Exploring Housing Conditions of Low-Income Minorities in the Southern United States

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Abstract

This study examined housing conditions of Southern low-income minorities in the United States, focusing on demographic and housing characteristics, and using data from the 2009 American Housing Survey. This paper presents a detailed profile of the demographic and housing characteristics of the 2,304 person sample. Bivariate analysis, focusing on the *housing adequacy* variable showed that people who were older, had less family income, were native born, had less than a high school education, lived in rural and suburban areas, and were less satisfied with their neighborhood were more likely to report inadequate housing. Living in inadequate housing was more likely to be associated with single family housing and less likely to be associated with renting for cash. A model was developed that hypothesized a relationship between demographic and housing characteristics and housing quality, where housing quality was measured by the respondents' perception of housing adequacy. The model was supported by the rejection of the null hypothesis and family income, geographic location, housing subsidies, neighborhood rating, structure size, and structure type were found to be significant variables. This study highlights both affordability and quality issues with respect to housing for low-income minorities in the Southern United States, and should be of interest to both researchers and policymakers.

Introduction

Anyone who generally tracks housing and demographic trends in the United States in recent years is doubtless aware of two key issues: 1) the depressed economy that has led to plummeting real estate values and concomitant foreclosures; and 2) the growing diversity of our population, especially as influenced by immigration. These trends are clearly evident in the Southern U.S. and interact to influence housing in the South. However, it is important to move beyond general trends to understand the specific influences on the housing conditions within a region. Further, within a region, particular demographic groups, such as low-income or minorities may be impacted in unique ways.

The purpose of this study was to examine housing conditions of Southern low-income minorities in the United States, focusing on demographic and housing characteristics, and to recommend future housing studies and policies related to U.S. minorities. A premise of the study was that housing conditions of the Southern low-income minorities were likely to be influenced by the on-going depressed economy because they may have limited demographic and housing resources.

The study defined the Southern United States to include: Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas (ICF International, 2009). Minority populations were defined as non-Whites. The study was based on the 2009 American Housing Survey national data (AHS).

Background

There are three major demographic and housing issues of minority populations, which are particularly noted in the Southern areas of the U.S.

Increasing number of minorities. The United States is currently experiencing rapid increases in minority populations. The combined Hispanic and Asian population was expected to represent about one fifth of the population in 2010, compared to only one-ninth in 1990 (Frey, 2006). As of 2007, minority populations consisted of 34% (102.5 million) of the total U.S. population (301.6 million). Hispanics were the largest and fastest-growing minority group with 45.5 million (15.1%), and Blacks were the second largest minority with 40.7 million (U.S. Census Bureau, 2008). From Frey's (2006) analyses based on U.S. Census sources, fast rates of Hispanic growth in the U.S. are seen in large metro areas in Southern areas such as North Carolina, Tennessee, Georgia, Florida, and Oklahoma.

Relatively lower income levels. According to the *State of the Nation's Housing 2010*, median incomes of minority households are lower than those of White households. For example, the median income for 35 to 44 years old minority-headed households was $45,000 in 2008 while that for Whites was $72,900 (The Joint Center for Housing Studies of [Harvard University], 2010).

According to the 2008 and 2009 *American Community Survey* of the Census Bureau, household incomes in 13 out of 17 states in the Southern U.S. were below the U.S. median (2009 U.S. median household income = $50,221). In the South, only Delaware, Maryland, the District of Columbia, and Virginia showed more than the median U.S. household income (Noss, 2010).

The 2009 *American Community Survey* data also indicates an estimated 14.3% of the U.S. population had income below the poverty threshold[1] in the past 12 months. Seventeen states had 16 or more percent of people living below poverty level. Among them, 14 states[2] were in the Southern areas defined for this study (Bishaw and Macartney, 2010).

Lower homeownership rate. Homeownership rates of minorities are considerably lower than those of Whites. From the U.S. Census Bureau *Housing Vacancy Survey*, the homeownership rate of minorities in 2009 was 49.7%, compared with 74.8% of that of Whites. Blacks showed the lowest homeownership rate with 46.6%, followed by Hispanics, 48.4% and Asian/Other, 59%. According to the annual housing study in 2010 by the Joint Center for Housing Studies of Harvard University, the rate of unemployment was 9.9% in April 2010 and the overall vacancy rate hit a record. This study also indicates that 40.3 million households spent more than 30 percent of their incomes on housing in 2008, while 18.6 million of these

[1] Poverty state is determined by comparing annual income to a set of dollar values called thresholds that vary by family size, number of children, and age of householder. If a family's before tax money income is less than the dollar value of their threshold, then that family and every individual in it are considered to be in poverty. For people not living in families, poverty status is determined by comparing the individual's income to his or her threshold (Bishaw and Macartney, 2010).

[2] These states are District of Columbia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas.

households spent more than half—up from 13.8 million in 2001 (Harvard University, 2010). It is easily assumed that there is increasing numbers of house-cost burden families in low-income families.

In summary, low-income minorities in the Southern U.S. are growing in number and proportion of the population. However, they tend to have relatively lower income levels than the population as a whole and are less likely to be homeowners. This suggests that a growing proportion of the regional population could be facing housing challenges due to limited resources and lack of access to home ownership. Therefore, data from the 2009 American Housing Survey (AHS) was used in this study to investigate the housing conditions of low-income minorities in the Southern U.S. to profile and examine demographic and housing characteristics.

Methodology

The methodology section includes (a) theoretical background, (b) the research questions, (c) sample selection, (d) data coding, and (e) data analysis procedures.

Theoretical Background

This research was based on the theory of housing adjustment (Morris and Winter, 1975, 1978, 1998) and adapted from Lee's study (2010). The theory of housing adjustment has been used extensively in housing research to investigate housing preferences and housing decisions (Steggell, Binder, Davidson, Vega, Hutton, and Rodecap, 2003), and to reveal the relationships among individual characteristics, housing, and neighborhoods (Morris and Winter, 1978). The theory describes the complex processes of American families making decisions about their housing and explains the relationships of individuals, housing, and neighborhoods within the social context (Morris and Winter, 1978).

The central themes of housing adjustment theory are: (a) housing adjustment represents a causal chain from housing conditions to dissatisfaction to adjustment behavior to adaptive behavior; (b) progress through the chain depends on the household members' ability to complete housing adjustment processes; and (c) the ability depends on the strengths of the various constraints (Morris and Winter, 1998). Further, according to the theory, housing norms (such as tenure status, structure type, and neighborhood) and constraints (such as low-income or low education levels) are important influential forces when members of a household need to decide about housing conditions. These forces lead households to either housing adjustment, adaptation to reduce housing deficits and problems, or continued dissatisfaction with their housing. One assumption of this study was that housing conditions of the Southern low-income minorities are likely to be severely influenced by the current decreased economy because they may have limited demographic and housing resources, which can be interpreted as constraints.

