

# The Effect of Homeownership on Household Savings in the United States

Jacquelyn Ammirato<sup>a</sup>

## Abstract:

This paper examines the effect of changes in house prices on the saving patterns of households in the United States of America. The paper uses data from the Panel Study of Income Dynamics. Three empirical models are run, one for 2009, one for 2005 and one for 1999 data, to account for differences in household income, age of the head of household, employment status, and mortgage information. The results indicate that whether the home is owned or rented has a significant impact on household savings in each year.

JEL Classification: D12, E2, E3  
Keywords: House prices, Savings

<sup>a</sup> Bryant University, 1150 Douglas Pike, Smithfield, RI 02917. Phone: (401) 319-4049. Email: [jammirat@bryant.edu](mailto:jammirat@bryant.edu).

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## 1.0 INTRODUCTION

Household wealth attracts a lot of attention in talks about the economy. As the economy has faltered in the last several years, housing wealth has become a key indicator for a nation's overall health. Many different stakeholders from homeowners themselves to politicians to analysts desire to understand and predict the effect of changes in households' wealth on their consumption and savings behavior.

This paper aims to study the effect of home ownership on household savings in the United States in the 2000's. Specifically in the United States fluctuations in house prices have been pointed to as the main cause for economic downturn. Because for the majority of Americans their home is their largest asset, a change in the wealth associated with that asset has the potential to drastically change the household's spending and saving patterns.

Many previous studies have analyzed this issue using aggregate national data or household data focused only on food consumption. This paper uses data from the Panel Study of Income Dynamics (PSID), specifically data on household asset value and the value of related debt. Changes in this measure of household wealth are subsequently used to capture household saving behavior.

Empirical analysis was done on the PSID data for the years 1999, 2005, and 2009. These years were chosen because of their relation to the housing bubble experienced in the United States in the early 2000's. Research illustrates that housing prices reached their peak in the summer of 2006. The data from 1999 helps to paint the picture before the housing bubble. The 2005 data represents the period right in the middle of the housing bubble and the 2009 data is the most recently available and was chosen to represent the post-bubble data.

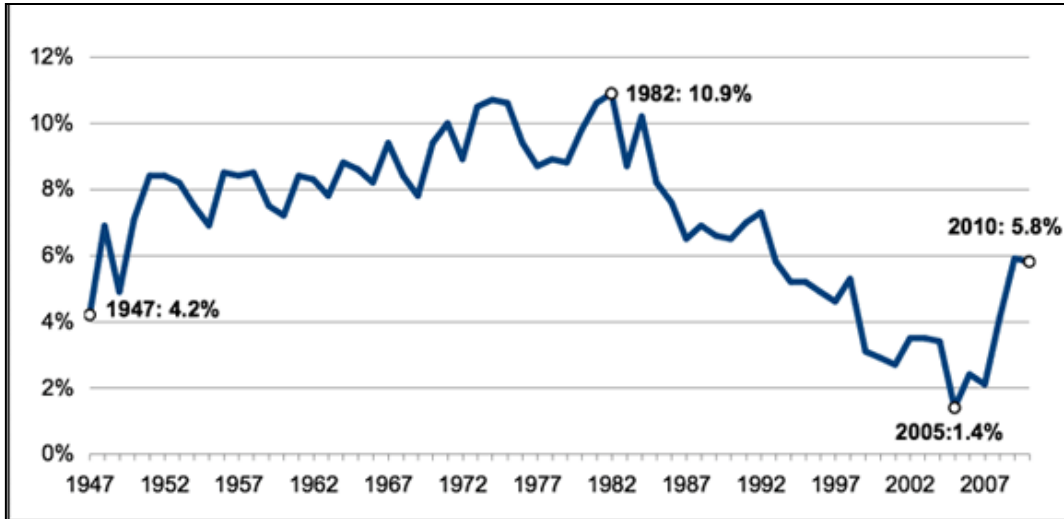
Two different regressions are done on each of the three stated years. The first regression is run to capture the effect of home ownership on savings. Both households that own and those that rent are included in this regression. The second regression aims to capture the impact of the home's reported value and the amount of principal remaining on the primary mortgage on savings. This regression was run using only data for those households that are owned.

