

# **Drowning in Debt: Housing and Households with Underwater Mortgages<sup>1</sup>**

George R. Carter III, Alfred O. Gottschalck

U.S. Census Bureau  
4600 Silver Hill Road, Washington, DC 20233  
[george.r.carter.LLL@census.gov](mailto:george.r.carter.LLL@census.gov)  
[alfred.o.gottschalck@census.gov](mailto:alfred.o.gottschalck@census.gov)

## **Abstract**

In 2004, homeownership rates peaked in the United States with home prices peaking two years later in 2006. Since these peaks, homeownership rates and home prices have fallen at the national level. An increasing number of homeowners are now “underwater” in their mortgages, meaning that they owe more on their mortgages than their homes are worth. Two longitudinal Census surveys collect data on mortgages, making it possible to provide an estimate of the prevalence of underwater mortgages over time. The American Housing Survey (AHS) collects information on the quality of housing in the United States and information on household characteristics. The Survey of Income and Program Participation (SIPP) collects information about income and program participation in the United States and detailed data on taxes, assets, liabilities, and participation in government transfer programs. Whereas the AHS follows housing units over time, the SIPP follows individuals and households over time. While the surveys may not collect data on the actual value of the home, both surveys collect owner estimated home values and data on outstanding principal and interest on mortgages. We use these measures to calculate home equity and to develop an estimate of whether the mortgage is underwater. Using data from the 2003, 2005, 2007, and 2009 American Housing Surveys, we explore national and regional trends in underwater mortgages, as well as housing and mortgage characteristics associated with these mortgages. Using two waves of data from the 2004 SIPP Panel, we examine tenure transitions of individuals and households whose mortgages are underwater. We find across the board increases in underwater mortgages in 2009 and find owners who are underwater or have high housing burdens to be at greater risk of homeownership exit.

## **I. Introduction**

In 2004, homeownership rates peaked in the United States<sup>2</sup> with home prices peaking two years later in 2006<sup>3</sup>; since these peaks, homeownership rates and home prices have fallen at the national level. According to First American CoreLogic, an increasing number of homeowners

---

<sup>1</sup> This paper is intended to inform interested parties of ongoing research and to encourage discussion of work in progress. The views expressed on methodological, technical and operational issues are those of the authors and not necessarily those of the U.S. Census Bureau.

<sup>2</sup> U.S. Census Bureau, Current Population Survey. For more information, refer to: <http://www.census.gov/hhes/www/housing/hvs/qtr108/q108tab5.html>.

<sup>3</sup> Standard & Poor’s Case-Shiller Index. For more information refer to: <http://www2.standardandpoors.com/>.

are now “underwater” in their mortgages, meaning that they owe more in their mortgages than their home is worth. At the end of the first quarter of 2010, First American CoreLogic estimated that 24% of mortgages were “underwater”<sup>4</sup>

Two longitudinal surveys conducted by the U.S. Census Bureau collect data on home values and mortgage debt, making it possible to estimate “underwater” status. The American Housing Survey (AHS) follows housing units over time and collects information on the quality of housing in the United States, as well as information on household characteristics. The Survey of Income and Program Participation (SIPP) is a panel study of households that follows individuals over time, usually for two to three years. The main objective of the SIPP is to provide accurate and comprehensive information about income and program participation in the United States. In order to model eligibility for such means-tested programs as Temporary Assistance for Needy Families (TANF), the SIPP also collects detailed asset and liability data (e.g., data on property value and debt).

In this paper, we use internal use data from the 2003, 2005, 2007, and 2009 American Housing Survey (AHS) National files to explore national and regional trends in underwater mortgages, as well as housing and mortgage characteristics associated with these mortgages. Neither the AHS nor the SIPP collect data on foreclosures. We use the transition from owning to renting as a proxy for foreclosures in the SIPP. While homeowners transition to rentership for different reasons, such as when they move to new area to start a new job, we hypothesize that those who have gone through foreclosure are likely to be renters at time 2. Using two waves of data from the internal use version of the 2004 SIPP Panel, we examine tenure changes of individuals and households whose mortgages are underwater.

---

<sup>4</sup> First American CoreLogic Negative Equity Report. For more information refer to: <https://www.corelogic.com/About-Us/ResearchTrends/Negative-Equity-Report.aspx> .

The remainder of the paper will be organized as follows: In the second section, we provide a brief overview of each survey; in section three we discuss what it means to be “underwater,” how “underwater” mortgages are measured, and the effects of “underwater” mortgages on the housing market; in section four we discuss existing research on the self reported home values, home equity, and owner to renter transitions; in section five we discuss our research methodology; in section six results will be presented and discussed; and concluding remarks will be provided in the last section.

## **II. Overview of the AHS and the SIPP**

The AHS started in 1973 and has had the same sample since 1985 with updates for new construction. Between 1973 and 1981, the AHS, formerly called the Annual Housing Survey, was conducted annually. The AHS consists of two surveys: a national survey and a metropolitan area survey. Since 1983, the national survey has interviewed a nationally representative sample of approximately 55,000 housing units every two years in odd numbered years. Both national and metropolitan area AHS surveys are longitudinal, following the same housing units over time.

The 1973 AHS through the 1983 AHS followed a sample of housing units drawn from the 1970 Census. Since 1985 the AHS has followed a sample of housing units drawn from the 1980 Census. Building permit data and data from other resources have been used to update the sample to account for new construction. Updates have also been made for housing units missed in the 1980 Census, a sample of units added to existing sample units, manufactured/mobile homes from Census 2000, and a sample of assisted living units to improve coverage of the

elderly.<sup>5</sup> Returning cases are interviewed with dependent interviewing techniques on some items, confirming housing characteristics recorded in previous administrations of the AHS.<sup>6</sup> Since 1997, the AHS has been conducted using computer assisted person interviewing (CAPI).

In this paper, we analyze data from the internal use versions of the 2003, 2005, 2007, and 2009 American Housing Survey National files. The data collection time period for the AHS National survey is between late-April and mid-September.

In regard to SIPP, the population represented in the 2004 SIPP (the population universe) is the civilian non-institutionalized population living in the United States. The institutionalized population, which is excluded from the population universe, is composed primarily of the population in correctional institutions and nursing homes (91 percent of the 4.1 million institutionalized people in Census 2000).

The Census Bureau employs a two-stage sample design to select the SIPP sample. The two stages are (1) selection of primary sampling units (PSUs) and (2) selection of address units within sample PSUs. The sample frame for the selection of sample PSUs consists of a listing of U.S. counties and independent cities, along with population counts and other data for those units from the most recent census of population.

Sample households within a given SIPP panel are divided into four random subsamples of nearly equal size. These subsamples are called rotation groups and one rotation group is interviewed each month. Each household in the sample is interviewed at four-month intervals over a period of roughly four years beginning in February 2004. SIPP interviews are conducted via computer assisted personal interview (CAPI) and computer assisted telephone interview

---

<sup>5</sup> The sample frame of assisted living units was constructed by matching independent lists of assisted living units to addresses of housing units from Census 2000. While improving coverage of the elderly, this methodology may have missed assisted living housing units that were erroneously enumerated as group quarters in Census 2000.

<sup>6</sup> Further detailed information concerning the AHS sample can be found at <http://www.census.gov/hhes/www/housing/ahs/ahs01/appendixb.pdf>.

