

# Mortgage Pricing Differentials Across Hispanic, African-American, and White Households: Evidence From the American Housing Survey

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## Abstract

*This article uses recent metropolitan area samples of the American Housing Survey (AHS) for 1998, 2002, and 2004 to investigate differences in the terms, conditions, and use of mortgage financing alternatives. It investigates how financing and mortgage rates differ for Hispanics compared with other ethnic groups across a number of different U.S. housing markets. The principal focus of the article is to examine the extent to which differences in the interest rates obtained by homeowners of different race/ethnicity and income levels can be explained by differences in the characteristics of the borrowers, the property, and the loan itself. For example, Hispanic households appear to have a relatively high burden of first mortgage debt. Although limitations in the information available in the AHS do not allow for the determination of whether discrimination exists for minorities in the sample, this data set does identify important differences in the characteristics of these households, which in turn affect mortgage pricing.*

## Introduction<sup>1</sup>

An important policy emphasis in recent years of the U.S. Department of Housing and Urban Development has been to promote affordable housing homeownership and stronger communities. In developing the details of such programs, Secretary Alphonso Jackson acknowledged the increasing importance of the Hispanic-American population, particularly as a component of low-

income households, whose housing options need improvement.<sup>2</sup> Consistent with the recognition of the housing needs of low-income households and the Hispanic population, however, is the concern of policymakers and housing analysts that differences in access to homeownership financing may be a critical barrier to reducing the homeownership gap between Hispanic households and their White counterparts.

Thus, more needs to be understood about the differences in the terms, conditions, and use of financing alternatives across ethnic groups. The analysis presented in this article employs recent metropolitan statistical area (MSA) samples of the American Housing Survey (AHS) to address these issues and examine how financing factors differ for Hispanics compared with other ethnic groups across a number of different housing markets.

Recently, several researchers have used the AHS to examine loan terms, although their analyses have focused on first mortgages using the national version of the AHS. In this respect, these analyses are more limited in scope than the investigation developed in this article. Our analysis uses a much larger sample of Hispanic homeowners and identifies the markets in which the loans are being originated, which is not true for the national AHS sample.<sup>3</sup> Also, by expanding the analysis to include junior mortgages and home equity loans, a much more complete picture of housing-related finance can be developed. For example, according to the Federal Reserve, as of the second quarter of 2004, American homeowners owed \$766.2 billion in home equity loans and lines of credit, more than twice the amount they owed in 1998.<sup>4</sup> Also, one might anticipate that minorities could be more likely to obtain such financing from more costly sources, including “predatory” lenders.

In addition to comparing overall debt levels, interest rates, and other loan characteristics across three major ethnic groups and income categorizations, for both traditional first mortgages and junior and home equity loans this study conducted a basic regression analysis.<sup>5</sup> In particular, for each ethnic subgroup, the current mortgage interest rate is the dependent variable with explanatory variables grouped into three broad categories: (1) the characteristics of the borrower, (2) the characteristics of the property, and (3) the characteristics of the loan itself.<sup>6</sup> Separate regression models are estimated both by purpose (home purchase and refinance) and by market type (conventional and Federal Housing Administration/U.S. Department of Veterans Affairs [FHA/VA]).

There is no “perfect” publicly available data set that allows researchers to investigate the issues and policy concerns related to variations in mortgage terms, conditions, and use across key borrower groups. A limiting factor within the AHS, as in most data, is a lack of information on the households’ net-wealth and credit history. Also the AHS does not have information on the institutions that made the loan or the specifics of their underwriting criteria.<sup>7</sup> Consequently, it is not possible to definitively answer the question of whether discrimination exists in mortgage pricing. It is possible, however, to investigate differences in the signs and significance of the independent variables included in the pricing regression, draw inferences about the nature of the mortgage pricing process experienced by Hispanics (as compared with others), and suggest avenues for future research and potential policy concerns. To this end, it is important to note that studies have demonstrated that the financial variables from the AHS generally appear to be quite reliable.<sup>8</sup> Consequently, it is reasonable to assert that any implications for future research and policy development regarding both the pricing of loans and the differences found across other

dimensions of the financing for Hispanic, African-American, and White households in the analysis are based on mortgage information that, although limited in scope, is statistically reliable across a national sample. In addition, due to adequate sample size, the study is able to present new, reliable information for such dimensions as junior mortgages and home equity loans.

This article consists of five sections in addition to the first section, this introduction. The second section presents a brief overview of recent literature on mortgage pricing to provide a frame of reference for the analysis. The third section presents an overview of the data on which the study is based and several data compilations, including the financial variables noted previously. This section presents and discusses various aspects of mortgage loans by type and characteristics and shows these results across the dimensions of income and minority household status. The fourth section presents the basic specification of the regression analysis and the results for first mortgages for both the full sample and, separately, recent movers. Section five presents means and regression analyses for junior mortgage and home equity lending. Conclusions follow the last section.

## Literature Review: A Brief Summary

Discussions of public policy about mortgage pricing have been handicapped by the relative lack of studies on the rates charged for mortgages categorized by race and by mortgage market segment. The existing literature on discrimination in mortgage markets has focused largely on discrimination and redlining in the mortgage approval process. Examples of this literature include Yinger (1996), Ross and Yinger (1996), and Ladd (1998). An extensive literature discussion appears in the book by Ross and Yinger (2002). Other studies have examined loan default rates (for example, Berkovec et al., 1996; Cotterman, 2002).

The small but growing literature that analyzes mortgage rates using recent data includes Courchane and Nickerson (1997); Crawford and Rosenblatt (1999); Nothaft and Perry (2002); Black, Boehm, and DeGennaro (2003); and Susin (2003).<sup>9</sup> Courchane and Nickerson report the results from three examinations by the Office of the Comptroller of the Currency. They conclude that differences in rates may be due to discrimination, lenders' market power, or legal restrictions on lenders. Crawford and Rosenblatt 1999 examine lending by a single national mortgage lender for the period 1988–89. They conclude that conventional loan rates are race neutral. Due to data limitations, neither of these studies employs a representative national sample or analyzes refinanced loans in any detail. Nothaft and Perry (2002), using data from the Federal Housing Finance Board's Mortgage Interest Rate Survey for 1992–1995, analyze neighborhood effects. They find that rates are slightly higher in predominantly Hispanic neighborhoods but may be slightly lower in predominantly African-American neighborhoods. Black, Boehm, and DeGennaro (2003) analyze overages for purchase and refinance loans for a single national mortgage lender in 1996.<sup>10</sup> They conclude that the differences in overages are due to market power and differential bargaining skill.

In a pioneering study based on the AHS, Susin (2003) uses data from the national AHS for 2001. He employs a sample of all homeowners who have mortgages (12,524 households) to look at interest rates as a function of several household characteristics (race/ethnicity, house value, education, age, and a wealth proxy [dividend income]), mortgage characteristics, and neighborhood characteristics (the poverty rate and the percentage of African Americans and

Hispanics living in census tracts in which the households reside<sup>11</sup>). In addition, an interest rate index (the 10-year Treasury bond rate) was used to control for differences in interest rates at the time the home was originally purchased. Susin's analysis suggests that African Americans pay an average of 44 basis points more than Whites do, but the differential appears to be smaller for more recent mortgages. Susin's analysis suggests that most of the African-American–White differential is due to the difference in African Americans' refinancing behavior; the rate differential is larger for African Americans who refinance. Susin also finds that Hispanics pay an average of 23 basis points more than Whites do and that most of the differential is due to neighborhood effects.

Because the analysis of Susin (2003) uses the national AHS data to explore mortgage pricing, it is important to delineate clearly the differences between his and our analysis. First, Susin's paper considers all outstanding mortgages for all homeowners in a given year (2001). Although we, too, consider all mortgages at a given point in time, we also consider originations for a sample of homeowners who have moved within a year of their interview. This approach is consistent with the recent study by Lam and Kaul (2003), which suggests that the AHS financial data is more reliable the closer respondents are to the date of loan origination. In addition, borrower characteristics, loan characteristics, and property characteristics are the approximate characteristics that existed when the loans were originated. Thus, our approach should provide a better picture of how those characteristics currently affect market interest rates. Finally, our approach differs from Susin's analysis and represents substantial extension of preliminary work that we have done on this issue using AHS data (see Boehm, Schlottmann, and Thistle [2006]) in several additional ways. First, it employs a pooled set of the AHS MSA samples for the years 1998, 2002, and 2004. This pooled set of samples allows for a substantially larger sample size, which becomes particularly important as one begins to stratify by loan types and minority subgroups. In addition, the markets in which households reside can be identified. Thus, control variables can be included in the interest rate regression for the market in which the loan was made in addition to the year in which it was originated. Also, because of the increased sample size, this analysis separately analyzes first mortgages, junior mortgages (primarily second mortgages), and home equity loans (including lines of credit) individually, while the previous works focus exclusively on first mortgages.

## The Data

As already suggested, the data presented and discussed in this article is from recent AHS samples that are specific for MSAs. Information is gathered for samples of approximately 5,000 households in each MSA. Approximately 14 MSAs are selected for each sampling year.<sup>12</sup> The most recently available MSAs are for the sampling years 1998, 2002, and 2004, with information from all 41 of the MSAs covered by these surveys combined for this analysis.<sup>13</sup>

Two primary reasons for using the MSA samples, as opposed to the national version of the data set, are apparent. First, of the almost 50,000 housing units included in the national sample, only about 4,000 are occupied by Hispanic households and slightly less than half of these households are owner occupants. In contrast, pooling the MSA samples for 41 markets yields a total sample size of nearly 200,000 observations, including more than 5,000 Hispanic households with first mortgages.<sup>14</sup> In addition, by using the MSA samples, we can identify the specific market in which housing decisions are being made.

For first mortgages, information is presented across several loan types. Specifically, the markets for home purchase versus refinance loans and conventional versus government (FHA/VA) loans are generally considered to be different enough that they need to be stratified into four separate submarkets for the purpose of analysis. In addition, for each submarket, the home purchase loans of recent movers will be considered separately from the loans of all households. Each sample provides a somewhat different perspective. Recent movers who choose homeownership and finance their home purchase with a first mortgage provide insight into current mortgage conditions across race and income categories for those households that have just negotiated a mortgage in the market. Alternatively, the full sample of current homeowners provides a view of the debt situation of all households whose current circumstances may be viewed as the result of financing decisions made over a substantially longer period of time. As mentioned earlier, in addition to permitting the investigation of first mortgages, the AHS data permits the investigation of other debt secured by home equity (junior mortgages and home equity loans).<sup>15</sup>

Exhibit 1 provides information on the share of homeowners in the sample by race/ethnicity and income who have one of the three types of loans examined in this study (that is, first, junior, and home equity).<sup>16</sup> The percentage of households by race with first mortgages is consistently lower among low-income households, as might be expected. For example, across all low-income households, no racial subgroup has more than 59 percent (Hispanics) of homeowners with first mortgages. In contrast, for high-income homeowners, no fewer than 74 percent (African Americans) of any subgroup have first mortgages. Similarly, low-income households are much less likely to use their homes as sources of financing to secure junior mortgages or home equity loans. Compared with other ethnic groups, White households are much more likely to use their home as a source of a home equity credit, with 4.8 percent of low-income White households using this credit alternative compared with about 2 percent of African-American and Hispanic households.

