Exploring Housing Challenges of Low-Income Minority Populations in the Southern United States

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Abstract

This study examined the housing challenges of low-income minority populations living in the Southern United States (the South), focusing on demographic and housing characteristics, and using data from the 2009 American Housing Survey. When investigating housing challenges, housing adequacy was considered to be a representative term and was used as the dependent variable. This article presents a detailed profile of the demographic and housing characteristics of the sample of 2,304 householders. Bivariate analysis, with 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 live in 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 the respondents' housing adequacy levels. 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 article highlights both affordability and quality issues regarding housing for low-income minority populations in the South and topics that are of interest to both researchers and policymakers.

Introduction

Those who have tracked housing and demographic trends in the United States in recent years are likely to be aware of two key trends: (1) the distressed economy has led to plummeting real estate values and has increased the number of foreclosures, and (2) the population's diversity is growing and is especially influenced by immigration. These trends are especially evident in the Southern United States (the South) and interact to influence housing in the South. It is important to move beyond general trends to understand the specific influences on a region's housing challenges, however. Within a region, particular demographic groups, such as low-income or minority households, may be affected in unique ways.

The purpose of this study was to examine housing challenges of low-income minority populations in the South, focusing on demographic and housing characteristics, and to recommend future housing studies and policies related to U.S. minority populations. A premise of the study was that housing environments of the low-income minority populations in the South were likely to be influenced by the ongoing distressed economy because they may have limited demographic and housing resources.

The study defined the South to include Delaware, Maryland, the District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas (Econometrica, Inc., 2011). Minority populations were defined as non-White. The study was based on the 2009 American Housing Survey (2009 AHS) national data.

Background

Minority populations in the South face at least three major demographic and housing issues: (1) the increasing number of minority residents, (2) relatively lower income levels, and (3) lower homeownership rates and higher worst case needs for renters.

Increasing Number of Minority Residents

The United States is currently experiencing a rapid increase in minority (non-White) populations. The combined Hispanic and Asian population represented about 21.1 percent of the U.S. population in 2010. Between 2000 and 2010, the Hispanic population increased 43.0 percent and the Asian population increased 43.3 percent (U.S. Census Bureau, 2011). From the 2010 U.S. Census, minority populations consisted of 36.3 percent (111.9 million) of the total U.S. population (308.7 million). The Hispanic population was the largest and fastest growing minority group, with 50.5 million (16.3 percent), and the Black population was the second largest minority group, with 38.9 million (12.6 percent). In terms of geographical distribution, the largest minority population, at 45.8 million, lived in the South, followed by 33.9 million in the West (Humes, Jones, and Ramirez, 2011).

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-year-old minority-headed households was $45,000 in 2008, whereas the median income for the same age group for White-headed households was $72,900 (JCHS, 2010).

According to the 2008 and 2009 American Community Surveys (ACSs) of the Census Bureau, household incomes in 13 out of 17 states in the South were below the U.S. median income (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 ACS data also indicate an estimated 14.3 percent of the U.S. population had incomes below the poverty threshold[1] in the past 12 months. The survey shows that 16 states and the District of Columbia had 16 percent or more of the population living below the poverty level. Among that group, 13 states[2] and the District of Columbia are located in the South, as defined for this study (Bishaw and Macartney, 2010).

Lower Homeownership Rates and Higher Worst Case Needs for Renters

Homeownership rates for the minority populations are considerably lower than those for the White population. The U.S. Census Bureau *Housing Vacancy Survey* indicates that the homeownership rate for the minority population was 49.7 percent in 2009 compared with 74.8 percent for the White population. The Black population had the lowest homeownership rate, 46.6 percent, followed by the Hispanic population, 48.4 percent, and Asian/Other, 59 percent. According to the annual study in 2010 by the Joint Center for Housing Studies of Harvard University, 40.3 million households spent more than 30 percent of their incomes on housing in 2008, while 18.6 million of these households spent more than one-half of their income—up from 13.8 million in 2001. This study also indicated that the rate of unemployment was 9.9 percent in April 2010 and the overall vacancy rate of housing for rent, for sale, or held off the market hit a record high in 2009 (JCHS, 2010). It is easily assumed that an increasing number of families in low-income groups are housing-cost burdened.

Low-income American renters are suffering housing-cost burdens. The U.S. Department of Housing and Urban Development (HUD) (HUD, 2011) reports worst case housing needs by using AHS data, providing information on critical problems facing low-income American renters. "Worst case needs" is defined as "very low-income renters with incomes below 50 percent of the area median income who do not receive government housing assistance and who either paid more than one-half of their income for rent or lived in severely inadequate conditions, or who faced both of these challenges" (HUD, 2011: vii). The report emphasizes that the number of renters experiencing worst

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[1] Poverty state is determined by comparing annual income with a set of dollar values called thresholds, which vary by family size, number of children, and age of householder. If a family's before-tax income is less than the dollar value of its 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 an individual's income with his or her threshold (Bishaw and Macartney, 2010).

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

case needs increased more than 20 percent, from 5.91 million in 2007 to 7.10 million in 2009. The Hispanic population experienced the largest increase in worst case needs in that 45 percent of all very low-income Hispanic renters faced worst case needs in 2009, an increase of 8 percent from the 2007 rate. Among all renters with worst case needs, non-Hispanic Black and Hispanic renters each comprised about 23 percent of the total. Regarding the geography of worst case needs, the South had the highest number of income-burdened renters by a significant margin, although the incidence of worst case needs in the South was similar to the average. Three causes were pivotal in the increase in worst case needs: renters' income losses, lack of rental assistance, and competition for affordable rental units (HUD, 2011).

Theoretical Background

This research was based on the theory of housing adjustment (Morris and Winter, 1998, 1978, 1975) and was 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 et al., 2003) and to reveal the relationships among individual characteristics, housing, and neighborhoods (Morris and Winter, 1978). The theory describes the complex processes that American families use to make 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 (1) housing adjustment represents a causal chain from housing conditions to dissatisfaction and adjustment behavior to adaptive behavior, (2) progress through the chain depends on the household members' ability to complete housing adjustment processes, and (3) the ability to adjust depends on the strengths of the various constraints (Morris and Winter, 1998).