(CATI). The reference period for the questions is the four-month period preceding the interview month. The most recent month is designated reference month four, the earliest month is reference month one.

In general, one cycle of four interview months covering the entire sample, using the same questionnaire, is called a wave. For example, wave 1 rotation group 1 of the 2004 Panel was interviewed in February 2004 and data for the reference months October 2003 through January 2004 were collected.

The SIPP is comprised of core and topical module data. Core data pertain to the basic items in the SIPP, such as demographics, program participation, income, and employment, while topical module data pertain to special topics such as assets and liabilities, marital and fertility history, education and training history, employment history, and disability. The core questions of the SIPP are asked every wave of the survey, while topical module questions are only asked during certain waves and usually for one wave only, though some modules are asked multiple times. The asset and liability topical module, where questions pertaining to real estate are asked, is fielded every three waves. For the 2004 SIPP panel, the asset and liability topical module was administered for the first time in wave 3 and subsequently in wave 6. We use the internal use versions of waves 3 and 6 in our analyses.

In wave 1, the 2004 SIPP began with a sample of about 62,700 housing units (HUs). About 11,300 of these HUs were found to be vacant, demolished, converted to nonresidential use, or otherwise ineligible for the survey. Field Representatives (FRs) were able to obtain interviews for about 43,700 of the eligible HUs. FRs were unable to interview approximately 7,700 eligible HUs in the panel because the occupants: (1) refused to be interviewed or (2) could not be found at home. Only original sample people (those in wave 1 sample households and

interviewed in wave 1) and people living with them are eligible to be interviewed. The SIPP sample follows original sample members who move, provided they are not institutionalized, do not live in military barracks, or do not move abroad. Based on these follow-up criteria, FRs were able to interview about 39,100 HUs of the approximately 44,600 eligible HUs for wave 3 and about 36,900 HUs of the approximately 45,600 eligible HUs for Wave 6.<sup>7</sup>

### **III. “Underwater” Mortgages**

Home equity is defined as the value of the home minus the outstanding principal on all mortgages or loans on the property. For the AHS and SIPP, home values and outstanding principal are self-reported measures. “Underwater” properties have negative equity, meaning that the value of the property is less than outstanding principal on all mortgages and loans on the property. First American CoreLogic began reporting on negative equity in 2008. CoreLogic calculates negative equity using public record data on mortgage debt outstanding and estimates of home value using Automated Valuation Models (AVM). Using this methodology, the percentage of homes with negative equity were 18% in the fourth quarter of 2008, 23% in the third quarter of 2009, and 24% in the first quarter of 2010.<sup>8</sup>

Being “underwater” can lead to several different housing outcomes. Obviously, for all homeowners with “underwater” mortgages, it impedes housing wealth accumulation. For some homeowners it can make them stuck in their homes for long periods of time as they wait for the market to improve. Other homeowners may choose to strategically default on their mortgage as they decide that their home will not appreciate enough to make the unit profitable.

Still others may default on their mortgages if their incomes decline or if they experience significant life events, such as losing their job, divorce, or death in the household, that make it

---

<sup>7</sup> Further detailed information about the SIPP sample can be found at [http://www.census.gov/sipp/sourceac/S&A04\\_W1toW12\(S&A-9\).pdf](http://www.census.gov/sipp/sourceac/S&A04_W1toW12(S&A-9).pdf).

<sup>8</sup> First American CoreLogic Negative Equity Report. For more information refer to: <https://www.corelogic.com/About-Us/ResearchTrends/Negative-Equity-Report.aspx>.

difficult to make mortgage payments. At the community level, increasing foreclosures contribute to continuing price declines and increasing numbers of “underwater” homes.

#### **IV. Literature Review**

##### *Home Values*

Unlike other estimates of home equity, the AHS and the SIPP use self reported measures of home value in their estimates. The SIPP asks “What is the current value of this property; that is, how much do you think it would sell for on today’s market if it were for sale? Include rental properties attached to or located on this residence.” In the AHS, respondents are asked: “How much do you think the house and lot would sell for on today’s market?” AHS respondents are not asked to include rental properties attached to the residence.

The earliest research on owners’ estimates of their home values, using appraisal data and national data from the Survey of Consumer Finance, found that owners overstate their home values by about 4 percent (Kish and Lansing 1954). Kain and Quigley (1972) replicated Kish and Lansing’s study on a single city and found that errors of estimates of home value were systematically related to the socioeconomic characteristics of owners. Kiel and Zabel (1999) in their comparison of AHS house value data to sales prices of houses sold in the twelve months prior to the interview, found that owners reported housing values 5.1 percent higher than stated sales prices and recent buyers reported house values 8.4 percent higher than stated sales prices. They found AHS estimates to be reliable, but to consistently overestimate house value. Unlike Kain and Quigley (1972), they did not find differences between sales prices and owners’ estimates to be related to owner characteristics other than length of tenure.

Overestimates of home value can depress estimates of negative equity. Overestimation may be less of a problem for owners who purchase their homes in soft markets. Recent research

by Benitez-Silva et al. (2008) suggests that respondents who purchase their homes during soft housing markets are more accurate in their assessments of their home's value.

### *Home Equity*

While the SIPP provides a home equity variable on its public user file, the AHS does not. Some researchers have approximated a value for home equity for the AHS by subtracting the total remaining principal on all mortgages and loans from the current value of the housing unit (Krivo and Kaufman 2004, Bourassa and Yin 2008). HUD states that home equity can be calculated in this way, using AHS National Publication table specifications code, but advises against doing so, as both the home value and the loan amounts used to calculate outstanding principal are topcoded.<sup>9</sup> Using the public use version of the 2001 AHS, Krivo and Kaufman (2004) found Black and Hispanic householders to have less housing equity than white householders. Age, education, income, length of residence, being a prior owner, and having a lower interest rate were found to be related to higher levels of home equity. In this paper, we use the internal use versions of the AHS and the SIPP, allowing us to calculate home equity on data that has not been topcoded.

### *Owner to Renter Transitions*

Prior research by Turner and Smith (2009) found home owners with low incomes or who were Black or Hispanic were more likely to exit homeownership. Painter and Lee (2009) examined homeownership exits among older owners. They found that age was not a factor in homeownership exit. Health reasons and single headship were found to increase the likelihood of exit. Living near children decreased the likelihood of exit, but living near rich children increased the likelihood of exit. Research by Spader and Quercia (2008) found that community reinvestment mortgages reduced the likelihood of homeownership exit.

---

<sup>9</sup> Vandenbroucke, David A. "AHS Data Users FAQ" page 11-12. [http://www.huduser.org/Datasets/ahs/AHS\\_%20FAQ\\_9-9-08.pdf](http://www.huduser.org/Datasets/ahs/AHS_%20FAQ_9-9-08.pdf).



## V. Research Methodology

Our study has two goals: (1) to analyze trends in negative equity since 2003 and (2) to determine the extent to which negative equity and housing burden affects transitions out of homeownership. Our analyses are restricted to owner occupied housing units with at least one mortgage. We analyze trends in negative equity with data from the AHS. Through our second study goal, we seek to examine the effect of “underwater” status on foreclosures. Neither the AHS nor the SIPP collect data on foreclosures. We use owner to renter transitions between waves 3 and 6 of the 2004 SIPP Panel as a proxy for this housing outcome. While homeowners may transition to rentership for different reasons, such as when they move to new area to start a new job, we hypothesize that those who have gone through foreclosure are likely to be renters at time 2.