### **Exhibit 1**

#### **Means All 1<sup>st</sup> Mortgagors<sup>a</sup>**

	Low Income			High Income		
	Hispanic	African American	White	Hispanic	African American	White
Percent of owners with first mortgage	58.7	53.9	43.1	80.1	73.7	74.9
Percent of owners with junior mortgage	3.1	4.1	3.1	8.8	6.5	7.4
Percent of owners with home equity credit line	2.2	1.8	4.8	5.9	3.6	10.4

<sup>a</sup> Data includes both home purchase loans and refinancings.

## **First Mortgages**

As a starting point for this discussion, information on mortgagors and mean characteristics for first mortgages for both the full and recent mover samples are presented in exhibits 2 and 3. Each of these exhibits will be discussed in turn.<sup>17</sup>

Exhibit 2 provides the financial characteristics of households and their loans. Both home purchase and refinanced loans are included in the data used to construct this exhibit. Perhaps the most striking data shown in exhibit 2 is housing costs relative to income (the ratio “housing cost/income” in the middle section of exhibit 2). As shown, the relative housing burden borne by low-income households to service their mortgage and related costs is quite high. Low-income Hispanic households have the highest ratio of all, with 67 percent of first mortgagors having a ratio that exceeds 32 percent. The ratios are high for other owners as well: 62 percent of African Americans and 61 percent of White low-income households have housing costs that exceed 32 percent of their income.<sup>18</sup> It is also particularly interesting to note that the interest rate differential between Hispanic first mortgagors and low-income White households is higher in exhibit 2 for low-income households than it is for those with higher incomes (a similar differential exists between African-American and White households). In general, White households have the lowest interest rates and African-American households have the highest interest rates within each income group.

Exhibit 3 provides comparable information for households that are recent movers in the AHS surveys. Several interesting differences exist between recent movers and the full sample. As shown in exhibit 3, recent movers have interest rates on first mortgages that are lower compared with those for the full sample of households (in exhibit 2). The differential is greatest for African-American households (for example, the interest rate is 6.78 percent for low-income African-American households that are recent movers compared with 7.39 percent for African Americans in the full sample).<sup>19</sup> In addition, the loan-to-value (LTV) ratios for recent movers are somewhat lower than those for the full sample, particularly for the percentage of households with LTV ratios that exceed 1. For example, across all the recent mover cohorts, 6 percent is the largest proportion of households with an LTV ratio exceeding 1. This finding is in marked contrast to the full sample, where corresponding figures are as high as approximately 13 percent. Although interesting, it is not obvious why this should be the case.

## Regression Analysis

As noted previously, a regression model is employed to explore the determinants of interest rates for first mortgages both by purpose (home purchase and refinance) and by market type (conventional and FHA/VA). In addition, we also separate recent movers from the full sample. Exhibit 4 shows the average interest rates for each of the subgroups to be employed in the regression analysis. A number of interesting differences can be observed across these subgroups. First, in all cases except one (Hispanic households in the high-income FHA/VA purchase market for the full sample), White households have lower interest rates than do comparable minority households. As might be expected, FHA/VA loans have higher average rates than do comparable conventional loans. In several instances for lower income homeowners, one minority group has a substantially higher average interest rate than other households do. Specifically, for low-income households that recently moved and purchased a home, Hispanic households pay substantially more than others do, approximately 7.2 percent compared with 6.6 to 6.8 percent for African Americans and Whites. For refinanced loans, in the conventional market African Americans pay more than Hispanics or Whites do, approximately 7.5 percent compared with 6.9 and 6.6 percent, respectively. In contrast, for FHA/VA refinanced loans, interest rates are the highest for Hispanics, at 7.2 percent, and average 6.7 percent for both African Americans and Whites.

## Exhibit 2

### Means

#### All 1<sup>st</sup> Mortgagors<sup>a</sup>

Variable Name	Low Income			High Income		
	Hispanic	African American	White	Hispanic	African American	White
Interest Rate	7.30%	7.39%	6.99%	6.99%	7.23%	6.88%
Monthly Debt Service	\$667	\$547	\$647	\$966	\$796	\$961
Monthly Housing Cost	\$1,071	\$925	\$1,074	\$1,522	\$1,264	\$1,524
Annual Household Income	\$30,301	\$27,949	\$30,369	\$101,999	\$90,153	\$108,451
Current House Value	\$146,560	\$107,608	\$165,022	\$216,758	\$155,419	\$230,437
LTV > 1	10.1%	12.8%	12.5%	12.7%	10.6%	10.8%
0.9 < LTV <= 1	48.2%	44.9%	30.8%	40.1%	49.9%	30.1%
0.8 < LTV <= 0.9	9.7%	7.9%	10.4%	14.8%	10.5%	14.5%
LTV <= 0.8	32.0%	34.5%	46.2%	32.4%	28.9%	44.7%
Housing Cost/Income > 0.32	66.8%	61.7%	60.7%	10.7%	7.3%	8.3%
0.22 < Housing Cost/Income <= 0.32	23.9%	26.2%	26.2%	28.9%	22.4%	24.0%
0.16 < Housing Cost/Income <= 0.22	6.5%	8.5%	8.8%	28.1%	30.2%	29.2%
Housing Cost/Income <= 0.16	2.7%	3.6%	4.2%	32.3%	40.0%	38.6%
Debt Service/Income > 0.2	59.1%	52.4%	54.6%	14.5%	10.5%	10.5%
0.15 < Debt Service/Income <= 0.2	15.8%	18.0%	17.4%	19.1%	16.2%	16.6%
0.10 < Debt Service/Income <= 0.15	10.1%	14.6%	14.0%	27.8%	28.1%	30.7%
Debt Service/Income < 0.10	15.0%	15.0%	13.9%	38.6%	45.3%	42.2%
Conventional—Purchase	52.7%	45.7%	53.8%	49.1%	45.5%	51.1%
Conventional—Refinance	15.5%	13.2%	22.7%	21.8%	11.9%	28.9%
FHA/VA—Purchase	27.2%	37.6%	19.8%	23.6%	36.7%	15.6%
FHA/VA—Refinance	4.6%	3.5%	3.7%	5.6%	6.0%	4.4%
<b>Number of observations</b>	1,821	2,118	3,191	3,650	2,771	10,210

<sup>a</sup> Data includes both home purchase loans and refinancings.

**Exhibit 3**

Means

Recent Mover 1<sup>st</sup> Mortgagors

Variable Name	Low Income			High Income		
	Hispanic	African American	White	Hispanic	African American	White
Interest Rate	7.20%	6.78%	6.65%	6.87%	6.86%	6.72%
Monthly Debt Service	\$766	\$651	\$754	\$1,113	\$990	\$1,133
Monthly Housing Cost	\$1,134	\$994	\$1,167	\$1,612	\$1,421	\$1,665
Annual Household Income	\$31,695	\$31,309	\$32,675	\$94,245	\$90,048	\$106,900
Current House Value	\$135,107	\$116,648	\$162,739	\$213,121	\$184,143	\$242,083
LTV > 1	2.8%	5.9%	1.9%	4.0%	4.3%	1.6%
0.9 < LTV <= 1	56.9%	51.9%	40.8%	47.2%	57.5%	35.4%
0.8 < LTV <= 0.9	11.4%	7.6%	10.0%	16.7%	9.8%	14.3%
LTV <= 0.8	28.9%	34.6%	47.3%	32.0%	28.4%	48.7%
Housing Cost/Income > 0.32	68.3%	59.7%	62.5%	16.3%	10.7%	11.4%
0.22 < Housing Cost/Income <= 0.32	25.6%	30.5%	27.8%	35.5%	30.0%	29.8%
0.16 < Housing Cost/Income <= 0.22	3.6%	7.0%	6.3%	25.7%	30.5%	31.6%
Housing Cost/Income <= 0.16	2.5%	2.7%	3.4%	22.4%	28.8%	27.2%
Debt Service/Income > 0.2	64.0%	58.6%	62.1%	24.3%	18.9%	17.7%
0.15 < Debt Service/Income <= 0.2	17.0%	19.5%	17.8%	22.8%	23.6%	23.4%
0.10 < Debt Service/Income <= 0.15	6.1%	9.2%	8.2%	27.8%	27.5%	31.0%
Debt Service/Income < 0.10	12.9%	12.7%	11.9%	25.1%	30.0%	27.9%
Conventional—Purchase	61.2%	53.5%	70.3%	68.0%	58.8%	77.8%
FHA/VA—Purchase	38.8%	46.5%	29.7%	32.0%	41.3%	22.2%
<b>Number of observations</b>	<b>394</b>	<b>370</b>	<b>522</b>	<b>777</b>	<b>560</b>	<b>1,715</b>



**Exhibit 4**

**First Mortgage Interest Rates by Sample, Loan Type, and Household Type**

Sample	Loan		Household Type					
			Low Income			High Income		
	Market	Purpose	Hispanic (%)	African American (%)	White (%)	Hispanic (%)	African American (%)	White (%)
Full	Conventional	Purchase	7.39	7.37	7.09	7.13	7.30	7.04
Full	FHA/VA	Purchase	7.45	7.41	7.20	7.22	7.38	7.27
Mover	Conventional	Purchase	7.20	6.81	6.63	6.89	6.85	6.70
Mover	FHA/VA	Purchase	7.21	6.73	6.70	6.83	6.86	6.80
Full	Conventional	Refinance	6.90	7.49	6.62	6.49	6.79	6.43
Full	FHA/VA	Refinance	7.21	6.73	6.70	6.83	6.86	6.80

Our basic regression specification is consistent with the regression models used by several authors such as Belsky and Duda (2002). In particular, for each ethnic subgroup, the current interest rate is the dependent variable with explanatory variables grouped into three broad categories: (1) the characteristics of the borrower, (2) the characteristics of the property, and (3) the characteristics of the loan itself. The list of included factors available from the AHS is shown in exhibit 5.

An additional aspect of race/ethnicity is identified for this analysis that is normally not available, namely that Hispanic households can be split into White and non-White households. Because the AHS asks questions about race separate from Hispanic ethnicity, it allows for a unique opportunity to compare results for Hispanic households that have different racial characteristics. Consequently, Hispanic households were split into two distinct groups: White and non-White Hispanics.<sup>20</sup> Note that the percentage of White and non-White Hispanics varies depending on whether one considers the refinancing or home purchase subsamples. For home purchases, 35 to 46 percent of Hispanics are classified as non-White. For refinanced loans, only about 25 percent of the Hispanic households are classified as non-White.<sup>21</sup> In addition to including a set of race/ethnicity variables, the AHS includes gender, age, and education as controls. Because women, the elderly, and minorities are protected classes under discrimination laws, some believe these groups may be at a disadvantage in terms of shopping for and negotiating loan rates. It also is hypothesized that more-educated individuals will generally be more able to assess financial market opportunities and might be expected to fare better in finding the lowest cost financing alternatives than less-educated individuals fare. Similarly, we include whether a household is a first-time homeowner, because households purchasing for the first time are likely to have less financial sophistication and generally find themselves in somewhat different financial circumstances than those that have already purchased a house, arranged for its financing, and, by owning, built up equity in that house and demonstrated a willingness and ability to make mortgage payments.