Research Questions

The following research questions directed this study.

1) What is the demographic profile of low-income minorities in the Southern U.S.?

2) What is the housing profile of low-income minorities in the Southern U.S.?
3) What are the relationships between demographic and housing characteristics and housing conditions of the low-income U.S. Southern minorities?

The following hypothesis was developed to address research question 3:

H_0 = Demographic and housing characteristics as a whole are not related with housing quality levels of low-income minorities in the Southern U.S.

The research model for the hypothesis appears in Figure 1. Housing conditions were considered as a representative term when investigating each householder's housing challenges in the United States. Therefore, the dependent variable (DV) was the housing quality levels, closely related to housing conditions; and was measured by perception of housing adequacy. This model focused on revealing: the overall relationships of demographic and housing variables (IVs) and adequacy of housing quality levels (DV).

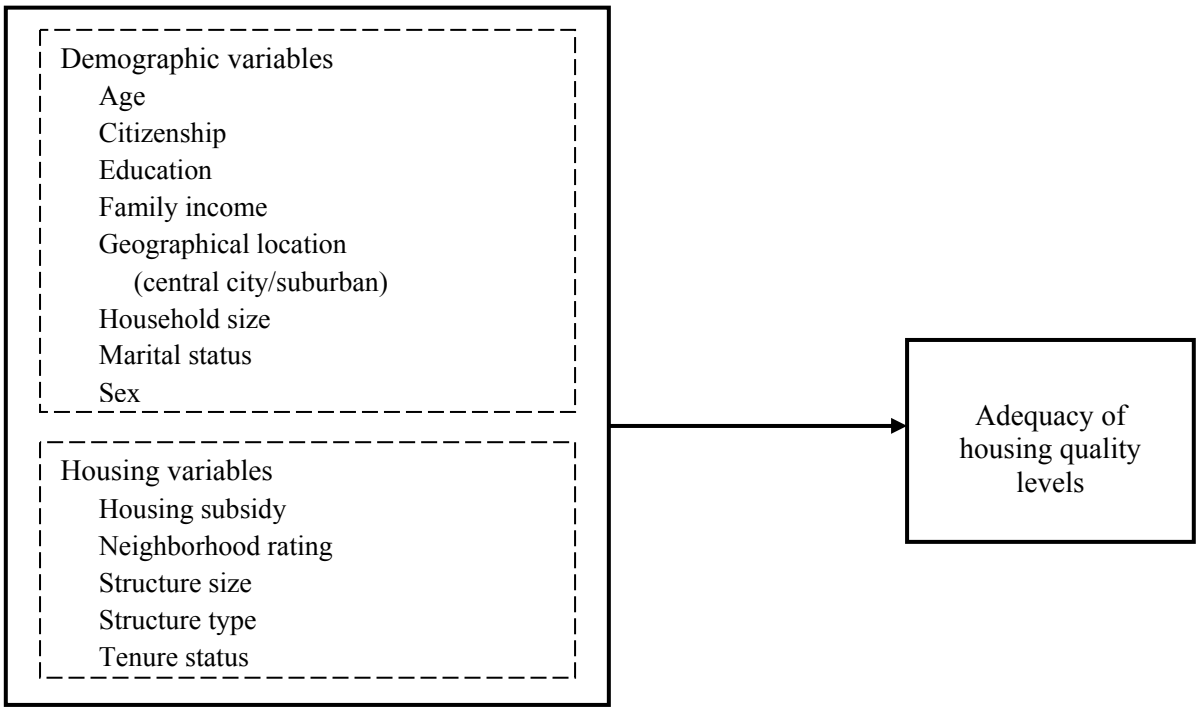


Figure 1. A research model.

Sample Selection

This study focused on Southern low-income minorities in the United States in the 2009 American Housing Survey (AHS) national sample. To select a subsample of the group, and determine eligibility for the study, the following procedures were used (Table 1 and Table 2).

1) A category, *South,* from a variable *REGION* was selected from the AHS 2009;

2) The variable, *race1,* was used when determining a minority group in the U.S. Southern areas. The variable related to race was categorized into 21 groups. *Minority* included all race categories (2-21) excluding *White Only* (1); and
3) A low-income group was developed from the Southern minority group by using the variable related to family income (*zinc*). If a household head earned family income less than $50,221 (2009 U.S. median household income), the head was considered as a low-income group.

The useable sample was 2,304 of low-income minority household heads in the Southern U.S., which was 70.5% of the total minority household heads in South (Table 1). Among the sample, majority was identified as the *Black Only* (86.5%), followed by *Asian Only* (5.4%) and *White/American Indian, Alaska Native* (2.9%) (Table 2).

Table 1

Summary of Useable Sample Numbers in this Study

	Total number of observations	Response number in South	% of total observations	Minority[a] household heads in South	% of total household heads in South[b]	Low-income[c] minority household heads in South	% of total minority household heads in South
AHS 2009	73,222	25,913	35.39	3,265	22.45	2,304	70.5

[a] From a variable, race1, *minority* means all race categories (2-21) excluding White only (1).
[b] Total household heads in South = 14,543.
[c] The *low-income* means those having family income less than $50,221, which is the 2009 U.S. median household income.

Table 2

Racial Distribution of Whites and Minorities by Income Levels in South

	Race as reported in 2009 AHS	High-income[b]	% of total	Low-income[c]	% of total	% within low-income minorities	Total	% of total
Whites	1 White only	4,905	33.7	6,373	43.8		11,278	77.5
Minorities[a]	2 Black Only	699	4.8	1,992	13.7	**86.5**	2,691	18.5
	3 American Indian, Alaskan Native Only	21	.1	58	.4	**2.5**	79	.5
	4 Asian Only	176	1.2	125	.9	**5.4**	301	2.1
	5 Hawaiian, Pacific Islander Only	7	.0	13	.1	**.6**	20	.1
	6 White/Black	7	.0	24	.2	**1.0**	31	.2
	7 White/American Indian, Alaska Native	32	.2	67	.5	**2.9**	99	.7
	8 White/Asian	4	.0	3	.0	**.1**	7	.0
	9 White/Hawaiian, Pacific Islander	2	.0	1	.0	**.0**	3	.0
	10 Black/American Indian, Alaska Native	7	.0	17	.1	**.7**	24	.2
	11 Black/Asian	0	.0	0	.0		0	.0
	12 Black/Hawaiian, Pacific Islander	1	.0	0	.0		1	.0
	13 American Indian, Alaska Native/Asian	0	.0	0	.0		0	.0
	14 Asian/Hawaiian, Pacific Islander	1	.0	0	.0		1	.0
	15 White/Black/American Indian, Alaska Native	3	.0	3	.0	**.1**	6	.0
	16 White/Black/Asian	0	.0	0	.0		0	.0
	17 White/American Indian, Alaska Native/Asian	0	.0	0	.0		0	.0
	18 White/Asian/Hawaiian, Pacific Islander	0	.0	0	.0		0	.0
	19 White/Black/American Indian, Alaska Native/Asian	1	.0	0	.0		1	.0
	20 Other combinations of 2 or 3 races	0	.0	0	.0		0	.0
	21 Other combinations of 4 or 5 races	0	.0	1	.0	**.0**	1	.0
	Total	5,866	40.3	8,677	59.7	**100[d]**	14,543	100

[a] From a variable, race1, *minority* means all race categories (2-21) excluding *white only* (1).