We estimate transition to rentership through a logistic regression model that takes the common form:

$$\ln(\text{odds}) = \ln(p_i/(1-p_i)) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_p X_{pi}$$

Our dependent variable is tenure at wave 6 with renters indicated by a ‘1’ and owners indicated by a ‘0’. Our independent variables in the tenure transition model come from wave 3 and are restricted to owners with at least one mortgage or loan on their home. In addition to a dummy variable indicating “underwater” status, our independent variables include a dummy variable indicating housing burdens over 40% of household income and controls for race, Hispanic origin, age, education, and region.

## VI. Results<sup>10</sup>

Figures and tables can be found in the appendix. We first discuss trends in “underwater” mortgages between 2003 and 2009, using data from the American Housing Survey. Then we

---

<sup>10</sup> All differences reported in the text have been tested at the 10% significance level.

turn to a discussion of our owner/renter transition model, using data from waves 3 and 6 of the 2004 SIPP Panel.

### *AHS Trends*

Overall, as can be seen in Figure 1, the percentage of housing units that were underwater remained around 5% in 2003, 2005, and 2007 and shot up to 11.6% in 2009.

Figure 2 shows regional variations in “underwater” homes between 2003 and 2009. In 2003, the West had smaller percentages of underwater homes than the South, but not compared to other regions. In 2005, the West had smaller percentages of underwater homes compared with the other regions. In 2007, the South and the West had higher percentages of underwater homes than the Northeast. Rates began to rise in the West in 2007. In 2009, the highest rates were in the West, followed by the Midwest and the South. The Northeast had the lowest percentages of underwater mortgages in 2009.

In Figures 3 through 8, we examine demographic differences in “underwater” status by looking at the demographic characteristics of the householder of the housing unit. Figure 3 breaks down “underwater” status by race. In 2003, 2005, and 2007, there were no statistically significant differences in the percentage of underwater units by race. In 2009, housing units with white householders had the lowest percentage of underwater mortgages and those with black householders had the highest, followed by other race and Asian race categories.

In Figure 4 we examine trends in “underwater” status by Hispanic origin of the householder. In 2003 and 2005, there were no statistically significant differences between Hispanic and Non-Hispanics. In 2007, the percentage of Hispanic underwater homes rose to 6.14% compared with 4.53% for Non-Hispanics. In 2009, housing units with Hispanic

householders were almost twice as likely as housing units with non-Hispanic householders to be underwater.

In Figure 5 we examine trends in “underwater” status by age of householder. In 2003, there were no statistically significant differences in underwater status by age. In 2005, householders who were 65+ were less likely than other age groups to be underwater with a underwater percentage of 2.43%. In 2007 householders who were under 35 were more likely than other age groups to be underwater with an underwater percentage of 6.71%. Within age groups, differences were not statistically significant across the 3 years, except for householders who were 65+ in 2005, who had lower rates of underwater status than householders the same age in 2003 and 2007. While the percentage of underwater housing units increased for all groups in 2009, the increase was greatest for those under 45.

The percentage of housing units with married householders with an underwater mortgage decreased from 5.25% in 2003 to 4.36% in 2007. In 2009, we see married householders being slightly less likely to be underwater than non-married householders (Figure 6).

In Figures 7 and 8, we examine the trends by socioeconomic status. Regarding education, we see a weak negative linear relationship between level of education and underwater status with those with advanced degrees less likely than those with less than a high school education to be underwater. In 2003, householders with college or advanced degrees had lower rates of underwater mortgages compared with householders with all other lower education levels. In 2005 and 2007, householders with college or advanced degrees had lower percentages of underwater mortgages compared with householders with a high school education or less. Percentages of homes that were underwater increased in all education categories in 2009 with

respondents with less than a high school education continuing to have higher percentages with underwater mortgages compared with those with advanced degrees (Figure 7).

In 2003, 2005, 2007, and 2009 housing units in the fifth income quintile were less likely to be underwater. Percentages of underwater homes increased across the board in all income quintiles in 2009 (Figure 8).

In Figure 9 and 10, we examine “underwater” status by characteristics of the first mortgage on the property. In 2003, 2005, 2007, and 2009 housing units with first mortgage interest rates over 8% were most likely to be underwater. In 2005, housing units with first mortgage interest rates over 6% were more likely to be underwater compared with units with lower interest rates. In 2007, housing units with first mortgage interest rates over 7% were more likely to be underwater compared with units with lower interest rates. In 2009, we see an increase for all categories, but we also see an increase in the likelihood of being underwater for those with interest rates above 6 percent in comparison with those below 6 percent (Figure 9).

In 2003, adjustable rate mortgages (ARMs) were less likely to be underwater compared with fixed rate mortgages. In 2005, there was no difference in the percentage of underwater mortgages between mortgage types. In 2007, the percentage of ARMs with underwater mortgages rose above those with fixed mortgages. In 2009, we see that ARMs were more likely to be underwater compared with fixed rate mortgages (Figure 10).

Manufactured/mobile homes do not appreciate in the same way as detached and attached single units and condos (Jewell 2003). The financing of manufactured/mobile homes is different than that for single family homes and condos, as the homeowner does not always own the land on which the home sits. In Figure 11, we examine “underwater” status by building type. Across all years, manufactured/mobile homes were more likely to be underwater, followed by units in

multiunit buildings, and one unit buildings. There were increases in the percentages of underwater units for all building types except for manufactured/mobile homes in 2009. For 2003-2007, there were no significant differences within groups, except for manufactured/mobile homes which had lower rates of underwater homes in 2005 compare to 2003.

In Figure 12, we examine the effect of the housing bust on first time homeowners. There were no statistically significant differences between first time homeowners and homeowners who had owned homes before between 2003 and 2007. In 2009, first time homeowners were more likely to be underwater.

Using the AHS, we have identified trends in “underwater” status between 2003 and 2009. Overall, SIPP rates of “underwater” mortgages are lower than the AHS. The SIPP reported that 3.18 percent of mortgages were “underwater” in 2004 and 3.39 percent of mortgages were “underwater” in 2005.<sup>11</sup> This compares with 5.12 percent of mortgages that were “underwater” in 2003 and 4.98 percent of mortgages that were “underwater” in 2005 in the AHS. Carter and Gottschalck (2010) found that home values were very similar between the 2005 AHS and Wave 3 of the 2004 SIPP Panel. The AHS is designed to collect more detailed data on more mortgages and loans than the SIPP and thus captures higher amounts of mortgage debt than the SIPP. The AHS home equity measure includes manufactured/mobile homes, unlike the SIPP measure. Higher percentages of manufactured/mobile homes are “underwater,” increasing the number of “underwater” homes captured by the AHS.

#### *Owner/Renter Transitions Model*

The question remains whether being “underwater” increases the likelihood of foreclosure. As mentioned above, neither the AHS nor the SIPP collect information on foreclosures. With

---

<sup>11</sup> The percentage of “underwater” mortgages in 2004 and 2005 in the SIPP were not significantly different at the 10% level.

the SIPP, owner to renter transitions can be examined as a proxy for foreclosure, as households that go through foreclosure are likely to be renters at time 2. With the AHS, we can examine if there is a new owner or renter at time 2 as a proxy for foreclosure. In addition, purchase price at time 2 can be used to estimate if the unit was a foreclosure or a short sale. Here we examine owner to renter transitions in the SIPP.