According to the theory, housing norms and constraints are important influential forces when members of a household need to evaluate housing conditions. Morris and Winter (1975) suggest five types of American housing norms: housing space, tenure, structure type, quality, and neighborhood (location). Typical housing norms in the United States prescribe homeownership (an example of tenure norm); single-family dwellings (an example of structure type norm); an adequate number of rooms, especially sleeping spaces, for the number of household members of each age and sex category; and private outdoor space (Morris and Winter, 1998). Quality norms are more likely to be subjective and are most likely to be congruent with income. Neighborhood norms are related to the location of the unit and the nature of the area, which are important determinants of the family's satisfaction with the dwelling and of its ability to complete nonhousing goals; for example, the quality of the children's education is greatly determined by the location of the dwelling (Morris and Winter, 1975). Constraints may interfere with people's ability to live in normative housing conditions. The five categories of constraints are (1) *resources* (income, wealth, information, skills, and time), (2) *family organization* (the household's ability to effectively make and implement decisions about its housing), (3) the *housing market* (prices, supplies of housing, building materials, and mortgage money), (4) *predispositions* (psychological characteristics of household members—apathy, ambition, and so on), and (5) *discrimination* (because of race, ethnicity, sex, age, disability, or

social class) (Morris and Winter, 1998). 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 is that the low-income minority populations in the South are likely to face housing challenges from the current distressed economy because they may have limited demographic and housing resources, which can be interpreted as constraints to housing adjustment.

In summary, low-income minority populations in the South are growing in number and proportion of the population. They tend to have relatively lower income levels than the population as a whole and are less likely to be homeowners. These facts suggest that a growing proportion of the regional population could be facing housing challenges because of limited resources and a lack of access to homeownership. Data from the 2009 AHS were used in this study to investigate the housing challenges of low-income minority populations in the South to profile and examine demographic and housing characteristics.

Methodology

The methodology section includes (1) research questions and hypothesis, (2) research framework, (3) sample selection, (4) data coding, and (5) data analysis procedures.

Research Questions and Hypothesis

The following research questions directed this study:

1. What is the demographic profile of low-income minority populations in the South?

2. What is the housing profile of low-income minority populations in the South?

3. What are the relationships between demographic and housing characteristics and housing adequacy of low-income minority populations in the South?

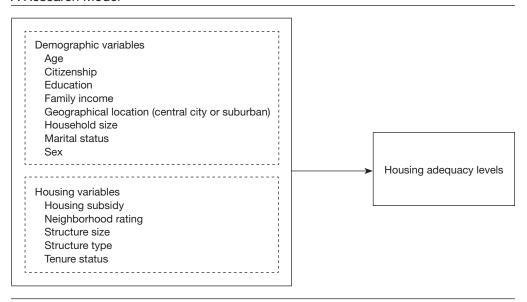The following hypothesis was developed to address research question 3:

H_0 = Demographic and housing characteristics as a whole are not related to housing adequacy of low-income minority populations in the South.

Research Framework

To implement the study purpose, a research framework was developed based on the housing adjustment theory (Morris and Winter, 1978) and related previous research (exhibit 1). Housing adequacy was considered as a representative term when investigating each householder's housing challenges in the United States. To measure housing challenges, a housing adequacy level was used as a dependent variable in this study. The framework focused on revealing the overall relationships between demographic and housing variables (independent variables [IVs]) and housing adequacy levels (dependent variable [DV]) of low-income minority populations in the South (exhibit 1).

Exhibit 1

A Research Model

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│  │ Demographic variables                           │ │
│  │    Age                                          │ │
│  │    Citizenship                                  │ │
│  │    Education                                    │ │
│  │    Family income                                │ │
│  │    Geographical location (central city or suburban) │ │
│  │    Household size                               │ │
│  │    Marital status                               │ │
│  │    Sex                                          │ │
│  └─────────────────────────────────────────────────┘ │
│                                                       │
│  ┌─────────────────────────────────────────────────┐ │
│  │ Housing variables                               │ │
│  │    Housing subsidy                              │ │
│  │    Neighborhood rating                          │ │
│  │    Structure size                               │ │
│  │    Structure type                               │ │
│  │    Tenure status                                │ │
│  └─────────────────────────────────────────────────┘ │
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Housing adequacy levels

Sample Selection

This study focused on low-income minority populations in the South in the 2009 AHS national sample. To select a subsample of the group and determine eligibility for the study, the following procedures were used (exhibits 2 and 3):

1. A category, *South*, from the variable *REGION* was selected from the 2009 AHS.

2. A variable, *race1*, was used when determining a minority group in the South. The variable related to race was categorized into 21 groups. *Minority* included all race categories (2-21) excluding *White Only* (1).

3. A low-income group was developed from the minority group in the South by using the variable related to family income (*zinc*). If a householder earned a family income of less than $50,221 (2009 U.S. median household income), the householder was considered part of a low-income group.

The useable sample was 2,304 low-income minority householders in the South, which was 70.5 percent of the total minority householders in the South (exhibit 2). Among the sample of householders, most identified themselves as *Black Only* (86.5 percent), followed by *Asian Only* (5.4 percent), and *White/American Indian, Alaska Native* (2.9 percent) (exhibit 3).

Exhibit 2

Summary of Useable Sample Numbers in This Study

Total Number of Observations	Response Number in the South	Percent of Total Observations	Minority[a] House-holders in the South	Percent of Total House-holders in the South[b]	Low-Income[c] Minority House-holders in the South	Percent of Total Minority House-holders in the South
2009 AHS 73,222	25,913	35.39	3,265	22.45	2,304	70.50

AHS = American Housing Survey.

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

[b] *Total householders in the South = 14,543.*

[c] *Low-income means those having family incomes of less than $50,221, which was the 2009 median household income in the United States.*

Data Coding

Data analysis employed in this study included *direct logistic regression* where the DV used a categorical measurement scale that revealed how well the set of predictor variables explained the categorical DV. Exhibit 4 shows how data were coded in the 2009 AHS national data and also shows the value labels and measurement scales for the study. In this study, *housing adequacy level* was the DV, measured with a single-item variable showing adequacy of housing (*zadeq*). In the 2009 AHS, the variable was a roughly continuous variable, which employed a three-rating scale, including *adequate* (1), *moderately inadequate* (2), and *severely inadequate* (3). For this study, the variable was converted to a categorical variable having *adequate* (1) and *inadequate* (0). *Moderately inadequate* (2) and *severely inadequate* (3) were recoded as *inadequate* (0) in this study.