The rest of the paper is organized as follows: Section 2 gives a brief literature review. Section 3 outlines the empirical model. Data and estimation methodology are discussed in section 4. Finally, section 5 presents and discusses the empirical results. This is followed by a conclusion in section 6.

## **2.0 TREND**

Figure 1 illustrates the personal savings rate of households in the United States from 1947 to 2010. The graph indicates that over the past sixty years, the personal savings rate has ranged from a high of 10.9 percent to a low of 1.4 percent. The high was reached in 1982 which coincides with the aftermath of the housing boom that occurred during the 1970s. From 1982 until 2005, the savings rate steadily decreased. The low point was reached during 2005, right in the peak of the United States' latest housing bubble. Following the burst of that bubble, the savings rate has begun to increase again, up to 5.8 percent in 2010.

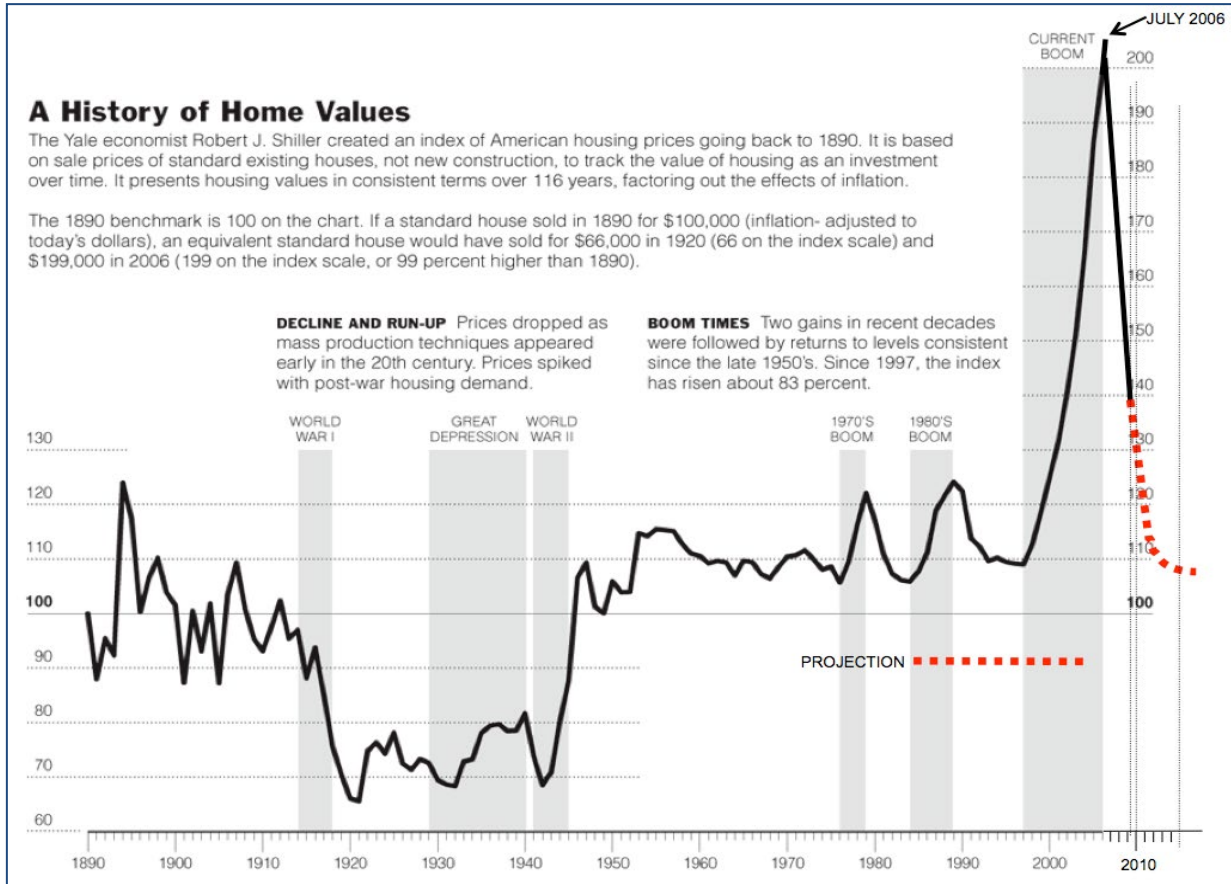
**Figure 1: U.S. Personal Saving Rate, 1947-2010**