We model housing tenure change while controlling for “underwater” status and housing burden looking at 2004 and 2005, the years preceding the housing bust. We expect both “underwater” status and housing burdens to increase the likelihood of transition, as owners walk away from their homes or find themselves unable to afford them. We use owner and regional characteristics at wave 3 to predict the transition to renter status at wave 6.

In Table 1 we see that “underwater” status and housing burden play a significant role in predicting the transition from owner to renter. All control variables have appropriate signs and meet theoretical expectations set forth in the literature. We found the interaction of underwater status and housing burden to not be statistically significant. This makes sense, as those who are “underwater” may not leave homeownership only because their mortgage payments are high in relation to their income.

## **VII. Summary and Conclusions**

Both the AHS and the SIPP use self-reported measures of home value and mortgage debt in their calculations of home equity. Estimates of the percentage of “underwater” mortgages in 2009 in the AHS (11.6%) are lower than CoreLogic’s estimates (23%). We found percentages of “underwater” mortgages in the AHS to increase across the board in 2009. In our analyses of the AHS, the highest percentages of “underwater” housing units were found in the South and West in 2007 and the West in 2009; among housing units with Black only householders in 2009;

among Hispanic householders in 2007 and 2009; among householders under 35 in 2005 and 2007; among not married householders in 2009; among householders with a high school education or less in 2003-2009; among the lowest four income quintiles in 2003-2009; among units with first mortgage interests rates over 8% in 2003-2009; among units with first mortgages that are adjustable rate in 2007 and 2009; among multi-unit structures and manufactured/mobile homes in 2003-2009; and among first time homeowners in 2009.

Using data from the 2004 SIPP Panel waves 3 and 6, we found “underwater” status and housing burden to be positively associated with a change in status from owner to renter between wave 3 and wave 6. The interaction between underwater status and housing burden was not statistically significant. Future research can further explore the prevalence of “underwater” mortgages and the effects of “underwater” mortgages with new data from the SIPP. The first wave of the 2008 SIPP Panel housing wealth data will be released in 2011 and will allow us to determine if the 2008 SIPP captured the same changes in “underwater” status that were captured by the 2009 AHS. The second wave of 2008 SIPP Panel housing wealth data will be released in 2012 and will allow us to replicate our owner/renter transition model after the end of the housing boom.

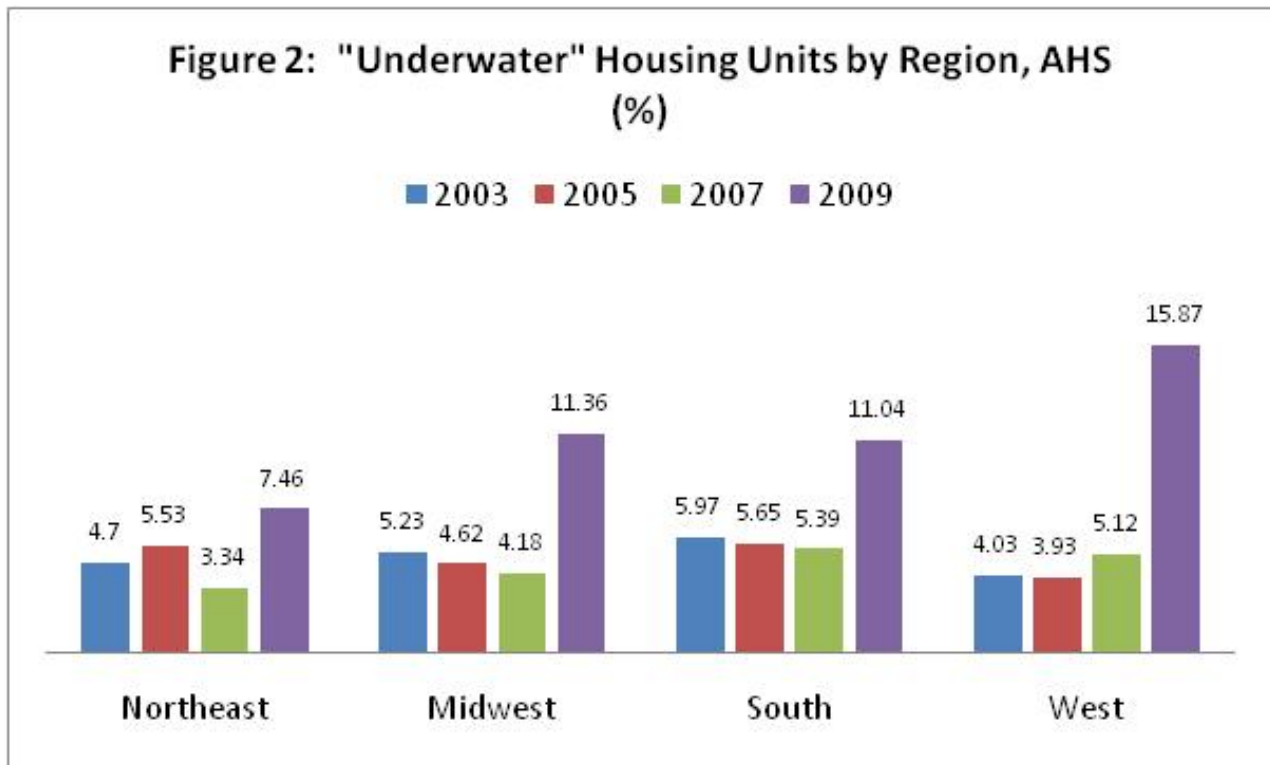
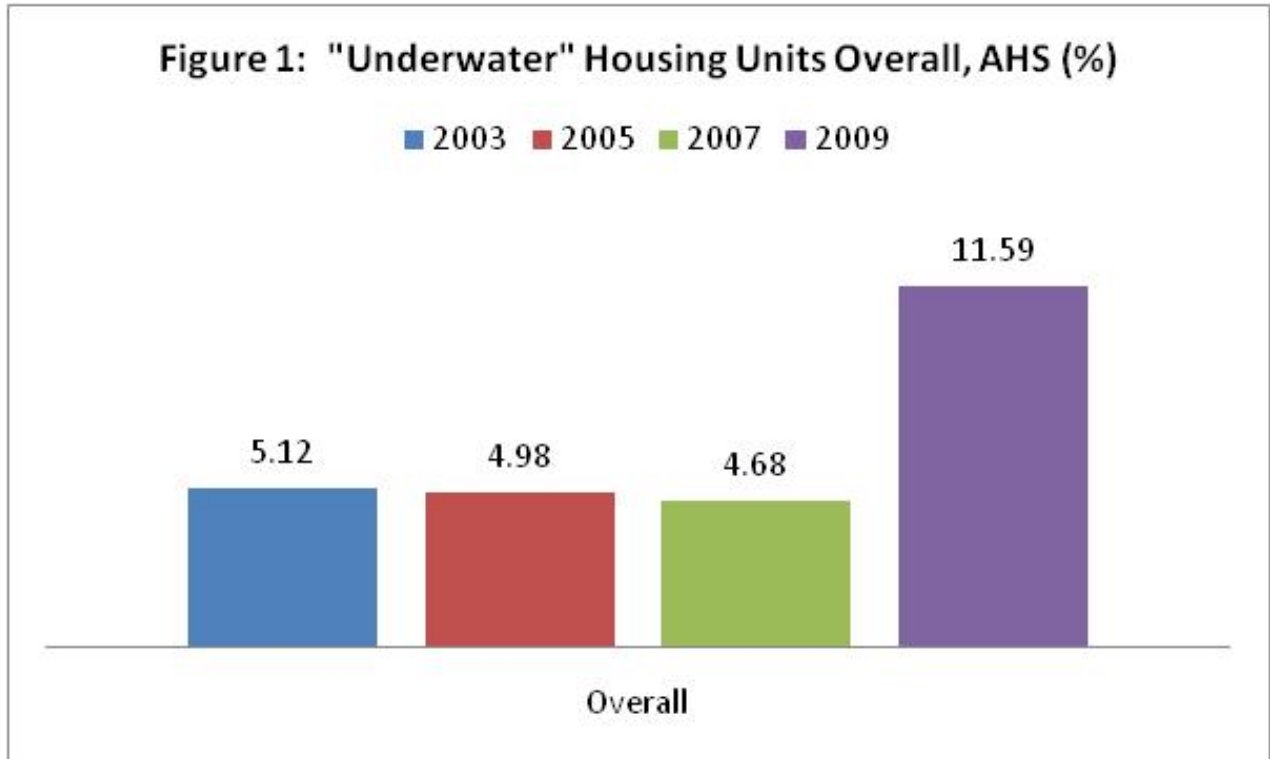
#### REFERENCES:

- Benítez-Silva, Hugo, Selcuk Eren, Frank Heiland, and Sergi Jiménez-Martín. 2008. “How Well do Individuals Predict the Selling Prices of their Homes?” *Working Papers 2008-10, FEDEA*.
- Bourassa, Steven C., Yin, Ming. 2008. “Tax Deductions, Tax Credits and the Homeownership Rate of Young Urban Adults in the United States.” *Urban Studies*, Vol 45, Issue 5&6: pp 1141-1161.
- Carter, George and Gottschalck, Alfred. 2010. “A Tale of Two Surveys: Mortgage Wealth Data in the AHS and the SIPP” Proceedings of the Federal Committee on Statistical Methodology Meeting, Washington, DC. 2009.  
[http://www.fcsm.gov/09papers/Carter\\_VII-B.pdf](http://www.fcsm.gov/09papers/Carter_VII-B.pdf)
- Case, Karl E. 2008. “The Central Role of Home Prices in the Current Financial Crisis: How Will the Market Clear?” *Brookings Papers on Economic Activity*, pp. 161-193.

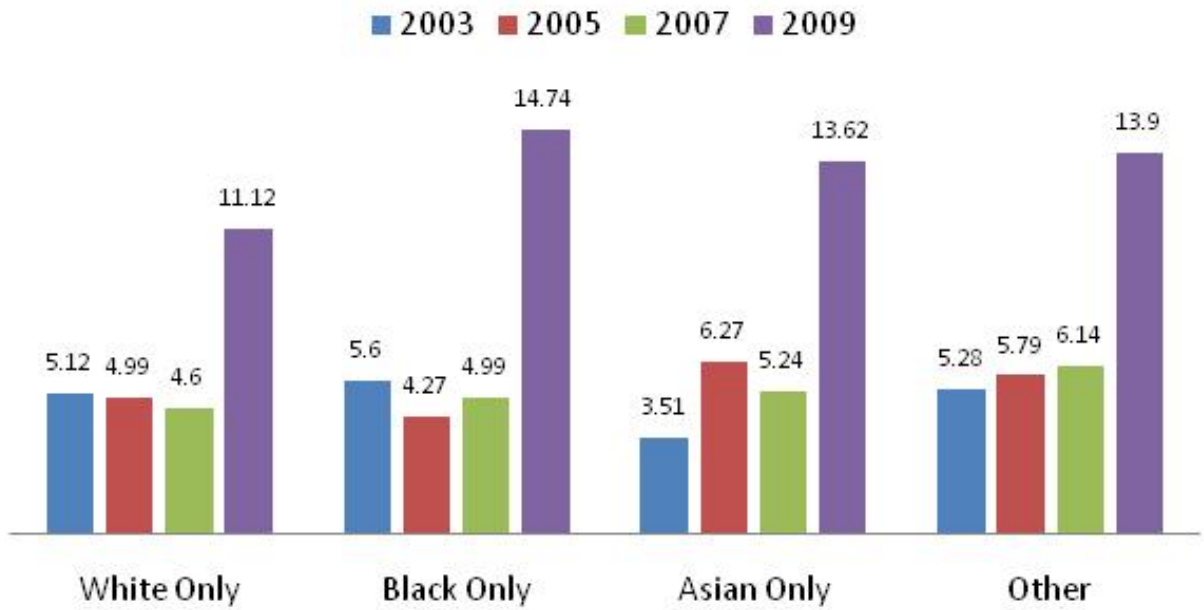
- Case, Karl E. and Shiller, Robert J. 2003. "Is There a Bubble in the Housing Market?" *Brookings Papers on Economic Activity*, Vol. 2003, No. 2, pp. 299-342.
- Case, Karl E., Glaeser, Edward L., and Jonathan A. Parker. 2000. "Real Estate and the Macroeconomy" *Brookings Papers on Economic Activity*, Vol. 2000, No. 2, pp. 119-162.
- Glaeser, Edward L., Gyuorko, Joseph, and Raven E. Saks. "Why Have Housing Prices Gone Up?" *The American Economic Review*, Vol. 95, No. 2, Papers and Proceedings of the One Hundred Seventeenth Annual Meeting of the American Economic Association., pp. 329-333.
- Jewell, Kevin. 2003. "Manufactured Housing: Stereotypes and Data" Consumers Union Report, [www.consumersunion.org/pdf/mh/Appreciation.pdf](http://www.consumersunion.org/pdf/mh/Appreciation.pdf).
- Kain, John F. and Quigley, John M. 1972. "Note on Owner's Estimate of Housing Value" *Journal of the American Statistical Association*, Volume 67, Number 340.
- Kiel, Katharine, A. and Zabel, Jeffrey E. 1999. "The Accuracy of Owner-Provided House Values: The 1978-1991 American Housing Survey" *Real Estate Economics*, V27: pp. 263-298.
- Kish, L. and Lansing, J.B., 1954. "Response Errors in Estimating the Value of Homes," *Journal of the American Statistical Association*, 49, pp. 520-38.
- Krivo, Lauren J., Kaufman, Robert L. 2004. "Housing and Wealth Inequality: Racial-Ethnic Differences in Home Equity in the United States" *Demography*, 41, 3, pp.585-605.
- Painter G, Lee K. 2009. "Housing tenure transitions of older households: Life cycle, demographic, and familial factors" *REGIONAL SCIENCE AND URBAN ECONOMICS* Volume: 39 Issue: 6, pp 749-760.
- Spader JS, Quercia RG. 2008. "Mobility and Exit from Homeownership: Implications for Community Reinvestment Lending" *HOUSING POLICY DEBATE*, Volume: 19 Issue: 4, pp. 675-709.
- Turner, Tracy M., Smith, Marc T. 2009. "Exits from Homeownership: The Effects of Race, Ethnicity, and Income" *Journal of Regional Science*, Vol. 49, No. 1, pp. 1-32.
- Withers SD. 1998. "Linking household transitions and housing transitions: a longitudinal analysis of renters" *ENVIRONMENT AND PLANNING A* Volume: 30 Issue: 4, pp. 615-630.