[b] The *high-income* means those having family income $50,221 and more. $50,221 is the 2009 U.S. median household income.

[c] The *low-income* means those having family income less than $50,221, which is the 2009 U.S. median household income.

[d] Total number of low-income minorities in South = 2,304.

Data Coding

Data analyses employed in this study included *direct logistic regression*, whose dependent variable was a categorical measurement scale and which allows accessing how well the set of predictor variables explains the categorical dependent variable. In this study, *housing quality level* was the dependent variable and measured with a single-item variable showing adequacy of housing (*zadeq*). In AHS 2009, the variable was a continuous variable, which employed a three rating scale, including *Adequate* (1), *Moderately inadequate* (2), and *Severely inadequate* (3). In this study, the variable was converted as a categorical variable having *Adequate* (1) and *Inadequate* (0). Table 3 shows how data was coded in the AHS 2009 national data; and the value labels and measurement scales for the study.

Table 3

Value Labels and Measurement Scale in this Study

	Construct	Variable names (Label)	Value labels in 2009		Value labels/measurement scale in this study	
Dependent variable						
Housing quality levels	Housing quality	zadeq (Adequacy of housing)	1 2 3 B	Adequate (1) Moderately inadequate (0) Severely inadequate (0) Not applicable	1 0	Adequate Inadequate **Categorical**
Independent variables						
Demographic variables	Age	age1/HHAGE (Age of household head)	0-120	0-120 years old	0-120	0-120 years old **Continuous**
	Citizenship	citshp1/HHCITSHP (U.S. Citizenship of head of household)	1 2 3 4 5 Blank	Native, born in US Native, born in Puerto Rico or US outlying area Native born abroad of US parent(s) Foreign born, US citizen by naturalization Foreign born, not a US citizen Not reported	1 2 3 4 5	Native, born in US Native, born in Puerto Rico or US outlying area Native, born abroad of US parent(s) Foreign born, US citizen by naturalization Foreign born, not a US citizen **Categorical**
	Education	grad1/HHGRAD (Educational level of household head)	31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	Less than 1st grade (1) 1st, 2nd, 3rd or 4th grade (1) 5th or 6th grade (1) 7th or 8th grade (1) 9th grade (1) 10th grade (1) 11th grade (1) 12th grade, no diploma (1) HIGH SCHOOL GRADUATE - high school DIPLOMA or equivalent (For example: GED) (2) Some college but no degree (3) Diploma or certificate from a vocational, technical, trade or business school beyond high school (3) Associate degree in college - Occupational/vocational program (3) Associate degree in college - Academic program (3) Bachelors degree (For example: BA, AB, BS) (4) Master's degree (For example: MA, MS, MEng, MEd, MSW, MBA) (4) Professional School Degree (For example: MD, DDS, DVM, LLB, JD) (4) Doctorate degree (For example: PhD, EdD) (4)	1 2 3 4	Less than high school High school graduate Some college or associate degree Bachelor's degree or more **Categorical**

(table continues)

Table 3 (Continued)

	Family income	zinc (Family income)	-10000 -9999 to -1 0 1 to 9999995 9999996 B	loss of $10,000 or more loss of $1to $9,999 no income income of $1-$9,999,995 income of $9,999,996 or more Not applicable	0 1 to 50221	no income $1 to $50,221	**Continuous**
						Log_{10} transformation for data analysis	**Continuous**
					1 2 3 4	Less than $25,000 $25,000 to $34,999 $35,000 to $49,999 $50,000 to $50,221	**Categorical**
	Geographical location	metro3 (Central city /Suburban)	1 2 3 4 5	Central city of MSA (1) Inside MSA, but not in central city – urban (1) Inside MSA, but not in central city – rural (2) Outside MSA, urban (2) Outside MSA, rural (3)	1 2 3	Urban Suburban Rural	**Categorical**
	Household size	per (Number of persons in household)	1-30	1-30 persons	1- 30	1-30 persons	**Continuous**
	Marital status	mar1/ HHMAR (Marital status of household head)	1 2 3 4 5 6 Blank	Married, SPOUSE PRESENT (0) Married, SPOUSE ABSENT (0) Widowed (1) Divorced (1) Separated (1) Never married (1) Not reported	0 1	Married Not married	**Categorical**
	Sex	sex1/HHSEX (Sex of household head)	1 2 Blank	Male (0) Female (1) Not reported	0 1	Male Female	**Categorical**
Housing variables	Housing subsidy	subrnt[a] (Government housing subsidy)	1 2 B D R Blank	Yes (1) No (0) Not applicable (2) Don't know (missing) Refused (missing) Not reported (missing)	0 1 2	No Yes Not applicable	**Categorical**
	Neighborhood rating	HOWN (Rating of neighborhood as place to live)	0 1-10	No neighborhood Rating (10 is best, 1 is worst)	1-10	Rating (10 is best, 1 is worst)	**Continuous**
	Structure size (Space)	BEDRMS (Number of bedrooms in unit)	0-10	0 to 10 full bedrooms	0-10	0-10 full bedrooms	**Continuous**

(table continues)

Table 3 (Continued)

Structure type	nunit2 (Structure type)	1	One-unit building, detached from any other building	1	One-unit building, detached from any other building
		2	One-unit building, attached to one or more buildings	2	One-unit building, attached to one or more buildings
		3	Building with two or more apartments	3	Building with two or more apartments
		4	Manufactured (mobile) home	4	Manufactured (mobile) home
		B	Not applicable		**Categorical**
Tenure	TENURE (Owner/ renter status of unit)	1	Owned or being bought by someone in your household	1	Own or buying
		2	Rented for cash rent	2	Rent for cash
		3	Occupied without payment of cash rent	3	No cash rent
		B	Not applicable		**Categorical**

From ICF International. (2009). *Codebook for the American Housing Survey, public use file: 1997 and later.*

[a] Long description in the AHS: *Does the Federal, State, or local government pay some of the cost of the unit?* (ICF International, 2009).