Housing Adequacy Variable in the AHS

In the AHS data, the housing adequacy variable was constructed from AHS disrepair-related variables based on plumbing, heating, electricity, upkeep problems, and kitchen equipment (only applied when measuring moderately inadequate). *Severely inadequate* was assigned if the housing unit met one of the following four conditions: (1) unit had fewer than two full bathrooms and at least one of the following—no hot and cold running water, no bathtub or shower, no flush toilet, and shared plumbing facilities; (2) unit was cold for 24 hours or more and had more than two breakdowns of the heating equipment lasting longer than 6 hours; (3) electricity was not used; or (4) unit had exposed wiring, not every room had working electrical plugs, and the fuses had blown more than twice in past year. Also, *severely inadequate* was assigned if the unit met five or six of the following six upkeep problems: (1) outside water leaks in the past 12 months, (2) inside water leaks in the past 12 months, (3) holes in the floor, (4) open cracks wider than a dime, (5) an area of peeling paint larger than 8 by 11 inches, or (6) rats in past 3 months. *Moderately inadequate* was assigned if the unit met three or four of the upkeep problems of the housing unit. Also, *moderately inadequate* was assigned if the housing unit met one of the following three conditions: (1) unit had more than two breakdowns of the toilet that lasted longer than 6 hours; (2) main heating equipment was unvented room heaters burning kerosene, gas, or oil; or (3) unit was lacking complete kitchen facilities. *Adequate* was assigned if a unit was neither severely nor moderately inadequate (Econometrica, Inc., 2011; Vandenbroucke, 2011).

Exhibit 3

Racial Distribution of White and Minority Householders in the South by Income Levels

	Race as Reported in the 2009 AHS	High Income Level[b]	Percent of Total	Low Income Level[c]	Percent of Total	Percent Among Low-Income Minority Householders	Total	Percent of Total
White householders	1 White Only	4,905	33.7	6,373	43.8		11,278	77.5
Minority[a] householders	2 Black Only	699	4.8	1,992	13.7	**86.5**	2,691	18.5
	3 American Indian, Alaskan Native Only	21	0.1	58	0.4	**2.5**	79	0.5
	4 Asian Only	176	1.2	125	0.9	**5.4**	301	2.1
	5 Hawaiian, Pacific Islander Only	7	0.0	13	0.1	**0.6**	20	0.1
	6 White/Black	7	0.0	24	0.2	**1.0**	31	0.2
	7 White/American Indian, Alaska Native	32	0.2	67	0.5	**2.9**	99	0.7
	8 White/Asian	4	0.0	3	0.0	**0.1**	7	0.0
	9 White/Hawaiian, Pacific Islander	2	0.0	1	0.0	**0.0**	3	0.0
	10 Black/American Indian, Alaska Native	7	0.0	17	0.1	**0.7**	24	0.2
	11 Black/Asian	0	0.0	0	0.0		0	0.0
	12 Black/Hawaiian, Pacific Islander	1	0.0	0	0.0		1	0.0
	13 American Indian, Alaska Native/Asian	0	0.0	0	0.0		0	0.0
	14 Asian/Hawaiian, Pacific Islander	1	0.0	0	0.0		1	0.0
	15 White/Black/American Indian, Alaska Native	3	0.0	3	0.0	**0.1**	6	0.0
	16 White/Black/Asian	0	0.0	0	0.0		0	0.0
	17 White/American Indian, Alaska Native/Asian	0	0.0	0	0.0		0	0.0
	18 White/Asian/Hawaiian, Pacific Islander	0	0.0	0	0.0		0	0.0
	19 White/Black/American Indian, Alaska Native/Asian	1	0.0	0	0.0		1	0.0
	20 Other combinations of two or three races	0	0.0	0	0.0		0	0.0
	21 Other combinations of four or five races	0	0.0	1	0.0	**0.0**	1	0.0
	Total	5,866	40.3	8,677	59.7	**100.0[d]**	14,543	100.0

AHS = American Housing Survey.

Note: Numbers may not sum to column totals because of rounding.

[a] From a variable, race1, minority means all race categories (2–21) excluding White Only (1).

[b] High income refers to those having family incomes of $50,221 or more; $50,221 was the 2009 median household income in the United States.

[c] Low income refers to those having family incomes of less than $50,221, which was the 2009 median household income in the United States.

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

Exhibit 4

Value Labels and Measurement Scale in This Study (1 of 4)

Construct	Variable Name (Label)	Coding Value	Value Label in the 2009 AHS	Coding Value	Value Label and Measurement Scale in This Study
Dependent variable					
Housing adequacy levels	zadeq (Adequacy of housing)	1	Adequate (1)	1	Adequate
		2	Moderately inadequate (0)	0	Inadequate
		3	Severely inadequate (0)		
		B	Not applicable		**Categorical**
Independent variables					
Demographic variables	age1/HHAGE (Age of householder)	0–120	0–120 years old	0–120	0–120 years old **Continuous**
	citshp1/HHCITSHP (U.S. citizenship of householder)	1	Native, born in the United States	1	Native, born in the United States
		2	Native, born in Puerto Rico or U.S. outlying area	2	Native, born in Puerto Rico or U.S. outlying area
		3	Native, born abroad of U.S. parent(s)	3	Native, born abroad of U.S. parent(s)
		4	Foreign born, U.S. citizen by naturalization	4	Foreign born, U.S. citizen by naturalization
		5	Foreign born, not a U.S. citizen	5	Foreign born, not a U.S. citizen
		Blank	Not reported		**Categorical**
Education	grad1/HHGRAD (Educational level of householder)	31	Less than 1st grade (1)	1	Less than high school
		32	1st, 2nd, 3rd, or 4th grade (1)		
		33	5th or 6th grade (1)		
		34	7th or 8th grade (1)		
		35	9th grade (1)		
		36	10th grade (1)		
		37	11th grade (1)		

Exhibit 4

Value Labels and Measurement Scale in This Study (2 of 4)

