 = Household has $25,000 in savings or more; 0 = otherwise
White[a,b]	1 = Household's race designated to be white; 0 = otherwise
Black[a, b]	1 = Household's race designated to be black; 0 = otherwise
White Hispanic[a, b]	1 = Household identified as Hispanic and white; 0 = otherwise
Non-White Hispanic[a, b]	1 = Household identified as Hispanic and non-white; 0 = otherwise
Years in Residence	Years family resided at their current location
First-time Owner	1 = First home owned by the household; 0 =otherwise
Native Born American[c]	1 = Household head or partner a US citizen and lived in US their entire life; 0 = otherwise
Less than 5 Years in Us[c]	1 = Household head and partner lived in U.S. less than 5 years; 0 = otherwise
5 - 12 Years in Us[c]	1 = Household head and partner lived in U.S. 5 to 12 years; 0 = otherwise
13 - 22 Years in Us[c]	1 = Household head and partner lived in U.S. 13 to 22 years; 0 = otherwise
23 or more Years in Us[c]	1 = Household head and partner lived in U.S. 23 years or more; 0 = otherwise
Owned Prior to Move[d]	1 = Household head was a homeowner prior to moving into current housing unit; 0 = otherwise
Metropolitan Areas	Households in the sample came from 41 SMSAs in 3 interview periods (1998, 2002, 2004) discreate variables indicating the SMSA in which each housing unit was located were included in regression analyses. For a complete list of the SMSAs included in the analysis, see Appendix A

[a] Because the American Housing Survey designates race and Hispanic ethnicity separately both white and non-white individuals can identify themselves as Hispanic. This split is represented in the categorization of Hispanics above.

[b] Race of the spouse (or partner) was considered when identifying the race of the household. For mixed race couples, if either the head or spouse was Hispanic, the household was consider Hispanic, for other couples where one partner was black the household was considered to be black.

[c] Only available for 2002 and 2004 sample years

[d] Only available for recent mover sample

Table 3
Sample: All Households in All Years
Regression Coefficients and Significance[a,b,c]

Variable Names	Low Income, P(Own)		High Income, P(Own)		Low Income Owner, House Value[d]		High Income Owner, House Value[d]		Low Income Renter, Rent		High Income Renter, Rent	
Intercept	-0.90365	*	1.15341	*	265.1007	*	304.5289	*	733.2642	*	1150.5191	*
Rent Subsidy	na		na		na		na		-44.6759	*	-77.6438	**
Total Mort. Payments	na		na		na		na		na		na	
Unit - Condominium	na		na		na		na		na		na	
Unit - Owned Manf.	na		na		na		na		na		na	
High School Grad.	0.17628	*	0.30287	*	11.4106	*	12.6865	*	33.2714	*	98.1926	*
Post High School	0.27570	*	0.47035	*	21.0954	*	24.4424	*	69.8501	*	150.8448	*
College Graduate	0.40019	*	0.68698	*	59.6001	*	70.7723	*	121.7508	*	243.9352	*
Single Female	-0.78472	*	-1.08672	*	-19.9748	*	-30.9336	*	12.8566	*	-15.4230	
Single Male	-0.95726	*	-1.42484	*	-25.9315	*	-23.9932	*	-8.0430		-42.3257	*
Family Size	0.07337	*	0.07926	*	2.5617	*	3.8244	*	29.5515	*	31.2130	*
Hosuehold Income	0.36443	*	0.02682	*	1.3073	**	3.4340	*	32.2427	*	1.7973	*
Age 24 or less	-1.70622	*	-1.62107	*	34.5308	*	10.4148		32.2511	*	-25.3692	
Age 25 - 44	-0.91547	*	-0.87961	*	0.1594		-7.2805	*	-2.8043		-30.4830	*
Age 62 or more	1.19256	*	0.84593	*	7.8439	*	14.4785	*	23.5471	*	89.0619	*
Savings 25k or more	1.16893	*	0.69443	*	27.9968	*	26.3942	*	136.9097	*	11.5115	*
Black	-0.76399	*	-0.64752	*	-20.1132	*	-35.0772	*	-59.2936	*	-109.3235	*
White Hispanic	-0.62149	*	-0.46376	*	-19.7677	*	-23.7147	*	-63.6912	*	-80.3219	*
Non-White Hispanic	-0.86910	*	-0.67916	*	-28.8447	*	-45.0185	*	-72.6176	*	-147.4588	*
Years in Residence	na		na		0.1543	**	-0.8198	*	-5.0728	*	-13.6543	*
First-time Owner	na		na		25.2690	*	58.3705	*	na		na	
R^2	0.21927	[e]	0.15975	[e]	0.3267		0.3723		0.31530		0.39370	
Number of Obs.	40,488		31,250		18,758		25,374		21,730		5,876	

[a] The P(Own) Equations were estimated using Logit Analysis

[b] *, **, and *** represent significance at the 1%, 5%, and 10% levels respectively

[c] All regressions include discreate variables indicating in which of 41 SMSAs the housing units were located (over the 3 year time period: 1998, 2002, and 2004). For a complete list of these SMSAs see Appendix A.

[d] House Value in thousand dollar units

[e] For the logit equations the R^2 is computed as 1-[unrestricted ln likelihood function / restricted ln likelihood function]

The results shown in Table 3 are largely consistent with the literature. However, several observations are of particular interest. First, the primary reason for estimating these regressions is to see if the substantial differences across racial/income groups in Table 1 would be present once we controlled for other factors that influence the choices of ownership versus rental tenure and, conditionally upon that choice, for owners their house value and for renters their dollar amount of rent. Indeed, both African-American households and Hispanic households have substantially different outcomes than whites controlling for the MSA in which these households reside, their age profile, income, education, etc. They are less likely to own, and owners and renters exhibit lower levels of housing values and annual rents, respectively. This suggests a systematic problem for minority households. Regarding Hispanics, because the AHS asks questions about race separate from Hispanic ethnicity, it allows us a unique opportunity to compare results for Hispanic households that have different racial characteristics. Consequently, Hispanic households were split into two distinct groups: white and non-white Hispanics.[16] Interestingly, non-white Hispanics have less desirable housing outcomes than white Hispanics. As shown in Table 3, low-income non-white Hispanics have the lowest likelihood of both homeownership and housing value. While it is not clear whether this result is suggestive of discrimination, or rather the result of correlation with some omitted variable, it is the first time we have seen this difference empirically demonstrated and clearly merits additional future investigation.

Second, the negative impact of a lack of savings as it relates to required down payment constraints and the probability of homeownership is demonstrated in Table 3. While the discrete variable indicating whether a household has $25,000 in savings or more is an arbitrary way to categorize household's savings, it does identify those people who generally have exhibited a much higher propensity to save.[17] As the literature suggests, the ability to accumulate wealth is a critical factor in the ability to achieve homeownership. As discussed by Golding (2002), U.S. Census Bureau estimates suggest that reducing even $1,000 in origination costs could assist an additional 116,000 renters in attaining homeownership. The difficulty of lower-income households in overcoming increases in down payment requirements should not be understated.

These households have difficulty accumulating savings in order to purchase a home as it relates to "upfront" fees. For example, Di (2001) discusses trends in wealth that include data for renters with lower incomes. These data, from the Survey of Consumer Finances, clearly suggest that what might appear to be modest changes in fixed payments associated with a home purchase are difficult for these households to overcome. For example, among Hispanic renters, average savings (or wealth)

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[16] This designation was based on householder's categorization for single individuals. For married couples if one individual was white and the other Hispanic or African-American the household was deemed Hispanic or African-American respectively. For the case in which a householder and spouse were both Hispanic, if either the spouse or the householder was classified as a non-white Hispanic the household designation to be non-white Hispanic. If one was Hispanic and the other African-American the household was classified as African-American. For the full sample, approximately 64 percent of low-income Hispanics are reported to be white and 36 percent are non-white. Among high-income Hispanics, 71 percent are white and 29 percent are non-white. For the recent movers, 59 percent of low-income Hispanics are white and 41 percent are non-white. For their high-income counterparts the percentages are 62 percent and 38 percent, respectively.

[17] This definition of savings is based upon the specific question in the AHS survey.

was $2,000. This figure for savings falls for African-American renters to $1,661.[18] Quercia, McCarthy, and Wachter's (2002) excellent formal analysis and empirical estimates reinforce these statements.[19]

Third, the positive impact of rent subsidies in lowering rents for low-income households is seen in Table 3. Given the low levels of household savings among lower-income households, discussed above, programs such as these have the potential to positively impact savings, and/or expenditure on other necessities, by reducing household's required monthly outlays for rental payments.

Magnitude of Effects

In order to more fully explore the results above, Tables 4 through 6 provide evidence on the variable means and the impact of estimated coefficients on several dimensions of housing choice: the likelihood of homeownership, house value for owners, and rental payment for renters. In Table 4, probabilities of ownership are calculated at the sample means for all variables except the specific variable listed, which is evaluated at the mean for each minority group and whites, respectively.[20,21] The primary result of note is the magnitude of negative impacts of minority status on the likelihood of homeownership. The negative impact of race/ethnicity itself on the likelihood of homeownership is quite similar between non-white Hispanic households and black households: -40.53 percent and -39.22 percent (panel A), respectively, for low-income households, and -10.55 and -9.66 (panel B), respectively, for high-income households. Obviously, the effects of race are dramatically smaller for higher-income families, but in either case they dominate the impacts of other factors.

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[18] See Figure 10 in Di (2001).

[19] Not surprisingly, savings also impacts the value of the house homeowners can afford to purchase and, in addition, the "quality" [as measured by cost] of rental units.

[20] These percentages were calculated using coefficient estimates from a logit model of homeownership. For example, in the case of non-white Hispanic households, the likelihood of homeownership was calculated with all variables included in the regression set at the overall sample mean except those for the household's race (i.e., white black, white Hispanic, non-white Hispanic). In the case of race, this variable was first set at 1 for a particular minority group (e.g., non-white Hispanics) and 0 for all other racial groups. Subsequently, the probability was recalculated with all the race variables set at 0 which represents white households who are the excluded group in the analysis. The difference in these two probability calculations represents the impact of being in the particular minority group as compared to a white family on the likelihood of homeownership. Similar calculations and interpretations can be made for other variables.

[21] Note that for the Hispanic households rather than using the proportions of white or non-white Hispanics, as presented in the tables, a value of 1 was used to denote each category to make the magnitudes that were calculated comparable to the calculation for Blacks without having to combine the non-white and white Hispanics into a single group.

Table 4
Sample: All Households, All Years
Variable Means and Impact of Variables on the Likelihood of Homeownership

A: Low Income Households

Variable Names	Means			$Pr(Own)_{Black}$ minus $Pr(Own)_{White}$ [a,b]	$Pr(Own)_{Hisp.}$ minus $Pr(Own)_{White}$ [a,b]
	White	Black	Hispanic		
Own Home	0.60843	0.35554	0.38010	na	na
Intercept	na	na	na	na	na
High School Grad.	0.29897	0.29910	0.25835	0.001%	-0.390%
Post High School	0.30551	0.29903	0.20679	-0.098%	-1.482%
College Graduate	0.22483	0.11423	0.09334	-2.413%	-2.868%
Single Female	0.43706	0.58065	0.30788	-6.110%	5.548%
Single Male	0.23662	0.22392	0.19452	0.662%	2.197%
Family Size	1.91216	2.33331	3.10764	1.681%	4.783%
Hosuehold Income	2.44268	2.05510	2.42986	-7.677%	-0.256%
Age 24 or less	0.06803	0.08136	0.09408	-1.240%	-2.421%
Age 25 - 44	0.29977	0.43861	0.52518	-6.943%	-11.229%
Age 62 or more	0.39330	0.20406	0.15505	-12.322%	-15.469%
Savings 25k or more	0.08877	0.01153	0.01817	-4.922%	-4.501%
Black Household	0.00000	1.00000	0.00000	-40.529%	0.000%
White Hispanic Hshld	0.00000	0.00000	0.63752	0.000%	-28.501%
Dark Hispanic Hshld	0.00000	0.00000	0.36248	0.000%	-39.218%
All Metropolitan Areas				8.514%	-0.200%
Number of Obs.	16,199	13,447	10,842		

B: High Income Households

Variable Names	Means			$Pr(Own)_{Black}$ minus $Pr(Own)_{White}$ [a,b]	$Pr(Own)_{Hisp.}$ minus $Pr(Own)_{White}$ [a,b]
	White	Black	Hispanic		
Own Home	0.85978	0.74313	0.74488	na	na
Intercept	na	na	na	na	na
High School Grad.	0.19302	0.21247	0.21765	0.083%	0.106%
Post High School	0.28890	0.34807	0.31504	0.394%	0.175%
College Graduate	0.46905	0.33495	0.29820	-1.315%	-1.690%
Single Female	0.12893	0.24598	0.11563	-1.840%	0.199%
Single Male	0.14475	0.14528	0.13261	-0.010%	0.241%
Family Size	2.87118	3.09691	3.60132	0.257%	0.821%
Hosuehold Income	10.48242	8.74979	9.62220	-0.668%	-0.329%
Age 24 or less	0.01445	0.02505	0.02722	-0.242%	-0.292%
Age 25 - 44	0.44816	0.48886	0.57732	-0.488%	-1.592%
Age 62 or more	0.12621	0.09121	0.06582	-0.418%	-0.727%
Savings 25k or more	0.02062	0.00432	0.00603	-0.160%	-0.143%
Black	0.00000	1.00000	0.00000	-10.548%	0.000%
White Hispanic	0.00000	0.00000	0.70601	0.000%	-6.161%
Non-White Hispanic	0.00000	0.00000	0.29399	0.000%	-9.661%
All Metropolitan Areas				0.671%	-1.781%
Number of Obs.	18,335	5,789	7,126		

[a] Probabilities are calculated at the means for the entire sample (all Whites, Blacks, and Hispanics) except for the variable in question which is evaluated at the mean for the denoted minority group and Whites respectively

[b] $Pr(Own) = 1 / (1 – e^{-X\beta})$; where $X\beta$ = a vector representing the sum of the product individual independent variable values (Xs) and estimated coefficients (βs). Pr(Own)minority = the probability of owning given all the variables in the regression are evaluated at the overall sample mean except the particular variable in question which is evaluated at the mean for the minority households. Pr(Own)white = the probability of owning given all the variables in the regression are evaluated at the overall sample mean except the particular variable in question which is evaluated at the mean for the white households. Pr(Own)minority – Pr(Own)white is expressed as a percentage of Pr(Own), the predicted average likelihood of ownership calculated at the mean for the mean for the overall sample. Thus, if for a given variable, xj, Pr(Own)minority = 0.40 and Pr(Own) white = 0.45 and Pr(Own) = 0.42 then the calculation for variable xj is [(0.40 – 0.45) /0.42] x 100 = 11.9 %

Table 5 presents similar results for the house value models for homeowners. A number of differences in the characteristics of Hispanics and blacks lead to substantial reductions in the value of the housing they occupy.[22] For example, particularly in the low income group (Table 5.a) lower levels of educational attainment for Hispanics and African-Americans are correlated with lower valued owned homes. Specifically, for Hispanic households their house values are $8523.22 ($590.86 + $1,599.66 + $6,332.70) lower than those of low-income white owners. For black families the difference is $4,542.20 ($502.57 + $118.97 + 3,920.66). Other, interesting observations can be found by merely looking at the differences in sample means. For example, it is noteworthy that for white households a substantially higher proportion of the families in the sample have heads that are greater than 62 years old, suggesting they are in the low-income sub-sample because of retirement. As one might expect, their house values are much higher than low-income working-age households. Again, focusing on the low-income group, those with substantial saving have higher house values as one might expect. The largest affects on house value for both high and low-income families, controlling for as many socio-economic characteristics as possible, is race. For example, low-income black households average house value is $20,113.18 lower than whites. For white and non-white Hispanics this figure is $19,767.67 and $28,848.68 respectively. For high-income households these differentials are comparable (Table 5.b). This suggests that there are substantial differences in the current value of houses purchased by minorities even after our sample is stratified by income, and controls are included in the regression for the market in which the dwelling was located, the time when the value was observed, and the major socio-economic factors thought to influence the value of a family's home purchase.