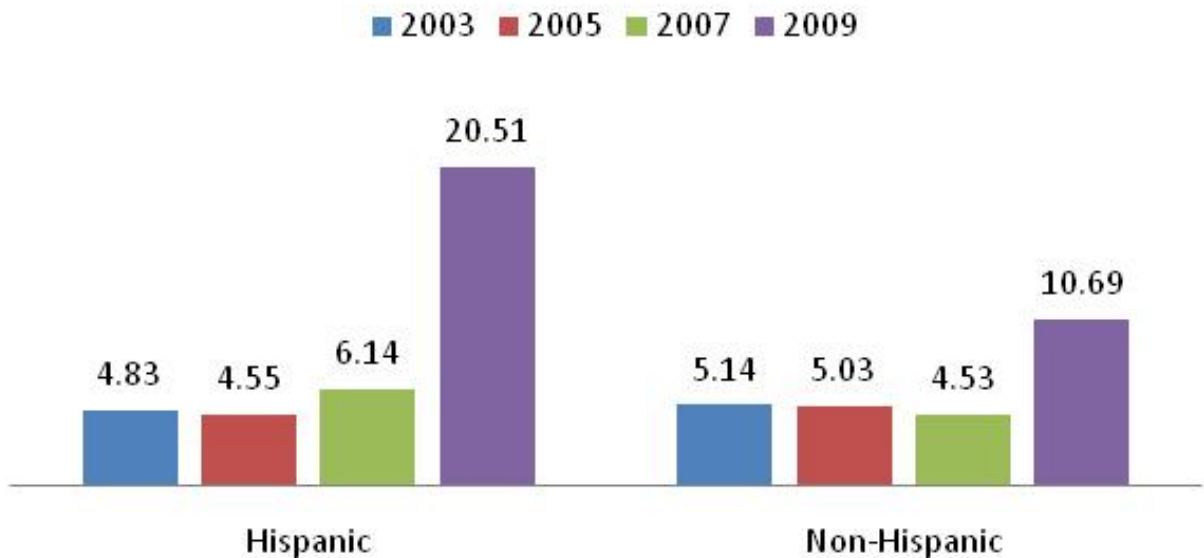
## Appendix: Figures and Tables



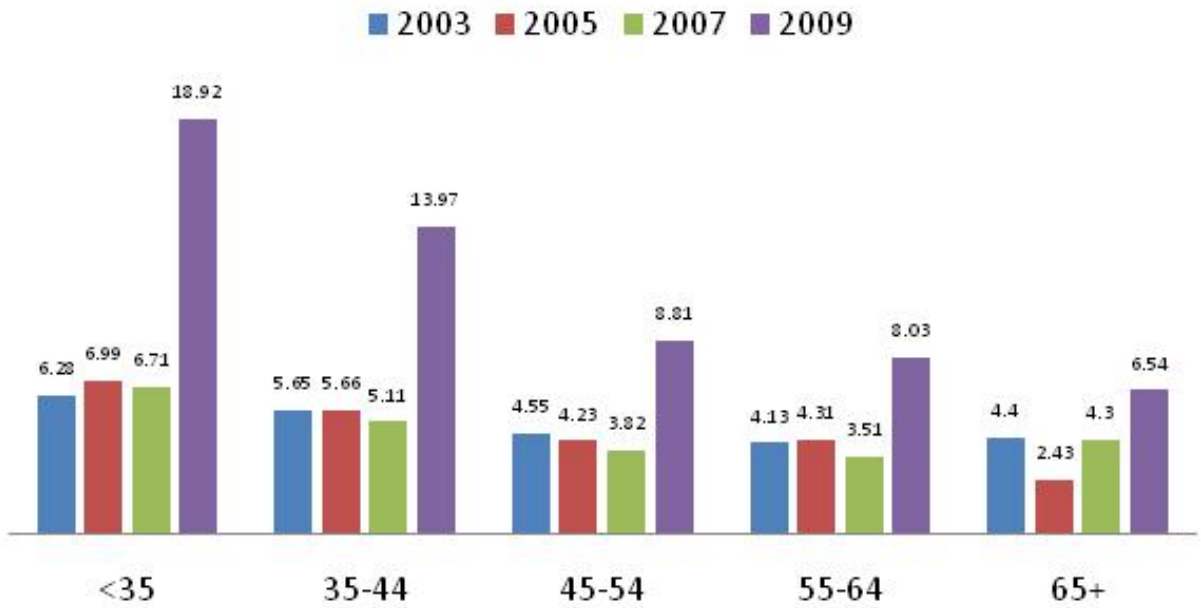
**Figure 3: "Underwater" Housing Units by Race, AHS (%)**



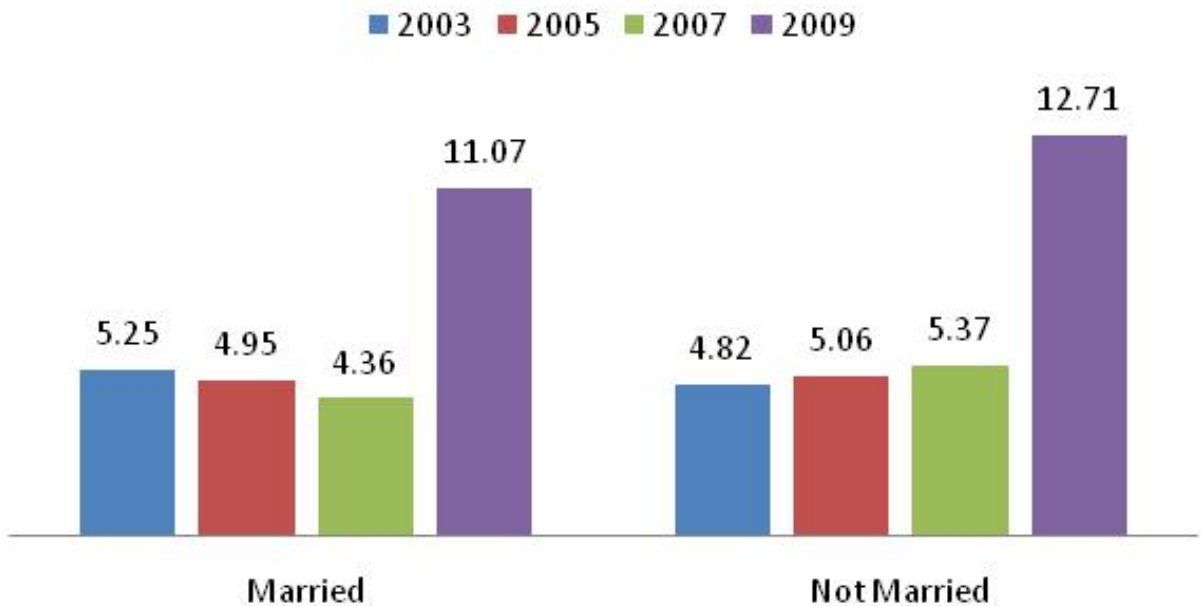
**Figure 4: "Underwater" Housing Units by Hispanic Origin, AHS (%)**