In addition, three other household characteristics are included in an attempt to control for a household's ability to make its debt service payments. The ratio of income to household size captures the extent to which household size and related expenditures on the needs of household members could impact default risk. A discrete measure of whether household savings are equal to

**Exhibit 5****Variable Names and Definitions**

<b>Variable Name</b>	<b>Variable Definition</b>
<b>Loan Characteristics</b>	
Interest Rate	Current interest rate on the loan expressed as a percent
10 Year Loan Term	1 = Loan term is 10 years; 0 = otherwise
15 Year Loan Term	1 = Loan term is 15 years; 0 = otherwise
20 Year Loan Term	1 = Loan term is 20 years; 0 = otherwise
25 Year Loan Term	1 = Loan term is 25 years; 0 = otherwise
30 Year Loan Term	1 = Loan term is 30 years; 0 = otherwise
Loan Term <= 5 years	1 = Loan term is less than or equal to 5 years; 0 = otherwise
5–10 Year Loan Term	1 = Loan term is greater than 5 years and less than or equal to 10 years; 0 = otherwise
10–15 Year Loan Term	1 = Loan term is greater than 10 years and less than or equal to 15 years; 0 = otherwise
15–20 Year Loan Term	1 = Loan term is greater than 15 years and less than or equal to 20 years; 0 = otherwise
20–30 Year Loan Term	1 = Loan term is greater than 20 years and less than or equal to 30 years; 0 = otherwise
Loan Term > 30 years	1 = Loan term is greater than 30 years; 0 = otherwise
Loan to Value (LTV) > 1.0	1 = LTV ratio greater than 100 percent; 0 = otherwise
0.9 < LTV <= 1.0	1 = LTV ratio greater than 90 percent and less than or equal to 100 percent; 0 = otherwise
0.8 < LTV <= 0.9	1 = LTV greater than 80 percent and less than or equal to 90 percent; 0 = otherwise
LTV <= 0.8	1 = LTV ratio less than or equal to 80 percent; 0 = otherwise
Loan Payments Fixed	1 = Loan payments are fixed during the life of the loan; 0 = otherwise
Private Mortgage Insurance	1 = Loan has private mortgage insurance; 0 = otherwise
Year of Origination	Discrete variables indicating the year in which the mortgage was originated
<b>Household Characteristics</b>	
Income/Household Size	Monthly income in 1,000 dollar units of measure relative to household size
Not High School Graduate	1 = Did not graduate from high school; 0 = otherwise
High School Graduate	1 = High school graduate; 0 = otherwise
Post High School	1 = Some education after high school, but not a college graduate; 0 = otherwise
College Graduate	1 = College graduate or more; 0 = otherwise
Married	1 = Married couple or partner present; 0 = otherwise
Single Female	1 = Household head a single female; 0 = otherwise
Single Male	1 = Household head a single male; 0 = otherwise
Household Size	Number of persons in household
Household Income	Household income in \$10,000 units

## Exhibit 5

### Variable Names and Definitions (continued)

Variable Name	Variable Definition
Age 24 or less	1 = Age of household head less than 25 years of age; 0 = otherwise
Age 25–44	1 = Age of household head 25 to 44 years of age; 0 = otherwise
Age 45–61	1 = Age of household head 45 to 61 years of age; 0 = otherwise
Age 62 or more	1 = Age of household head 62 years of age or more; 0 = otherwise
Savings 20k or more	1 = Household has \$20,000 in savings or more; 0 = otherwise
White Household <sup>a, b</sup>	1 = Household's race designated to be White; 0 = otherwise
African-American Household <sup>a, b</sup>	1 = Household's race designated to be African American; 0 = otherwise
White Hispanic Household <sup>a, b</sup>	1 = Household identified as Hispanic and White; 0 = otherwise
Non-White Hispanic Household <sup>a, b</sup>	1 = Household identified as Hispanic and non-White; 0 = otherwise
First-time Owner	1 = First home owned by the household; 0 = otherwise
Monthly Housing Cost	Included are the costs of electricity, gas, other heating fuels, water and sewer, real estate taxes, property insurance, condominium fees, mobile home park fees, homeownership association fees, mortgage and home equity loan payments, other mortgage fees paid periodically, and routine maintenance
Housing Cost/Income > 0.33 <sup>c, d</sup>	1 = Monthly housing cost relative to monthly income is greater than 33 percent; 0 = otherwise
0.22 < Housing Cost/Income <= 0.33 <sup>c, d</sup>	1 = Monthly housing cost relative to monthly income is greater than 22 percent and less than 34 percent; 0 = otherwise
0.16 < Housing Cost/Income <= 0.22 <sup>c, d</sup>	1 = Monthly housing cost relative to monthly income is greater than 16 percent and less than 23 percent; 0 = otherwise
Housing Cost/Income <= 0.16 <sup>c, d</sup>	1 = Monthly housing cost relative to monthly income is less than or equal to 16 percent; 0 = otherwise

### Property Characteristics

Current House Value	Current house value in 10,000 dollar units
Metropolitan Areas	Households in the sample came from 41 MSAs in three interview periods (1998, 2002, 2004) discrete variables indicating the MSAs in which each housing unit was located were included in regression analyses. For a complete list of the MSAs included in the analysis, see appendix A.

<sup>a</sup> Because the American Housing Survey designates race and Hispanic ethnicity separately, both White and non-White individuals can identify themselves as Hispanic. This split is represented in the categorization of Hispanics in the exhibit.

<sup>b</sup> Race of the spouse (or partner) was considered when identifying the race of the household. For mixed race couples, if either the head or spouse was Hispanic, the household was considered Hispanic, for couples where one partner was African American the household was considered to be African American.

<sup>c</sup> Break points represent the division of the distribution for the full sample into quartiles.

<sup>d</sup> For a definition of what is included in monthly housing cost, see the definition of that variable in the exhibit.

or greater than \$20,000 is the only wealth measure available in the AHS. This wealth measure, too, might impact default risk; that is, those households with a substantial amount of savings might be expected to get lower interest rates because they have a greater financial cushion to draw on to avoid default. Finally, the categorical variables representing various levels of housing cost relative to income should be a primary determinant of default risk. Lower values of this ratio should also be correlated with lower interest rates.

In addition to including household characteristics, the AHS includes several loan characteristics to control for differences in the risk associated with these loans. Specifically, loan term, whether the loan payment is fixed, whether the loan has private mortgage insurance (for conventional loans only), and (for recent movers only) whether a set of categorical variables that distinguish between various LTV ratio levels are included in the analysis.<sup>22</sup> Normally, one would expect that the longer the loan term, the higher the interest rate would be based on inflationary risk and the risk associated with any deferral in the repayment of principal. Fixed-payment loans exclude all mortgage instruments where payments may vary (for example, adjustable rate or graduated payment loans). Generally, we might consider fixed-payment, fully-amortized loans to be lower risk than other types of so-called “alternative” mortgage instruments. The effect of private mortgage insurance on the cost of a loan might be expected to differ depending on whether measures of the LTV ratio are included in the analysis. Private mortgage insurance is obtained to reduce the level of default risk on loans with higher LTV ratios. When a measure of the LTV ratio is included in the analysis, mortgage insurance might be expected to have a negative sign. For conventional mortgages, where LTV is not included, however, it might be expected to capture the higher risk associated with low downpayment loans and, therefore, have a positive sign. For recent movers, LTV ratio is defined as a set of categorical variables in which break points occur at meaningful intervals in terms of risk differentiation. In particular, loans with a greater than 80 percent LTV ratio typically are required to have private mortgage insurance, and loans with an LTV ratio of greater than 100 percent represent loans in which the principal balance is greater than the collateral value. Thus, loans in the lower LTV categories might be expected to have lower interest rates.

Beyond the loan and household characteristics, the quality of the neighborhood and structural characteristics of the property (that is, the quality of the collateral) might be expected to influence the risk of the loan. Although numerous subjective measures of housing quality abound in the AHS, the best single measure of the quality of the collateral is property value. It is expected that higher property values will be associated with lower interest rates.<sup>23</sup>

Finally, the AHS enables us to control for the year in which the loan was originated, and, because we are employing the metropolitan statistical area sample, the market in which the loan was originated. Thus, we include a set of categorical variables for the year of origination and the market in which the loan was originated.<sup>24</sup> Although these coefficients and t-statistics are not included in the exhibits, to allow for the results to be presented in a more concise and effective manner, they are highly significant in all the regressions and, as might be expected, account for a substantial amount of the variation in interest rates that are observed.<sup>25</sup> As noted in exhibit 5, the 41 MSAs included in the analysis are listed in appendix A.

As discussed previously, this study recognizes the limitations of the AHS in conducting interest rate analysis—namely, that information on the net-wealth position and credit history of the sample

households is not available and that information on the institutions making the loan (in particular, their underwriting criteria) are not available. Thus, the regression analysis presented can make no definitive statement about whether discrimination exists; however, this investigation's combined regression/means exhibits can shed light on two primary issues:

1. Are there separate racial/ethnic effects, after controlling for factors available in the AHS, that might influence interest rates?
2. What factors, if any, differ across the racial/ethnic/income groups that appear to influence the interest rate a household pays for a given loan? For example, if Hispanics are on average less well educated than Whites, do these differences matter economically and are they statistically significant in the interest rate regressions?

## **Home Purchase**

Exhibits 6 and 7 present results for interest rates on home purchase loans through conventional markets for both the full sample and recent movers. Similarly, exhibits 8 and 9 consider the FHA/VA markets for the same two groups of mortgagors. Both sample means and the regression results are presented in all four exhibits.

The regression coefficients for the different race/ethnicity categories indicate the extent to which these groups pay higher interest rates than Whites do, all else being equal. For the full sample, African-American households appear to pay higher interest rates on first mortgages in both the conventional and FHA/VA markets compared with the interest rates that other households pay. Recent movers who are African American also pay significantly higher rates in the conventional market than other ethnic groups do but not in the government sector. Both non-White and White Hispanics pay significantly higher rates in the conventional market than Whites do (14.6 and 9.2 basis points, respectively), but these rates are not as high as those that African Americans pay (30.6 basis points). For recent movers, only non-White Hispanics pay significantly more than their White counterparts, 14.7 basis points, approximately the same differential we observe for the full sample. In contrast to the conventional market, in the FHA/VA market rates paid by Hispanics are not significantly different from those paid by Whites. Indeed, if one considers these results for minorities as a whole, it appears that, controlling for other factors, they are much more likely to experience significantly higher rates than Whites do in conventional markets than in the government sector.