For renters, Table 6 shows that significant household differences by minority status exist in the basic rents paid by households in the sample. Minority households have substantially lower rents than white households. Also, non-white Hispanics have slightly lower rent than either their high- or low-income black counterparts. Specifically, the differential in annual rental cost with white households is $871 for low-income non-white Hispanics and $1,770 for high-income Hispanics. For African-American households, these differences are $712 and $1,312 respectively.

Collectively, the results in Tables 4 through 6 demonstrate the importance of racial differences per se (controlling for other socio-economic differences and differences in the markets in which the choices were made) as determinants of house value and rental expenditures for renters. They reinforce the arguments made in the discussion of mean characteristics above (Table 1), in which the mean house values for owners or rental payments were always the highest for whites regardless of whether they were high- or low-income, and African-American household's house values and rental payments are substantially lower than those of both their white and Hispanic counterparts.

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[22] Because the regression coefficients in this analysis were estimated using a sample that pools households of all three ethnic/racial groups. The implicit assumption being made is that the coefficients corresponding to the various independent variables (e.g., such as education income age etc.) have the same impact across all ethnic groups. This may not be the case. The assumption could be relaxed by stratifying the samples into white black and Hispanic sub-samples. Given that the primary purpose of estimating these equations was to demonstrate that significant racial differences still exist when controlling for various other characteristics that might influence the demand for housing services, we chose not to run separate regressions for each racial group. However, this type of stratification is employed in the second part of the paper in which the factors affecting households' perceptions of the structural quality of their dwelling and the neighborhood in which it is located are investigated.

Table 5.a
Sample: All Households in All Years
Variable Means and Impacts of Variables on House Value and Annual Housing Cost
Low Income - Homeowners

Variable Names	Means			House Value in Dollars (Black Mean - White Mean) x Coefficient[a]	House Value in Dollars (Hisp. Mean - White Mean) x Coefficient[a]
	White	Black	Hispanic		
Current House Value	147.28920	95.05469	128.68114	na	na
Monthly Housing Cost	683.4819	653.5064	773.6894	na	na
Total Mort. Payments	341.46408	363.21125	463.47852	na	na
Unit - Condominium	0.08127	0.03451	0.07450	na	na
Unit - Owned Manf.	0.07599	0.01360	0.07037	na	na
High School Grad.	0.31240	0.26835	0.26062	$ (502.57)	$ (590.86)
Post High School	0.29616	0.29052	0.22033	$ (118.97)	$ (1,599.66)
College Graduate	0.21763	0.15185	0.11138	$ (3,920.66)	$ (6,332.70)
Single Female	0.39945	0.50617	0.25285	$ (2,131.67)	$ 2,928.32
Single Male	0.17644	0.18113	0.13079	$ (121.69)	$ 1,183.70
Family Size	1.97524	2.35411	3.16671	$ 970.56	$ 3,052.22
Hosuehold Income	2.54560	2.41994	2.71158	$ (164.27)	$ 217.00
Age 24 or less	0.02232	0.02426	0.02766	$ 67.03	$ 184.45
Age 25 - 44	0.21652	0.29283	0.42344	$ 12.16	$ 32.98
Age 62 or more	0.51228	0.36101	0.28076	$ (1,186.50)	$ (1,816.02)
Savings 25k or more	0.12226	0.02384	0.03688	$ (2,755.33)	$ (2,390.26)
Years in Residence	18.54799	16.65175	12.19655	$ (292.50)	$ (979.73)
First-time Owner	0.55875	0.27798	0.35598	$ (7,094.80)	$ (5,123.66)
Black Household	0.00000	1.00000	0.00000	$ (20,113.18)	$ - [b]
White Hispanic Hshld	0.00000	0.00000	0.71099	$ -	$ (19,767.67) [b]
Dark Hispanic Hshld	0.00000	0.00000	0.28901	$ -	$ (28,844.68) [b]
All Metropolitan Areas	na	na	na	$ (14,930.12)	$ 15,042.99
Number of Obs.	9856	4781	4121		

[a] Regression coefficients are presented in Table 3. This calculation for a given variable, x_j is $(x_{jm} - x_{jw}) \times \beta_j$; where xjm = the minority mean for variable j, x_{jw} = the white mean for variable j, βj = the regression coefficient for variable j

[b] Effect calculate based on a value of 1 for the racial category in question and 0 for all other alternatives

Table 5.b
Sample: All Households in All Years
Variable Means and Impacts of Variables on House Value and Annual Housing Cost
High Income - Homeowners

Variable Names	Means			House Value in Dollars (Black Mean - White Mean) x Coefficient[a]	House Value in Dollars (Hisp. Mean - White Mean) x Coefficient[a]
	White	Black	Hispanic		
Current House Value	221.4752	142.6643	204.2477	na	na
Monthly Housing Cost	1252.61	1037.63	1289.08	na	na
Total Mort. Payments	904.06236	726.67911	949.99642	na	na
Unit - Condominium	0.04796	0.03231	0.05350	na	na
Unit - Owned Manf.	0.01662	0.00604	0.01771	na	na
High School Grad.	0.19075	0.2101	0.2087	$ 245.91	$ 228.24
Post High School	0.28749	0.3387	0.3244	$ 1,251.18	$ 902.55
College Graduate	0.47437	0.3491	0.3229	$ (8,862.96)	$ (10,719.40)
Single Female	0.11361	0.2194	0.0921	$ (3,273.38)	$ 664.71
Single Male	0.10962	0.1172	0.0820	$ (180.86)	$ 663.77
Family Size	2.94722	3.1530	3.6336	$ 786.80	$ 2,624.89
Hosuehold Income	10.79164	8.7928	10.1724	$ (6,864.04)	$ (2,126.32)
Age 24 or less	0.00907	0.0149	0.0128	$ 60.46	$ 38.95
Age 25 - 44	0.41994	0.4421	0.5373	$ (161.45)	$ (854.43)
Age 62 or more	0.13759	0.1102	0.0829	$ (396.87)	$ (791.95)
Savings 25k or more	0.02220	0.0049	0.0073	$ (457.17)	$ (392.09)
Years in Residence	11.02582	10.6446	8.6486	$ 312.52	$ 1,948.71
First-time Owner	0.64660	0.4000	0.5049	$ (14,391.44)	$ (8,271.19)
Black	0.00000	1.0000	0.0000	$ (35,077.24)	na [b]
White Hispanic	0.00000	0.0000	0.7340	na	$ (23,714.68) [b]
Non-White Hispanic	0.00000	0.0000	0.2660	na	$ (45,018.53) [b]
All Metropolitan Areas	na	na	na	$ (11,751.70)	$ 28,278.59
Number of Obs.	15764	4302	5308		

[a] Regression coefficients are presented in Table 3. This calculation for a given variable, x_j is $(x_{jm} - x_{jw}) \times \beta_j$; where xjm = the minority mean for variable j, x_{jw} = the white mean for variable j, βj = the regression coefficient for variable j

[b] Effect calculate based on a value of 1 for the racial category in question and 0 for all other alternatives

Table 6
Sample: All Households in All Years
Variable Means and Impacts of Variables on Annual Rent

A. Low Income Renters

Variable Names	Means White	Means Black	Means Hispanic	Annualized (Black Mean - White Mean) x Coefficient[a]	Annualized (Hisp. Mean - White Mean) x Coefficient[a]
Monthly Rent	605.8988	496.2181	592.2403	na	na
Intercept	na	na	na	na	na
Rent Subsidy	0.05959	0.10835	0.05535	$ (26.14)	$ 2.28
High School Grad.	0.27810	0.31606	0.25696	$ 15.16	$ (8.44)
Post High School	0.32004	0.30372	0.19848	$ (13.68)	$ (101.89)
College Graduate	0.23601	0.09347	0.08228	$ (208.25)	$ (224.60)
Single Female	0.49551	0.62174	0.34162	$ 19.48	$ (23.74)
Single Male	0.33013	0.24752	0.23360	$ 7.97	$ 9.32
Family Size	1.81413	2.32183	3.07142	$ 180.04	$ 445.86
Household Income	2.28276	1.85383	2.25711	$ (165.96)	$ (9.92)
Age 24 or less	0.13905	0.11285	0.13480	$ (10.14)	$ (1.64)
Age 25 - 44	0.42913	0.51904	0.58756	$ (3.03)	$ (5.33)
Age 62 or more	0.20842	0.11747	0.07796	$ (25.70)	$ (36.86)
Savings 25k or more	0.03673	0.00473	0.00670	$ (52.58)	$ (49.35)
Years in Residence	4.26060	3.86049	3.05148	$ 24.36	$ 73.60
Black	0.00000	1.00000	0.00000	$ (711.52)	$ -
White Hispanic	0.00000	0.00000	0.59247	$ -	$ (764.29)
Non-White Hispanic	0.00000	0.00000	0.40753	$ -	$ (871.41)
All Metropolitan Areas				$ (346.17)	$ 574.77
Number of Obs.	6343	8666	6721		

B. High Income Renters

Variable Names	Means White	Means Black	Means Hispanic	Annualized (Black Mean - White Mean) x Coefficient[a]	Annualized (Hisp. Mean - White Mean) x Coefficient[a]
Monthly Rent	864.9844	693.5057	807.3124	na	na
Intercept	na	na	na	na	na
Rent Subsidy	0.00467	0.02017	0.01155	$ (14.45)	$ (6.41)
High School Grad.	0.20692	0.21923	0.24367	$ 14.50	$ 43.30
Post High School	0.29755	0.37525	0.28768	$ 140.65	$ (17.87)
College Graduate	0.43641	0.29388	0.22607	$ (417.20)	$ (615.69)
Single Female	0.22287	0.32280	0.18427	$ (18.49)	$ 7.14
Single Male	0.36017	0.22663	0.28053	$ 67.83	$ 40.45
Family Size	2.40490	2.93477	3.50715	$ 198.47	$ 412.85
Household Income	8.58649	8.62539	8.01568	$ 0.84	$ (12.31)
Age 24 or less	0.04745	0.05447	0.06931	$ (2.14)	$ (6.65)
Age 25 - 44	0.62116	0.62408	0.69417	$ (1.07)	$ (26.71)
Age 62 or more	0.05640	0.03631	0.01595	$ (21.46)	$ (43.23)
Savings 25k or more	0.01089	0.00269	0.00220	$ (1.13)	$ (1.20)
Years in Residence	3.23221	3.53867	2.79428	$ (50.21)	$ 71.75
Black Household	0.00000	1.00000	0.00000	$ (1,311.88)	$ -
White Hispanic Hshld	0.00000	0.00000	0.62431	$ -	$ (963.86)
Dark Hispanic Hshld	0.00000	0.00000	0.37569	$ -	$ (1,769.51)
All Metropolitan Areas				$ (641.99)	$ 729.03
Number of Obs.	2571	1487	1818		

[a] Regression coefficients are presented in Table 3. This calculation for a given variable, x_j, is $(x_{jm} - x_{jw}) \times \beta_j$; where x_{jm} = the minority mean for variable j, x_{jw} = the white mean for variable j, β_j = the regression coefficient for variable j

Recent Movers

In order to more fully explore the results above for households assumed to be faced with a recent housing decision, Table 7 through Table 10 present results only for recent movers. As stated earlier, consideration of this sub-sample of households is potentially important for two related reasons. First, it represents how minority and other households are being treated today as they make "active" housing choices, as compared to a presentation of the cumulative outcome of housing choices that were made (or not made) over decades. Second, because these choices have been made recently, household income, family size, and other socio-economic factors represent measures of the households' situations at the time when these housing choices were actively made. These tables include an additional variable in the analysis as defined in Table 2 above, whether or not the household was a homeowner prior to the recent move.

In general, the results for recent movers are similar to those for the full sample based upon this smaller set of observations. However, there are several points in the analysis for recent movers that are of particular interest. As stated above, a primary motivation for running regressions (Table 7) and calculating the magnitude of the effect of variables on the likelihood of ownership, housing values for owners and annual rental cost for renters (Tables 8 -10) is to demonstrate the importance of race controlling for other factors in influencing these choices. As previously demonstrated, race is a particularly important in each of these outcomes. However, it is important to note that the impact of race cannot be construed as a result of some form of discrimination. While discrimination could play a role in producing this result, it could also be (in part) the result of omitted variables. For instance, using the AHS data, household wealth cannot be specified as well as one would like. In addition, it is not clear that Hispanic and black households would have the same preference for homeownership and/or the same level of demand for housing services, as is the case for comparable white households. Nonetheless, insights can be gained by considering any subtle differences that exist across the different racial/ethnic groups.

Regarding the effect on the likelihood of ownership (Table 8), being African-American appears to have more of a negative impact than being Hispanic, and non-white Hispanics no longer appear to systematically be doing worse than the white Hispanics. In particular, low-income blacks have a 52.33 percent lower chance of owning a home and, for high-income blacks this differential is only 13.81 percent. For white Hispanics these differentials are 38.20 percent and 10.35 percent, respectively, while for non-white Hispanics these differentials are estimated to be 23.03 percent and 8.40 percent, respectively. The fact that non-white Hispanics have a lower differential than whites is the opposite of what was observed for the full sample.

For homeowner's value, there is no clear change in the calculated differentials. Both high- and low-income African-Americans and Hispanics continue to have substantially lower house values than whites. The same is true of annual rent for renters.

A result of interest is that for prior tenure (which can only be included in recent mover sample). As noted in several recent papers such as Belsky and Duda (2002) and Boehm and Schlottmann (2002), asset accumulation through prior homeownership is an important determinant of future homeownership. Consistently, the results for recent movers confirm that prior homeownership is a significant determinant of current homeownership, house value, and, if the recent movers are renting,

the value of the rental unit. Although indirect evidence, these results lend support to the importance of programs designed to increase homeownership, as a means of wealth accumulation, which could allow a household to move to obtain better more highly valued housing in the future.