Data Analysis Procedures

The Statistical Package for the Social Sciences (SPSS) version 18 was used to describe and analyze data for this study. Mainly, descriptive statistics (frequencies, percentages, and means) were employed for the U.S. Southern low-income household heads' demographic and housing characteristics. Further, to assess bivariate associations, one-way analysis of variance was used to detect the association between the continuous independent variables (IVs) and the categorical dependent variable (DV); crosstabs were used to investigate the association between the categorical IVs and DV. To test the hypothesis, direct logistic regression was used. A significance level of α=.05 was chosen as the criterion for decision on rejecting the null hypotheses. A null hypothesis in this study was as follows:

H_0: Demographic and housing characteristics as a whole are not related with housing quality levels of low-income minorities in the Southern U.S.

Analysis: Direct logistic regression

Statistical hypothesis test: $H_0 : \beta_j = 0$ vs. $H_1 : \beta_j \neq 0$ *for* $j = 1 \sim 13$

A model for hypothesis:

$$ln\left[\frac{p}{1-p}\right] = \beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Citizenship}_i + \beta_3 \text{Education}_i + \beta_4 \text{Family Income}_i +$$
$$\beta_5 \text{Geographical Location}_i + \beta_6 \text{Household Size}_i + \beta_7 \text{Marital Status}_i +$$
$$\beta_8 \text{Sex}_i + \beta_9 \text{Housing Subsidy}_i + \beta_{10} \text{Neighborhood Rating}_i +$$
$$\beta_{11} \text{Structure Size}_i + \beta_{12} \text{Structure Type}_i + \beta_{13} \text{Tenure}_i + \varepsilon_i$$

Where "$ln\left[\frac{p}{1-p}\right]$" is the log odds (logit) of the dependent variable

Where β_0 is the constant

$_i$ = individual household head

β is the logistic regression coefficients

Results

Demographic and Housing Profile of the Sample of Low-Income Minorities in the Southern United States

Descriptive statistics of categorical variables related to the demographic and housing profile are provided in Table 4 and those of continuous variables are in Table 5. Almost 90% of the sample (N = 2,304, the total number of the U.S. Southern minority having family income less than $50,221) thought that their housing unit was adequate. Twelve percent of the sample was foreign-born. Average age of household head was almost 49 years. Education levels and family income were relatively low in that 59% reported education levels as a high school graduate or less and that 58% earned less than $25,000. The majority lived in urban areas (66%). Their household sizes were relatively small with M = 2.35 persons. Most were not married (76%) and

female (62%). Only 13% of the sample received a housing subsidy. Average structure size was 2.56 bedrooms. Almost half of the sample lived in a one-unit building, detached from any other building. Less than half of the sample (45%) was homeowners. The sample's neighborhood rating was relatively high, $M = 7.75$ (1 to 10 range).

Table 4

Demographic and Housing Profile: Categorical Variables (N = 2,304)

		n	*%*
Housing quality levels	Adequate	2052	89.1
	Inadequate	252	10.9
Citizenship	Native, born in U.S.	2002	86.9
	Native, born in Puerto Rico or US outlying area	19	.8
	Native born abroad of US parent(s)	19	.8
	Foreign-born, US citizen by naturalization	129	5.6
	Foreign-born, not a US citizen	135	5.9
Education	Less than high school	564	24.5
	High school graduate	785	34.1
	Some college or associate degree	663	28.8
	Bachelor's degree or more	292	12.7
Family income	Less than $25,000	1326	57.6
	$25,000 to $34,999	479	20.8
	$35,000 to $49,999	451	19.6
	$50,000 to $50,221	48	2.1
Geographical location (Central city/Suburban)	Urban	1511	65.6
	Suburban	488	21.2
	Rural	305	13.2
Marital status	Married	548	23.8
	Not married	1756	76.2
Sex	Male	869	37.7
	Female	1435	62.3
Housing subsidy[a]	No	925	40.1
	Yes	302	13.1
	Not applicable (for housing subsidy)	1027	44.6
Structure type	One-unit building, detached from any other building	1159	50.3
	One-unit building, attached to one or more buildings	133	5.8
	Building with two or more apartments	849	36.8
	Manufactured (mobile) home	163	7.1
Tenure status	Own or buying- regular	1027	44.6
	Rent for cash	1216	52.8
	No cash rent	61	2.6

[a] $n = 2,254$ for the housing subsidy. There were 50 missing values from the sample ($N = 2,304$).

Table 5

Demographic and Housing profile: Continuous Variables

	N	Min.	Max.	*M*	*SD*	Skewness Statistic	Kurtosis Statistic
Age	2,304	17	93	48.74	17.684	.293	-.747
Family income	2,304	0	50,200	21,564.13	14,257.454	.246	-.963
Family income[a]	2,197	0	5	4.21	.470	-2.250	8.081
Household size	2,304	1	14	2.35	1.520	1.482	3.268
Neighborhood rating[b]	2,193	1	10	7.75	2.078	-1.086	1.117
Structure size	2,304	0	7	2.56	.960	.248	.709

[a] Log transformation was used for *family income.*

[b] Scale: Scale: 1 = worst to 10 = best.

Association of demographic variables and housing quality levels. One-way analysis of variance (ANOVA) was employed to assess the association between continuous demographic variables (age, family income, and household size) and housing quality levels. When conducting ANOVA, three assumptions were also examined including normality of errors, homogeneity of variance of errors, and independent observations. Also, crosstabs were employed to assess whether the association between categorical demographic variables (citizenship, education, family income, geographical location, marital status, and sex) and the housing quality levels was statistically significant. The ANOVA tables showing significant mean differences among groups of each variable are provided in Table 6; and means plots, showing significant mean differences among groups of each variable are provided in Figure 2. Table 7 provides the significance level among the variables from the Chi-square tests. The results revealed that there were statistically significant associations between demographic factors and housing quality levels.

- Age [$F(1, 2302) = 10.569$, $p < .05$]: The average age of household heads who reported housing quality as inadequate ($M = 52.15$, $SD = 17.033$) was higher than those who reported housing quality as adequate ($M = 48.32$, $SD = 17.033$).

- Family income [$F(1, 2195) = 5.683$, $p < .05$; $\chi^2(3, N = 2304) = 15.367$, $p < .05$]): Those who lived in inadequate housing ($M = 4.14$, $SD = .434$) had less family income than those who lived in adequate housing ($M = 4.22$, $SD = .474$). From the Chi-square test regarding family income, the most influential cell was that those who had income *less than $25,000* lived in inadequate housing. The cell had more observed frequencies than expected, indicating that those who had income *less than $25,000* were more likely to live in inadequate housing.

- Citizenship [$\chi^2(4, N = 2304) = 16.543$, $p < .05$]: From the Chi-square test, the most influential cell was that those who were *native, born in US* lived in inadequate housing. The cell had more observed frequencies than expected, indicating those who were *native, born in US* were more likely to live in the inadequate housing.