Turning to the consideration of other factors in these regressions, higher levels of education tend to be associated with lower interest rates across all markets; however, the effects appear to be stronger in the conventional market. Given the correlation between higher levels of education and household wealth and the assumed better understanding of financial markets, this is certainly an anticipated result. This result matters, however, given the lower levels of education of Hispanic households. For example, the proportion of college graduates among low-income Hispanic households is less than half the corresponding figure for White households with conventional mortgages in the full sample—approximately 12.3 percent compared with 28.9 percent, respectively. For FHA/VA loans for the full sample, the difference is more pronounced, as only 7.8 percent of Hispanic household heads are college graduates, whereas 21.2 percent of Whites have earned a

**Exhibit 6**

**Full Sample<sup>a</sup>  
First Mortgages—Conventional/Home Purchase**

Variable Name	Regression Coefficient <sup>b</sup>	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate	NA	7.38568	7.37048	7.08955	7.12884	7.29837	7.03914
Intercept	6.50615*	NA	NA	NA	NA	NA	NA
<b>Household Race</b>							
African-American Household	0.30565*	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.14621*	0.35313	0.00000	0.00000	0.27734	0.00000	0.00000
White Hispanic Household	0.09177*	0.64688	0.00000	0.00000	0.72266	0.00000	0.00000
<b>Household Characteristics</b>							
Single Female	-0.00595	0.21042	0.51810	0.36634	0.08259	0.20777	0.09481
Single Male	0.07736**	0.09688	0.16029	0.18462	0.06696	0.09992	0.10247
Age 24 or Less	-0.07429	0.03229	0.05067	0.03611	0.01228	0.01665	0.01034
Age 45–61	0.03633	0.28021	0.34333	0.31217	0.34933	0.40285	0.39284
Age 62 or More	-0.06316	0.14167	0.20476	0.25335	0.04743	0.06899	0.05861
High School Graduate	-0.06094	0.25417	0.25750	0.27082	0.19364	0.19508	0.16376
Post High School	-0.10632*	0.22708	0.31127	0.32207	0.30971	0.31800	0.27083
College Graduate	-0.23344*	0.12292	0.20889	0.28946	0.37835	0.41079	0.52959
Income/Household Size	0.00066	0.84848	1.22576	1.37065	2.91491	3.04984	3.56726
Savings 20k or More	-0.08740	0.02292	0.01861	0.07338	0.01004	0.00634	0.02624
First-Time Owner	-0.06815*	0.35104	0.30403	0.56494	0.56975	0.45044	0.68148
0.22 < Housing Cost/Income <= 0.33	-0.12112*	0.22188	0.25129	0.23646	0.27902	0.22125	0.24631
0.16 < Housing Cost/Income <= 0.22	-0.17071*	0.07708	0.08583	0.08212	0.27065	0.27042	0.28041
Housing Cost/Income <= 0.16	-0.21923*	0.03125	0.05274	0.05358	0.32757	0.42982	0.38288

**Exhibit 6**

**Full Sample<sup>a</sup>**  
**First Mortgages—Conventional/Home Purchase (continued)**

Variable Name	Regression Coefficient <sup>b</sup>	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
<b>Loan Characteristics</b>							
10 Year Loan Term	-0.26373*	0.02917	0.01965	0.02213	0.01563	0.01190	0.01379
15 Year Loan Term	-0.08616*	0.10938	0.09721	0.12522	0.09989	0.06503	0.12335
20 Year Loan Term	-0.12420**	0.01875	0.04033	0.04485	0.02958	0.02538	0.03639
25 Year Loan Term	0.15492	0.00625	0.02172	0.01747	0.00781	0.01665	0.01915
Loan Payments Fixed	-0.11489*	0.24479	0.35367	0.32091	0.22712	0.27914	0.23903
Private Mortgage Insurance	0.21008*	0.88854	0.77766	0.85149	0.93080	0.86598	0.93354
<b>Property Characteristics</b>							
Current House Value	-0.00949*	14.59536	10.98829	16.02168	21.47161	17.03789	22.40053
<b>Adjusted R<sup>2</sup></b>	0.2575						
<b>Number of observations</b>	11,918	960	967	1,717	1,792	1,261	5,221

NA = not applicable.

<sup>a</sup> The sample includes all households that have a first mortgage loan.

<sup>b</sup> All regressions include discrete variables indicating in which of 41 MSAs the housing units were located and the year in which the first mortgage was originated. For a complete list of the MSAs, see appendix A.

\* Indicates significance at the 1% level.

\*\* Indicates significance at the 5% level.

**Exhibit 7**

**Recent Mover Sample<sup>a</sup>  
First Mortgage—Conventional/Home Purchase**

Variable Name	Regression Coefficient <sup>b</sup>	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate	NA	7.19865	6.81376	6.62636	6.89205	6.85220	6.69537
Intercept	7.29703	NA	NA	NA	NA	NA	NA
<b>Household Race</b>							
African-American Household	0.20625*	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.14753**	0.43983	0.00000	0.00000	0.28598	0.00000	0.00000
White Hispanic Household	0.06353	0.56017	0.00000	0.00000	0.71402	0.00000	0.00000
<b>Household Characteristics</b>							
Single Female	-0.04983	0.17842	0.48485	0.36512	0.08902	0.21277	0.08996
Single Male	0.09302	0.10373	0.22727	0.19074	0.09470	0.09726	0.12444
Age 24 or Less	-0.14171	0.05809	0.09596	0.07357	0.03030	0.03040	0.01499
Age 45–61	0.04850	0.20747	0.23232	0.23433	0.22727	0.28875	0.25787
Age 62 or More	-0.06739	0.04979	0.09596	0.09537	0.02083	0.02128	0.02624
High School Graduate	-0.12846	0.23237	0.18687	0.23978	0.20076	0.21277	0.14168
Post High School	-0.16904**	0.25726	0.35354	0.28610	0.30492	0.31307	0.26762
College Graduate	-0.32766*	0.14108	0.30303	0.38147	0.40341	0.41641	0.56822
Income/Household Size	0.00180	0.87207	1.36439	1.47890	2.85650	3.19382	3.85890
Savings 20k or More	0.01119	0.01660	0.02020	0.04087	0.00758	0.00000	0.01799
First-Time Owner	-0.08608**	0.40664	0.33838	0.58311	0.59659	0.47112	0.73163
0.22 < Housing Cost/Income <= 0.33	-0.11604**	0.23651	0.27273	0.25341	0.28030	0.24316	0.24363
0.16 < Housing Cost/Income <= 0.22	-0.20247*	0.07469	0.10101	0.05995	0.29735	0.27964	0.32984
Housing Cost/Income <= 0.16	-0.24972*	0.03734	0.04545	0.05177	0.28030	0.37994	0.32759



**Exhibit 7**

**Recent Mover Sample<sup>a</sup>  
First Mortgage — Conventional/Home Purchase (continued)**

Variable Name	Regression Coefficient <sup>b</sup>	Means						
		Low Income		High Income		Hispanic	African American	White
		Hispanic	African American	African American	Hispanic			
<b>Loan Characteristics</b>								
10 Year Loan Term	0.10420	0.00415	0.02525	0.00817	0.01136	0.00608	0.00600	
15 Year Loan Term	-0.15056**	0.08299	0.08081	0.11989	0.07008	0.04863	0.10120	
20 Year Loan Term	0.00316	0.02075	0.04040	0.02997	0.01894	0.02128	0.02699	
25 Year Loan Term	-0.35288	0.00415	0.01515	0.01362	0.00379	0.00304	0.00450	
0.9 < Loan to Value <= 1.0	-0.20040***	0.45228	0.38384	0.27520	0.35795	0.49240	0.26087	
0.8 < Loan to Value <= 0.9	-0.28043**	0.12863	0.08081	0.11989	0.21212	0.12158	0.16567	
Loan to Value <= 0.8	-0.37618*	0.37759	0.47475	0.58311	0.39773	0.35562	0.56147	
Loan Payments Fixed	-0.27142*	0.19917	0.33838	0.28065	0.18939	0.26748	0.21364	
Private Mortgage Insurance	-0.02421	0.90871	0.79798	0.87738	0.95076	0.89970	0.95502	
<b>Property Characteristics</b>								
Current House Value	-0.00686*	14.51983	12.03673	17.14565	23.08435	19.80033	25.28515	
<b>Adjusted R<sup>2</sup></b>	0.3963							
<b>Number of observations</b>	2,997	241	198	367	528	329	1,334	

NA = not applicable.

<sup>a</sup> The sample includes all households that have a first mortgage loan.

<sup>b</sup> All regressions include discrete variables indicating in which of 41 MSAs the housing units were located and the year in which the first mortgage was originated. For a complete list of the MSAs, see appendix A.

\* Indicates significance at the 1% level.

\*\* Indicates significance at the 5% level.

\*\*\* Indicates significance at the 10% level.

**Exhibit 8**

**Full Sample<sup>a</sup>  
First Mortgages—FHIA/VA—Home Purchases**

Variable Name	Regression Coefficient <sup>b</sup>	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate	NA	7.45379	7.40982	7.19988	7.22314	7.38361	7.26889
Intercept	6.96243*	NA	NA	NA	NA	NA	NA
<b>Household Race</b>							
African-American Household	0.14791*	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.06765	0.40404	0.00000	0.00000	0.35192	0.00000	0.00000
White Hispanic Household	0.06274	0.59596	0.00000	0.00000	0.64808	0.00000	0.00000
<b>Household Characteristics</b>							
Single Female	-0.00873	0.23030	0.52196	0.31696	0.08246	0.17421	0.09572
Single Male	-0.04552	0.11313	0.15809	0.22187	0.09175	0.10630	0.12091
Age 24 or Less	0.08823	0.03838	0.01757	0.03328	0.01858	0.00787	0.01259
Age 45–61	0.08786*	0.24444	0.34128	0.27575	0.27875	0.40059	0.31927
Age 62 or More	-0.07417	0.09091	0.13802	0.11727	0.02787	0.03937	0.03904
High School Graduate	-0.12947**	0.29293	0.25721	0.30289	0.23926	0.23130	0.23678
Post High School	-0.11004**	0.26869	0.39147	0.38669	0.38560	0.39469	0.35516
College Graduate	-0.15405*	0.07879	0.18444	0.21236	0.21719	0.29921	0.36524
Income/Household Size	0.00001	0.86657	1.29547	1.44098	2.22893	2.44053	2.83088
Savings 20k or More	-0.16708	0.00606	0.01380	0.03645	0.00348	0.00197	0.01511
First-Time Owner	0.01030	0.25253	0.22836	0.38035	0.37631	0.35925	0.50378
0.22 < Housing Cost/Income <= 0.33	-0.12765*	0.27273	0.28984	0.34390	0.31243	0.22638	0.24937
0.16 < Housing Cost/Income <= 0.22	-0.16061*	0.07273	0.08908	0.10618	0.31591	0.33858	0.32746
Housing Cost/Income <= 0.16	-0.20876*	0.02020	0.02133	0.03170	0.28571	0.37402	0.35579

**Exhibit 8**

**Full Sample<sup>a</sup>  
First Mortgages—FHA/VA—Home Purchases (continued)**

Variable Name	Regression Coefficient <sup>b</sup>	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
<b>Loan Characteristics</b>							
10 Year Loan Term	0.54419**	0.00404	0.00125	0.00792	0.00348	0.00098	0.00189
15 Year Loan Term	- 0.13764***	0.03888	0.04391	0.04279	0.03136	0.03839	0.05164
20 Year Loan Term	- 0.17783	0.01818	0.02635	0.01426	0.01626	0.01969	0.01196
25 Year Loan Term	- 0.08999	0.00404	0.01882	0.01109	0.00813	0.00689	0.00819
Loan Payments Fixed	- 0.11800*	0.19192	0.24592	0.28051	0.19744	0.22047	0.22796
<b>Property Characteristics</b>							
Current House Value	- 0.01926*	11.69912	9.72548	11.48391	14.97329	12.26612	14.92562
<b>Adjusted R<sup>2</sup></b>	0.2913						
<b>Number of observations</b>	5,388	495	797	631	861	1,016	1,588

NA = not applicable.

<sup>a</sup> The sample includes all households that have a first mortgage loan.

<sup>b</sup> All regressions include discrete variables indicating in which of 41 MSAs the housing units were located and the year in which the first mortgage was originated. For a complete list of the MSAs, see appendix A.

\* Indicates significance at the 1% level.

\*\* Indicates significance at the 5% level.

\*\*\* Indicates significance at the 10% level.