Table 7
Sample: Recent Movers in All Years
Regression Coefficients and Significance[a,b,c]

Variable Names	Low Income, P(Own)		High Income, P(Own)		Low Income Owner, House Value[d]		High Income Owner, House Value[d]		Low Income Renter, Rent		High Income Renter, Rent	
Intercept	-2.6648	*	-0.122352		239.6721	*	301.1626	*	775.8281	*	1191.2327	*
Rent Subsidy	na		na		na		na		-25.6661	*	-117.5344	**
Total Mort. Payments	na		na		na		na		na		na	
Unit - Condominium	na		na		na		na		na		na	
Unit - Owned Manf.	na		na		na		na		na		na	
High School Grad.	0.0605		0.284679	*	10.6494	***	19.0405	**	29.7014	*	131.1436	*
Post High School	0.1809	**	0.363289	*	22.1824	*	34.4826	*	73.2485	*	173.9658	*
College Graduate	0.4315	*	0.707306	*	47.3261	*	71.3781	*	120.3864	*	279.5982	*
Single Female	-0.6657	*	-1.009692	*	-22.6617	*	-37.4740	*	18.2430	*	-22.2923	
Single Male	-0.8659	*	-1.270501	*	-24.3034	*	-25.3587	*	-1.5905		-36.0999	*
Family Size	0.1071	*	0.064878	*	1.9295		9.2230	*	34.1079	*	46.0567	*
Hosuehold Income	0.4289	*	0.013798	*	1.2115		5.9081	*	30.1751	*	2.1258	*
Age 24 or less	-1.1114	*	-0.837417	*	4.1801		-16.3486		17.4452	**	-22.6096	
Age 25 - 44	-0.2998	*	-0.204607	*	-5.5756		-15.0986	*	1.1432		-21.0127	
Age 62 or more	0.8016	*	0.443105	*	-1.5401		-13.9301		32.6108	*	66.8954	*
Savings 25k or more	0.7714	*	-0.197007		61.9855	*	23.9694		134.1262	*	37.6346	
Black	-0.6498	*	-0.334796	*	-15.6557	*	-22.5373	*	-61.9148	*	-115.4088	*
White Hispanic	-0.5460	*	-0.288677	*	-32.2758	*	-23.7357	*	-70.3688	*	-66.0502	*
Non-White Hispanic	-0.3921	*	-0.267641	*	-24.0538	*	-48.6101	*	-78.8632	*	-144.4279	*
Years in Residence	na		na		-3.4167		-11.1044	*	-11.3390	*	-31.3817	*
First-time Owner	na		na		20.4978	*	39.3487	*	na		na	
Owned Prior to Move	0.8201	*	0.963640	*	11.0657	**	37.5928	*	22.9222	*	32.3176	**
R^2	0.16307	[e]	0.14979	[e]	0.2913		0.2913		0.3346		0.4222	
Number of Obs.	13688		7594		2543		3940		11113		3092	

[a] The P(Own) Equations were estimated using Logit Analysis

[b] *, **, and *** represent significance at the 1%, 5%, and 10% levels respectively

[c] All regressions include discreate variables indicating in which of 41 SMSAs the housing units were located (over the 3 year time period: 1998, 2002, and 2004). For a complete list of these SMSAs see Appendix A.

[d] House Value in thousand dollar units

[e] For the logit equations the R^2 is computed as 1-[unrestricted ln likelihood function / restricted ln likelihood function]

Table 8
Sample: Recent Movers All Years
Variable Means and Impact of Variables on the Likelihood of Homeownership

A: Low Income Households

Variable Names	Means			$Pr(Own)_{Black}$ minus $Pr(Own)_{White}$ [a, b]	$Pr(Own)_{Hisp.}$ minus $Pr(Own)_{White}$ [a, b]
	White	Black	Hispanic		
Own Home	0.26550	0.12682	0.18119	na	na
Intercept	na	na	na	na	na
High School Grad.	0.25999	0.31196	0.27340	0.268%	0.069%
Post High School	0.34819	0.33034	0.21562	-0.277%	-2.042%
College Graduate	0.26412	0.11604	0.08643	-5.516%	-6.589%
Single Female	0.45223	0.60835	0.31754	-8.604%	7.957%
Single Male	0.32154	0.24506	0.22787	5.585%	6.877%
Family Size	1.96716	2.42820	3.11786	4.117%	10.556%
Hosuehold Income	2.48910	2.02979	2.39491	-16.655%	-3.610%
Age 24 or less	0.18833	0.15898	0.17518	2.784%	1.239%
Age 25 - 44	0.48048	0.57360	0.60827	-2.398%	-3.278%
Age 62 or more	0.12517	0.05652	0.04553	-4.740%	-5.482%
Savings 25k or more	0.03836	0.00479	0.00855	-2.216%	-1.970%
Owned Prior to Move	0.32843	0.17775	0.18119	-10.714%	-10.481%
Black	0.00000	1.00000	0.00000	-52.331%	0.000%
White Hispanic	0.00000	0.00000	0.59787	0.000%	-38.195%
Non-White Hispanic	0.00000	0.00000	0.40213	0.000%	-23.034%
All Metropolitan Areas				7.937%	2.236%
Number of Obs.	4354	5007	4327		

B: High Income Households

Variable Names	Means			$Pr(Own)_{Black}$ minus $Pr(Own)_{White}$ [a, b]	$Pr(Own)_{Hisp.}$ minus $Pr(Own)_{White}$ [a, b]
	White	Black	Hispanic		
Own Home	0.64457	0.52760	0.54318	na	na
Intercept	na	na	na	na	na
High School Grad.	0.17126	0.20499	0.22322	0.371%	0.572%
Post High School	0.29168	0.37582	0.31524	1.180%	0.331%
College Graduate	0.49456	0.33771	0.29873	-4.283%	-5.363%
Single Female	0.15153	0.25033	0.14960	-3.882%	0.075%
Single Male	0.23096	0.18988	0.20104	2.015%	1.471%
Family Size	2.70023	3.03351	3.43841	0.837%	1.849%
Hosuehold Income	10.13987	8.90115	8.72166	-0.661%	-0.757%
Age 24 or less	0.04022	0.05519	0.06135	-0.484%	-0.684%
Age 25 - 44	0.65343	0.68003	0.71071	-0.210%	-0.453%
Age 62 or more	0.04225	0.02234	0.01982	-0.341%	-0.384%
Savings 25k or more	0.01568	0.00329	0.00378	0.094%	0.091%
Owned Prior to Move	0.47129	0.29238	0.33129	-6.682%	-5.208%
Black	0.00000	1.00000	0.00000	-13.181%	0.000%
White Hispanic	0.00000	0.00000	0.66730	0.000%	-10.354%
Non-White Hispanic	0.00000	0.00000	0.33270	0.000%	-8.404%
All Metropolitan Areas				2.205%	-0.737%
Number of Obs.	3953	1522	2119		

[a] Probabilities are calculated at the means for the entire sample (all Whites, Blacks, and Hispanics) except for the variable in question which is evaluated at the mean for the denoted minority group and Whites respectively

[b] $Pr(Own) = 1 / (1 – e^{-X\beta})$; where $X\beta$ = a vector representing the sum of the product individual independent variable values (Xs) and estimated coefficients (βs). Pr(Own)minority = the probability of owning given all the variables in the regression are evaluated at the overall sample mean except the particular variable in question which is evaluated at the mean for the minority households. Pr(Own)white = the probability of owning given all the variables in the regression are evaluated at the overall sample mean except the particular variable in question which is evaluated at the mean for the white households. Pr(Own)minority – Pr(Own)white is expressed as a percentage of Pr(Own), the predicted average likelihood of ownership calculated at the mean for the mean for the overall sample. Thus, if for a given variable, xj, Pr(Own)minority = 0.40 and Pr(Own) white = 0.45 and Pr(Own) = 0.42 then the calculation for variable xj is [(0.40 – 0.45) /0.42] x 100 = 11.9 %

Table 9.a
Sample: Recent Movers in All Years
Variable Means and Impacts of Variables on House Value and Annual Housing Cost

Low Income - Homeowners

Variable Names	Means			House Value in Dollars (Black Mean - White Mean) x Coefficient[a]	House Value in Dollars (Hisp. Mean - White Mean) x Coefficient[a]
	White	Black	Hispanic		
Current House Value	148.34957	107.54655	120.69439	na	na
Monthly Housing Cost	893.24221	803.67402	896.47704	na	na
Total Mort. Payments	578.86678	555.25984	619.07015	na	na
Unit - Condominium	0.12889	0.07559	0.09949	na	na
Unit - Owned Manf.	0.11851	0.02205	0.11480	na	na
High School Grad.	0.25692	0.24409	0.27168	$ (136.59)	$ 157.22
Post High School	0.33045	0.36063	0.23980	$ 669.47	$ (2,010.92)
College Graduate	0.29585	0.22992	0.10842	$ (3,120.05)	$ (8,870.31)
Single Female	0.39014	0.51654	0.20663	$ (2,864.38)	$ 4,158.56
Single Male	0.22059	0.19528	0.14668	$ 615.18	$ 1,796.13
Family Size	2.17561	2.66457	3.50765	$ 943.47	$ 2,570.23
Hosuehold Income	2.90528	2.90860	2.93063	$ 4.02	$ 30.71
Age 24 or less	0.07612	0.05669	0.07526	$ (81.23)	$ (3.63)
Age 25 - 44	0.46107	0.60157	0.65051	$ (783.38)	$ (1,056.22)
Age 62 or more	0.20675	0.09606	0.08673	$ 170.47	$ 184.84
Savings 25k or more	0.06055	0.01575	0.01786	$ (2,777.30)	$ (2,646.56)
Years in Residence	1.00433	0.97953	0.99235	$ 84.73	$ 40.93
First-time Owner	0.54844	0.29291	0.33801	$ (5,237.79)	$ (4,313.40)
Owned Prior to Move	0.49481	0.25984	0.30357	$ (2,600.07)	$ (2,116.18)
Black	0.00000	1.00000	0.00000	$ (15,655.73)	$ - [b]
White Hispanic	0.00000	0.00000	0.59566	$ -	$ (32,275.81) [b]
Non-White Hispanic	0.00000	0.00000	0.40434	$ -	$ (24,053.82) [b]
All Metropolitan Areas	na	na	na	$ (10,004.17)	$ 13,536.26
Number of Obs.	1140	627	776		

[a] Regression coefficients are presented in Table 3. This calculation for a given variable, x_j is $(x_{jm} - x_{jw}) \times \beta_j$; where xjm = the minority mean for variable j, xjw = the white mean for variable j, βj = the regression coefficient for variable j

[b] Effect calculate based on a value of 1 for the racial category in question and 0 for all other alternatives

Table 9.b
Sample: Recent Movers in All Years
Variable Means and Impacts of Variables on House Value and Annual Housing Cost

High Income - Homeowners

Variable Names	Means			House Value in Dollars (Black Mean - White Mean) x Coefficient[a]	House Value in Dollars (Hisp. Mean - White Mean) x Coefficient[a]
	White	Black	Hispanic		
Current House Value	240.00366	172.38076	211.30323	na	na
Monthly Housing Cost	1503.62755	1220.66750	1451.26151	na	na
Intercept	na	na	na	na	na
Total Mort. Payments	1176.52826	951.11831	1139.82103	na	na
Unit - Condominium	0.07575	0.04981	0.08080	na	na
Unit - Owned Manf.	0.02002	0.00125	0.02172	na	na
High School Grad.	0.15816	0.19303	0.21894	$ 663.81	$ 1,157.22
Post High School	0.27669	0.35866	0.33015	$ 2,826.45	$ 1,843.44
College Graduate	0.52630	0.37858	0.33884	$ (10,543.61)	$ (13,380.50)
Single Female	0.11264	0.20672	0.10513	$ (3,525.83)	$ 281.48
Single Male	0.15031	0.13574	0.11295	$ 369.55	$ 947.62
Family Size	2.87637	3.16563	3.57428	$ 2,667.80	$ 6,436.81
Hosuehold Income	10.92931	9.11381	9.48721	$ (10,726.05)	$ (8,519.98)
Age 24 or less	0.02237	0.03362	0.03301	$ (183.98)	$ (174.02)
Age 25 - 44	0.64560	0.66874	0.70895	$ (349.35)	$ (956.41)
Age 62 or more	0.05024	0.02864	0.02780	$ 300.79	$ 312.50
Savings 25k or more	0.01648	0.00125	0.00608	$ (365.25)	$ (249.33)
Years in Residence	1.05769	1.01494	1.03301	$ 474.69	$ 274.03
First-time Owner	0.68407	0.42964	0.53345	$ (10,011.37)	$ (5,926.57)
Owned Prior to Move	0.57653	0.35866	0.44570	$ (8,190.55)	$ (4,918.31)
Black	0.00000	1.00000	0.00000	$ (22,537.31)	$ - [b]
White Hispanic	0.00000	0.00000	0.68028	$ -	$ (23,735.67) [b]
Non-White Hispanic	0.00000	0.00000	0.31972	$ -	$ (48,610.08) [b]
All Metropolitan Areas	na	na	na	$ (8,102.69)	$ 26,123.00
Number of Obs.	2537	800	776		

[a] Regression coefficients are presented in Table 3. This calculation for a given variable, x_j is $(x_{jm} - x_{jw}) \times \beta_j$;
where xjm = the minority mean for variable j, xjw = the white mean for variable j,
βj = the regression coefficient for variable j

[b] Effect calculate based on a value of 1 for the racial category in question and 0 for all other alternatives

Table 10
Sample: Recent Movers in All Years
Variable Means and Impacts of Variables on Annual Rent

A. Low Income Renters

Variable Names	Means White	Means Black	Means Hispanic	Annualized (Black Mean - White Mean) x Coefficient[a]	Annualized (Hisp. Mean - White Mean) x Coefficient[a]
Monthly Rent	631.72420	520.83875	600.53881	na	na
Intercept	na	na	na		
Rent Subsidy	0.04534	0.09927	0.04177	$ (16.61)	$ 1.10
High School Grad.	0.26110	0.32182	0.27378	$ 21.64	$ 4.52
Post High School	0.35460	0.32594	0.21027	$ (25.19)	$ (126.86)
College Graduate	0.25266	0.09950	0.08157	$ (221.26)	$ (247.16)
Single Female	0.47467	0.62168	0.34208	$ 32.18	$ (29.03)
Single Male	0.35804	0.25229	0.24584	$ 2.02	$ 2.14
Family Size	1.89181	2.39387	3.03161	$ 205.49	$ 466.52
Hosuehold Income	2.33865	1.90215	2.27636	$ (158.06)	$ (22.56)
Age 24 or less	0.22889	0.17383	0.19729	$ (11.53)	$ (6.62)
Age 25 - 44	0.48749	0.56953	0.59893	$ 1.13	$ 1.53
Age 62 or more	0.09568	0.05078	0.03641	$ (17.57)	$ (23.20)
Savings 25k or more	0.03033	0.00320	0.00649	$ (43.66)	$ (38.37)
Years in Residence	0.80394	0.81016	0.77900	$ (0.85)	$ 3.39
Owned Prior to Move	0.26829	0.16583	0.15411	$ (28.18)	$ (31.41)
Black	0.00000	1.00000	0.00000	$ (742.98)	$ -
White Hispanic	0.00000	0.00000	0.59836	$ -	$ (844.43)
Non-White Hispanic	0.00000	0.00000	0.40164	$ -	$ (946.36)
All Metropolitan Areas	na	na	na	$ (327.19)	$ 557.13
Number of Obs.	3198	4372	3543		