Source: Inequality.org

Figure 2 represents a history of home values in the United States over a period of 116 years dating back to 1890. Historically, home prices have not fluctuated too drastically, excluding the huge drop experienced during the Great Depression and the two World Wars. Even during the housing booms of the 1970s and 1980s, housing prices did not increase by that much according to the Shiller Index. It was not until the boom that began in 2000 that housing prices increased to unprecedented levels. Starting in 2000 house prices increased from an indexed level of 110 to a peak of 207 in 2006. The graph illustrates that at the height of the housing boom in 2006, an equivalent standard house would have sold for more than 100 percent more than it would have sold for in 1890.

**Figure 2: A History of Home Values – Shiller Index**

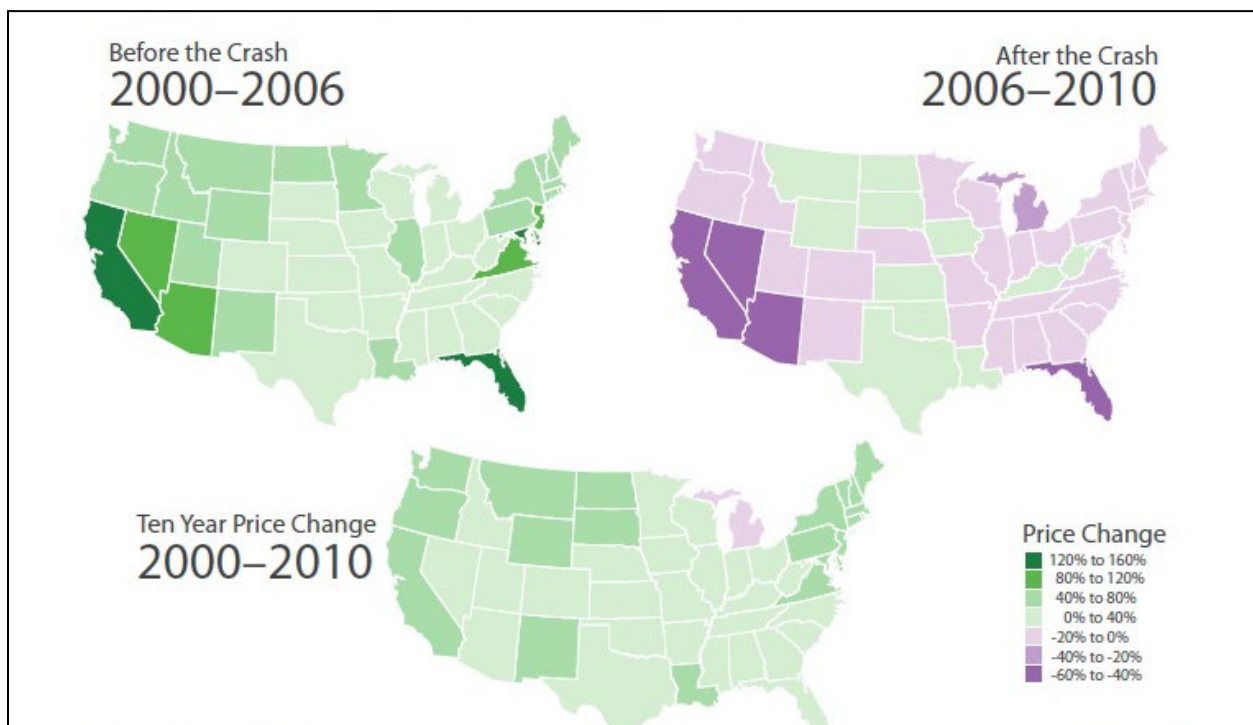


Source: "Irrational Exuberance" by Robert J. Shiller

Figure 3 utilizes data from the Federal Housing Finance Agency's Housing Price Index to create a graphic representation of the change in house prices in the United States over the past decade. Unlike something such as a change in the stock market, a change in house price differs depending on the part of the country analyzed. The first map shows the increase in prices from 2000 to 2006. Illustrated by the darker shading, states in the West and South East experienced the greatest increase in price changes. States such as Florida, California, and Maryland saw price increases ranging from 120 to 160 percent. Most states saw increases between 40 and 80 percent. The second map illustrates the decline in prices from 2006 to 2010; again, the darker the shading

the more drastic the fall in prices. Generally speaking, those states that had seen the largest increase in prices saw the greatest decrease in prices after 2006. California, Arizona, Nevada, and Florida saw prices drop between 40 and 60 percent. The final map illustrates the overall change in prices over the first decade of the twenty-first century. The majority of states saw a slight increase in prices. Michigan was the only state to see prices decrease overall with prices falling by 20 percent or less over the decade (Mulbrandon, 2011).

**Figure 3: Change in United States Housing Prices: 2000-2010**



Source: Data from Federal Housing Finance Agency, graphic from DesignandGeography.com

### **3.0 LITERATURE REVIEW**

Because of the belief that it is an indicator of the overall economy, the effect of household prices on household behavior has been extensively studied (Vadas, 2009). However,