Construct	Variable Name (Label)	Coding Value	Value Label in the 2009 AHS	Coding Value	Value Label and Measurement Scale in This Study
		38	12th grade, no diploma (1)		
		39	HIGH SCHOOL GRADUATE—high school DIPLOMA or equivalent (for example, GED) (2)	2	High school graduate
		40	Some college but no degree (3)	3	Some college or associate's degree
		41	Diploma or certificate from a vocational, technical, trade, or business school beyond high school (3)		
		42	Associate's degree in college—occupational/vocational program (3)		
		43	Associate's degree in college—academic program (3)		
		44	Bachelor's degree (e.g., BA, AB, BS) (4)	4	Bachelor's degree or more
		45	Master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA) (4)		
		46	Professional school degree (e.g., MD, DDS, DVM, LLB, JD) (4)		
		47	Doctorate degree (e.g., PhD, EdD) (4)		
					Categorical
Family income	zinc (Family income)	– 10,000	Loss of $10,000 or more	0	No income
		– 9,999 to – 1	Loss of $1 to $9,999		
		0	No income		
		1 to 9,999,995	Income of $1 to $9,999,995	1 to 50,220	$1 to $50,220
		9,999,996	Income of $9,999,996 or more		
		B	Not applicable		**Continuous**

Exhibit 4

Value Labels and Measurement Scale in This Study (3 of 4)

Construct	Variable Name (Label)	Coding Value	Value Label in the 2009 AHS	Coding Value	Value Label and Measurement Scale in This Study
					Log_{10} transformation for data analysis **Continuous**
				1	Less than $25,000
				2	$25,000 to $34,999
				3	$35,000 to $49,999
				4	$50,000 to $50,220
					Categorical
Geographical location	metro3 (Central city or suburban)	1	Central city of MSA (1)	1	Urban
		2	Inside MSA, but not in central city—urban (1)		
		3	Inside MSA, but not in central city—rural (2)	2	Suburban
		4	Outside MSA, urban (2)		
		5	Outside MSA, rural (3)	3	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 householder)	1	Married, SPOUSE PRESENT (0)	0	Married
		2	Married, SPOUSE ABSENT (0)		
		3	Widowed (1)	1	Not married
		4	Divorced (1)		
		5	Separated (1)		
		6	Never married (1)		
		Blank	Not reported		
					Categorical
Sex	sex1/HHSEX (Sex of householder)	1	Male (0)	0	Male
		2	Female (1)	1	Female
		Blank	Not reported		
					Categorical

Exhibit 4

Value Labels and Measurement Scale in This Study (4 of 4)

Construct	Variable Name (Label)	Coding Value	Value Label in the 2009 AHS	Coding Value	Value Label and Measurement Scale in This Study
Housing variables					
Housing subsidy	subrnt[a] (Government housing subsidy)	1	Yes (1)	0	No
		2	No (0)	1	Yes
		B	Not applicable (2)	2	Not applicable
		D	Don't know (missing)		
		R	Refused (missing)		
		Blank	Not reported (missing)		**Categorical**
Neighborhood rating	HOWN (Rating of neighborhood as place to live)	0	No neighborhood	1–10	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
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 or 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**

AHS = American Housing Survey.

[a] Long description in the AHS: Does the Federal, State, or local government pay some of the cost of the unit?

Source: Econometrica, Inc. (2011)

Data Analysis Procedures

The Statistical Package for the Social Sciences (SPSS) version 18 was used to analyze data for this study. Descriptive statistics (frequencies, percentages, and means) were employed for the demographic and housing characteristics of low-income householders in the South. Further, to assess bivariate associations, one-way analysis of variance was used to detect the association between the continuous IVs and the categorical DV; crosstabs were used to investigate the association between the categorical IVs and the DV. To test the hypothesis, a direct logistic regression was used. A significance level of $\alpha = 0.05$ was chosen as the criterion for decision on rejecting the null hypotheses. The null hypothesis in this study was as follows:

H_0: Demographic and housing characteristics as a whole are not related to housing adequacy of low-income minority populations in the South.
Analysis: Direct logistic regression
Statistical hypothesis test: $H_0 : \beta_j = 0$ vs. $H_1 : \beta_j \neq 0$ *for j = 1~13*
A model for hypothesis:

$$ln\left[\frac{p}{1-p}\right] = \beta_0 + \beta_1 Age_i + \beta_2 Citizenship_i + \beta_3 Education_i + \beta_4 Family\ Income_i +$$
$$\beta_5 Geographical\ Location_i + \beta_6 Household\ Size_i + \beta_7 Marital\ Satus_i +$$
$$\beta_8 Sex_i + \beta_9 Housing\ Subsidy_i + \beta_{10} Neighborhood\ Rating_i +$$
$$\beta_{11} Structure\ Size_i + \beta_{12} Structure\ Type_i + \beta_{13} Tenure_i + \varepsilon_i$$

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 householder

β is the logistic regression coefficinet.

Results

This section provides a demographic and housing profile of low-income minority householders in the South and discusses bivariate relationships between the housing adequacy levels and demographic and housing characteristics of those householders, and a result of the hypothesis test.

Demographic and Housing Profile of the Sample of Low-Income Minority Householders in the South

Descriptive statistics of categorical variables related to the demographic and housing profile are provided in exhibit 5 and those of continuous variables are in exhibit 6. Nearly 90 percent of low-income householders in the South (*N* = 2,304, the total number of minority householders in the South having family incomes of less than $50,221) had adequate housing units. Of the householders, 12 percent were foreign born. The average age of the householders was nearly 49 years.

Education and family income levels were relatively low; 59 percent of the householders reported education levels as a high school graduate or less and 58 percent earned less than $25,000. Most of the respondents lived in urban areas (66 percent). Their household sizes were relatively small with *M* = 2.35 persons. Most were not married (76 percent) and were female (62 percent). Only 13 percent of the householders received a housing subsidy. The average structure size was 2.56 bedrooms. Nearly one-half of the householders lived in a one-unit building, detached from any other building. Less than one-half (45 percent) of the householders were homeowners. The householders' neighborhood rating was relatively high, *M* = 7.75 (1 to 10 range).