**Exhibit 9**

**Recent Mover<sup>a</sup>  
First Mortgages — FHA/VA — Home Purchases**

Variable Name	Regression Coefficient <sup>b</sup>	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate	NA	7.21160	6.73110	6.70242	6.82580	6.86255	6.80282
Intercept	7.29264	NA	NA	NA	NA	NA	NA
<b>Household Race</b>							
African-American Household	0.09910	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.12381	0.45752	0.00000	0.00000	0.41365	0.00000	0.00000
White Hispanic Household	0.05543	0.54248	0.00000	0.00000	0.58635	0.00000	0.00000
<b>Household Characteristics</b>							
Single Female	-0.07690	0.15033	0.54070	0.29677	0.09639	0.15584	0.11549
Single Male	-0.04041	0.11765	0.15698	0.25161	0.11245	0.14719	0.17323
Age 24 or Less	-0.00542	0.10458	0.04070	0.07742	0.04016	0.01732	0.03150
Age 45–61	0.00819	0.14379	0.20349	0.16129	0.17269	0.23377	0.20997
Age 62 or More	0.03368	0.04575	0.05233	0.04516	0.01205	0.02597	0.01837
High School Graduate	-0.16834***	0.30719	0.21512	0.26452	0.22892	0.19481	0.19948
Post High School	-0.07405	0.30719	0.40116	0.40000	0.41365	0.40693	0.35696
College Graduate	-0.19007**	0.05882	0.26163	0.26452	0.22892	0.34632	0.40420
Income/Household Size	-0.00773	0.87220	1.43446	1.53205	2.17557	2.44391	3.05117
Savings 20k or More	-0.33871	0.00654	0.01163	0.01290	0.00402	0.00000	0.01312

**Exhibit 9**

**Recent Mover<sup>a</sup>  
First Mortgages — FHA/VA — Home Purchases (continued)**

Variable Name	Regression Coefficient <sup>b</sup>	Means						
		Low Income		High Income		Hispanic	African American	White
		Hispanic	African American	African American	White			
<b>Loan Characteristics</b>								
10 Year Loan Term	- 0.11575	0.00654	0.00000	0.02581	0.00000	0.00433	0.00000	0.00000
15 Year Loan Term	0.00647	0.01961	0.05814	0.03871	0.01205	0.03030	0.02625	0.02625
20 Year Loan Term	0.00437	0.01307	0.03488	0.00645	0.02410	0.02597	0.01312	0.01312
25 Year Loan Term	- 0.08973	0.00000	0.00581	0.01290	0.00803	0.00000	0.00000	0.00000
Current House Value	- 0.01746*	11.92007	10.65694	11.50876	16.19525	14.59677	16.21859	16.21859
First-time Owner	0.02142	0.23529	0.23256	0.31613	0.40562	0.43290	0.52231	0.52231
0.22 < Housing Cost/Income <= 0.33	- 0.05458	0.30719	0.30814	0.34839	0.29719	0.23377	0.25459	0.25459
0.16 < Housing Cost/Income <= 0.22	- 0.09202	0.06536	0.12209	0.20000	0.33735	0.38961	0.37008	0.37008
Housing Cost/Income <= 0.16	- 0.08656	0.00654	0.02907	0.00645	0.23293	0.29004	0.29921	0.29921
0.9 < Loan to Value <= 1.0	- 0.08078	0.75163	0.67442	0.72258	0.71486	0.69264	0.67979	0.67979
0.8 < Loan to Value <= 0.9	- 0.26382**	0.09150	0.06977	0.05161	0.07229	0.06494	0.06562	0.06562
Loan to Value <= 0.8	- 0.04048	0.15033	0.19767	0.21290	0.15663	0.18182	0.22572	0.22572
Loan Payments Fixed	- 0.41250*	0.16993	0.20930	0.21935	0.14056	0.18182	0.20472	0.20472
<b>Adjusted R<sup>2</sup></b>	0.4016							
<b>Number of observations</b>	1,341	153	172	155	249	231	381	381

NA = not applicable.

<sup>a</sup> The sample includes all households that have a first mortgage loan.

<sup>b</sup> All regressions include discrete variables indicating in which of 41 MSAs the housing units were located and the year in which the first mortgage was originated. For a complete list of the MSAs, see appendix A.

\* Indicates significance at the 1% level.

\*\* Indicates significance at the 5% level.

\*\*\* Indicates significance at the 10% level.

bachelor's degree or more. The results are similar for recent movers. Similarly, across ethnic groups, high-income households have significantly higher levels of college graduates than corresponding low-income households do. In general, although African-American households are not as highly educated as White households are, the African-American sample contains higher proportions of households in which the head is in a higher education category than the Hispanic sample does. For example, considering the full sample and focusing on low-income households, in the conventional market 20.9 percent of African-American households are college graduates and 18.4 percent have achieved this level of education in the FHA/VA market. For recent movers, the percentage of African-American college graduates is very close to that of Whites and substantially higher than that of Hispanics.

Other variables that are generally highly significant with the expected sign are the housing-cost-to-income categorical variables, and, for the recent mover sample, the LTV categorical variable. As hypothesized earlier, these variables are included as measures of default risk. The only instance in which the housing-cost-to-income variables are not significantly correlated with interest rate differences (although they do have the expected sign) is in the government sector for recent movers. This difference seems reasonable because lenders are largely insulated against default risk in the FHA/VA market. Although the proportions in each of the housing-cost-to-income categories do not differ substantially across White and minority households, for recent movers in the conventional market, a substantially higher proportion of minority households are in the highest LTV categories. Specifically, for low-income households, 49.4 percent of Hispanic households and 44.4 percent of African-American households have more than a 90 percent LTV ratio at loan origination. For comparable Whites, this figure is only 29.7 percent. For higher income households, the percentage of African Americans with an LTV ratio of greater than 90 percent is substantially higher (53.3 percent) than that of either Hispanics (39.0 percent) or Whites (27.3 percent). These differences suggest that minority groups in our sample are also paying more in interest because of the extent of their mortgage debt with respect to both their ability to pay and the value of the properties acting as collateral for these loans.

One other variable that is statistically significant with the expected sign is house value. Although Hispanics' house values are relatively comparable to those of the White households in the home purchase samples, the current house values for African Americans are consistently lower for both the high- and low-income subsamples. For example, for the low-income group in the conventional market for the full sample, the average house value is \$109,883 for African Americans, \$145,954 for Hispanics, and \$160,217 for Whites.<sup>26</sup> These differences suggest that African Americans in particular may face higher interest rates to a certain degree because of the quality of their owned units.

## **Refinance Loans**

Exhibits 10 and 11 present results for interest rates on refinanced loans in the conventional and government sectors, respectively. Because it is highly unlikely that a recent mover household would be refinancing (after its move but before its interview), this analysis is only done for the full sample of homeowners who have refinanced. In particular, a refinanced loan is identified as any loan that was originated in a more recent year than the year of purchase. The total number of refinanced loans in the FHA/VA market (1,089 loans) is much smaller than the number in the conventional market (5,366 loans). It is not hard to understand why this might be the case. FHA/VA loans are

generally more costly than comparable conventional loans. Refinancing by definition occurs after some time has passed since the home was purchased, the combination of appreciation in house values and some loan amortization increases the borrower's opportunity to choose a conventional loan upon refinancing. Another interesting dimension of the data becomes evident when one considers the proportions of refinanced loans in this sample compared with home purchase loans. Minorities appear less likely to refinance than comparable Whites.<sup>27</sup> This result is more pronounced for low-income households, particularly those that are African American.

For example, in the conventional market for the full sample approximately 29.69 percent of the outstanding first mortgages are refinances (725 out of 2,442 loans); this percentage is 22.77 percent for Hispanics and 22.45 percent for African Americans. In the FHA/VA market, 15.75 percent of White households have refinanced. The proportion of Hispanic FHA/VA borrowers that have refinanced is not substantially different, at 14.4 percent, but only 8.75 percent of African Americans have refinanced. These numbers are consistent with the belief that minority households, especially African Americans, are less likely to refinance than White households are.

A point of particular interest in these exhibits is related to the FHA/VA market. As shown in exhibit 11, this market is the only segment in which no separate impact, or interest rate differential, exists among households by racial/ethnic group. Put another way, on average, neither Hispanic nor African-American households pay significantly higher rates than White households do, controlling for the effects of the other variables that can be held constant. A number of explanations are possible for this result, but the lack of significant differences across racial/ethnic groups does not have to do with the act of refinancing per se. In the conventional refinance market, all else being equal, African Americans and non-White Hispanics (although to a lesser extent) refinance at significantly higher costs than other groups do. In the FHA/VA market, interest rates are 41.2 and 12.8 basis points higher, respectively, for each subgroup.

As is the case for home purchases, the regression coefficients suggest that households in which the head has a college education pay lower interest rates than other households do. Considering the different racial groups, both African-American and Hispanic households have a smaller proportion of college-educated household heads compared with White households. In particular, considering the conventional market, only 13.1 percent of Hispanic households have a college degree or more; this figure is 20.0 percent for African-American households and 31.4 percent for White households. Education generally appears to be less important for refinancing than it is for home purchase, however, because only college graduates are observed to pay interest rates that are significantly different from those paid by individuals who did not finish high school. Because those who refinance loans represent a subset of the population that might be expected to have developed a certain level of expertise from previous experience, we might expect the households that refinance to obtain better interest rates regardless of their education levels. This effect, however, may be offset by the greater prevalence of subprime loans in the refinance market, which have generally higher interest rates. The diminished impact of education levels on interest rates may reflect the fact that poor credit—and hence subprime loans—is generally more common among all owners with less than a college education.

It is interesting to note that in the FHA/VA sample fewer of the risk-related control variables are significant compared with the conventional refinancing market. This trend is to be expected

**Exhibit 10**

**Full Sample<sup>a</sup>  
First Mortgages—Conventional/Refinance**

Variable Name	Regression Coefficient <sup>b</sup>	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate	NA	6.90415	7.49018	6.62328	6.49370	6.78913	6.42712
Intercept	6.77508	NA	NA	NA	NA	NA	NA
<b>Household Race</b>							
African-American Household	0.41196*	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.12786***	0.25442	0.00000	0.00000	0.20151	0.00000	0.00000
White Hispanic Household	0.03112	0.74558	0.00000	0.00000	0.79849	0.00000	0.00000
<b>Household Characteristics</b>							
Single Female	0.00325	0.16961	0.51429	0.37103	0.06675	0.22188	0.09002
Single Male	-0.01350	0.15901	0.13214	0.15172	0.05793	0.10638	0.08799
Age 24 or Less	-0.39055***	0.01767	0.00714	0.00690	0.00882	0.00000	0.00237
Age 45–61	0.08971*	0.36749	0.40357	0.41793	0.40050	0.50152	0.51743
Age 62 or More	0.04391	0.19788	0.33929	0.24552	0.06297	0.14590	0.07174
High School Graduate	0.01194	0.26148	0.26429	0.23586	0.17884	0.16717	0.15601
Post High School	-0.06829	0.30389	0.24643	0.36138	0.31864	0.31003	0.28663
College Graduate	-0.14865**	0.13074	0.20000	0.31448	0.40932	0.43769	0.53029
Income/Household Size	0.00450	1.09417	1.17046	1.52272	3.12867	3.49322	3.78808
Savings 20k or More	-0.10242	0.02120	0.03929	0.07862	0.00252	0.00000	0.00880
First-Time Owner	-0.11036*	0.39576	0.32500	0.58207	0.59068	0.51368	0.70491
0.22 < Housing Cost/Income <= 0.33	-0.14693*	0.21201	0.22857	0.25517	0.28967	0.21884	0.22369
0.16 < Housing Cost/Income <= 0.22	-0.30723*	0.02473	0.07500	0.08690	0.26574	0.29483	0.29306
Housing Cost/Income <= 0.16	-0.38467*	0.03180	0.01786	0.02759	0.33879	0.39514	0.40440



**Exhibit 10**

**Full Sample<sup>a</sup>**  
**First Mortgages — Conventional/Refinance (continued)**

Variable Name	Regression Coefficient <sup>b</sup>	Means					
		Low Income		High Income		Hispanic	White
		Hispanic	African American	African American	White		
<b>Loan Characteristics</b>							
10 Year Loan Term	- 0.38293*	0.02473	0.05714	0.02483	0.01637	0.02736	0.03756
15 Year Loan Term	- 0.39109*	0.28975	0.18571	0.25517	0.28338	0.28571	0.33469
20 Year Loan Term	- 0.12932**	0.03180	0.04643	0.06207	0.05164	0.04255	0.05821
25 Year Loan Term	0.02597	0.01060	0.02500	0.01379	0.01134	0.01824	0.01523
Loan Payments Fixed	- 0.16726*	0.15194	0.21429	0.19448	0.12217	0.18237	0.13232
Private Mortgage Insurance	0.23012	0.96466	0.92500	0.95586	0.99118	0.95441	0.99323
<b>Property Characteristics</b>							
Current House Value	- 0.00857*	19.02732	12.17491	19.57272	26.34839	18.57597	25.46101
<b>Adjusted R<sup>2</sup></b>	0.4086						
<b>Number of observations</b>	5,366	283	280	725	794	329	2,955

NA = not applicable.