- Education [$\chi^2(3, N = 2304) = 13.869$, $p < .05$]: From the Chi-square test, the most influential cell was that those who had *less than a high school education* lived in inadequate housing. The cell had more observed frequencies than expected, indicating that those who had *less than a high school education* were more likely to live in inadequate housing.

- Geographical location [$\chi^2(2, N = 2304) = 28.073, p < .05$]: From the Chi-square test, the most influential cell was that those in *urban areas* lived in inadequate housing. The cell had less observed frequencies than expected, indicating that those in *urban areas* were less likely to live in inadequate housing (i.e., those in *urban areas* were more likely to live in adequate housing).

Table 6

Result of One-Way ANOVA for Continuous Demographic Variables by Housing Quality Levels

(a) Age of household head by housing quality levels

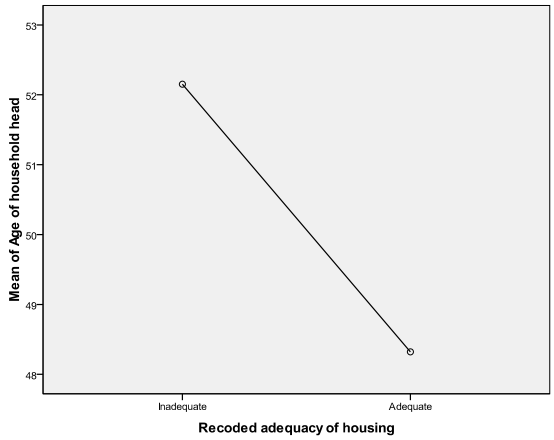
	SS	*df*	*MS*	*F*	*p*
Between Groups	3291.638	1	3291.638	10.569	.001*
Within Groups	716929.632	2302	311.438		
Total	720221.270	2303			

(b) Family income by housing quality levels

	SS	*df*	*MS*	*F*	*p*
Between Groups	1.254	1	1.254	5.683	.017*
Within Groups	484.390	2195	.221		
Total	485.645	2196			

* $p < .05$

(a) Age by housing quality levels



(b) Family income by housing quality levels

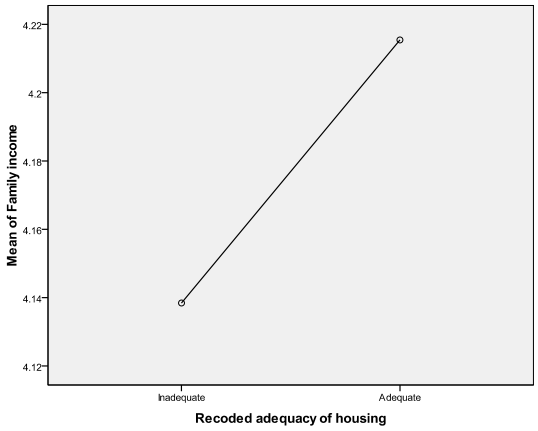


Figure 2. Means plots of continuous and demographic variables by housing quality levels.

Table 7

A Compound Matrix of Chi-square Analyses Results (Association between Categorical Demographic Variables and Housing Quality Levels)

	Citizenship	Education	Family income	Geographical location	Marital status	Sex
Housing quality levels	**.002***	**.003***	**.002***	**.000***	.439	.273

Note. Each value in a cell was p-value from Pearson's Chi-square test results. * $p < .05$

Association of housing variables and housing quality levels. One-way ANOVA was employed to investigate the association between continuous housing variables (neighborhood rating and structure size) and housing quality levels. Crosstabs were employed to assess whether the association between categorical housing variables (housing subsidy, structure type, and tenure status) and the housing quality levels was statistically significant. Table 8 and Figure 3 provide the ANOVA result and a means plot respectively, only showing significant mean differences; and Table 9 provides the significance level among the variables from the Chi-square tests. The results revealed that there were statistically significant associations between housing characteristics and housing quality levels.

- Neighborhood [$F(1, 2191) = 6.994$, $p < .05$]: For neighborhood rating, the mean of those who lived in adequate housing ($M = 7.79$, $SD = 2.026$) was significantly different from those who lived in inadequate housing ($M = 7.42$, $SD = 2.432$), indicating that those who lived in adequate housing were more satisfied with their neighborhood than those in inadequate housing.

- Structure type [$\chi^2(3, N = 2304) = 13.265$, $p < .05$]: From the Chi-square test, the most influential cell was that those living in *one-unit building, detached from any other building*, lived in inadequate housing. The cell had more observed frequencies than expected, indicating those living in *one-unit building, detached from any other building* were more likely to live in the inadequate housing.

- Tenure status [$\chi^2(2, N = 2304) = 6.121$, $p < .05$]: From the Chi-square test, the most influential cell was that those renting for cash lived in adequate housing. The cell had more observed frequencies than expected, indicating those renting for cash were more likely to live in the adequate housing.

Table 8

Result of One-Way ANOVA for Neighborhood Rating by Housing Quality Levels

Neighborhood rating by housing quality levels					
	SS	*df*	*MS*	*F*	*p*
Between Groups	30.111	1	30.111	6.994	.008
Within Groups	9433.427	2191	4.306		
Total	9463.539	2192			

* $p < .05$

Table 9

A Compound Matrix of Chi-square Analyses Results (Association between Categorical Housing Variables and Housing Quality Levels)

	Housing subsidy	Structure type	Tenure status
Housing quality levels	.246	**.004***	**.047***

Note. Each value in a cell was p-value from Pearson's Chi-square test results. * $p < .05$

Neighborhood rating by housing quality levels

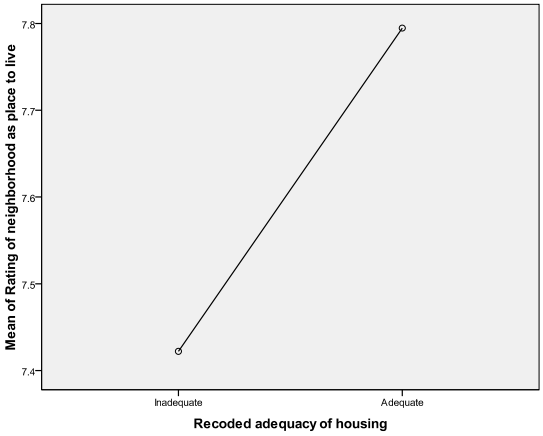


Figure 3. A means plot of neighborhood rating by housing quality levels.

Tests of Hypothesis

This study employed a categorical dependent variable. Therefore, logistic regression was employed because it is appropriate for testing hypotheses about relationships between a categorical outcome variable and one or more categorical or continuous predictor variables (Peng, Lee, and Ingersoll, 2002). An overall null hypothesis was proposed for the study.