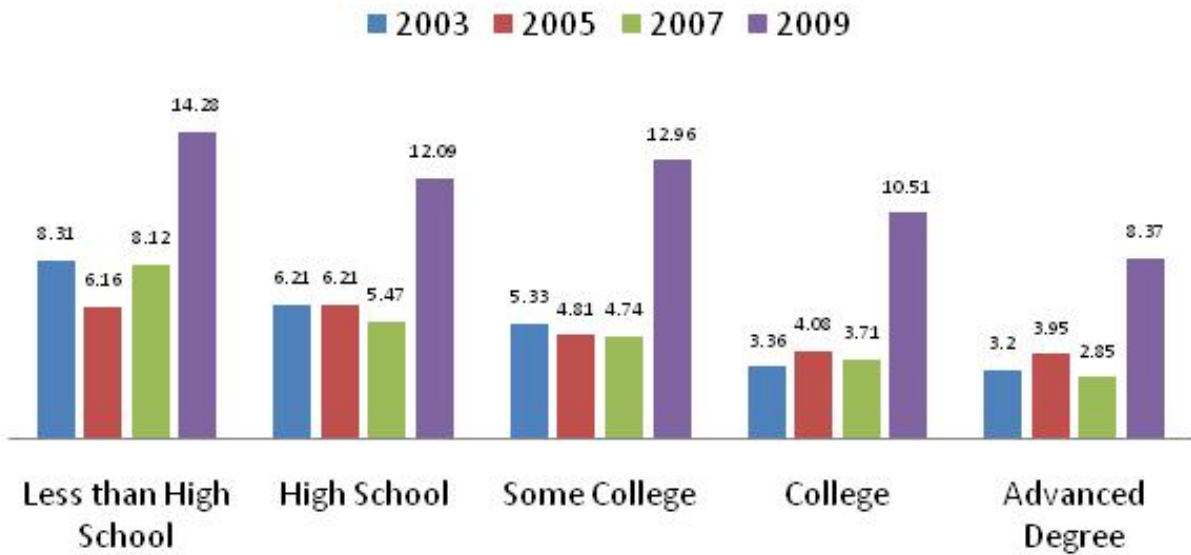
**Figure 5: "Underwater" Housing Units by Age, AHS (%)**



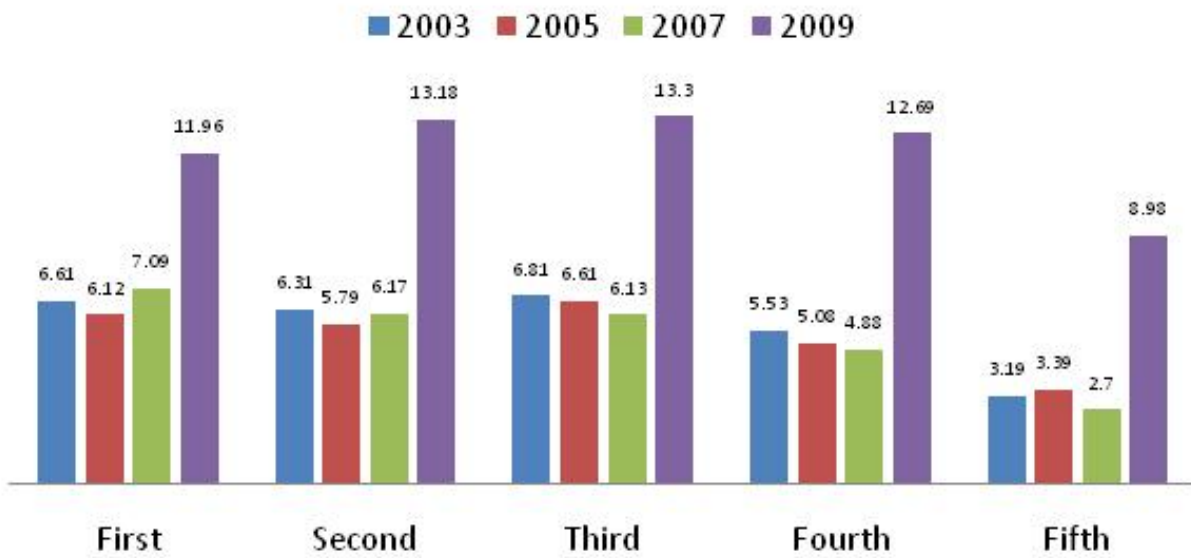
**Figure 6: "Underwater" Housing Units by Marital Status**



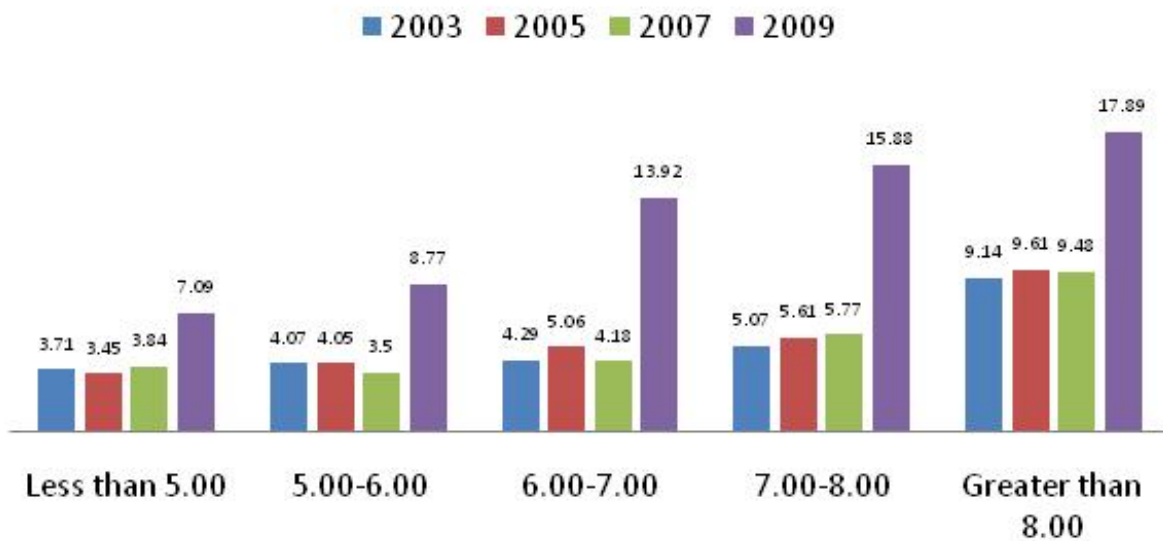
**Figure 7: "Underwater" Housing Units by Education, AHS (%)**