<sup>a</sup> The sample includes all households that have a first mortgage loan.

<sup>b</sup> All regressions include discrete variables indicating in which of 41 MSAs the housing units were located and the year in which the first mortgage was originated. For a complete list of the MSAs, see appendix A.

\* Indicates significance at the 1% level.

\*\* Indicates significance at the 5% level.

\*\*\* Indicates significance at the 10% level.

**Exhibit 11**

**Full Sample<sup>a</sup>  
First Mortgages—FHIA/VA—Refinance**

Variable Name	Regression Coefficient <sup>b</sup>	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate		6.83283	7.03378	6.54025	6.63855	6.67197	6.59922
Intercept	7.23833	NA	NA	NA	NA	NA	NA
<b>Household Race</b>							
African-American Household	0.13966	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.16889	0.24096	0.00000	0.00000	0.26601	0.00000	0.00000
White Hispanic Household	0.10371	0.75904	0.00000	0.00000	0.73399	0.00000	0.00000
<b>Household Characteristics</b>							
Single Female	0.17377***	0.28916	0.50000	0.39831	0.06897	0.16970	0.11883
Single Male	-0.00254	0.09639	0.13514	0.11017	0.09360	0.11515	0.09417
Age 24 or Less	-1.08716***	0.00000	0.00000	0.00847	0.00493	0.00606	0.00224
Age 45–61	0.02559	0.22892	0.37838	0.33898	0.45320	0.50303	0.45516
Age 62 or More	-0.03795	0.24096	0.28378	0.21186	0.04433	0.09697	0.07175
High School Graduate	0.00645	0.19277	0.21622	0.27966	0.15764	0.15758	0.24215
Post High School	-0.20464	0.32530	0.28378	0.37288	0.42857	0.40606	0.37892
College Graduate	-0.26914***	0.10843	0.31081	0.27119	0.29064	0.37576	0.34978
Income/Household Size	-0.00876	1.05962	1.19023	1.39742	2.57311	2.87956	3.45887
Savings 20k or More	-0.45330	0.01205	0.01351	0.05932	0.00000	0.00000	0.00897
First-Time Owner	-0.09081	0.25301	0.27027	0.57627	0.53202	0.45455	0.59865
0.22 < Housing Cost/Income <= 0.33	-0.15784	0.32530	0.22973	0.24576	0.27586	0.24848	0.23094
0.16 < Housing Cost/Income <= 0.22	-0.23200**	0.02410	0.08108	0.08475	0.28571	0.33333	0.30045
Housing Cost/Income <= 0.16	-0.35448*	0.01205	0.04054	0.02542	0.37438	0.34545	0.39910

**Exhibit 11**

**Full Sample<sup>a</sup>**  
**First Mortgages — FHA/VA — Refinance (continued)**

Variable Name	Regression Coefficient <sup>b</sup>	Means						
		Low Income		High Income		Hispanic	African American	White
		Hispanic	African American	Hispanic	African American			
<b>Loan Characteristics</b>								
10 Year Loan Term	- 0.35254	0.00000	0.01351	0.00000	0.01970	0.01212	0.01570	
15 Year Loan Term	- 0.12519	0.15663	0.14865	0.17797	0.24631	0.18182	0.29821	
20 Year Loan Term	- 0.00280	0.02410	0.10811	0.06780	0.02463	0.04848	0.04036	
25 Year Loan Term	- 0.09150	0.01205	0.00000	0.02542	0.01970	0.02424	0.01345	
Loan Payments Fixed	- 0.12616	0.13253	0.18919	0.22034	0.08374	0.14545	0.14350	
<b>Property Characteristics</b>								
Current House Value	- 0.00423	15.32506	10.90693	14.95164	18.37806	15.10242	19.33909	
<b>Adjusted R<sup>2</sup></b>	0.3261							
<b>Number of observations</b>	1,089	83	74	118	203	165	446	

NA = not applicable.

<sup>a</sup> The sample includes all households that have a first mortgage loan.

<sup>b</sup> All regressions include discrete variables indicating in which of 41 MSAs the housing units were located and the year in which the first mortgage was originated. For a complete list of the MSAs, see appendix A.

\* Indicates significance at the 1% level.

\*\* Indicates significance at the 5% level.

\*\*\* Indicates significance at the 10% level.

because FHA and VA insurance and guarantees offer virtually 100-percent protection to lenders against default risk. In any event, in the conventional market for refinancing, higher housing-cost-to-income ratios, longer loan terms, and lower house values each give rise to higher interest charges. As with home purchases, one area where the African-American households in the sample appear to be at a disadvantage relative to Hispanics or Whites has to do with the value of their housing units. In particular, in the conventional market, low-income African Americans who refinance have an average current house value of approximately \$121,749, while the average value for both Hispanics and Whites exceeds \$190,000.

## Junior Mortgages and Home Equity Loans

In general, unlike the American Housing Survey, most publicly available data sets do not allow for an investigation of the types of debt that are not traditional first mortgages but are still secured by home equity. So-called junior mortgages (that is, mortgages that are subordinate to a first mortgage in the event of default and foreclosure) can be identified using the AHS. In addition, information on home equity loans, including lines of credit, is recorded separately from junior and first mortgages in the more recent versions of the AHS. Such loans are becoming an ever more popular way of accessing home equity. These types of loans are explored in exhibits 12 through 15. For this sample, junior mortgages and home equity loans represent a relatively small portion of loans held by homeowners. Comparing the sample sizes for these loans in exhibits 12 and 14 with the sample sizes shown earlier for households that have first mortgages (exhibit 2), the largest percentage of owners with home equity loans, 14.6 percent, is for high-income White households (1,493 out of 10,210 households). Minorities appear to be slightly more likely to use junior mortgages, whereas Whites in both income groups are more likely to have home equity loans. That is, minorities, as compared with Whites, have a much smaller percentage of home equity loans. For example, as a percentage of observations with first mortgages, only 4.1 percent of Hispanics (74 out of 1,821 households) and 3.8 percent of African Americans (80 out of 2,118 households) have home equity loans, but 12.3 percent of Whites do (393 out of 3,191 households). This difference suggests that, for whatever reason, the White households are somewhat more willing and able to make use of this type of financing. For junior mortgages, this difference generally does not appear to exist.

### Junior Mortgages

For junior mortgages, all owners who indicated that they had these financial instruments were included in the means analysis reported in exhibit 12. The monthly debt service and total amount of mortgage debt across all junior clients are calculated to give an idea of each group's total indebtedness in this area; however, interest rates are considered only for second mortgages (which is, of course, the predominant loan).<sup>28</sup> Similarly, the regression analysis was conducted for second mortgages only.<sup>29</sup> As in the previous analyses, in the case of the second mortgages, the loans that were included were made by a bank (not, for example, by a relative) and with only residential property acting as collateral for the loan.

Exhibit 12 presents mean values for junior mortgages. White high-income households appear to have lower interest rates on these mortgages than either African-American or Hispanic households do; the latter groups pay rates that are 82 and 64 basis points higher, respectively. Interestingly

## Exhibit 12

### Full Sample<sup>a</sup> Means Junior Mortgages

Variable Name	Low Income			High Income		
	Hispanic	African American	White	Hispanic	African American	White
Interest Rate <sup>b</sup>	8.13%	8.89%	8.19%	8.37%	8.55%	7.73%
Monthly Debt Service <sup>c</sup>	\$436	\$304	\$393	\$442	\$397	\$451
Total Amount of Debt <sup>c</sup>	\$37,591	\$21,749	\$34,514	\$41,944	\$34,113	\$42,947
Current House Value	\$167,419	\$106,666	\$166,414	\$243,689	\$172,508	\$238,578
Monthly Housing Cost	\$1,538	\$1,193	\$1,481	\$1,960	\$1,697	\$1,953
Annual Household Income	\$32,957	\$28,154	\$32,943	\$109,274	\$92,340	\$110,103
<b>Number of observations</b>	102	174	252	414	259	1,033

<sup>a</sup> The sample includes all households that have a second mortgage loan.

<sup>b</sup> Interest rate on the second mortgage.

<sup>c</sup> Total for all junior mortgages—up to four.

for the low-income subgroup, Hispanic and White households' average interest rates are relatively comparable, at 8.13 and 8.19 percent, respectively; however, African Americans' average interest rate is 70 basis points higher than that of Whites. This difference is almost identical to that in the high-income subsector of this market. Perhaps the most striking observation derived from data presented in exhibit 12 lies in the values for "total amount of debt" (the third line in exhibit 12) for junior mortgages. It certainly does seem that Hispanic and White households in particular have taken on significant levels of junior mortgage debt. For example, among low-income households, Hispanic households have a debt of \$37,591 compared with \$34,514 for White households and \$21,749 for African-American households. Considering these debt levels relative to annual income, low-income Hispanics have a particularly large amount of debt. Specifically, for low-income households, this ratio is 1.14 ( $\$37,591/\$32,957$ ); it is 1.04 for Whites and only 0.773 for African Americans. This difference suggests that low-income Hispanics have relatively high monthly debt service on these junior mortgages. Specifically, Hispanics' monthly debt service on junior financing is \$436 compared with \$304 for African Americans and \$393 for Whites. When considered relative to monthly income, these costs represent 15.88 percent for Hispanics ( $\$436/\$2,746$ ), 12.96 percent for African Americans ( $\$304/\$2,346$ ), and 14.31 percent for Whites ( $\$393/\$2,745$ ).

Regression results for second mortgages are shown in exhibit 13. African-American households (but not Hispanic households) pay significantly higher rates on second mortgages than White households do, holding constant the metropolitan area and time period in which the loan was originated and the household, loan, and property characteristics indicated. In particular, the estimated differential between African Americans and Whites is 44.7 basis points. As in the case of first mortgages, education does lower reported interest rates. For example, college graduates are observed to pay an average of 97.1 basis points less on the junior mortgages that they have outstanding at the time of their interview than those who did not graduate high school. In general, White households that have junior mortgages have a higher level of education than minority

households do. This difference is most apparent for low-income individuals. For example, only 13.7 percent of low-income Hispanic household heads have a college degree or more. For African Americans, the rate is about 15.5 percent. In contrast, among White household heads, 24.2 percent fall into this category.