Null hypothesis. *Demographic and housing characteristics as a whole are not related with housing quality levels of low-income minorities in the Southern U.S.* A direct logistic regression was employed to assess the relationships of housing quality levels of low-income minorities in the Southern U.S. and their demographic and housing characteristics. The dependent variable was coded as *1* if the household head responded that their housing quality level was adequate and *0* otherwise. Demographic predictors comprised age, citizenship, education, family income, geographical location (census region), household size, marital status, and sex; and housing variables were housing subsidy, neighborhood rating, structure size, structure type, and tenure status. For categorical independent variables, each category was compared with the reference group (see Footnotes in Table 10).

The full model was statistically significant with $\chi^2(24, N = 2{,}180) = 99.070$, $p < .05$, indicating that the model was able to distinguish between the respondents whose housing quality was adequate and whose housing quality was inadequate. Based on the value of Nagelkerke R^2 which provides an indication of the variation amount in the dependent variable explained by the model from a minimum value of 0 to a maximum of approximately 1(Pallant, 2007), the model as a whole explained 8.8% (Nagelkerke $R^2 = .088$) of the variance in housing quality levels. The value of Nagelkerke R^2 was low in this study, but it was the norm in logistic regression (Hosmer and Lemeshow, 2000; Walker, Bukenya, and Thomas, 2010). Overall 88.9% of respondents (1,937 out of 2,180) were correctly classified as those who had adequate housing quality. The Chi-square value for the Hosmer-Lemeshow Test was 9.685 with a significant level .288 ($p > .05$), indicating support for the model. For the Hosmer-Lemeshow Goodness of Fit Test, poor

fit is indicated by a significant value less than .05, and therefore, to support the model, the value should be greater than .05 (Pallant, 2007).

As shown in Table 10, the hypothesis that housing quality was significantly affected by demographic and housing characteristics was supported by findings that related family income levels [Family income (1) and (2) ($\chi^2 = 4.409$, $p < .05$ and $\chi^2 = 5.313$, $p < .05$ respectively)], geographical location [Census region (1) and (2) ($\chi^2 = 4.967$, $p < .05$ and $\chi^2 = 13.896$, $p < .05$ respectively)], housing subsidy [housing subsidy (1) ($\chi^2 = 4.332$, $p < .05$)], neighborhood rating ($\chi^2 = 11.387$, $p < .05$), structure size ($\chi^2 = 9.710$, $p < .05$), and structure type [structure type (2) ($\chi^2 = 6.548$, $p < .05$)].

Those having income, *$25,000 - $34,999,* were 1.5 times more likely to have adequate housing quality than those having their income, *less than $25,000*, when controlling for all other factors in the model (Odds Ratio = 1.522). Those having income, *$35,000 - $49,999* were 1.7 times more likely to have adequate housing quality than those having their income with *less than $25,000*, when controlling for other variables (Odds Ratio = 1.669). Those living in *suburban* and *rural* areas were .68 times and .50 times respectively less likely to have adequate housing condition than those living in urban areas, when controlling for all other variables (Odds Ratio = .676 and .459 respectively).

For a one point increase in the level of neighborhood rating and structure size, there was a likelihood of increases in household heads' housing adequacy by 12% (Odd Ratio = 1.115) and 39% (Odd Ratio = 1.390) respectively when controlling for other variables in the model. That means, the more neighborhood rating and structure size, the more likely it was that the household heads had adequate housing. Those having (federal, state, and local) government housing subsidies were 1.69 times more likely to express their housing condition as adequate than *those who did not receive government housing subsidies* (Odds Ratio = 1.690) when controlling for other variables in the model. Those living in *building with two or more apartments* were 1.82 times more likely to report their housing condition as adequate than *those living in one-unit building, detached from any other building* (Odds Ratio = 1.817) when controlling for other variables in the model. The regression coefficients of age, citizenship, education, household size, marital status, sex, and tenure were insignificant, implying that those variables had no effect on the adequate housing quality when controlling for other variables.

Briefly, H_0 was rejected and it was concluded that there was a relationship between demographic and housing characteristics and housing quality levels of low-income minorities in the Southern United States. Variables including family income, geographical location, housing subsidies, neighborhood rating, structure size, and structure type were statistically significantly related with housing quality levels when controlling for other variables.

Table 10

Logistic Regression Results for Hypothesis 1 (n=2,180)

Predictor	β	*SE* β	Wald's χ^2	*df*	*p*	Odds Ratio	95% C.I.for Odds Ratio Lower	Upper
Constant	-.030	.634	.002	1	.962	.970		
Age	-.009	.005	3.075	1	.080	.991	.982	1.001
Citizenship (1)[a]	18.939	9149.761	.000	1	.998	1.679E8	.000	.
Citizenship (2)[b]	18.841	9059.087	.000	1	.998	1.523E8	.000	.
Citizenship (3)[c]	.852	.435	3.842	1	.050	2.345	1.000	5.499
Citizenship (4)[d]	.829	.441	3.527	1	.060	2.290	.964	5.437
Education (1)[e]	.076	.182	.174	1	.677	1.079	.755	1.541
Education (2)[f]	.313	.205	2.338	1	.126	1.368	.916	2.043
Education (3)[g]	.234	.283	.680	1	.409	1.263	.725	2.201
Family income (1)[h]	**.420**	**.200**	**4.409**	**1**	**.036***	**1.522**	**1.028**	**2.253**
Family income (2)[i]	**.512**	**.222**	**5.313**	**1**	**.021***	**1.669**	**1.080**	**2.581**
Family income (3)[j]	-.311	.469	.438	1	.508	.733	.292	1.840
Census region (1)[k]	**-.392**	**.176**	**4.967**	**1**	**.026***	**.676**	**.479**	**.954**
Census region (2)[l]	**-.778**	**.209**	**13.896**	**1**	**.000***	**.459**	**.305**	**.691**
Household size	-.046	.060	.591	1	.442	.955	.849	1.074
Marital status[m]	.010	.195	.003	1	.960	1.010	.689	1.480
Sex[n]	.121	.152	.630	1	.427	1.128	.838	1.520
Housing subsidy (1)[o]	**.525**	**.252**	**4.332**	**1**	**.037***	**1.690**	**1.031**	**2.772**
Housing subsidy (2)[p]	.561	.357	2.468	1	.116	1.752	.870	3.526
Neighborhood rating	**.109**	**.032**	**11.387**	**1**	**.001***	**1.115**	**1.047**	**1.189**
Structure size	**.329**	**.106**	**9.710**	**1**	**.002***	**1.390**	**1.130**	**1.710**
Structure type (1)[q]	.756	.417	3.293	1	.070	2.131	.941	4.822
Structure type (2)[r]	**.597**	**.233**	**6.548**	**1**	**.011***	**1.817**	**1.150**	**2.870**
Structure type (3)[s]	.468	.277	2.861	1	.091	1.596	.928	2.745
Tenure (1)[t]	.326	.370	.777	1	.378	1.386	.671	2.862

Test		χ^2	*df*	*p*
Overall model evaluation		99.070	24	.000*
Goodness-of-fit test	Hosmer & Lemeshow	9.685	8	.288

Note. Dependent variable: housing quality level (1=adequate and 0=inadequate); Nagelkerke R^2 = .088; Model Prediction = 88.9%

[a] A value label, *Native, born in Puerto Rico or US outlying area*, was coded 1 and other value labels were coded 0. Native*, born in US* was a reference group.