B. High Income Renters

Variable Names	Means White	Means Black	Means Hispanic	Annualized (Black Mean - White Mean) x Coefficient[a]	Annualized (Hisp. Mean - White Mean) x Coefficient[a]
Monthly Rent	891.50961	719.56745	840.00620	na	na
Intercept	na	na	na	na	na
Rent Subsidy	0.00285	0.01669	0.01033	$ (19.52)	$ (10.55)
High School Grad.	0.19502	0.21836	0.22831	$ 36.73	$ 52.39
Post High School	0.31886	0.39499	0.29752	$ 158.93	$ (44.55)
College Graduate	0.43701	0.29207	0.25103	$ (486.29)	$ (623.99)
Single Female	0.22206	0.29903	0.20248	$ (20.59)	$ 5.24
Single Male	0.37722	0.25035	0.30579	$ 54.96	$ 30.95
Family Size	2.38078	2.88595	3.27686	$ 279.20	$ 495.24
Hosuehold Income	8.70822	8.66364	7.81138	$ (1.14)	$ (22.88)
Age 24 or less	0.07260	0.07928	0.09504	$ (1.81)	$ (6.09)
Age 25 - 44	0.66762	0.69263	0.71281	$ (6.31)	$ (11.40)
Age 62 or more	0.02776	0.01530	0.01033	$ (10.00)	$ (13.99)
Savings 25k or more	0.01423	0.00556	0.00103	$ (3.92)	$ (5.96)
Years in Residence	0.85765	0.79138	0.79752	$ 24.96	$ 22.64
Owned Previously	0.28043	0.21836	0.19525	$ (24.07)	$ (33.03)
Black Household	0.00000	1.00000	0.00000	$ (1,384.91)	$ -
White Hispanic Hshld	0.00000	0.00000	0.65186	$ -	$ (792.60)
Dark Hispanic Hshld	0.00000	0.00000	0.34814	$ -	$ (1,733.13)
All Metropolitan Areas	na	na	na	$ (659.53)	$ 667.98
Number of Obs.	1405	719	968		

[a] Regression coefficients are presented in Table 3. This calculation for a given variable, x_j is $(x_{jm} - x_{jw}) \times \beta_j$; where x_{jm} = the minority mean for variable j, x_{jw} = the white mean for variable j, β_j = the regression coefficient for variable j

4. Time in the U.S.: Impacts on the Likelihood of Homeownership, Housing Values, and Rents

As shown previously in Table 2, the AHS survey in 2002 and 2004 has an additional variable of interest, namely the length of time a non-native born resident has been in this country. The literature on immigrant assimilation generally considers time spent in the U.S. as a major factor (see the recent literature review by Waters and Jimenez (2005)). Since Hispanic families are immigrating to this country at an increasingly rapid rate, and because length of residence might influence the effectiveness with which a household could function in the housing and mortgage markets, we selected a sample that included only households from the 2002 and 2004 sample periods. This was done to observe the effect of length of time in the U.S. on housing choices. It was our expectation that a discrete set of classifications would work better than a continuous variable due to the non-linear nature of a household's learning curve. Consequently, a classification scheme for length of residence in the United States (5 years or less, 5-12 years, 13-22 years, and 23 years or more) was developed by dividing the observed distribution of this variable for non-natural born residents into quartiles. Subsequently, we estimated the same set of regressions discussed in Section 3 for both the full sample and for recent movers using the 2002 and 2004 AHS surveys in order to take advantage of this potentially insightful information.[23]

Table 11 provides a summary of the impacts of time spent in the U.S. on housing outcomes. The increase in the probability of homeownership as time in the U.S. increases for both low-income households and high-income households is striking for the full sample. For low-income families, holding income, age, education, marital status, etc. constant, being in this country less than 5 years and living in the country between 5 and 12 years both decrease the probability of owning. The coefficient values are - 0.73896 and -0.42444. For high-income families, the coefficient values are -0.9279 and -0.4859 respectively.[24] All coefficients are statistically significant at the 1-percent level.

To the extent increased time spent in the U.S. can impact earned income, it is also interesting to note the significantly lower rents associated with more recent immigrants. For recent movers, the negative impacts are much smaller. Specifically, the coefficients for households who have been in the country 5 years or less are -0.1895 for low-income families and -0.40923 for those with higher incomes. Only the latter effect is statistically significant. For those who have been in the U.S. between 5 and 12 years both coefficients are insignificant and one has a positive sign. These results suggest an interesting dynamic that may be at work. Recent movers represent households who have made an adjustment in their housing consumption and, therefore, are more likely to have moved closer to a traditional housing equilibrium situation. Therefore, they are more likely to be owners, and, whether owners or renters, closer to their optimal level of housing expenditure (value for owners, rent for renters) given their income, family size and other characteristics. That is to say, their recent adjustment in housing consumption might be expected to diminish differences in their housing

[23] Selected tables of these regressions are shown in Appendix B.

[24] Note, because of the non-linear nature of the logit probability model, these coefficient magnitudes do not represent the exact change in the probability of ownership associated with these variables. None the less the values are relatively large as compared to many of the other variables included in the regression.

situation that were primarily due to a lack of information about U.S. markets when they first immigrated. The top panel of Table 11 shows clearly that the households who are recent arrivals have worse housing outcomes compared to other households, but these differences are much smaller among those recent arrivals that also recently moved. These results suggest that if recent arrivals are able to move they improve their housing circumstances and so are not at the same disadvantage over time.[25]

[25] The AHS is not, of course, a longitudinal household survey. This argument implies that over time the household experiences some type of (positive) work history, additional financial knowledge of the housing system, etc.

Table 11
Time in U.S. for those not Native Born Citizens Living in the U.S. Their Entire Life
Regression Coefficients and Significance[a,b,c]

Sample: All Households in 2002 and 2004

Variable Names	Low Income, P(Own)		High Income, P(Own)		Low Income Owner, House Value[d]		High Income Owner, House Value[d]		Low Income Renter, Rent		High Income Renter, Rent	
Less than 5 Years in US	-0.73896	*	-0.9279	*	-9.9162		0.4730		-38.2796	*	-97.8302	*
5 - 12 Years in US	-0.42444	*	-0.4859	*	-7.5731		-7.3579		-26.2431	*	-64.3877	**
13 - 22 Years in US	0.06040		0.0426		-7.3530		6.9505		-17.0748		-69.7892	**
23 or more Years in US	0.30797	*	0.3750	*	4.1590		0.9481		-12.6175		-5.9086	
Number of Obs.	26,476		19,723		12,389		15,700		13,992		3,543	

Sample: Recent Movers in 2002 and 2004

Variable Names	Low Income, P(Own)		High Income, P(Own)		Low Income Owner, House Value[d]		High Income Owner, House Value[d]		Low Income Renter, Rent		High Income Renter, Rent	
Less than 5 Years in US	-0.1895		-0.40923	*	-1.1540		-4.4248		-63.6214	*	-97.6543	*
5 - 12 Years in US	0.1502		-0.11495		-3.6726		-2.6956		-36.2107	*	-41.7562	
13 - 22 Years in US	0.4860	*	0.28948		5.6428		-15.8701		-20.8422		-67.6456	
23 or more Years in US	0.4204	**	0.36927		30.4118	**	-10.2522		-23.1130		-35.6294	
Number of Obs.	9,244		4,997		1,817		2,626		7,405		1,947	

[a] The P(Own) Equations were estimated using Logit Analysis

[b] *, **, and *** represent significance at the 1%, 5%, and 10% levels respectively

[c] These regressions include all the variables in regressions estimated for the full sample. Appendix B contains the complete results for these regressions.

[d] House Value in thousand dollar units.

5. Neighborhood and Structural Quality

The results above for the likelihood of homeownership for minority households and their pattern of housing expenditures provide a context for a more detailed analysis of housing quality. In particular, minority households have lower likelihoods of ownership and lower levels of housing expenditure on both owned and rented units for both higher- and lower-income families. Thus, minority households might be expected to rank their circumstances somewhat lower than white households overall, and the individual factors which combine to produce the housing services these families receive could be quite different depending upon the racial/ethnic group to which a household belongs.

The purpose of this section is to analyze the relative importance of various individual structural and neighborhood attributes in determining households' perceptions of overall dwelling and neighborhood quality. In addition, we present results separately for households who are owners versus those who are renters.

As noted, the AHS data contain detailed information on the structural characteristics of the house, the characteristics of the neighborhood in which the house is located, the current cost of housing services, the demographic characteristics of the resident of the dwelling at the time of the interview, and two indices that measure the resident's satisfaction with their neighborhood and the quality of the structure in which they reside on an ordinal scale from one to ten. Basic characteristics of these data have been presented above in Section 2.

Conceptual Model

Most of the research considering the relative importance of individual structural and other (e.g., neighborhood, public service, location) housing characteristics on household preferences has been implemented by estimating hedonic price models. In this approach, sales price or contract rent is regressed on a set of variables that describe the structure and its environment. Unfortunately, the hedonic approach has often been criticized because it assumes that consumer preferences are identical. However, in reality, consumer preferences may not be identical. For example, some individuals may not mind cracks in walls or peeling paint while others would find them quite objectionable. On the margin, if the household that ends up occupying a given dwelling is indifferent to these structural defects then they will be uncorrelated with rent or value, even though the majority of people would consider them to be bothersome.

In lieu of the hedonic approach, we employ the estimating technique in Boehm and Ihlanfeldt (1991), which revealed the importance of individual neighborhood characteristics on the overall quality of the neighborhood. In this analysis, the AHS 10-point scale is interpreted to be an ordinal utility index.[26] There are two primary advantages to this approach. First, for each household group, estimates will represent the group average rather than the preferences of the marginal purchaser of housing services. Second, by focusing on perceptions rather than the relationship between some objective characteristics and dwelling rent/price, we can identify more clearly the factors that influence the way people feel about their living environment.

[26] See Appendix C for a detailed description of the assumptions underlying this estimation technique.

Variable Definitions

There is a great deal of structural information provided for each of the housing units included in the AHS, including: structure age, unit size (used to construct a measure of crowding), availability and age of major appliances, type and condition of heating, air-conditioning, plumbing, and electrical systems, and structural problems with the roof, internal and external walls, windows, and foundation. In addition, there is a detailed set of neighborhood factors included in the questions that relate to such issues as crime, noise, litter, abandoned buildings, general deterioration, etc. Table 12 contains variable names and definitions for all of the variables included in the analysis.[27]

[27] As is well appreciated, often when one incorporates many structural variables in estimating equation multicollinearity can be a significant concern. Fortunately, this issue does not appear to be a significant issue in our low-income household samples.

Table 12
Neighborhood and Structural Quallity
Variable Names and Definitions

Variable Names	Variable Definitions
Structural	
Structure Quality	Housing structural quality ranking: 0 = worst, 9 = best[a]
Structure Age	Age of the structure in years
Porch	1 = housing unit has a porch, 0 = otherwise
Garage	1 = housing unit has a garage or carport, 0 = otherwise
Equipment	Number of the following items the housing unit has at least one of: refrigerator, garbage disposal, stove/oven, dishwasher, washer/dryer
Bathroom & Water	1 = unit has a private toilet, 0 = otherwise 1 = unit has hot and cold piped water, 0 = otherwise
Septic or Cesspool	1 = unit is connected to a public sewer or septic system, 0 = otherwise
Central Air	1 = unit has central air conditioning, 0 = otherwise
Structural Problems	Number of structural problems: sagging roof, missing roof materials, holes in roof, missing wall material or siding, sloping exterior walls, broken windows, bars on windows, and/or crumbling foundation
Exterior Leaks	1 = exterior leak in last 12 months, 0 = otherwise
Interior Leaks	1 = interior leak in last 12 months, 0 = otherwise
Interior Deterioration	1 = cracks or holes in walls or ceiling, holes in floor, or broken plaster or peeling paint over 1 square foot, 0 = otherwise
Water Breakdowns	Number of water source broke down in last 90 days
Toilet Breakdowns	Number of toilet breakdowns in the last 90 days
Sewer Breakdowns	Number of public sewer breakdowns in the last 90 days
Inadequate Wiring	1 = inadequate electrical wiring, 0 = otherwise
Blown Fuses	Number of times fuses blew or breakers tripped in the last 90 days
Heating Breakdowns	Number of heat breakdowns last winter lasting 6 hours or more
	1 = steam, electric, heat pump, or central warm air furnace, 0 = otherwise
Built in Electric Heat	1 = other built in electric floor, wall, or heaters, 0 = otherwise
Lowest Qaulity Heat	1 = space heaters, stoves, fireplaces or no heat, 0 = otherwise
Vermin Present	1 = presence of rats or mice in building the last 90 days, 0 = otherwise
Water not Safe	1 = Water is not safe to drink; 0 = otherwise
Rooms to Household Size	Number of rooms in the housing unit divided by the number of individuals in the household.
Unit Manufactured	1 = housing unit was manufactured, 0 = otherwise

[a] In the AHS data, both structural and neighborhood quality are ordinal rankings with a range of 1 to 10. For the estimation software, the first category needs to be 0. Conequently the means in this table are based on the normalized rankings between 0 and 9.

Table 12 (continued)

Variable Names	Variable Definitions
Neighborhood	
Neighborhood Quality	Housing neighborhood quality ranking; 0 = worst, 9 = best[a]
Low-rise buildings	1 = single family or other low-rise buildings within 1/2 block of unit, 0 = otherwise
Mid-rise buildings	1 = mid-rise residential buildings within 1/2 block of unit, 0 = otherwise
High-rise buildings	1 = high-rise residential buildings within 1/2 block of unit, 0 = otherwise
Mobile homes	1 = mobile homes within 1/2 block of unit, 0 = otherwise
Commercial buildings	1 = commercial/institutional/industrial within 1/2 block of unit, 0 = otherwise
Parking lots	1 = residential parking lots within 1/2 block of unit, 0 = otherwise
Water	1 = a body of water within 1/2 block of unit, 0 = otherwise
Green space	1 = open space/park/woods/farm/ranch within 1/2 block of unit, 0 = otherwise
Older buildings	1 = buildings in the area are predominantly older than the unit, 0 = otherwise
Newer buildings	1 = buildings in the area are predominantly younger than the unit, 0 = otherwise
Abandoned buildings	1 = abandoned buildings within 1/2 block of unit, 0 = otherwise
Bars on windows	1 = bars on windows of buildings within 1/2 block of unit, 0 = otherwise
Road repairs needed	1 = roads within 1/2 block of unit in need of repairs, 0 = otherwise
Junk	1 = trash litter or junk accumulated in the neighborhood, 0 = otherwise
Crime Problem	1 = resident feels crime in the neighborhood is bothersome, 0 = otherwise
Noise Problem	1 = resident feels noise in the neighborhood is bothersome, 0 = otherwise
Litter Problem	1= litter or housing deterioration in the neighborhood is bothersome, 0 = otherwise
Poor services	1 = poor city/county services in the neighborhood are bothersome, 0 = otherwise
Property use problem	1 = undesirable nonresidential uses in the neighborhood are bothersome, 0 = otherwise
Odor Problem	1 = odor in the neighborhood is bothersome, 0 = otherwise
Neighbor problem	1 = people in the neighborhood are bothersome, 0 = otherwise
Other Problem	1 = some other feature in the neighborhood is bothersome, 0 = otherwise
Schools inadequate	1 = schools in the area are inadequate, 0 = otherwise
Shopping inadequate	1 = shopping in the area is inadequate, 0 = otherwise
Public transit good	1 = public transportation in the area is adequate, 0 = otherwise
Police inadequate	1 = dissatisfied with police services; 0 = otherwise

[a] In the AHS data, both structural and neighborhood quality are ordinal rankings with a range of 1 to 10. For the estimation software, the first category needs to be 0. Conequently the means in this table are based on the normalized rankings between 0 and 9.