As is the case with the home purchase and refinancing markets, several of our risk measures are significant predictors of interest rates. High housing-cost-to-income ratios and lower house values give rise to higher interest rates. Whereas the proportions of Hispanics, African Americans, and Whites in different housing-cost-to-income categories do not look substantially different for either the high- or low-income subgroups, average house values are substantially lower for African Americans than for either of the other racial/ethnic groups. Specifically, the average house value is \$106,666 for African-American households compared with \$156,403 for White households and \$167,419 for Hispanic households. In addition, as with the first mortgages examined previously, for second mortgages the shortest loan terms generally tend to have significantly lower interest rates. For example, second mortgages with a term in the range of 10 to 20 years have average interest rates more than 105 basis points higher than loans with a term of 5 years or less.

## Home Equity Loans

For home equity loans, the AHS contains information on interest rates on all loans of this type held by the owner, so the interest rate that is used in the analysis is the weighted average based on the amount of each loan (although very few households have two home equity loans and none have three). In 2002 and 2004, the AHS began to distinguish between home equity lines of credit and lump-sum loans; however, because this information was not available in 1998 and because of small sample sizes across different race/income categories, we do not disaggregate home equity financing into lines of credit and lump-sum loans with fixed monthly debt service payments.

Mean values for household home equity loans are presented in exhibit 14. Perhaps the most striking figures in exhibit 14 are those for the “total amount of debt” (the third line of exhibit) for all household home equity loans. Among both low- and high-income owners, Hispanic households have the highest amounts in the sample. Specifically, for low-income Hispanic households that have home equity loans, their average level of debt is \$4,742 higher than that of African-American households and \$3,226 higher than that of White households. For high-income households, these differences are \$7,850 and \$8,991, respectively. Considering the level of debt relative to income, for high-income households, minorities have a bit more debt per dollar of annual income than Whites do, but the difference is not substantial. When low-income households are considered, however, the ratio of home equity debt to current annual income is about 86.5 percent (\$26,142/\$30,236) for Hispanics compared with ratios of 75.6 (\$21,399/\$28,324) and 72.5 (\$22,916/\$31,587), respectively, for African Americans and Whites. These results are comparable with the circumstances observed for low-income Hispanics with second mortgages. Together, the information presented on junior and home equity loans suggests that Hispanic households that access home equity through these types of loans incur more debt than their African-American or White counterparts do; however, the terms of these loans will impact the magnitude of the debt service. Among low-income owners, interest rates on these loans are more than 100 basis points lower for Hispanics (6.53 percent) than for African Americans (7.74 percent), but this interest rate differential does not exist in comparison with the average rate paid by White households

**Exhibit 13**

**Full Sample<sup>a</sup>  
Second Mortgages**

Variable Name	Regression Coefficient <sup>b</sup>	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate	NA	8.12623	8.88721	8.18948	8.37228	8.54875	7.72955
Intercept	9.18053*	NA	NA	NA	NA	NA	NA
<b>Household Race</b>							
African-American Household	0.44743*	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.19985	0.23529	0.00000	0.00000	0.26329	0.00000	0.00000
White Hispanic Household	0.06977	0.76471	0.00000	0.00000	0.73671	0.00000	0.00000
<b>Household Characteristics</b>							
Single Female	-0.09982	0.18627	0.52874	0.31746	0.04106	0.18533	0.08906
Single Male	-0.06994	0.09804	0.12644	0.15476	0.04589	0.06950	0.07648
Age 24 or Less	-0.77507	0.00000	0.01149	0.00794	0.00725	0.00386	0.00387
Age 45-61	-0.15998	0.32353	0.39080	0.39286	0.35266	0.45560	0.40755
Age 62 or More	-0.92149*	0.16667	0.24713	0.13492	0.03140	0.06564	0.04743
High School Graduate	-0.69196*	0.23529	0.20690	0.28175	0.17874	0.19305	0.16651
Post High School	-0.49440**	0.31373	0.37931	0.36508	0.36473	0.34363	0.33591
College Graduate	-0.97105*	0.13725	0.15517	0.24206	0.36715	0.40927	0.46467
0.22 < Housing Cost/Income <= 0.33	-0.44061*	0.19608	0.21839	0.23016	0.28744	0.25869	0.24782
0.16 < Housing Cost/Income <= 0.22	-0.64024*	0.03922	0.06897	0.06746	0.27778	0.30116	0.31559
Housing Cost/Income <= 0.16	-0.71181*	0.01961	0.00000	0.01587	0.30918	0.33591	0.33398
Income/Household Size	-0.01577	0.99824	1.18339	1.39053	2.86406	2.89012	3.41864
Savings 20k or More	-0.47382	0.02941	0.01149	0.05159	0.00242	0.00386	0.00194

**Exhibit 13****Full Sample<sup>a</sup>  
Second Mortgages (continued)**

Variable Name	Regression Coefficient <sup>b</sup>	Means					
		Low Income		High Income		Hispanic	White
		African American	Hispanic	African American	Hispanic		
<b>Loan Characteristics</b>							
5–10 Year Loan Term	0.52542*	0.19608	0.21839	0.17063	0.16908	0.22394	0.22943
10–15 Year Loan Term	1.05332*	0.25490	0.32759	0.28571	0.40338	0.35521	0.31559
15–20 Year Loan Term	1.05993*	0.04902	0.08621	0.08730	0.07246	0.08494	0.07551
20–30 Year Loan Term	0.33094***	0.36275	0.27011	0.25000	0.23188	0.22394	0.21975
Loan Term > 30 years	-0.38742	0.00000	0.00575	0.00000	0.00000	0.00386	0.00194
<b>Property Characteristics</b>							
Current House Value	-0.02612*	16.74190	10.66659	15.64032	22.24207	17.25083	22.46650
<b>Adjusted R<sup>2</sup></b>	0.2219						
<b>Number of observations</b>	2,234	102	174	252	414	259	1,033

NA = not applicable.

<sup>a</sup> The sample includes all households that have a second mortgage loan.<sup>b</sup> All regressions include discrete variables indicating in which of 41 MSAs the housing units were located and the year in which the second mortgage was originated. For a complete list of the MSAs, see appendix A.

\* Indicates significance at the 1% level.

\*\* Indicates significance at the 5% level.

\*\*\* Indicates significance at the 10% level.



## Exhibit 14

### Full Sample<sup>a</sup> Means Home Equity Loans<sup>b</sup>

Variable Name	Low Income			High Income		
	Hispanic	African American	White	Hispanic	African American	White
Interest Rate <sup>c</sup>	6.53%	7.74%	6.68%	6.98%	7.41%	6.72%
Monthly Debt Service <sup>d</sup>	\$288	\$325	\$306	\$405	\$388	\$429
Total Amount of Debt <sup>d</sup>	\$26,142	\$21,399	\$22,916	\$35,051	\$27,201	\$26,060
Current House Value	\$223,641	\$123,571	\$183,102	\$294,233	\$202,130	\$257,307
Monthly Housing Cost	\$899	\$714	\$837	\$1,631	\$1,273	\$1,379
Annual Household Income	\$30,236	\$28,324	\$31,587	\$120,662	\$98,545	\$113,224
<b>Number of observations</b>	74	80	393	283	147	1,493

<sup>a</sup> The sample includes all households that have a home equity loan.

<sup>b</sup> No distinction is made between lump-sum home equity loans and lines of credit.

<sup>c</sup> Weighted average of cost of up to two home equity loans.

<sup>d</sup> Represents the total for all home equity loans—up to three.

(6.68 percent). More generally, if one considers monthly debt service relative to monthly income, this ratio is lowest for low-income Hispanic households (11.43 percent) compared with African-American households (13.75 percent) and White households (11.63 percent).

The interest rate regression results are reported in exhibit 15. They suggest that both non-White Hispanic households and African-American households pay higher rates on home equity loans than White households do, controlling for other factors. Note that the only variables that are really significant are the housing-cost-to-income categorical variables and current house value. As in the other interest rate regressions presented previously, the first variable represents a fundamental measure of default risk for the borrowers, and the second represents a basic way of capturing the quality of the property acting as collateral for these loans. For both income groups, Hispanics are observed to have a substantially higher level of housing cost relative to income than other racial/ethnic groups do. In particular, 74.3 percent of low-income Hispanics who have home equity loans are in the highest housing-cost-to-income category (greater than 33 percent). Only 60.0 percent of African Americans and 56.5 percent of Whites have housing-cost-to-income ratios that are in this range. For higher income households, these ratios are generally not as high, but if one considers the top two categories, 50.5 percent of Hispanic households have housing costs greater than 22 percent, whereas 36.1 percent of African-American and 42.3 percent of White households have housing costs greater than 22 percent. This difference suggests that higher levels of debt contribute to the higher rates paid by Hispanics relative to other ethnicities. Analogously, as we have seen in all subsamples, African Americans with home equity loans have relatively higher rates in part because of their lower house values.

**Exhibit 15**

**Full Sample<sup>a</sup>  
Home Equity Loans<sup>b</sup>**

Variable Name	Regression Coefficient <sup>c,d,e</sup>	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate	NA	6.52546	7.74440	6.67957	6.97700	7.40986	6.71614
Intercept	6.8023*	NA	NA	NA	NA	NA	NA
<b>Household Race</b>							
African-American Household	0.52322*	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.62674**	0.16216	0.00000	0.00000	0.20495	0.00000	0.00000
White Hispanic Household	0.11176	0.83784	0.00000	0.00000	0.79505	0.00000	0.00000
<b>Household Characteristics</b>							
Single Female	-0.09450	0.28378	0.43750	0.27735	0.03180	0.18367	0.07971
Single Male	-0.08529	0.13514	0.16250	0.13995	0.04594	0.08163	0.08104
Age 24 or Less	-1.07545***	0.01351	0.00000	0.01527	0.01060	0.00000	0.00201
Age 45-61	-0.14770	0.35135	0.38750	0.37405	0.51237	0.60544	0.50971
Age 62 or More	-0.20480	0.37838	0.38750	0.38422	0.04947	0.09524	0.10181
High School Graduate	0.26854	0.28378	0.18750	0.34097	0.11307	0.12245	0.15740
Post High School	0.22005	0.39189	0.38750	0.28753	0.33216	0.35374	0.29203
College Graduate	0.00912	0.16216	0.21250	0.27735	0.50177	0.51020	0.51909
Income/Household Size	0.02074	1.12105	1.28883	1.45157	3.21931	3.03552	3.70123
Savings 20k or More	-0.13541	0.04054	0.07500	0.09669	0.01413	0.01361	0.01340
0.22 < Housing Cost/Income <= 0.33	-0.20957***	0.09459	0.16250	0.17048	0.30389	0.17687	0.28667
0.16 < Housing Cost/Income <= 0.22	-0.36253*	0.10811	0.10000	0.15013	0.27915	0.29932	0.27729
Housing Cost/Income <= 0.16	-0.55485*	0.05405	0.13750	0.11450	0.21555	0.34014	0.29940

**Exhibit 15**

**Full Sample<sup>a</sup>  
Home Equity Loans<sup>b</sup> (continued)**

Variable Name	Regression Coefficient <sup>c,d,e</sup>	Means					
		Low Income		High Income		White	Hispanic
		African American	Hispanic	African American	White		
<b>Property Characteristics</b>							
Current House Value	- 0.01358*	19.33944	12.35709	18.31017	27.95724	18.83493	24.23831
<b>Adjusted R<sup>2</sup></b>	0.4493						
<b>Number of observations</b>	2,470	74	80	393	283	147	1,493

NA = not applicable.

<sup>a</sup> The sample includes all households that have a home equity loan.