[b] A value label, *Native born abroad of US parent(s)*, was coded 1 and other value labels were coded 0. Native*, born in US* was a reference group.

[c] A value label, *Foreign born, US citizen by naturalization,* was coded 1 and other value labels were coded 0. Native*, born in US* was a reference group.

[d] A value label, *Foreign born, not a US citizen*, was coded 1 and other value labels were coded 0. Native*, born in US* was a reference group.

[e] A value label, *High school graduate,* was coded 1, and other value labels were coded 0. *Less than high school* was a reference group.

[f] A value label, *Some college or associate degree,* was coded 1, and other value labels were coded 0. *Less than high school* was a reference group.

(Footnotes continue on next page)

Footnotes to Table 10, continued

[g] A value label, *Bachelor's degree or more,* was coded 1, and other value labels were coded 0. *Less than high school* was a reference group.
[h] A value label*, $25,000-$34,999,* was coded 1, and other value labels were coded 0. *Less than $25,000* was a reference group.
[i] A value label*, $35,000-$49,999,* was coded 1, and other value labels were coded 0. *Less than $25,000* was a reference group.
[j] A value label*, $50,000-$50,221,* was coded 1, and other value labels were coded 0. *Less than $25,000* was a reference group.
[k] A value label, *Suburban*, was coded 1, and other value labels were coded 0. *Urban* was a reference group.
[l] A value label, *Rural*, was coded 1, and other value labels were coded 0. *Urban* was a reference group.
[m] A value label, *Not married,* was coded 1, and Married was coded 0. *Married* was a reference group.
[n] A value label, *Female,* was coded 1, and Male was coded 0. *Male* was the reference group.
[o] A value label, *Yes*, was coded 1; other value labels were coded 0. *No* was a reference group.
[p] A value label, *Not applicable, was* coded 1; other value labels were coded 0. *No* was a reference group.
[q] A value label, *one-unit building, attached from any other building* was coded 1; other value labels were coded 0. *One-unit building,* detached from any other building, was a reference group.
[r] A value label, *building with two or more apartments* was coded 1; other value labels were coded 0. *One-unit building,* detached from any other building, was a reference group.
[s] A value label, *manufactured (mobile) homes* was coded 1; other value labels were coded 0. *One-unit building,* detached from any other building, was a reference group.
[t] A value label, *rent for cash*, was coded 1; and other value labels were coded 0. *Own or buying* was a reference group.

Discussion and Conclusion

This study examined housing conditions of Southern low-income minorities in the United States, focusing on demographic and housing characteristics. In this study, adequacy of housing quality was considered as a representative term when investigating each householder's housing conditions.

Summary

A profile of the Southern low-income minorities (Tables 4 and 5) in this study revealed the respondents to be predominately native to the U.S. (87%). They were more likely to be female (62%) and unmarried (76%). The average age was 49 years. While 34% of the study participants were high school graduates, 25% were not. Further, 57% reported family income as $25,000 or less, while the average household size was 2.35. The majority lived in urban areas (66%) in homes that averaged between 2 to 3 bedrooms in size. Only 45% respondents reported being homeowners, and 50% lived in single-family homes (one unit buildings detached from any other building). However, only 13% reported receiving a housing subsidy. A large majority (89%) indicated that their housing quality was adequate. Neighborhood ratings were also quite positive, rating nearly 8 on a scale of 1 to 10.

A closer look at the profile of the low-income minority households (Table 6 and 7; Figure 2) revealed factors influencing the perception of housing quality. Those respondents who reported housing quality as inadequate were older, had less family income (more likely to have income less than $25,000), more likely to be native born, have less than a high school education, and less likely to live in urban areas. In addition, those respondents who reported inadequate housing quality were less satisfied with their neighborhoods and were more likely to live in a one unit building detached from any other building. Conversely, those renting for cash were more likely to live in the adequate housing (Tables 8 and 9; Figure 3).

From the hypothesis test, variables influencing housing quality levels included family income, geographical location, housing subsidy, neighborhood rating, structure size, and structure type (Table 10). Those having slightly higher incomes, *$25,000 - $34,999 and $35,000 - $49,999*, were more

likely to have adequate housing quality than those having the lowest income (*less than $25,000)*. Those living in *suburban* and *rural* areas were less likely to have adequate housing conditions than those living in urban areas. The greater the neighborhood rating and the larger the structure size, the more likely it was that the household had adequate housing. Those having government housing subsidies were more likely to express their housing condition as adequate than those who did not receive subsidies. Those living in apartments were more likely to have adequate housing quality than those living in single detached homes.

Discussion

One of the interesting findings from this study is that 89% of the sample indicated that their housing was *adequate*. With limited income, the low-income minority respondents might develop unconventional housing preferences specifically by lowering their expectations and standards for housing quality. As long as minimum needs are met, such as separate bedrooms for parents and children, they might modify their standard and subsequently, be likely to perceive their housing conditions as adequate. This has been investigated in several previous low-income families' housing satisfaction research (Bruin and Cook, 1997; Priemus, 1986). Despite the high positive response to the question of housing adequacy, this study clearly revealed factors related to inadequate housing. This raises the question of whether respondent perception of housing adequacy was, in fact, a representative term for objective housing conditions.

Other important findings of this study were that those living in urban areas, living in apartment housing, and having housing subsidies were more likely to have adequate housing quality than their counterparts. In this study, more than half of the sample were renters (55.4%) and lived in urban area (65.6%). Renters and households living in apartments in urban areas may have more options for housing that meets their needs and be considered adequate than in rural areas. In addition, low-income families having homeownership in urban areas might not have adequate housing conditions because such homeowners may need more money to have regular home maintenance or repairs. From the Joint Center for Housing Studies (2010), the median home price in 2009 was $172,100. Assuming a 30-year mortgage with 10% down payment and 5% mortgage rate, a homeowner should pay $835 per month as an after-tax mortgage payment. Therefore, low-income minority households that are homeowners are likely to have purchased homes with below median prices which are more likely to be inadequate, and they would be more likely to be challenged to maintain these homes.