6. Results

The fours separate sets of results for the dimensions of housing quality and neighborhood quality for both owners and renters are presented in Table 13 through Table 16 below. Separate equations are estimated for African-American, Hispanic, and white Households.[28] For ease of exposition, we will first consider the results for owners and then for renters.

Owners

Owners' assessments of characteristics that affect structural quality are shown in Table 13. These variables shed light on the sources of satisfaction (and dissatisfaction) with existing housing both overall and for specific minority groups. For each variable the table provides both the estimated regression coefficients and the mean values by household type.

In general, and perhaps not surprisingly, all households react in a similar manner to negative aspects of their owner-occupied homes. In Table 13, when one considers which variables have a significant impact on household rankings of the structural quality of their dwellings, having external leaks, internal leaks, vermin problems, etc. are viewed as lowering the quality of housing services. Households that are on a public sewer system with a home's toilet systems and other plumbing working satisfactorily and on a central heating system (as opposed to space heaters) increases perceptions of quality. Although these statements might seem predictable, the results shown in Table 13, in general, dispel any myth of significant household differences in housing quality perceptions. To summarize, American households generally appear to agree on what makes good owner-occupied housing regardless of race/ethnicity.

However, there are significant issues to note when comparing the mean quality levels by individual characteristics for households by minority status. In each table, the mean values presented represent the average characteristic value observed for each of the racial groups stratified further into high- and low-income subgroups. Major structural problems and water quality issues are much worse for Hispanic households and black households.[29] In Table 13, 43.2 percent of low-income Hispanics and 54.4 percent of low-income African-Americans occupy owned homes with major structural problems as compared to only 23.0 percent for low-income whites. Similarly, 24.3 percent of low-income Hispanics occupy owned homes with water that is not safe to drink. This percentage is substantially higher than both their African-American counterparts at 13.4 percent and white low-income

[28] As part of the racial/ethnic stratification we decided not to split the Hispanic sample into white and non-white subsets for several reasons. First, the more data stratifications employed in the analysis, the more difficult and cumbersome it becomes to present all the results. In addition, each stratification of the data reduces the sample size for a given regression. Also, the most important variables demonstrated to influence structural and neighborhood rankings were relatively similar across the racial/ethnic groups currently employed.

[29] As defined in Table 12, structural problems include a number of conditions identified by survey respondents. Specifically: sagging roof, missing roof materials, holes in roof, missing wall material or siding, sloping exterior walls, broken windows, bars on windows, and/or crumbling foundation.

Table 13
Structural Quality of Owned Units
Ordinal Probit Coefficients and Means

Variable Names	Hispanic Coefficients	[a,b]	Black Coefficients	[a,b]	White Coefficients	[a,b]	Hispanic Low Income	Black Low Income	White Low Income	Hispanic High Income	Black High Income	White High Income
Structure Quality[c]	na		na		na		7.3608	7.3068	7.4446	7.4761	7.4354	7.4566
Intercept	1.8867	*	2.62347	*	2.1667	*	na	na	na	na	na	na
Structure Age	-0.0033	*	-0.00130	**	-0.0021	*	39.8492	45.5429	40.2947	29.7078	33.0196	31.5746
Porch	0.0941	*	0.02462		0.1014	*	0.8437	0.8488	0.8837	0.9007	0.8809	0.9237
Garage	0.0973	*	0.09097	*	0.1513	*	0.7069	0.5840	0.7714	0.8450	0.7490	0.8693
Equipment	0.0244	***	0.01183		0.0543	*	3.8758	3.6593	4.1133	4.4998	4.2745	4.5790
Bathroom & Water	0.9096	**	0.15702		0.4428		0.9978	0.9978	0.9996	0.9996	0.9995	0.9999
Septic or Cesspool	0.1447	*	0.16032	*	0.2858	*	0.0682	0.0611	0.1946	0.0856	0.0544	0.1964
Central Air	0.1185	*	0.11540	*	0.0758	*	0.5770	0.5906	0.6179	0.7195	0.7584	0.7078
Structural Problems	-0.1025	*	-0.13808	*	-0.1903	*	0.4315	0.5442	0.2304	0.2438	0.3266	0.1741
Exterior Leaks	-0.1917	*	-0.10193	*	-0.1008	*	0.1030	0.1551	0.1356	0.1062	0.1551	0.1612
Interior Leaks	-0.2090	*	-0.14695	*	-0.1351	*	0.0809	0.1004	0.0722	0.1099	0.1080	0.0917
Interior Deterioration	-0.2423	*	-0.42731	*	-0.3240	*	0.0921	0.1175	0.0604	0.0678	0.0730	0.0547
Water Breakdowns	-0.0484		0.06335		-0.0741	*	0.0301	0.0263	0.0340	0.0295	0.0232	0.0287
Toilet Breakdowns	-0.0785	***	0.02758		-0.1518	*	0.0296	0.0309	0.0111	0.0191	0.0251	0.0103
Sewer Breakdowns	0.0615		-0.10718	***	-0.0607		0.0249	0.0247	0.0119	0.0158	0.0227	0.0088
Inadequate Wiring	-0.0708		0.02800		-0.1072	***	0.0189	0.0232	0.0136	0.0143	0.0128	0.0114
Blown Fuses	-0.0355	*	-0.01321		-0.0132	**	0.2127	0.3427	0.3510	0.3352	0.4470	0.4821
Heating Breakdowns	-0.0711		-0.02606		-0.0741	**	0.0269	0.0453	0.0260	0.0306	0.0372	0.0223
Built in Electric Heat	0.0432		-0.04149		-0.0721	**	0.0938	0.0613	0.0518	0.0478	0.0365	0.0342
Lowest Qaulity Heat	-0.1035	**	-0.03467		-0.1114	**	0.1072	0.0626	0.0279	0.0299	0.0237	0.0133
Vermin Present	-0.1405	*	-0.08251	*	-0.0706	*	0.1879	0.2578	0.2024	0.1727	0.1897	0.2112
Water not Safe	-0.0383		-0.08100	**	-0.1277	*	0.2426	0.1341	0.0846	0.1895	0.1317	0.0756
Rooms to Family Size	0.0617	*	0.02785	*	0.0610	*	2.4742	3.5113	3.8290	2.2516	2.7552	2.9218
Unit Manufactured	-0.3604	*	-0.08190		-0.2910	*	0.0709	0.0133	0.0764	0.0179	0.0060	0.0164
No. of Observations	9207		8709		24920		4019	4570	9511	5188	4139	15409
Log likelihood fn	-14565.14		-14033.8		-39019.04							
Chi-squared	776.8221		703.9435		1953.349							
Degrees of freedom	23		23		23							

[a] Not presented in this table is a set of "threshold" parameters corresponding to n-1 ordinal categories (e.g. structural quality has rankings from 0 to 9).

[b] *, **, and *** represent significance at the 1%, 5%, and 10% levels respectively
Thus, 8 "threshhold" parameters (μ_js) and one intercept term are estimated. All these parameters are significant at the 1% level.

[c] In the AHS data, both structural and neighborhood quality are ordinal rankings with a range of 1 to 10. For the estimation software, the first category needs to be 0. Conequently the means in this table are based on the normalized rankings between 0 and 9.

Table 14
Neighborhood Quality of Owned Units
Ordinal Probit Coefficients and Means

Variable Names	Hispanic Coefficients	[a,b]	Black Coefficients	[a,b]	White Coefficients	[a,b]	Hispanic Low Income	Black Low Income	White Low Income	Hispanic High Income	Black High Income	White High Income
Neighborhood Quality[c]	na		na		na		7.0331	6.7352	7.1712	7.1717	6.9983	7.2378
Intercept	3.4329	*	3.3047	*	3.5253	*	na	na	na	na	na	na
Low-rise buildings	-0.1160	*	-0.1369	*	-0.1582	*	0.2446	0.2790	0.2094	0.2088	0.2402	0.1604
Mid-rise buildings	0.1827	**	0.0271		0.0213		0.0239	0.0317	0.0197	0.0177	0.0239	0.0151
High-rise buildings	0.0472		0.1137		0.2059	*	0.0127	0.0103	0.0099	0.0075	0.0080	0.0064
Mobile homes	-0.0799	**	0.0761		-0.2335	*	0.1028	0.0359	0.1058	0.0457	0.0259	0.0397
Commercial buildings	-0.0280		-0.0373		-0.0590	*	0.2797	0.2796	0.1970	0.1991	0.2431	0.1553
Parking lots	-0.0944	**	-0.0012		-0.0748	*	0.1368	0.1243	0.1340	0.1126	0.1087	0.1036
Water	0.0687	***	0.0731	***	0.0731	*	0.0928	0.0842	0.1727	0.1457	0.1384	0.2055
Green space	0.0872	*	0.0874	*	0.1388	*	0.2379	0.2718	0.3567	0.3279	0.3276	0.4204
Older buildings	-0.0653	***	0.0799	**	0.0156		0.0970	0.0954	0.1193	0.0634	0.0626	0.0788
Newer buildings	0.0560		0.0862	**	0.0544	**	0.0637	0.0613	0.0752	0.0750	0.0732	0.0830
Abandoned buildings	-0.2478	*	-0.2605	*	-0.3268	*	0.0605	0.1497	0.0383	0.0372	0.0727	0.0238
Bars on windows	-0.0773	**	-0.0349		-0.1230	*	0.1956	0.2652	0.0539	0.1214	0.1759	0.0429
Road repairs needed	-0.1402	*	-0.1943	*	-0.1587	*	0.3976	0.4928	0.3474	0.3167	0.3842	0.3126
Junk	-0.3469	*	-0.4381	*	-0.4049	*	0.1053	0.1611	0.0841	0.0738	0.1020	0.0600
Crime Problem	-0.5695	*	-0.5320	*	-0.5651	*	0.1257	0.1759	0.0877	0.1097	0.1206	0.0863
Noise Problem	-0.3671	*	-0.4047	*	-0.4324	*	0.1483	0.1729	0.1356	0.1378	0.1256	0.1199
Litter Problem	-0.5235	*	-0.3155	*	-0.4101	*	0.0251	0.0457	0.0216	0.0262	0.0319	0.0164
Poor services	-0.1396		-0.0181		-0.0457		0.0144	0.0341	0.0088	0.0145	0.0239	0.0103
Odor Problem	-0.3092	*	-0.2122	*	-0.2700	*	0.0075	0.0140	0.0076	0.0100	0.0106	0.0094
Property use problem	-0.1966	***	0.0921		-0.2534	*	0.0455	0.0532	0.0339	0.0380	0.0350	0.0278
Neighbor problem	-0.4434	*	-0.4685	*	-0.6488	*	0.0530	0.0611	0.0453	0.0445	0.0505	0.0397
Other Problem	-0.2979	*	-0.2163	*	-0.3151	*	0.1120	0.1138	0.1018	0.1297	0.1317	0.1120
Schools inadequate	-0.3504	*	-0.3497	*	-0.3003	*	0.0296	0.0306	0.0139	0.0412	0.0466	0.0275
Shopping inadequate	-0.0988	*	-0.0890	*	-0.0346	***	0.1197	0.2066	0.1276	0.0921	0.1438	0.1041
Public transit good	-0.0627	*	-0.0541	**	-0.0410	*	0.5272	0.5267	0.3356	0.4329	0.4148	0.3087
Police inadequate	-0.2684	*	-0.3317	*	-0.2202	*	0.1070	0.1245	0.0584	0.0779	0.0778	0.0513
No. of Observations	9207		8709		24920		4019	4570	9511	5188	4139	15409
Log likelihood fn	-15322.75		-15022.43		-40756.8							
Chi-squared	1957.959		2365.287		4748.447							
Degrees of freedom	26		26		26							

[a] Not presented in this table is a set of "threshold" parameters corresponding to n-1 ordinal categories (e.g. structural quality has rankings from 0 to 9. Thus, 8 "threshhold" parameters (μ_js) and one intercept term are estimated. All these parameters are significant at the 1% level.

[b] *, **, and *** represent significance at the 1%, 5%, and 10% levels respectively

[c] In the AHS data, both structural and neighborhood quality are ordinal rankings with a range of 1 to 10. For the estimation software, the first category needs to be 0. Conequently the means in this table are based on the normalized rankings between 0 and 9.