Exhibit 5

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

		n	%
Housing adequacy level	Adequate	2,052	89.1
	Inadequate	252	10.9
Citizenship	Native, born in United States	2,002	86.9
	Native, born in Puerto Rico or U.S. outlying area	19	0.8
	Native, born abroad of U.S. parent(s)	19	0.8
	Foreign born, U.S. citizen by naturalization	129	5.6
	Foreign born, not a U.S. 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	1,326	57.6
	$25,000 to $34,999	479	20.8
	$35,000 to $49,999	451	19.6
	$50,000 to $50,220	48	2.1
Geographical location (Central city or suburban)	Urban	1,511	65.6
	Suburban	488	21.2
	Rural	305	13.2
Marital status	Married	548	23.8
	Not married	1,756	76.2
Sex	Male	869	37.7
	Female	1,435	62.3
Housing subsidy[a]	No	925	40.1
	Yes	302	13.1
	Not applicable (for housing subsidy)	1,027	44.6
Structure type	One-unit building, detached from any other building	1,159	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	1,027	44.6
	Rent for cash	1,216	52.8
	No cash rent	61	2.6

N = total number in a sample. n = number in a subsample.

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

Exhibit 6

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

	N	Min.	Max.	*M*	*SD*	Skewness Statistic	Kurtosis Statistic
Age	2,304	17	93	48.74	17.684	0.293	– 0.747
Family income	2,304	0	50,200	21,564.13	14,257.454	0.246	– 0.963
Family income[a]	2,197	0	5	4.21	0.470	– 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	0.960	0.248	0.709

M = mean. N = total number in a sample. SD = standard deviation.

[a] Log transformation was used for family income.

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

Association of Demographic Variables and Housing Adequacy 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 adequacy 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 the categorical demographic variables (citizenship, education, family income, geographical location, marital status, and sex) and the housing adequacy levels were statistically significant. The ANOVA tables showing significant mean differences among groups of each variable are provided in exhibit 7. Means plots showing significant mean differences among groups of each variable are provided in exhibit 8. Exhibit 9 provides the significance level among the variables from the Chi-square tests. The results revealed statistically significant associations between demographic factors and housing adequacy levels.

- **Age** [$F(1, 2,302) = 10.569$, $p < 0.05$]: The average age of householders who lived in *inadequate* housing ($M = 52.15$, $SD = 17.033$) was higher than the average age of those who lived in *adequate* housing quality ($M = 48.32$, $SD = 17.033$).

- **Family income** [$F(1, 2,195) = 5.683$, $p < 0.05$; $\chi^2(3, N = 2,304) = 15.367$, $p < 0.05$]): Those who lived in inadequate housing ($M = 4.14$, $SD = 0.434$) had less family income than those who lived in adequate housing ($M = 4.22$, $SD = 0.474$). From the Chi-square test regarding family income, the most influential cell was that those who had incomes of *less than $25,000* lived in inadequate housing. The cell had more observed frequencies than expected, indicating that those who had incomes of *less than $25,000* were more likely to live in inadequate housing.

- **Citizenship** [$\chi^2(4, N = 2,304) = 16.543$, $p < 0.05$]: From the Chi-square test, the most influential cell was that those who were *native, born in the United States* lived in inadequate housing. The cell had more observed frequencies than expected, indicating that those who were *native, born in the United States* were more likely to live in inadequate housing.

- **Education** [$\chi^2(3, N = 2,304) = 13.869, p < 0.05$]: 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** [$\chi^2(2, N = 2,304) = 28.073, p < 0.05$]: From the Chi-square test, the most influential cell was that those in *urban areas* lived in inadequate housing. The cell had fewer observed frequencies than expected, indicating that those in *urban areas* were less likely to live in inadequate housing (that is, those in *urban areas* were more likely to live in adequate housing).

Briefly, those respondents who lived in inadequate housing were older, had less family income (were more likely to have incomes of less than $25,000), were more likely to be native born, had less than a high school education, and were less likely to live in urban areas (exhibits 7, 8, and 9).

Exhibit 7

Result of One-Way ANOVA for Continuous Demographic Variables by Housing Adequacy Levels
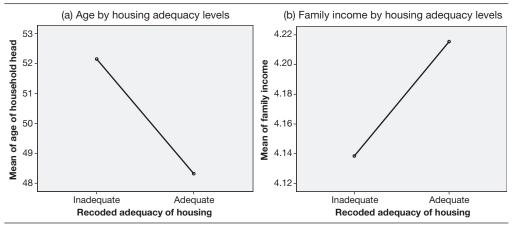
	SS	df	MS	F	p
(a) Age of householder by housing adequacy levels					
Between groups	3,291.638	1	3,291.638	10.569	0.001*
Within groups	716,929.632	2,302	311.438		
Total	720,221.270	2,303			
(b) Family income by housing adequacy levels					
Between groups	1.254	1	1.254	5.683	0.017*
Within groups	484.390	2,195	0.221		
Total	485.645	2,196			

ANOVA = analysis of variance. df = degree of freedom. F = Fisher's F ratio. MS = mean square. p = probability. SS = sum of squares.

* p < 0.05.

Exhibit 8

Means Plots of Continuous and Demographic Variables by Housing Adequacy Levels

(a) Age by housing adequacy levels   (b) Family income by housing adequacy levels

Exhibit 9

A Compound Matrix of Chi-Square Analyses Results (Association Between
Categorical Demographic Variables and Housing Adequacy Levels)

	Citizenship	Education	Family Income	Geographical Location	Marital Status	Sex
Housing adequacy levels	0.002*	0.003*	0.002*	0.000*	0.439	0.273

Note: Each value in a cell was p-value from Pearson's Chi-square test results.
* p < 0.05.

Association of Housing Variables and Housing Adequacy Levels

One-way ANOVA was employed to investigate the association between continuous housing variables (neighborhood rating and structure size) and housing adequacy levels. Crosstabs were employed to assess whether the association between the categorical housing variables (housing subsidy, structure type, and tenure status) and the housing adequacy levels were statistically significant. Exhibits 10 and 11 provide the ANOVA result and a means plot, respectively, only showing significant mean differences. Exhibit 12 provides the significance level among the variables from the Chi-square tests. The results revealed statistically significant associations between housing characteristics and housing adequacy levels.

- **Neighborhood** [$F(1, 2,191) = 6.994$, $p < 0.05$]: 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 living in inadequate housing.

- **Structure type** [$\chi^2(3, N = 2,304) = 13.265$, $p < 0.05$]: From the Chi-square test, the most influential cell was that those living in a *one-unit building, detached from any other building* lived in inadequate housing. The cell had more observed frequencies than expected, indicating that those living in a *one-unit building, detached from any other building* were more likely to live in inadequate housing.

- **Tenure status** [$\chi^2(2, N = 2,304) = 6.121$, $p < 0.05$]: 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 that those renting for cash were more likely to live in adequate housing.