<sup>b</sup> No distinction is made between lump-sum home equity loans and lines of credit.

<sup>c</sup> Weighted average of cost of up to two home equity loans.

<sup>d</sup> Represents the total for all home equity loans — up to three.

<sup>e</sup> All regressions include discrete variables indicating in which of 41 MSAs the housing units were located. For a complete list of MSAs, see appendix A.

\* Indicates significance at the 1% level.

\*\* Indicates significance at the 5% level.

\*\*\* Indicates significance at the 10% level.

## Conclusions

Using the American Housing Survey, this article attempted to investigate differences in the terms, conditions, and use of financing alternatives across ethnic groups. The analysis presented used recent metropolitan statistical area samples of the AHS for 1998, 2002, and 2004 to address these issues and examine how financing factors differ for Hispanics as compared with other ethnic groups across a number of different housing markets.

As noted previously, no “perfect” publicly available data set exists to investigate the issues and policy concerns addressed here. Specifically, we do not have information on the credit situation and net-worth position of households in the sample. Nor do we know who the lenders are and what their underwriting criteria are. The characteristics of the AHS, however, do enable researchers to suggest avenues for future investigation and potential policy concerns. To this end, the results presented previously suggest several general conclusions:

1. African-American households in the sample do not appear to be doing quite as well financially as White households and Hispanics households (as evidenced by lower incomes and house values). They also appear to be paying more for their financing.
2. To the extent that Hispanics fare worse in the mortgage markets than other ethnic groups do, the effect seems to be coming from the subgroup of non-White Hispanic households. For home purchases, 35 to 46 percent of Hispanics are classified as non-White. For refinanced loans, only about 25 percent of Hispanic households are classified as non-White. Previously, White and non-White Hispanics have not been considered separately in the mortgage pricing literature.
3. More significant ethnic effects exist for loans originating in the conventional purchase market than in the Federal Housing Administration/U.S. Department of Veterans Affairs market.
4. Household educational levels are an important factor associated with lower interest rates in most markets. This effect contributes to racial/ethnic differences in interest rates due to educational attainment differentials across the groups. In particular, Hispanic and African-American households have lower levels of education on average than their White counterparts do, which tends to increase their mortgage interest rates.
5. Similarly, housing-cost-to-income ratios, loan-to-value ratios (for recent movers), and current house value all are consistent predictors of interest rates. Mean value differences by race/ethnicity suggest that the first two factors contribute to higher interest rates for Hispanics, while the third factor contributes to higher rates for African Americans.
6. For junior mortgages and home equity loans, the specifications are limited by the information that is available on loan characteristics. It is interesting, however, that for second-mortgage interest rates, education appears relatively important, but all else being equal, Hispanic households do not appear to obtain higher rates than White households do (although African-American households do). On the other hand, with home equity loans, both African-American households and non-White Hispanic households have significantly higher rates. In general, low-income Hispanics appear to be taking on a lot of nonprimary mortgage debt compared with other racial/ethnic groups.

This study represents a first step in understanding how the mortgage market experience of minorities, particularly Hispanic households, differs from that of Whites. The analysis suggests areas for further study and, in a few instances, areas in which improvements in the characteristics of minority households and/or their housing situation could help improve their mortgage market outcomes. To better understand these issues, it is imperative that data containing the details of households' credit quality, net worth, and the underwriting criteria of the financial institutions that provide funding to these households be made generally available to researchers working in this area. A clear understanding of these mortgage markets and the reasons for differentials in the terms, conditions, and use of mortgage debt by different racial/ethnic and income groups is crucial if we are to provide equal access to homeownership—and the benefits of homeownership—for all Americans.

## Appendix A

### List of Metropolitan Statistical Areas in the American Housing Survey for 1998, 2002, and 2004

#### Exhibit A-1

#### American Housing Survey MSA Sample Information

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

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## Notes

1. This article was originally part of a series of studies commissioned by U.S. Department of Housing and Urban Development examining Hispanic homeownership. See Cortes et al. (2006) for references to the complete series of reports.
2. This recognition has appeared in numerous U.S. Department of Housing and Urban Development (HUD) statements in recent years. For example, see the discussion of any recent proposed HUD budget, such as that of 2005 (News Release No. 04-0101, 2004).
3. For more details, see Susin (2003) and Boehm, Schlottmann, and Thistle (2006).
4. See LePage (2005).
5. Income levels are defined using U.S. Department of Housing and Urban Development annual estimates of median household income, with low-income defined as being below 80 percent of the median. The three major ethnic classifications are African American, Hispanic, and White.
6. The set of variables that define these categories are shown in exhibit 4.
7. You can identify that a financial institution made the loan to the household in the sample. That is, it was not made by a relative or assumed from the seller.
8. See for example, Lam and Kaul (2003).
9. Earlier studies of mortgage rates include Schaefer and Ladd (1981), Black and Schweitzer (1985), and Benston and Horsky (1991).
10. *Overage*, also referred to as a *yield spread premium*, refers to the difference between the mortgage interest rate charged and the minimum rate the lender would accept as identified by a rate sheet.

11. Census tract information is not normally available with the American Housing Survey data released to researchers; however, because the author was employed by the U.S. Census Bureau at the time of the study, this information was made available to him.
12. Most of these metropolitan statistical areas are also resampled periodically.
13. The metropolitan statistical areas (MSAs) included in the sample for 1998 are Baltimore, MD; Birmingham, AL; Boston, MA; Cincinnati, OH-KY-IN; Houston, TX; Minneapolis-St. Paul, MN; Newport News-Hampton, VA; Oakland, CA; Providence, RI; Rochester, NY; Salt Lake City-Ogden, UT; San Francisco, CA; San Jose, CA; Tampa-St. Petersburg-Clearwater, FL; and Washington, DC-MD-VA. The MSAs included in the sample for 2002 are Anaheim-Santa Ana-Garden Grove, CA; Buffalo, NY; Charlotte-Gastonia, NC-SC; Columbus, OH; Dallas, TX; Fort Worth-Arlington, TX; Kansas City, KS-MO; Miami-Hialeah, FL; Milwaukee, WI; Phoenix, AZ; Portland, OR-WA; San Bernardino-Riverside, CA; San Diego, CA. The MSAs included in the sample for 2004 include Atlanta, GA; Cleveland, OH; Denver, CO; Hartford, CT; Indianapolis, IN; Memphis, TN; New Orleans, LA; Oklahoma City, OK; Pittsburgh, PA; Sacramento, CA; San Antonio, TX; Seattle-Everett, WA; and St. Louis, MO.
14. Because of the large numbers of White households in the sample, a random subsample of these households for first mortgages was selected to make the analysis more tractable.
15. Although the American Housing Survey (AHS) separates loans other than first mortgages into junior mortgages (that is, second and third mortgages; only a few third mortgages exist) and home equity loans, the characteristics that distinguish these loans from one another are not completely clear. In the event of default, junior mortgages are clearly in a subordinate position to more senior liens, which is not necessarily true of home equity loans. Also, home equity loans include lines of credit, which do not require that regular payments be made to amortize the loan and in which the term is indeterminate and may be kept alive as long as the household resides in the dwelling, acting as collateral for the loan. For these reasons and because they are recorded separately in the AHS, these two loan categories are kept separate for purposes of this analysis.
16. Based on the authors' previous research, we used a standard definition of low income as those households below 80 percent of the area median income as defined by the U.S. Department of Housing and Urban Development. Experimentation with this definition (for example, 60 percent and 70 percent) did not lead to any substantive differences in the results for this analysis.
17. The sample was constrained to include only mortgages made by a financial institution (not a relative, seller, or some other unusual source). The mortgage had to be made for a residence only (not in part for a business or other buildings on the property). It was not made on a condominium or a manufactured home (these types of units represented a very small fraction [less than 5 percent] of the total), and the loan was not an assumption or a wraparound loan (that is, it was a newly originated loan when the borrower got it). In addition, for the first mortgage analysis these loans were constrained so that the loan terms were 10, 15, 20, 25, or 30 years. As one might expect, restricting the sample to include only loans with these terms still accounted for 95 percent of all the loans in the sample. The motivation for the loan term



restriction is that it enabled us to include discrete dummy variables for the different loan terms above (a better way generally to capture the fundamental differences in these different loans) and gave us only those loans whose terms were consistent with loan terms that traditional, long-term financing might be expected to have.

18. The breakpoints in the categorization of housing cost were obtained by cutting the distribution of housing cost to income for the full sample into quartiles; however, particularly for pretax income, devoting 30 percent of income to housing expenses would be considered quite high.
19. This differential reflects relatively recent reductions in interest rates compared to previous levels.
20. The designation of race/ethnicity is straightforward for households consisting of a single individual. For married couples, if one individual was White and the other Hispanic or African American, the household was deemed Hispanic or African American, respectively. For cases in which the household head and spouse were both Hispanic, if either the spouse or the head was classified as a non-White Hispanic, the household was designated to be non-White Hispanic. If one was Hispanic and the other African American, the household was classified as African American.
21. The exact percentages for each subsample analyzed in this article are presented in exhibits 10 through 12.
22. To estimate a loan-to-value ratio for the full sample, we would need the house value at the time the loan was originated. It is not possible to obtain house value for refinancing because measures of property value are available only at the point of home purchase and at the point of the interview. For purchases, it is conceptually possible to obtain house value since that (retrospective) variable is on the data set; however, this variable has, unfortunately, many missing values, probably due to the nature of the retrospective question. These issues are not relevant for recent movers who purchase homes.
23. Note that the proposed inverse relationship between property value and interest rates may be mitigated, to some degree, to the extent that higher valued properties have “jumbo” mortgages. Jumbo mortgages are considered nonconforming loans because their values exceed the loan limits set by Fannie Mae and Freddie Mac. As such, they are considered to be higher risk from the lender’s perspective, and, therefore, have slightly higher interest rates than would otherwise comparable conforming loans. Experimentation with a dummy variable for jumbo loans did not improve the fit of the model, nor was this variable statistically significant.
24. Note that the earlier a loan was originated, the fewer loans originated in that year are still in existence. Consequently, in earlier years the discrete variables included in the regressions may represent, for example, a 5-year interval (for example, 1965–70). In the case of recent movers, only the metropolitan statistical area (MSA) categorical variables could be included because distinct MSAs were sampled in each year and, therefore, were perfectly correlated with the origination periods.

25. The  $R^2$ s in all the regressions presented in the analysis are relatively high for disaggregated microdata samples, ranging from .22 (exhibit 13, for second mortgages) to .45 (exhibit 15, for home equity loans).
26. Note that this is the only instance in which the average house values for Hispanics and Whites appear markedly different.
27. This result is consistent with the literature. Canner, Dynan, and Passmore (2002) found that minorities are less likely to refinance, and, when they do, the average amount of cash borrowed is lower than the amount Whites borrow. See HUD, Office of Policy Development and Research (2004), which examines refinancing using recent Home Mortgage Disclosure Act data. The report considers mortgage refinance by racial/ethnic group and shows that the percentage of refinanced loans is relatively small in comparison to White households; for example, in 2002, 65.5 percent of all refinanced loans were identified as being held by White households, whereas African Americans and Hispanics accounted for only 3.8 percent and 4.9 percent, respectively.
28. The American Housing Survey provides the monthly debt service and the amount of the debt when borrowed for the second, third, fourth, and subsequent mortgages. The monthly debt service is the payment due for each loan each month. See ICF International (2004).
29. The slightly lower number of observations in the remaining exhibits is due to the possibility of a third mortgage. Only a few third mortgages exist.

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