Table 15
Structural Quality of Rental Units
Ordinal Probit Coefficients and Means

Variable Names	Hispanic Coefficients	[a,b]	Black Coefficients	[a,b]	White Coefficients	[a,b]	Hispanic Low Income	Black Low Income	White Low Income	Hispanic High Income	Black High Income	White High Income
Structure Quality[c]	na		na		na		6.3932	6.3020	6.5586	6.4866	6.4107	6.4653
Intercept	1.1346	*	1.6290	*	2.1585	*						
Structure Age	0.0001		0.0004		-0.0011	**	40.1208	43.2640	40.6971	35.3555	35.4121	37.2146
Porch	0.1216	*	0.0945	*	0.0380		0.6486	0.6468	0.6568	0.7984	0.7665	0.7937
Garage	0.0621	**	0.1130	**	0.0280		0.3558	0.1963	0.3258	0.5465	0.3760	0.5375
Equipment	0.0741	*	0.0466	*	0.0350	*	3.2515	3.1867	3.4355	3.8231	3.9027	4.0341
Bathroom & Water	0.9466	*	0.4981	*	0.3936	**	0.9965	0.9960	0.9959	0.9994	0.9993	0.9992
Septic or Cesspool	0.1452	***	0.1398		0.2026	*	0.0178	0.0114	0.0520	0.0252	0.0111	0.0512
Central Air	0.0551	***	0.0338		0.0034		0.4704	0.5109	0.4395	0.5571	0.6824	0.5502
Structural Problems	-0.1488	*	-0.1395	*	-0.1556	*	0.4839	0.5183	0.3432	0.4003	0.4163	0.3130
Exterior Leaks	-0.1597	*	-0.1338	*	-0.1309	*	0.0992	0.1226	0.1130	0.0974	0.1487	0.1313
Interior Leaks	-0.2739	*	-0.2481	*	-0.2486	*	0.1322	0.1564	0.1176	0.1607	0.1619	0.1305
Interior Deterioration	-0.3376	*	-0.4371	*	-0.4773	*	0.1290	0.1500	0.0994	0.0890	0.1140	0.0936
Water Breakdowns	-0.0909	*	-0.0713	*	-0.1479	*	0.0696	0.0579	0.0592	0.0633	0.0688	0.0678
Toilet Breakdowns	-0.1571	*	-0.0954	*	-0.0770		0.0562	0.0680	0.0268	0.0392	0.0403	0.0294
Sewer Breakdowns	-0.0869	**	-0.0835	**	-0.0188		0.0315	0.0362	0.0145	0.0140	0.0299	0.0198
Inadequate Wiring	-0.2379	*	-0.3235	*	-0.3029	*	0.0337	0.0351	0.0280	0.0241	0.0236	0.0186
Blown Fuses	-0.0337	**	-0.0216	***	-0.0114		0.1737	0.2661	0.2869	0.2794	0.3426	0.3566
Heating Breakdowns	-0.0392		-0.0543	*	-0.1128	*	0.0464	0.0830	0.0477	0.0319	0.0507	0.0341
Built in Electric Heat	-0.0278		-0.0644	**	-0.0980	*	0.1916	0.1022	0.1538	0.1445	0.0730	0.1111
Lowest Qaulity Heat	-0.0621		-0.1313	*	-0.1119	**	0.1056	0.0494	0.0347	0.0711	0.0271	0.0218
Vermin Present	-0.1541	*	-0.2194	*	-0.2194	*	0.1388	0.1737	0.1076	0.1310	0.1258	0.0980
Water not Safe	-0.0254		-0.1820		-0.2306	*	0.3126	0.1598	0.1203	0.2772	0.1779	0.1115
Rooms to Family Size	0.0876	*	0.0652	*	0.0869	*	1.7766	2.4541	2.7757	1.6911	2.0772	2.5124
No. of Observations	8366		9764		8599		6580	8325	6078	1786	1439	2521
Log likelihood fn	-15621.99		-18553.46		-15552.12							
Chi-squared	1184.50		1569.755		1067.849							
Degrees of freedom	22		22		22							

[a] Not presented in this table is a set of "threshold" parameters corresponding to n-1 ordinal categories (e.g. structural quality has rankings from 0 to 9. Thus, 8 "threshhold" parameters (μ_js) and one intercept term are estimated. All these parameters are significant at the 1% level.

[b] *, **, and *** represent significance at the 1%, 5%, and 10% levels respectively

[c] In the AHS data, both structural and neighborhood quality are ordinal rankings with a range of 1 to 10. For the estimation software, the first category needs to be 0. Conequently the means in this table are based on the normalized rankings between 0 and 9.

Table 16
Neighborhood Quality of Rental Units
Ordinal Probit Coefficients and Means

Variable Names	Hispanic Coefficients	[a,b]	Black Coefficients	[a,b]	White Coefficients	[a,b]	Hispanic Low Income	Black Low Income	White Low Income	Hispanic High Income	Black High Income	White High Income
Neighborhood Quality[c]	na		na		na		6.3555	6.0049	6.4717	6.5414	6.3398	6.5593
Intercept	2.9305	*	2.9592	*	3.3706	*	na	na	na	na	na	na
Low-rise buildings	-0.1503	*	-0.1294	*	-0.1404	*	0.7068	0.7082	0.6757	0.6176	0.6623	0.6283
Mid-rise buildings	-0.0239		0.1165	*	0.1186	*	0.0891	0.1170	0.1158	0.0778	0.0910	0.0881
High-rise buildings	0.0379		0.0238		0.0741		0.0394	0.0633	0.0456	0.0353	0.0424	0.0325
Mobile homes	-0.0146		0.0712		-0.1587	*	0.0509	0.0237	0.0457	0.0442	0.0229	0.0309
Commercial buildings	0.0266		0.0268		-0.0531	**	0.5260	0.5313	0.4808	0.4692	0.4767	0.4038
Parking lots	0.0329		0.0145		-0.0581	**	0.4353	0.4532	0.4732	0.3897	0.4225	0.3990
Water	0.0509		0.0564		0.0454		0.0916	0.0897	0.1479	0.1366	0.1508	0.1928
Green space	0.0884	*	0.0414	**	0.1441	**	0.2553	0.2924	0.3351	0.3007	0.3259	0.3689
Older buildings	-0.0558	***	-0.0478		-0.0610	***	0.1470	0.1398	0.1420	0.1125	0.1070	0.1095
Newer buildings	0.0963	**	0.1346	*	0.1164	*	0.0676	0.0770	0.0867	0.0829	0.0890	0.0877
Abandoned buildings	-0.2049	*	-0.1731	*	-0.3060	*	0.0894	0.1594	0.0610	0.0622	0.0952	0.0464
Bars on windows	0.0297		-0.0139		-0.0994	**	0.1655	0.2022	0.0806	0.1305	0.1494	0.0793
Road repairs needed	-0.1839	*	-0.1592	*	-0.1848	*	0.4339	0.5032	0.3799	0.3712	0.4315	0.3249
Junk	-0.3921	*	-0.4288	*	-0.4268	*	0.1825	0.2223	0.1436	0.1366	0.1550	0.0889
Crime Problem	-0.7448	*	-0.7501	*	-0.6471	*	0.1626	0.2072	0.1451	0.1450	0.1654	0.1111
Noise Problem	-0.3295	*	-0.3939	*	-0.4389	*	0.1597	0.1886	0.1749	0.1545	0.1564	0.1698
Litter Problem	-0.1885	**	-0.1710	*	-0.2924	*	0.0240	0.0329	0.0196	0.0230	0.0285	0.0167
Poor services	0.0308		-0.0589		0.0737		0.0119	0.0222	0.0094	0.0078	0.0097	0.0083
Odor Problem	-0.1067	**	-0.2525	*	-0.2257	*	0.0065	0.0092	0.0059	0.0073	0.0056	0.0075
Property use problem	-0.1767		0.0809		0.0335		0.0590	0.0708	0.0451	0.0504	0.0514	0.0329
Neighbor problem	-0.4037	*	-0.4975	*	-0.5157	*	0.0622	0.0668	0.0545	0.0588	0.0618	0.0440
Other Problem	-0.1563	*	-0.2593	*	-0.2502	*	0.0886	0.0949	0.0905	0.1086	0.1001	0.0944
Schools inadequate	-0.3976	*	-0.2415	*	-0.3392	*	0.0281	0.0381	0.0146	0.0269	0.0354	0.0179
Shopping inadequate	-0.0431		-0.1797	*	-0.0126	*	0.0913	0.1529	0.0944	0.0789	0.1015	0.0651
Public transit good	0.0285		-0.0203		0.0374		0.6480	0.6671	0.4956	0.5588	0.5594	0.4463
Police inadequate	-0.2919	*	-0.3539	*	-0.3722	*	0.1035	0.1174	0.0548	0.0711	0.0792	0.0389
No. of Observations	8366		9764		8599		6580	8325	6078	1786	1439	2521
Log likelihood fn	-15537.9		-18439.01		-15592.07							
Chi-squared	2183.674		3535.939		2309.241							
Degrees of freedom	26		26		26							

[a] Not presented in this table is a set of "threshold" parameters corresponding to n-1 ordinal categories (e.g. structural quality has rankings from 0 to 9. Thus, 8 "threshhold" parameters (μ_js) and one intercept term are estimated. All these parameters are significant at the 1% level.

[b] *, **, and *** represent significance at the 1%, 5%, and 10% levels respectively

[c] In the AHS data, both structural and neighborhood quality are ordinal rankings with a range of 1 to 10. For the estimation software, the first category needs to be 0. Conequently the means in this table are based on the normalized rankings between 0 and 9.

households at 8.5 percent. While lower in magnitude, comparable differences exist for higher-income families as well. The deterioration of interior facilities appears much worse for low-income minority homeowners, 9.2 percent and 11.8 percent for Hispanics and blacks respectively, as compared to 6.0 percent for whites. Similarly, low-income Hispanic homeowners are substantially more likely to have lower-quality heating sources (i.e., space heater, stoves, fireplaces, or no heat) with 10.7 percent of households falling into this category as compared to 6.3 percent of low-income blacks and only 2.8 percent of low-income whites. Finally, both low and high-income Hispanics face more crowding. Low-income Hispanic, owners average 2.5 rooms per person; where as, African-Americans and white households have over a room more of space per person averaging 3.5 and 3.8 rooms per person respectively.

Table 14 presents results for owners' determinants of neighborhood quality. As with structural characteristics, what is striking in the results for the parameter estimates of the impact of individual characteristics on neighborhood quality (the first 3 columns) is the consistency of the sign, statistical significance, and magnitudes of these coefficients. These coefficient estimates demonstrate whether and to what extent various factors affect households' neighborhood rankings. Looking across homeowners by minority status there is general consistency in the factors that matter, with crime problems, litter problems, noise problems, roads in need of repair, junk and abandoned buildings, etc. all creating undesirable neighborhoods. Similarly, neighborhoods with green space, newer buildings, etc. are more desirable for all racial/ethnic groups.

However, as with structural characteristics, there are significant differences in household means of individual neighborhood characteristics by minority status. These differences appear particularly among low-income homeowners. Low-income Hispanic and black households consider inadequate policing to be more of an issue than white households. Specifically, 10.7 percent of low-income Hispanics and 12.5 percent of low-income African-American households consider police protection inadequate compared to 5.8 percent for comparable whites. This is consistent with the observation that both minority groups have added concerns regarding the perceptions of crime problems within their neighborhood. In particular, 12.6 percent and 17.6 percent of low-income Hispanics and blacks respectively perceive crime to be a problem, whereas only 8.8 percent of low-income whites share this concern. Also, both high and low-income white households have greater access to green space. In particular, on average, only 23.8 percent of low-income Hispanics and 27.2 percent of low-income black have open green space within a half a block of their unit, in contrast to 35.7 percent of low-income white homeowners. Consistent with central city locations, low-income black households tend to have more nearby abandoned buildings which appear to exhibit a negative effect on neighborhood quality. Approximately 15 percent of low-income blacks live near abandoned buildings as compared to 6.1 percent of Hispanics and 3.8 percent of whites that are low-income.

Renters

The results for renters, both for structural quality and neighborhood quality, are, in general, remarkably similar to the results for owners. In addition, perceptions of quality, as measured by the sign and statistical significance of the estimated coefficients shown in Table 15, are consistent across minority status as they were for owners. Significant characteristics that affect structural quality include external leaks, internal leaks, vermin problems, etc.—all of which lower the quality of rental housing. Similarly, households with well functioning plumbing, heating systems, etc. all clearly rank their housing quality higher.

When one considers differences in the average structural characteristics that impact the quality of housing services, the primary differences are remarkably similar to that of homeowners. Specifically, major structural problems are much more prevalent in minority rental units than in white units. For low-income Hispanic and African-American renters, 48.4 percent and 51.8 percent of the rental units have major structural problems. For their white counterparts this number is only 34.3 percent. Similarly, low-income Hispanic and black units have higher percentages of major interior deterioration than do whites, 12.9 percent, 15.0 percent, and 9.9 percent, respectively. Also, for both the higher- and lower-income groups, Hispanic renters are much more likely than African-Americans or whites to have the lowest quality heating options, water that is not safe to drink, and be substantially more crowded. In particular, for low-income Hispanic renters, 10.6 percent have low quality heating, 31.3 percent have bad water, and, on average, they have only 1.8 rooms per person as compared to approximately 2.5 rooms per person for other households.

Table 16 presents results for renters' determinants of neighborhood quality. Factors that influence renters' perceptions of neighborhood quality are consistent with those factors impacting owners. In addition, these factors are similar across households by minority status. Crime problems, litter problems, noise problems, roads in need of repair, junk and abandoned buildings, etc. create undesirable neighborhoods. A neighborhood with green space, newer buildings, etc. is more desirable.

Similar to the results for owners, based upon mean values, Hispanic and black households that rent note higher levels of police inadequacy, poorer roads, and abandoned buildings. In particular, for both lower and higher-income renters approximately twice as many households felt police protection was inadequate. For low-income renters this proportion was 10.4 percent of Hispanics, 11.7 percent of African-Americans, and only about 5.5 percent of whites. Regarding road repairs, for low-income renters, 43.4 percent of Hispanics and 50.3 percent of blacks said roads in the neighborhood were in need of repair. This was true for only 38.0 percent of whites. Regarding abandoned buildings, almost 16 percent of low-income African-American renters have abandoned buildings in their neighborhoods, while only 8.9 percent of Hispanic and 6.1 percent of white low-income households have a similar problem.

It is interesting to note the remarkable consistency between owners and renters as to the basic factors that play a role in affecting the quality of their housing experience both with respect to structure and neighborhood. In simple terms, this fact suggests that to implement sound housing policy, policymakers can concentrate on a consistent set of housing and neighborhood factors. In addition, differences in a number of key characteristics, for both owners and renters, suggest ways in which gaps between minority and white housing circumstances could be improved. In particular, the housing experience could be better, for both lower-income African-American and Hispanic families if major structural problems and interior deterioration could be reduced. Such a goal is consistent with stricter building code enforcement, perhaps through point-of-turnover inspection requirements, and/or tax incentive programs, which encourage maintenance and improvements. Similarly, for both minority groups, programs to improve relations with the police and reduce crime could help reduce the gap between their perceived problems in these areas and those of white households. In addition, accessible green spaces and fewer abandoned buildings would also enhance minority's perceptions of their neighborhoods. For lower-income, Hispanic families to be on a par with other racial/ethnic groups problems with poor quality water need to be addressed, crowded conditions need to be overcome, and heating systems need to be improved.

7. Conclusions

There has been a substantial amount of recent academic and policy research to understand how to expand the homeownership opportunities for minority families. What becomes quite clear from this literature is that, in addressing this question from a policy perspective, analysts and policymakers need to develop a better understanding of differences in the housing situations faced by households with different racial/ethnic backgrounds (i.e., Hispanic, black, and white). That is to say, how much better is the quality of housing services provided by owned housing as compared to rental housing, and what is it specifically about families' housing that gives rise to observed differences in the perceived quality of the housing services they receive. In addition, how do perceptions of service quality differ for Hispanic as compared to other households?

One key to better understanding Hispanics' circumstances relative to other race/ethnicities is having enough Hispanic families to observe. To this end, utilizing a set of recent MSA samples of the American Housing Survey (AHS) provided many more Hispanic families (17,968 full sample, and 6,446 recent movers) than previously available in other datasets with extensive housing information. In this context, this study investigates several ways in which housing circumstances differ for Hispanics as compared to other racial/ethnic groups across a number of different housing markets.

Based upon our preliminary analysis of housing quality, size, and cost in Table 1a and 1b several observations are of interest:

- Irrespective of either minority status or level of income, the primary differential in both perceived neighborhood quality and housing quality stems from ownership status. Owners clearly perceive their situation as better than renters. As shown for the quality dimensions of structure and neighborhood in Table 1a, the difference between owners and renters appears particularly important for the structural quality of the housing unit (as compared with the quality of the neighborhood). Given this situation, it is not surprising that renters housing situations are categorized as inadequate more often than for owners.