Exhibit 10

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

	SS	df	MS	F	p
Between groups	30.111	1	30.111	6.994	0.008
Within groups	9,433.427	2,191	4.306		
Total	9,463.539	2,192			

ANOVA = analysis of variance. df = degree of freedom. F = Fisher's F ratio. MS = mean square. p = probability. SS = sum of squares.
* p < 0.05.

Exhibit 11

A Means Plot of Neighborhood Rating by Housing Adequacy Levels

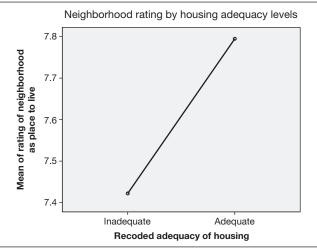Neighborhood rating by housing adequacy levels

Exhibit 12

A Compound Matrix of Chi-Square Analyses Results (Association Between Categorical Housing Variables and Housing Adequacy Levels)

	Housing Subsidy	Structure Type	Tenure Status
Housing quality levels	0.246	0.004*	0.047*

Note: Each value in a cell was p-value from Pearson's Chi-square test results.
* p < 0.05.

Those respondents who lived in inadequate housing 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 adequate housing (exhibits 10, 11, and 12).

Tests of Hypothesis

This study employed a categorical DV. 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).

Null hypothesis: Demographic and housing characteristics as a whole are not related to housing adequacy of low-income minority populations in the South. A direct logistic regression was employed to assess the relationships of housing adequacy levels of low-income minority populations in the South and their demographic and housing characteristics. The DV was coded as *1* if the householder lived in *adequate* housing and *0* otherwise. Demographic predictors were age, citizenship, education, family income, geographical location (census region), household size, marital status, and sex. Housing variables were housing subsidy, neighborhood rating, structure size, structure type, and tenure status. For categorical IVs, each category was compared with the reference group (see footnotes in exhibit 13).

Exhibit 13

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

Predictor	β	SE β	Wald's χ^2	df	p	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Constant	– 0.030	0.634	0.002	1	0.962	0.970		
Age	– 0.009	0.005	3.075	1	0.080	0.991	0.982	1.001
Citizenship (1)[a]	18.939	9,149.761	0.000	1	0.998	1.679E8	0.000	—
Citizenship (2)[b]	18.841	9,059.087	0.000	1	0.998	1.523E8	0.000	—
Citizenship (3)[c]	0.852	0.435	3.842	1	0.050	2.345	1.000	5.499
Citizenship (4)[d]	0.829	0.441	3.527	1	0.060	2.290	0.964	5.437
Education (1)[e]	0.076	0.182	0.174	1	0.677	1.079	0.755	1.541
Education (2)[f]	0.313	0.205	2.338	1	0.126	1.368	0.916	2.043
Education (3)[g]	0.234	0.283	0.680	1	0.409	1.263	0.725	2.201
Family income (1)[h]	0.420	0.200	4.409	1	0.036*	1.522	1.028	2.253
Family income (2)[i]	0.512	0.222	5.313	1	0.021*	1.669	1.080	2.581
Family income (3)[j]	– 0.311	0.469	0.438	1	0.508	0.733	0.292	1.840
Census region (1)[k]	– 0.392	0.176	4.967	1	0.026*	0.676	0.479	0.954
Census region (2)[l]	– 0.778	0.209	13.896	1	0.000*	0.459	0.305	0.691
Household size	– 0.046	0.060	0.591	1	0.442	0.955	0.849	1.074
Marital status[m]	0.010	0.195	0.003	1	0.960	1.010	0.689	1.480
Sex[n]	0.121	0.152	0.630	1	0.427	1.128	0.838	1.520
Housing subsidy (1)[o]	0.525	0.252	4.332	1	0.037*	1.690	1.031	2.772
Housing subsidy (2)[p]	0.561	0.357	2.468	1	0.116	1.752	0.870	3.526
Neighborhood rating	0.109	0.032	11.387	1	0.001*	1.115	1.047	1.189
Structure size	0.329	0.106	9.710	1	0.002*	1.390	1.130	1.710
Structure type (1)[q]	0.756	0.417	3.293	1	0.070	2.131	0.941	4.822
Structure type (2)[r]	0.597	0.233	6.548	1	0.011*	1.817	1.150	2.870
Structure type (3)[s]	0.468	0.277	2.861	1	0.091	1.596	0.928	2.745
Tenure (1)[t]	0.326	0.370	0.777	1	0.378	1.386	0.671	2.862

Test		χ^2	df	p
Overall model evaluation		99.070	24	0.000*
Goodness-of-fit test	Hosmer and Lemeshow	9.685	8	0.288

β = *regression coefficient.* CI = *confidence interval.* df = *degree of freedom.* p = *probability.* SE = *standard error.*

Note: Dependent variable: housing adequacy level (1 = adequate and 0 = inadequate); Nagelkerke R2 = 0.088; Model Prediction = 88.9 percent.

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

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

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

[d] *A value label,* Foreign born, not a U.S. citizen*, was coded 1, and other value labels were coded 0.* Native, born in the United States *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.*

[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.*

Exhibit 13

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

[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–$50,220, *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 a reference group.*

[o] *A value label,* Yes, *was coded 1, and other value labels were coded 0.* No *was a reference group.*

[p] *A value label,* Not applicable, *was coded 1, and other value labels were coded 0.* No *was a reference group.*

[q] *A value label,* one-unit building, detached from any other building, *was coded 1, and 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, and 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, and 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.*

* p < 0.05.

The full model was statistically significant with $\chi^2(24, n = 2,180) = 99.070$, $p < 0.05$, indicating that the model was able to distinguish between the respondents who lived in adequate housing and those who lived in inadequate housing. 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 percent (Nagelkerke R^2 = 0.088) of the variance in housing adequacy levels. The value of Nagelkerke R^2 was low in this study, but it is the norm in logistic regression (Hosmer and Lemeshow, 2000; Walker, Bukenya, and Thomas, 2010). Overall, 88.9 percent of respondents (1,937 out of 2,180) were correctly classified as those who lived in adequate housing. The Chi-square value for the Hosmer-Lemeshow Goodness of Fit Test was 9.685 with a significant level of 0.288 ($p > 0.05$), indicating support for the model. For the Hosmer-Lemeshow Test, poor fit is indicated by a significant value of less than 0.05 and, therefore, to support the model, the value should be greater than 0.05 (Pallant, 2007).