However, realistically, even renters in this study have housing affordability issues. In general, poor quality is closely related to affordability issues. Almost 50% of the low-income households living in inadequate housing paid more than 50% of their incomes for their housing (The Joint Center for Housing Studies, 2009). In this study, almost 60% had incomes of less than $25,000. A useful evaluation of the impact of low-income on housing can be determined by considering the idea of Fair Market Rents. A Fair Market Rent (FMR) is the Department of Housing and Urban Development's best estimate of what a household seeking a modest rental unit in a can expect to pay for *rent and utilities* in the current market, using approximately 30% of their income (Wardrip, Pelletier, and Crowley, 2009). In 2009, the national FMR for a 2 bedroom housing unit was $928 a month (Wardrip et al., 2009). To spend 30% of income for housing would require a household to earn $37,105. This is more than 78% of the sample of this study reported as income (Table 4), indicating that there is a big gap between their incomes and a

housing wage. Therefore, clearly, those households that received housing subsidies were less likely to be constrained by income and more likely to achieve adequate housing.

Implications

The results of this study have implications for researchers, educators, nonprofit organizations, and/or policymakers:

(a) Policymakers can refer to the research results in developing future housing or income related policies. From the study results, almost 60% of the sample had incomes less than $25,000 and 53% rented their homes. From this aspect, policymakers may consider how they will administer public income-oriented or housing programs.
(b) This study was based on housing adjustment theory and showed how the theory was applied to this research by making connections between housing quality levels and the housing deficits of low-income minorities in the Southern U.S. Therefore, the research framework in this study can be helpful when developing similar research.
(c) The results of study provided housing and demographic profiles of low-income minorities in the Southern U.S. Therefore, the findings of this study can be used as information for students in housing and social classes.
(d) Statistical methods of this study can be useful to show how data are treated and how secondary data can be analyzed based on this research.

Further Studies when Employing American Housing Survey Data

(a) In this study, we used a single variable regarding neighborhood condition instead of exploring several neighborhood related American Housing Survey (AHS) variables such as crime, traffic, school, and noise. In future, more advanced variables (i.e., combining such variables) could be considered when investigating relationships between housing quality levels and neighborhood condition.
(b) Within the AHS data coding, the variable related to race of head of household has been named as *RACE1, HHRACE, or RACE*. Since 2003, the variable was categorized into 21 groups (Table 2). In this study, we used a single file version, *race1* (*hhrace*) to develop a minority group from 21 race categories (Table 2); and the majority of the low-income minorities in the Southern U.S. were Blacks Only (87%). From the ICF International (2009), almost 93% of Hispanics are categorized as *White Alone* in AHS. It was a limitation of our study that the race variable did not allow us to include Hispanics as a minority. Therefore, if a researcher wants to explore a minority sample including Hispanics, one more variable from the AHS can be considered. The variable is named as *SPAN, SPAN1, or HHSPAN* (long description: *Is this person Hispanic or Spanish-American?*).

References

Bishaw, Alemayehu, and Suzanne Macartney. 2010. "Poverty: 2008 and 2009 – American Community Survey Briefs." Retrieved from http://www.census.gov/prod/2010pubs/acsbr09-1.pdf (accessed February 20, 2011).

Bruin, Marilyn J., and Christine C. Cook. 1997. "Understanding Constraints and Residential Satisfaction among Low-income Single-parent Families," *Environment and Behavior* 29(4): 532-554.

Frey, William, H. 2006. "America's Regional Demographics in the '00s Decade: The Role of Seniors, Boomers, and New Minorities." Retrieved from http://www.brookings.edu/~/media/ Files/ rc/reports/2006/1127_demographics_frey/1127_demographics_frey.pdf (accessed February 20, 2011).

Hosmer, David W., and Stanley Lemeshow. 2000. *Applied Logistic Regression.*2nd Ed. Hoboken, NJ: John Wiley & Sons.

ICF International. 2009. "Codebook for the American Housing Survey, Public Use File: 1997 and Later." Retrieved from http://www.huduser.org/Datasets/ahs/AHS_Codebook.pdf (accessed February 20, 2011).

Joint Center for Housing Studies of Harvard University. 2010. "The State of the Nation's Housing 2010." Retrieved from http://www.jchs.harvard.edu/publications/markets/son2010 /son2010.pdf (accessed February 20, 2011).

Joint Center for Housing Studies of Harvard University. 2009. "The State of the Nation's Housing 2009." Retrieved from http://www.jchs.harvard.edu/publications/markets/son2009/ son2009.pdf (accessed February 20, 2011).

Lee, Sung-jin. 2010. *Housing Challenges of Asian and Pacific Island Elders in the United States from 1995 to 2007* (Unpublished doctoral dissertation). Virginia Tech, Blacksburg, VA.

Morris, Earl, and Mary Winter. 1975. "A theory of Family Housing Adjustment," *The Journal of Marriage and the Family 37*(1): 79-88.

Morris, Earl W., and Mary Winter. 1978. *Housing, Family, and Society*. New York: John Wiley & Sons, Inc.

Morris, Earl W., and Mary Winter. 1998. "Housing Norms," in *The Encyclopedia of Housing*. Thousand Oaks, CA: Sage Publications Inc., 287-288.

Noss, Amanda. 2010. "Household Income for States: 2008 and 2009 – American Community Survey Briefs." Retrieved from http://www.census.gov/prod/2010pubs/acsbr09-2.pdf (accessed February 20, 2011).

Pallant, Julie. 2007. *SPSS: Survival Manual.* New York, NY: McGraw Hill, Open University Press.

Peng, Chao-Ying Joanne, Kuk Lida Lee, and Gary M. Ingersoll. 2002. "An Introduction to Logistic Regression Analysis and Reporting," *The Journal of Educational Research 96*(1): 3-14.

Priemus, Hugo. 1986. "Housing as a Social Adaptation Process," *Environment and Behavior 18*(1): 31-52.

Steggell, Carmen D., Susan K. Binder, Lori A. Davidson, Pat R. Vega, Eric D. Hutton, and Amelia R. Rodecap. 2003. "Exploring Theories of Human Behavior in Housing Research," *Housing and Society 30*(1): 3-32.

U.S. Census Bureau. 2008. "U.S. Hispanic Population Surpasses 45 Million Now 15 Percent of Total." Retrieved from http://www.census.gov/newsroom/releases/archives/population/cb08-67.html (accessed February 20, 2011).

Walker, Stevon, James O. Bukenya, and Terrence Thomas. 2010. "Examining Students' Perceptions of Globalization and Study Abroad Programs at HBCUs." Retrieved from http://ageconsearch.umn.edu/bitstream/56481/2/SAEA2010_Selected_Paper_Walker.pdf (accessed February 20, 2011).

Wardrip, Keith E., Danilo Pelletiere, and Sheila Crowley. 2009. "Out of Reach 2009." National Low Income Housing Coalition. Retrieved from http://www.nlihc.org/oor/oor2009/oor2009 pub.pdf (accessed February 20, 2011).