- Low-income households, particularly Hispanics, have the largest differentials between renters' and owners' average rankings of neighborhood and dwelling structural quality. For low-income Hispanics, average structural quality ranges from 8.36 for owners to 7.39 for renters and for neighborhood quality the difference is 8.02 (owners) compared to 7.34 (renters).

- White households have a higher proportion of homeownership, white owners have higher house values, and white renters have higher rental payments than comparable minority families.

- Hispanic households, particularly low-income families, have higher levels of mortgage debt than do white households. Given the fact that their house values are lower than whites, this suggests a substantial difference in borrowing and/or loan terms for Hispanics.

- Hispanic households appear to be much more crowded than other households and, in addition, like black households, pay substantially more in housing cost per square foot than white households.

- Housing outcomes are generally worse for African American families in this sample than for Hispanics. Specifically, they are observed to have slightly lower rates of ownership and substantially lower valued homes and lower rents for both high- and low-income subgroups

Assessment of "quality" does not, of course, occur within a vacuum, but rather within the context of basic household decisions regarding homeownership and the amount to spend on an apartment or an owned home. In order to place the results for housing quality within both the context of the literature and our data, we also analyzed the likelihood of homeownership for Hispanic households and their pattern of housing values and rents. For example, as noted in the literature, different racial/ethnic groups may have different understanding of, access to, and proclivity to use financial markets and institutions for both saving and borrowing. For Hispanic families, differentials in socio-economic factors could have a significant impact on the timing and likelihood of homeownership and the level of housing values and rents. Our results suggest systematic problems for minority households. In particular:

- It is important to note that for minorities the likelihood of owning, house value for owners, and rents for renters are all lower than for white households when controlling for the socio-economic characteristics of the family and the market in which these housing choices were made.

- Even though house value is lower for Hispanic homeowners compared to whites, their associated monthly housing cost is higher. This is particularly true for low-income owners. This observation suggests some significant differentials in such factors as loan to value ratios and/or other mortgage terms, points and fees, etc. Of course these issues can be examined directly with the AHS. Such a comparison of mortgage characteristics across racial groups using the same AHS data base is the subject of a second paper that is part of this research project titled "Mortgage Pricing Differentials across Hispanic, Black, and White Households: Evidence from the American Housing Survey" (2006).

- For the full sample, which, in comparison to recent movers, represents housing and mortgage market decisions made over a longer period of time, Hispanic owners (particularly low-income owners) have relatively high mortgage debt on owned units compared to other households. However, in this regard recent Hispanic movers do better, i.e., their average level of debt is much closer to that of their white counterparts. This raises the question of whether this outcome may be related to differentials in home financing related to junior mortgages, home equity loans, refinancing loans, less financial expertise in obtaining loans, etc. That is, do mortgage terms and the use of mortgage financing differ between Hispanic families and other ethnicities?

- Recent immigrants are significantly less likely to be owners and, when they rent, they have significantly lower rental payments. However, if recent immigrants achieve ownership, their expenditure levels do not appear to be substantially different.

- On a positive note, the impact of rent subsidies in lowering rents for low-income households was significant. In the regression analysis of rent levels, rent subsidies had coefficient estimates that were negative and statistically significant for both recent movers and the full sample of households

- The results for households' assessments of both structural quality and neighborhood quality are important for housing policy in that there is a fundamental unanimity regarding the characteristics that define "quality".

In general, and perhaps not surprisingly, all households react in a similar manner to structural problems with their owner-occupied homes. Having external leaks, internal leaks, vermin problems, major structural problems, interior deterioration, etc. are viewed as lowering the quality of housing. For example, households who are on a public sewer system with a home's toilet systems and other plumbing working satisfactorily and a central heating system as opposed to space heaters perceive their housing to be of higher quality. Although these statements might seem predictable, the results shown in table 13, in general, dispel any myth of significant household differences in housing quality perceptions. To summarize, American households agree what defines good quality housing.

However, there are substantial differences in the mean quality levels by individual characteristics for households across minority status. Poor water quality issues are much worse for Hispanic households than black or white households. Similarly, low-income Hispanic households face more crowding and are more likely to have the poorest quality heating. Also, the deterioration of interior facilities (i.e., cracks, holes in walls or ceilings, holes in the floor, or broken plaster or peeling paint), and major structural problems appear much worse for minority households than whites.

Similar comments are applicable to the results for determinants of neighborhood quality. Again, what is striking in these results for neighborhood quality is the consistency across households by minority status in defining a good neighborhood versus a bad neighborhood. Crime problems, litter problems, noise problems, roads in need of repair, junk and abandoned buildings, etc. create undesirable neighborhoods. A neighborhood with green space, newer buildings, etc. is more desirable. Once again, American households generally seem to agree on what makes good neighborhoods. However, as with structure, there are few substantial differences in neighborhood characteristics across racial/ethnic groups. Most notably crime and inadequate police protection are more likely to be perceived by African-Americans and Hispanics, particularly those who are lower income. For those who own their homes, green space is less likely to be near minority homes. Consistent with their greater tendency to live in inner city locations, African-American owners and renters are both more likely to have abandoned buildings nearby. Finally, minority renters appear to be located in neighborhoods in which road repairs are more likely to be a concern.

In sum, while the housing experience for Hispanic and African American families is not as positive yet as that of their white counterparts, this analysis has demonstrated more specifically the exact magnitude and nature of those differences for a relatively large cross-section of households. Developing a better understanding of the specifics of such differences will improve our ability to take actions that promote equal housing opportunities for all Americans.

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Appendix A

List of Metropolitan Statistical Areas in the AHS for 1998, 2002, and 2004

Appendix A

American Housing Survey SMSA Sample Information

Sample Year	SMSA Code	SMSA Name	SMSA Median Income
2004	520	Atlanta, GA	$ 69,000
2004	1680	Cleveland, OH	$ 59,900
2004	2080	Denver, CO	$ 69,500
2004	3280	Hartford, CT	$ 73,900
2004	3480	Indianapolis, IN	$ 63,800
2004	4920	Memphis, TN	$ 54,100
2004	5560	New Orleans, LA	$ 49,900
2004	5880	Oklahoma City, OK	$ 52,100
2004	6280	Pittsburg, PA	$ 55,100
2004	6920	Sacramento, CA	$ 64,100
2004	7040	Saint Louis, MO	$ 65,900
2004	7240	San Antonio, TX	$ 51,500
2004	7600	Seattle, WA	$ 71,900
2002	360	Anaheim-Santa Anna-Garden Grove, CA	$ 75,600
2002	1280	Buffalo, NY	$ 50,800
2002	1520	Charlotte-Gastonia, NC	$ 64,100
2002	1840	Columbus, OH	$ 63,400
2002	1920	Dallas, TX	$ 66,500
2002	2800	Fort Worth-Arlington, TX	$ 61,300
2002	3760	Kansas City, KS-MO	$ 64,500
2002	5000	Miami-Hialeah, FL	$ 48,200
2002	5080	Milwaukee, WI	$ 67,200
2002	6200	Phoenix, AZ	$ 57,900
2002	6440	Portland, OR-WA	$ 57,200
2002	7280	San Bernadino-Riverside, CA	$ 50,300
2002	7320	San Diego, CA	$ 60,100
1998	720	Baltimore, MD	$ 55,600
1998	1000	Birmingham, AL	$ 44,000
1998	1120	Boston, MA	$ 60,000
1998	1640	Cincinnati, OH-KY-IN	$ 51,500
1998	3360	Houston, TX	$ 50,400
1998	5120	Minneapolis-St. Paul	$ 60,800
1998	5680	Newport News-Hampton, VA	$ 44,600
1998	5775	Oakland, CA	$ 63,300
1998	6480	Providence, RI	$ 46,900
1998	6840	Rochester, NY	$ 48,800
1998	7160	Salt Lake City-Ogden, UT	$ 48,200
1998	7360	San Francisco, CA	$ 68,600
1998	7400	San Hose, CA	$ 77,200
1998	8280	Tampa-Saint Petersburg-Clearwater, FL	$ 42,000
1998	8840	Washington, DC, MD, VA	$ 72,300

Appendix B

Selected Regression Tables for AHS Sample 2002 and 2004: Time In The United States

Table B-1
Sample: All Households in 2002 and 2004
Regression Coefficients and Significance[a,b,c]

Variable Names	Low Income, P(Own)		High Income, P(Own)		Low Income Owner, House Value[d]		High Income Owner, House Value[d]		Low Income Renter, Rent		High Income Renter, Rent	
Own Home	na		na		na		na		na		na	
Intercept	-0.93807	*	1.3472	*	260.5866	*	297.9933	*	749.1402	*	1186.8850	*
Rent Subsidy	na		na		na		na		-26.5670	*	-103.5764	***
Total Mort. Payments	na		na		na		na		na		na	
Unit - Condominium	na		na		na		na		na		na	
Unit - Owned Manf.	na		na		na		na		na		na	
High School Grad.	0.13110	*	0.2485	*	10.6687	*	14.8738	*	31.6601	*	88.6468	*
Post High School	0.20977	*	0.4138	*	21.4922	*	27.3006	*	69.6483	*	130.3886	*
College Graduate	0.43251	*	0.7140	*	62.7798	*	79.6498	*	116.0044	*	228.5309	*
Single Female	-0.78937	*	-1.1302	*	-20.9859	*	-35.4732	*	7.7141		-32.0119	**
Single Male	-0.97450	*	-1.5390	*	-25.3775	*	-21.6512	*	-12.3569	***	-43.8872	*
Family Size	0.09292	*	0.0753	*	3.3776	*	4.6903	*	29.8159	*	31.9178	*
Hosuehold Income	0.37088	*	0.0179	*	2.1299	**	3.2234	*	31.7760	*	1.2966	*
Age 24 or less	-1.71783	*	-1.6312	*	30.1190	*	3.8044		31.8218	*	-16.5469	*
Age 25 - 44	-0.84239	*	-0.8045	*	-0.2646		-7.0191	**	-0.4523		-20.7899	*
Age 62 or more	1.15089	*	0.6484	*	8.7331	*	15.5786	*	27.1972	*	81.5269	*
Savings 20k or more	1.23352	*	10.5870		29.8835	*	69.0976		162.1297	*	na	
Black	-0.74192	*	-0.6794	*	-20.7580	*	-36.3103	*	-53.8819	*	-97.2112	*
White Hispanic	-0.51505	*	-0.4069	*	-21.4140	*	-24.4089	*	-61.3960	*	-78.5908	*
Non-White Hispanic	-0.76231	*	-0.6482	*	-26.5512	*	-43.9960	*	-66.0189	*	-146.4973	*
Years in Residence	na		na		0.0756		-1.2049	*	-5.8669	*	-14.7361	*
First-time Owner	na		na		27.4957	*	66.1191	*	na		na	
Less than 5 Years in US	-0.73896	*	-0.9279	*	-9.9162		0.4730		-38.2796	*	-97.8302	*
5 - 12 Years in US	-0.42444	*	-0.4859	*	-7.5731		-7.3579		-26.2431	*	-64.3877	**
13 - 22 Years in US	0.06040		0.0426		-7.3530		6.9505		-17.0748		-69.7892	**
23 or more Years in US	0.30797	*	0.3750	*	4.1590		0.9481		-12.6175		-5.9086	
R^2	0.21946	[e]	0.16186	[e]	0.27400		0.31670		0.26850		0.30890	
Number of Obs.	26,476		19,723		12,389		15,700		13,992		3,543	

[a] The P(Own) Equations were estimated using Logit Analysis

[b] *, **, and *** represent significance at the 1%, 5%, and 10% levels respectively

[c] All regressions include discreate variables indicating in which of 41 SMSAs the housing units were located (over the 3 year time period: 1998, 2002, and 2004). For a complete list of these SMSAs see Appendix A.

[d] House Value in thousand dollar units

[e] For the logit equations the R^2 is computed as 1-[unrestricted ln likelihood function / restricted ln likelihood function]

Table B-2
Sample: Recent Movers in 2002 and 2004
Regression Coefficients and Significance[a,b,c]

Variable Names	Low Income, P(Own)		High Income, P(Own)		Low Income Owner, House Value[d]		High Income Owner, House Value[d]		Low Income Renter, Rent		High Income Renter, Rent	
Intercept	-2.9225	*	0.04901		241.3872	*	290.7388	*	794.3608	*	1214.8268	*
Rent Subsidy			na		na		na		-8.2941		-146.6555	***
Total Mort. Payments	na		na		na		na		na			
Unit - Condominium	na		na		na		na		na			
Unit - Owned Manf.	na		na		na		na		na			
High School Grad.	0.1318		0.24007	***	6.9391		18.3246		25.6676	*	121.9683	*
Post High School	0.2585	*	0.27938	**	25.4592	*	36.8824	*	68.5882	*	160.6264	*
College Graduate	0.6124	*	0.73281	*	51.1914	*	78.0295	*	110.4100	*	264.4750	*
Single Female	-0.6385	*	-1.07405	*	-27.1984	*	-38.7168	*	8.3580		-40.7509	**
Single Male	-0.9046	*	-1.32240	*	-25.6838	*	-20.4932	**	-9.7115		-43.8524	**
Family Size	0.1263	*	0.05309	**	1.8553		12.2060	*	35.2973	*	49.5141	*
Hosuehold Income	0.4455	*	0.00849	**	1.1981		5.7208	*	28.7280	*	1.5382	*
Age 24 or less	-1.0926	*	-0.74512	*	3.5019		-21.7522		16.1503	***	-17.9498	
Age 25 - 44	-0.3189	*	-0.20922	*	-7.0459		-18.0600	**	3.8745		-20.6127	
Age 62 or more	0.8506	*	0.36176	***	-1.8535		-13.5326		32.8029	**	56.5439	
Savings 20k or more	0.7376	*	11.02229		62.9920	*	281.0762	**	147.7788	*	na	
Black	-0.6716	*	-0.37539	*	-16.4175	**	-24.2182	*	-57.4875	*	-109.1982	*
White Hispanic	-0.6052	*	-0.25999	*	-39.8952	*	-20.9416	**	-65.1228	*	-77.1629	*
Non-White Hispanic	-0.3632	*	-0.20809	***	-28.4852	*	-44.9420	*	-66.8850	*	-150.6409	*
Years in Residence	na		na		-3.9505		-14.0587	*	-7.3104	***	-23.8713	**
First-time Owner	na		na		22.9903	*	41.7715	*	na			
Owned Prior to Move	0.8715	*	0.95431	*	11.8052	***	44.7192	*	25.3926	*	42.9647	**
Less than 5 Years in US	-0.1895		-0.40923	*	-1.1540		-4.4248		-63.6214	*	-97.6543	*
5 - 12 Years in US	0.1502		-0.11495		-3.6726		-2.6956		-36.2107	*	-41.7562	
13 - 22 Years in US	0.4860	*	0.28948		5.6428		-15.8701		-20.8422		-67.6456	
23 or more Years in US	0.4204	**	0.36927		30.4118	**	-10.2522		-23.1130		-35.6294	
R^2	0.17793	[e]	0.14900		0.27080	[e]	0.34970		0.28360		0.33390	
Number of Obs.	9,244		4,997		1,817		2,626		7,405		1,947	

[a] The P(Own) Equations were estimated using Logit Analysis

[b] *, **, and *** represent significance at the 1%, 5%, and 10% levels respectively

[c] All regressions include discreate variables indicating in which of 41 SMSAs the housing units were located (over the 3 year time period: 1998, 2002, and 2004). For a complete list of these SMSAs see Appendix A.