As shown in exhibit 13, the hypothesis that housing adequacy was significantly affected by demographic and housing characteristics was supported by findings that related *family income* levels [Family income (1) and (2) ($\chi^2 = 4.409$, $p < 0.05$ and $\chi^2 = 5.313$, $p < 0.05$ respectively)], *geographical location* [Census region (1) and (2) ($\chi^2 = 4.967$, $p < 0.05$ and $\chi^2 = 13.896$, $p < 0.05$ respectively)], *housing subsidy* [housing subsidy (1) ($\chi^2 = 4.332$, $p < 0.05$)], *neighborhood rating* ($\chi^2 = 11.387$, $p < 0.05$), *structure size* ($\chi^2 = 9.710$, $p < 0.05$), and *structure type* [structure type (2) ($\chi^2 = 6.548$, $p < 0.05$)].

Those respondents with incomes ranging from *$25,000 to $34,999* were 1.5 times more likely to live in adequate housing than those with incomes of *less than $25,000,* when controlling for all other variables in the model (Odds Ratio = 1.522). Those with incomes ranging from *$35,000 to $49,999* were 1.7 times more likely to live in adequate housing than those with incomes of *less than $25,000*, when controlling for other variables in the model (Odds Ratio = 1.669). Those living in

suburban and *rural* areas were 0.68 times and 0.50 times, respectively, less likely to live in adequate housing than those living in *urban* areas, when controlling for all other variables in the model (Odds Ratio = 0.676 and 0.459, respectively).

For a 1-point increase in the level of *neighborhood rating* and *structure size*, the likely increases in a householder's housing adequacy were 12 percent (Odds Ratio = 1.115) and 39 percent (Odds Ratio = 1.390), respectively, when controlling for other variables in the model. That means, the higher the neighborhood rating and structure size, the more likely it was that the householder had adequate housing. Those with (federal, state, and local) *government housing subsidies* were 1.69 times more likely to live in adequate housing than *those who did not receive government housing subsidies* (Odds Ratio = 1.690), when controlling for other variables in the model. Those living in a *building with two or more apartments* were 1.82 times more likely to live in adequate housing 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 housing adequacy levels when controlling for other variables.

Briefly, H_0 was rejected and it was concluded that a relationship existed between demographic and housing characteristics and housing adequacy of low-income minority populations in the South. The variables of *family income*, *geographical location*, *housing subsidies*, *neighborhood rating*, *structure size*, and *structure type* were statistically significantly related with housing adequacy levels, when controlling for other variables. Those individuals with slightly higher incomes ranging from *$25,000 to $34,999 and $35,000 to $49,999* were more likely to live in adequate housing than those having the lowest income (*less than $25,000).* Those individuals living in *suburban* and *rural* areas were less likely to live in adequate housing 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 individuals who receive government housing subsidies were more likely to live in adequate housing than those who did not receive subsidies. Those individuals living in apartments were more likely to have adequate housing than those living in single-family detached homes.

Discussion and Conclusion

This study examined housing challenges of low-income minority populations in the South, focusing on demographic and housing characteristics. In this study, housing adequacy was considered as a representative term when investigating each householder's housing challenges.

Discussion

An important finding of this study was that those living in urban areas, living in apartment housing, and having housing subsidies were more likely to live in adequate housing than their counterparts. In this study, more than one-half of the sample of householders were renters (55.4 percent) and lived in urban areas (65.6 percent). Renters and households living in apartments in urban areas may have more options for housing that meets their needs and be adequate than those living in rural areas. 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 those homes. From the JCHS (2010), the median home price in 2009 was $172,100. Assuming a 30-year mortgage with a 10-percent downpayment and a 5-percent mortgage rate, a homeowner would pay approximately $835 per month as an after-tax mortgage payment (that is, the actual mortgage payment less the mortgage interest and property taxes deducted in a federal income tax return). This median house price raises an affordability challenge to low-income households, even before maintenance and repair costs are added.

Realistically, however, even renters in this study have housing affordability issues. In general, poor housing quality is closely related to affordability issues. Nearly 50 percent of low-income households living in inadequate housing pay more than 50 percent of their incomes for housing (JCHS, 2009). In this study, 58 percent had incomes of less than $25,000. A useful evaluation of the effect of low income on housing can be determined by considering the idea of Fair Market Rents (FMRs). An FMR is HUD's best estimate of what a household seeking a modest rental unit can expect to pay for *rent and utilities* in the current market, using approximately 30 percent of their income (Wardrip, Pelletiere, and Crowley, 2009). A household earning adequate income to afford FMR is considered to receive a *housing wage*. In 2009, the national FMR for a two-bedroom housing unit was $928 a month (Wardrip, Pelletiere, and Crowley, 2009). To spend 30 percent of income for housing would require a household to earn $37,105. More than 78 percent of the sample of householders reported incomes below this level (exhibit 5), indicating that a big gap exists between their incomes and a housing wage. Households that received housing subsidies were less likely to be constrained by income and more likely to achieve adequate housing.

In this study, housing adequacy levels were used as the dependent variable to represent housing challenges of low-income minority populations in the South. In the AHS data, a variable, *adequacy of housing (zadeq)* is a *summary measure of housing quality* and objectively developed by considering several variables, including plumbing, heating, electricity, upkeep problems, and kitchen equipment quality (Econometrica, Inc., 2011; Vandenbroucke, 2011). The emphases of the AHS variable are physical adequacy and defining substandard housing. One interesting finding from this study is that nearly 90 percent of the sample of householders lived in the *adequate* housing, a variable defined in the American Housing Survey. This finding raises the question of whether the AHS variable appropriately constructs or defines the housing adequacy levels of low-income family households in the United States.

Implications

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

1. Policymakers can refer to the research results in developing future housing or income-related policies. From the study results, nearly 60 percent of the sample of householders had incomes of less than $25,000 and 53 percent rented their homes. From this aspect, policymakers may consider how they will administer public income-oriented or housing programs.

2. This study was based on housing adjustment theory and showed how the theory was applied to this research by making connections between housing adequacy levels and the housing constraints of low-income minority populations in the South. Therefore, the research framework in this study can be helpful when developing similar research.