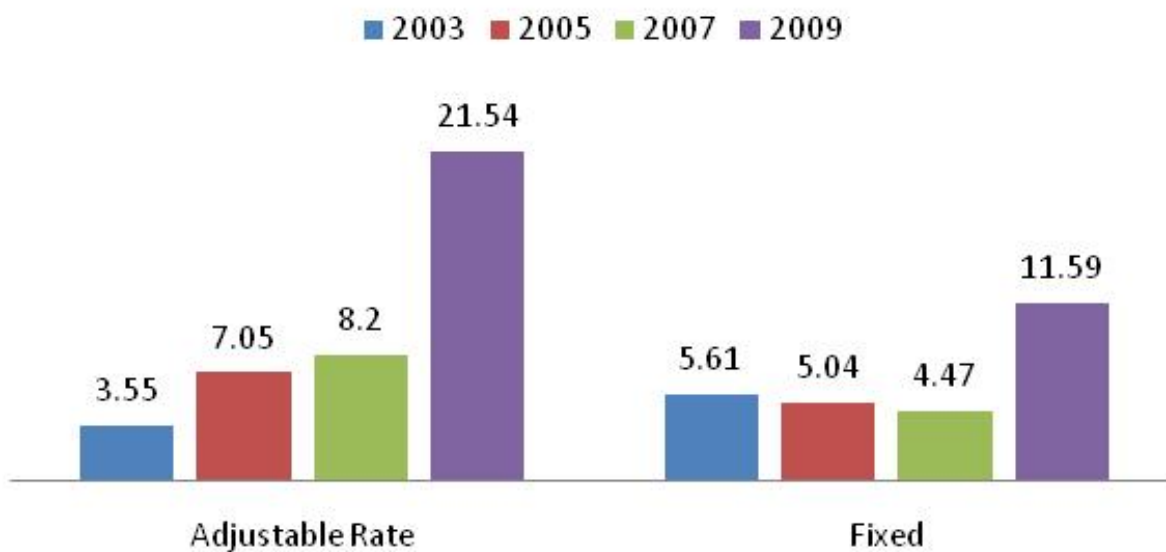
**Figure 8: "Underwater" housing Units by Income Quintile, AHS (%)**



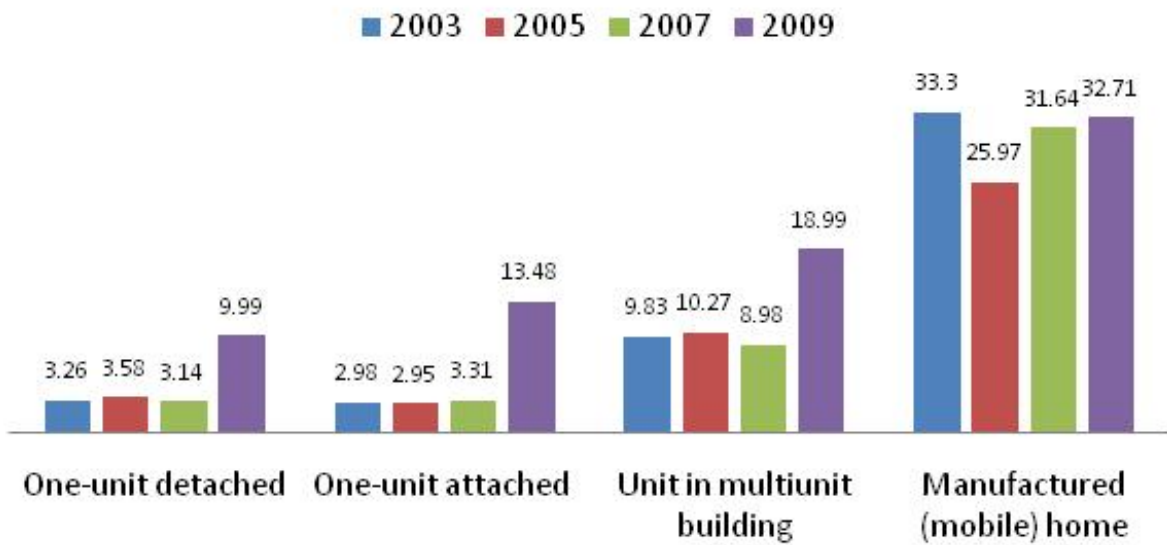
**Figure 9: "Underwater" Housing Units by Interest Rate of First Mortgage, AHS (%)**



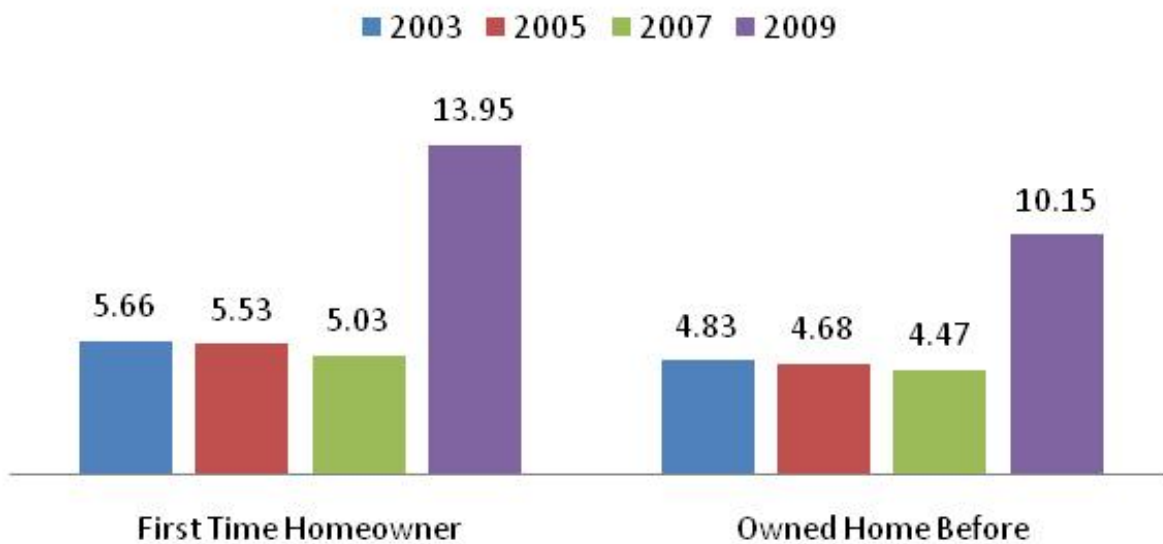
**Figure 10: "Underwater" Housing Units by Type of First Mortgage, AHS (%)**



**Figure 11: "Underwater" Housing Units by Building Type, AHS (%)**



**Figure 12: "Underwater" Housing Units by First Time Homeowners Status, AHS (%)**



**Table 1: Owner to Renter Transition Model, SIPP**

Independent Variable	Estimate	Standard Error	Significance
Intercept	-3.1500	0.0198	***
Underwater status	<b>0.8784</b>	0.0172	***
Housing burden greater than 40%	<b>0.2363</b>	0.0117	***
Marital Status	-1.3385	0.0105	***
Black	0.6215	0.0150	***
Other	0.2447	0.0190	***
Hispanic origin	0.2111	0.0150	***
35-44	-0.6227	0.0125	***
45-54	-0.6788	0.0125	***
55-64	-2.7126	0.0321	***
Greater than or equal to 65	-15.5381	21.1086	
High-school	-1.3346	0.0162	***
Some college	-2.1447	0.0163	***
College and above	-1.9677	0.0165	***
Midwest	-0.2695	0.0150	***
South	-0.9764	0.0165	***
West	0.1961	0.0144	***

Note: All estimates are weighted; the omitted groups are white, less than age 35, less than a high-school education, and reside in the Northeast.

\*\*\* Indicates significance at the P<.01 level.

Source: Survey of Income and Program Participation, 2004, waves 3 and 6.