[d] House Value in thousand dollar units

[e] For the logit equations the R^2 is computed as 1-[unrestricted ln likelihood function / restricted ln likelihood function]

Table B-3
Sample: All Household's Years 2002 & 2004
Variable Means and Impact of Variables on the Likelihood of Homeownership

A: Low Income Households

Variable Names	Means			$Pr(Own)_{Black}$ minus $Pr(Own)_{White}$ [a,b]	$Pr(Own)_{Hisp.}$ minus $Pr(Own)_{White}$ [a,b]
	White	Black	Hispanic		
Own Home	0.62133	0.36959	0.39590	na	na
Intercept	na	na	na	na	na
High School Grad.	0.30008	0.30927	0.26118	0.064%	-0.273%
Post High School	0.31375	0.30715	0.19832	-0.074%	-1.296%
College Graduate	0.22372	0.11500	0.09002	-2.519%	-3.097%
Single Female	0.43903	0.58020	0.31082	-5.940%	5.436%
Single Male	0.23942	0.22660	0.19375	0.668%	2.384%
Family Size	1.89741	2.36042	3.13337	2.299%	6.152%
Hosuehold Income	2.60348	2.17358	2.48295	-8.524%	-2.400%
Age 24 or less	0.06735	0.08325	0.09385	-1.464%	-2.438%
Age 25 - 44	0.28580	0.43309	0.51926	-6.657%	-10.524%
Age 62 or more	0.39123	0.18944	0.15559	-12.453%	-14.521%
Savings 20k or more	0.07606	0.01047	0.01593	-4.334%	-3.974%
Black	0.00000	1.00000	0.00000	-38.766%	0.000%
White Hispanic	0.00000	0.00000	0.68400	0.000%	-23.282%
Non-White Hispanic	0.00000	0.00000	0.31600	0.000%	-33.618%
Less than 5 Years in US	0.00749	0.01811	0.16473	-0.421%	-6.211%
5 - 12 Years in US	0.00770	0.01834	0.13966	-0.242%	-2.997%
13 - 22 Years in US	0.00628	0.01646	0.10780	0.033%	0.328%
23 or more Years in US	0.02978	0.01023	0.10027	-0.322%	1.163%
All Metropolitan Areas				9.092%	0.548%
Number of Obs.	9874	8504	8098		

B: High Income Households

Variable Names	Means			$Pr(Own)_{Black}$ minus $Pr(Own)_{White}$ [a,b]	$Pr(Own)_{Hisp.}$ minus $Pr(Own)_{White}$ [a,b]
	White	Black	Hispanic		
Own Home	0.87049	0.75728	0.75998	na	na
Intercept	na	na	na	na	na
High School Grad.	0.18327	0.20717	0.22205	0.080%	0.130%
Post High School	0.30449	0.35806	0.31946	0.298%	0.084%
College Graduate	0.46760	0.34127	0.28655	-1.212%	-1.762%
Single Female	0.13374	0.24328	0.11178	-1.728%	0.328%
Single Male	0.14801	0.14698	0.13580	0.022%	0.253%
Family Size	2.85843	3.11422	3.60356	0.262%	0.752%
Hosuehold Income	11.62895	9.58385	9.89870	-0.495%	-0.418%
Age 24 or less	0.01537	0.02464	0.02591	-0.204%	-0.232%
Age 25 - 44	0.42645	0.49720	0.57291	-0.761%	-1.610%
Age 62 or more	0.12914	0.08567	0.06771	-0.380%	-0.539%
Savings 20k or more	0.00018	0.00028	0.00095	0.014%	0.109%
				0.000%	
Black	0.00000	1.00000	0.00000	-10.714%	0.000%
White Hispanic	0.00000	0.00000	0.74579	0.000%	-5.266%
Non-White Hispanic	0.00000	0.00000	0.25421	0.000%	-9.066%
				0.000%	
Less than 5 Years in US	0.00644	0.01316	0.08436	-0.083%	-0.987%
5 - 12 Years in US	0.00801	0.01960	0.08133	-0.076%	-0.483%
13 - 22 Years in US	0.00884	0.02492	0.07963	0.009%	0.041%
23 or more Years in US	0.01997	0.01764	0.08057	-0.012%	0.305%
All Metropolitan Areas				1.082%	-1.147%
Number of Obs.	10864	3572	5287		

[a] Probabilities are calculated at the means for the entire sample (all Whites, Blacks, and Hispanics) except for the variable in question which is evaluated at the mean for the denoted minority group and Whites respectively

[b] $Pr(Own) = 1 / (1 – e^{-X\beta})$; where $X\beta$ = a vector representing the sum of the product individual independent variable values (Xs) and estimated coefficients (βs). Pr(Own)minority = the probability of owning given all the variables in the regression are evaluated at the overall sample mean except the particular variable in question which is evaluated at the mean for the minority households. Pr(Own)white = the probability of owning given all the variables in the regression are evaluated at the overall sample mean except the particular variable in question which is evaluated at the mean for the white households. Pr(Own)minority – Pr(Own)white is expressed as a percenta of Pr(Own), the predicted average likelihood of ownership calculated at the mean for the mean for the overall sample. Thus, if for a given variable, xj, Pr(Own)minority = 0.40 and Pr(Own) white = 0.45 and Pr(Own) = 0.42 then the calcula for variable xj is [(0.40 – 0.45) /0.42] x 100 = 11.9 %

Table B-4
Sample: Recent Movers Years 2002 & 2004
Variable Means and Impact of Variables on the Likelihood of Homeownership

A: Low Income Households

Variable Names	Means			$Pr(Own)_{Black}$ minus $Pr(Own)_{White}$ [a,b]	$Pr(Own)_{Hisp.}$ minus $Pr(Own)_{White}$ [a,b]
	White	Black	Hispanic		
Own Home	0.28587	0.13251	0.19182	na	na
Intercept				na	na
High School Grad.	0.26256	0.31957	0.27820	0.641%	0.176%
Post High School	0.35652	0.33898	0.21088	-0.390%	-3.202%
College Graduate	0.26402	0.11525	0.08177	-7.914%	-9.627%
Single Female	0.46249	0.61418	0.31817	-7.993%	8.129%
Single Male	0.31755	0.24468	0.23025	5.552%	6.683%
Family Size	1.94792	2.42958	3.13987	5.030%	12.853%
Hosuehold Income	2.64539	2.11357	2.47053	-20.113%	-6.987%
Age 24 or less	0.18318	0.15747	0.17522	2.398%	0.737%
Age 25 - 44	0.46103	0.56857	0.60467	-2.948%	-3.922%
Age 62 or more	0.13693	0.05239	0.04580	-6.206%	-6.677%
Savings 20k or more	0.03423	0.00431	0.00769	-1.887%	-1.676%
Owned Prior to Move	0.33758	0.18367	0.18598	-11.660%	-11.493%
Black	0.00000	1.00000	0.00000	-53.615%	0.000%
White Hispanic	0.00000	0.00000	0.63172	0.000%	-43.064%
Non-White Hispanic	0.00000	0.00000	0.36828	0.000%	-18.601%
Less than 5 Years in US	0.01092	0.02681	0.20873	-0.259%	-3.188%
5 - 12 Years in US	0.01165	0.02496	0.15955	0.170%	1.899%
13 - 22 Years in US	0.01020	0.01572	0.08884	0.227%	3.271%
23 or more Years in US	0.01493	0.00555	0.04857	-0.335%	1.209%
All Metropolitan Areas				10.607%	5.458%
Number of Obs.	2746	3245	3253		

B: High Income Households

Variable Names	Means			$Pr(Own)_{Black}$ minus $Pr(Own)_{White}$ [a,b]	$Pr(Own)_{Hisp.}$ minus $Pr(Own)_{White}$ [a,b]
	White	Black	Hispanic		
Own Home	0.66278	0.55118	0.56871	na	na
Intercept				na	na
High School Grad.	0.17152	0.20472	0.22799	0.291%	0.494%
Post High School	0.30225	0.37303	0.32742	0.720%	0.257%
College Graduate	0.48210	0.34843	0.27866	-3.554%	-5.446%
Single Female	0.15612	0.24409	0.14123	-3.476%	0.580%
Single Male	0.24938	0.19980	0.20963	2.389%	1.919%
Family Size	2.68984	3.00591	3.44142	0.613%	1.454%
Hosuehold Income	11.15228	9.87937	8.73692	-0.394%	-0.749%
Age 24 or less	0.04788	0.05315	0.06016	-0.143%	-0.334%
Age 25 - 44	0.63031	0.67323	0.70044	-0.327%	-0.535%
Age 62 or more	0.04455	0.02953	0.02217	-0.198%	-0.295%
Savings 20k or more	0.00042	0.00000	0.00063	-0.167%	0.087%
Owned Prior to Move	0.48834	0.31791	0.34642	-5.938%	-4.927%
Black	0.00000	1.00000	0.00000	-14.033%	0.000%
White Hispanic	0.00000	0.00000	0.68524	0.000%	-8.861%
Non-White Hispanic	0.00000	0.00000	0.31476	0.000%	-5.613%
Less than 5 Years in US	0.01207	0.01476	0.13300	-0.040%	-1.809%
5 - 12 Years in US	0.00958	0.02657	0.09816	-0.071%	-0.372%
13 - 22 Years in US	0.00791	0.02362	0.07220	0.166%	0.678%
23 or more Years in US	0.01707	0.01280	0.04180	-0.058%	0.333%
All Metropolitan Areas				2.434%	-0.553%
Number of Obs.	2402	1016	1579		

[a] Probabilities are calculated at the means for the entire sample (all Whites, Blacks, and Hispanics) except for the variable in question which is evaluated at the mean for the denoted minority group and Whites respectively

[b] $Pr(Own) = 1 / (1 – e^{-X\beta})$; where $X\beta$ = a vector representing the sum of the product individual independent variable values (Xs) and estimated coefficients (βs). Pr(Own)minority = the probability of owning given all the variables in the regression are evaluated at the overall sample mean except the particular variable in question which is evaluated at the mean for the minority households. Pr(Own)white = the probability of owning given all the variables in the regression are evaluated at the overall sample mean except the particular variable in question which is evaluated at the mean for the white households. Pr(Own)minority – Pr(Own)white is expressed as a percentage of Pr(Own), the predicted average likelihood of ownership calculated at the mean for the mean for the overall sample. Thus, if for a given variable, xj, Pr(Own)minority = 0.40 and Pr(Own) white = 0.45 and Pr(Own) = 0.42 then the calculation for variable xj is [(0.40 – 0.45) /0.42] x 100 = 11.9 %

Appendix C

Assumptions Underlying Models Interpreting AHS 10-point Satisfaction Scale as Ordinal Utility Level

AHS 10-point scale is interpreted to be an ordinal utility index
Assuming that utility functions are strongly separable, the *j* th household's utility from its dwelling (U_j^N) can be expressed as a function of individual structural attributes $(X_i \;\; i = 1, \ldots, k)$,

$$U_j^{NG} = u_j (X_1 \ldots . , X_k) \quad (j = 1, \ldots , s), \tag{1}$$

where *G* represents a group identification variable. We hypothesize homogenous preference functions for households within a particular group but permit these functions to differ among groups. The utility function for households within the same group then can be defined over the set of structural attributes, and assuming it is linear in its parameters, can be expressed as:

$$U_j^{NG} = u_j^G (\mathbf{X}) = \Sigma \beta_i X_{ij} + \varepsilon_j , \tag{2}$$

with the stochastic term ε_j accounting for the influence of unobserved attributes of the neighborhood and random deviations in preferences from the average of the subgroup. It is assumed that the ε_j are distributed normally $(N(0, \sigma^2 I))$.

In principle, the ordinary least-squares regression model could be employed to estimate the relationship between utility and observed structural attributes. However, this model assumes an interval level dependent variable, which would require a cardinal measure of utility. As is well known, such a measure is not available. However, our data do provide an ordinal version of U_j^N for which the OLS model is satisfied. Households were asked to rank the overall quality of their dwelling on a 10-point scale, with a "1" indicating worst and a "10" best. We assume that greater utility levels from either the structure or the neighborhood are concomitant with higher rankings. This quality ranking therefore provides a utility measure of ordinal strength, namely I.

An estimating equation using I_j in lieu of U_j^N as the dependent variable can be derived by first noting that in the general case, if there are Z distinct structure/neighborhood rankings (R_m, $m = 1, \ldots, Z$), there must be Z + 1 hypothetical category boundaries (α_m, $m = 0, \ldots, Z$) such that the j_{it} household ranks its dwelling or neighborhood as a "1" (R_1) if $\alpha_0 < U_j^N < \alpha_1$ as a "2" (R_2) if $\alpha_1 < U_j^N < \alpha_2$, etc. In other words, we observe the *m*th ranking if the true (but nonobservable) value of cardinal utility falls within that category's boundaries (α_{m-1}, α_m). Since it has been assumed that U_j^N is normally distributed, the probability of observing the *m*th rank by the *j*th household can be expressed as:

$$P(R_{mj}) = F[(U_j^N - \alpha_{m-1})/ \sigma] - F[(U_j^N - \alpha_m)/ \sigma] \tag{3}$$

where F is the cumulative standard normal density function. Following the convention of setting $\alpha_0 = -\infty$, $\alpha_1 = 0$, and $\sigma^2 = 1$ and substituting from (2), then (3) can be rewritten as

$$P(R_{mj}) = F[\Sigma \beta_i X_{ij} - \alpha_{m-1}] - F[\Sigma \beta_i X_{ij} - \alpha_m] \quad (4)$$

Equation (4) estimates the conditional probability of observing a particular structure or neighborhood ranking. McKelvey and Zavoina (1975) have provided a model (namely, N-chotomous multivariate probit) that simultaneously provides estimates of the β and α vectors of (4) that are minimum variance and consistent. Furthermore, since the parameter estimates are obtained by maximum likelihood techniques, they are known to be asymptotically normally distributed, allowing for standard statistical tests.[30]

[30] In surveys such as the AHS, household responses are preferences as expressed by an ordinal ranking. In this regard, there is no significance to the "unit distance" between the set of observed values (as contrasted to traditional statistical analyses of metric data). Thus, the estimation procedure utilizes an additional set of "variables" (break points) that merely preserve the ranking criterion. These are shown in the tables below (starting with Table 4) as a numbered set of parameters denoted as "Mu's." These are included in the tables for purposes of completeness but in themselves have no economic or public policy interpretation.