3. The results of this study provided housing and demographic profiles of low-income minority populations in the South. Therefore, the findings of this study could be used as information for students in housing and social classes.

4. 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

1. In this study, we used a single variable regarding neighborhood condition instead of exploring several neighborhood-related AHS variables, such as crime, traffic, school, and noise. In the future, another approach using each neighborhood-related variable could also be considered when investigating relationships between each neighborhood characteristic (for example, crime, traffic, and schools) and housing adequacy levels.

2. Within the AHS data coding, the variable related to race of householder has been named as *RACE1, HHRACE, or RACE.* Since 2003, the variable was categorized into 21 groups (exhibit 3). In this study, we used a single file version, *race1* (*hhrace*) to develop a minority group from 21 race categories (exhibit 3); most low-income minority householders in the South were *Black Only* (87 percent). From Econometrica, Inc. (2011), nearly 92 percent of Hispanic people are categorized as *White Alone* in AHS. It was a limitation of our study that the race variable did not allow us to include Hispanic householders as a minority population. Therefore, if a researcher wants to explore a sample of minority householders including Hispanic people, one more variable from the AHS could be considered. The variable is named as *SPAN, SPAN1, or HHSPAN* (long description: *Is this person Hispanic or Spanish-American?*).

3. When exploring housing challenges, housing satisfaction can also be considered as a representative term, based on the housing adjustment theory. Housing satisfaction provides *contentment levels with current housing conditions* (Morris and Winter, 1978). From this aspect, an AHS variable of *housing satisfaction score* [a 10-point rating scale, from 1 (worst) to 10 (best)] could be employed to measure housing challenges. The variable was not employed in this study, however, because of its subjective measurement characteristic. A single measure of housing satisfaction as a dependent variable has long been a challenge for researchers given the high positive response level. When using the AHS housing satisfaction variable, the respondents tend to be very satisfied with their housing and few people expressed dissatisfaction. For example, Lee and Parrott (2010), James (2008), and Liu (2005) all employed the AHS variable, housing satisfaction score, for their research and obtained a relatively high satisfaction average score, nearly 8 out of 10. Despite this limitation, the variable can be useful if a researcher wants to explore perception of housing conditions or subjective housing satisfaction levels of household members.

Conclusion

Low-income minority households, by definition, can be expected to experience constraints in achieving adequate housing. Our study revealed a number of factors that were associated with both a greater and lesser likelihood to live in adequate housing. Some factors, such as income and education, were anticipated. Other factors, such as native birth, urban residence, and apartment living, are less easily explained. Challenging and interesting research questions result from our findings and await further study.

Acknowledgments

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References

Bishaw, Alemayehu, and Suzanne Macartney. 2010. "Poverty: 2008 and 2009—American Community Survey Briefs." U.S. Census Bureau website: http://www.census.gov/prod/2010pubs/acsbr09-1.pdf (accessed August 31, 2011).

Econometrica, Inc. 2011. "Codebook for the American Housing Survey, Public Use File: 1997 and Later." HUD USER website: http://www.huduser.org/Datasets/ahs/AHS_Codebook.pdf (accessed August 31).

Harvard University, Joint Center for Housing Studies (JCHS). 2010. "The State of the Nation's Housing 2010." http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/son2010.pdf (accessed August 31, 2011).

———. 2009. "The State of the Nation's Housing 2009." http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/son2009.pdf (accessed August 31, 2011).

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

Humes, Karen R., Nicholas A. Jones, and Roberto R. Ramirez. 2011. "Overview of Race and Hispanic Origin: 2010." *2010 Census Briefs*. U.S. Census Bureau website: http://www.census.gov/prod/cen2010/briefs/c2010br-02.pdf (accessed August 31).

James, Russell N., III. 2008. "Residential Satisfaction of Elderly Tenants in Apartment Housing," *Social Indicators Research* 89 (3): 421–437.

Lee, Sung-jin. 2010. "Housing Challenges of Asian and Pacific Island Elders in the United States from 1995 to 2007." Unpublished Ph.D. diss., Virginia Polytechnic Institute and State University.

Lee, Sung-jin, and Kathleen R. Parrott. 2010. "Housing Satisfaction of Asian and Pacific Island Elders in the United States," *Housing and Society* 37 (2): 185–205.

Liu, Dongwang. 2005. "Factors Affecting Housing Satisfaction of Asian and Pacific Islander Households in the United States." Ph.D. diss., Department of Human Development and Family Studies, Iowa State University.

Morris, Earl W., and Mary Winter. 1998. "Housing Norms." In *The Encyclopedia of Housing*, edited by Willem Van Vliet. Thousand Oaks, CA: SAGE Publications: 287–288.

———. 1978. *Housing, Family, and Society*. New York: John Wiley & Sons.

———. 1975. "A Theory of Family Housing Adjustment," *The Journal of Marriage and the Family* 37 (1): 79–88.

Noss, Amanda. 2010. "Household Income for States: 2008 and 2009." *American Community Survey Briefs*. U.S. Census Bureau website: http://www.census.gov/prod/2010pubs/acsbr09-2.pdf (accessed August 23, 2011).

Pallant, Julie. 2007. *SPSS: Survival Manual*. New York: 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.

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. 2011. "2010 Census Data." U.S. Census Bureau website: http://2010.census.gov/2010census/data/ (accessed August 31).

U.S. Department of Housing and Urban Development (HUD). 2011. "Worst Case Housing Needs 2009: Report to Congress." HUD USER website: http://www.huduser.org/Publications/pdf/worstcase_HsgNeeds09.pdf (accessed August 31).

Vandenbroucke, David A. 2011. "Know Your Indicators: Housing Adequacy Data." PowerPoint presentation at the HUD PD&R Quarterly Housing Market and Research Update Conference, Washington, DC.

Walker, Stevon, James O. Bukenya, and Terrence Thomas. 2010. "Examining Students' Perceptions of Globalization and Study Abroad Programs at HBCUs." http://ageconsearch.umn.edu/bitstream/56481/2/SAEA2010_Selected_Paper_Walker.pdf (accessed August 31, 2011).

Wardrip, Keith E., Danilo Pelletiere, and Sheila Crowley. 2009. "Out of Reach 2009." National Low Income Housing Coalition website: http://www2398.ssldomain.com/nlihc/oor/oor2009/oor2009pub.pdf (accessed August 23, 2011).