there has been very little research into this correlation in the United States over the past decade. The housing wealth effect is the term used in economics to describe how housing price impacts the purchasing decisions of consumers (Sun et al., 2007). Sun et al. (2007) asserts that when house prices increase, people feel that their wealth has increased and will thus increase their consumption so as to return their assets to their equilibrium to income ratio.

In accordance with what this paper aims to study, Das et al. defines a housing bubble to occur when the increase in the price of a house exceeds the level required by basic economic fundamentals. Studying data from South Africa, Das et al. (2011) found significant evidence of links from the housing sector to the real sector. Such links remain the same regardless of the presence of a housing bubble. Furthermore, peoples' consumption behavior shows a significant reaction to a decrease in house price but not for acceleration in home prices.

This finding is also illustrated by Engelhardt (1996). Using data from the United States in the 1980's, Englehardt (1996) revealed that a behavioral response to a change in house prices comes only from households that experience real housing capital losses. One possible explanation for the findings that is presented is that households that experienced real housing capital losses increased their savings in order to avoid becoming "locked into" their current homes. Households with high loan-to-value ratios that experienced losses may have feared an inability to make a down payment on another home unless savings were increased.

Wang and Wen (2011) dispute this finding however. In studying the effect of housing prices on households' saving rate in China, they found a significant relationship. This paper found the behavioral response was strongest in young people and with a minimal effect on the aggregate saving rate of the country.

These findings are contrasted with the findings of Calcagno et al. (2009). Using data from the Bank of Italy's Survey of Household Income and Wealth, this paper found the oldest households to be the most sensitive to changes in housing wealth. Calcagno et al. (2009) notes that older households are the least affected by higher costs of future rents and therefore their consumption behavior reflects changes in housing wealth. This study found younger households' consumption decisions to not be significantly affected by house price increases. Furthermore it is shown that in Italy, consumption of both homeowners and renters increases when house prices increase.

Disney et al. (2010) found their to be homogenous behavioral responses by young and old homeowners in the United Kingdom. This paper also finds differences in the effect on savings between renters and owners. Additionally, Disney et al. (2010) notes a disproportionately high impact on savings if the household started the period with negative housing equity.

## **4.0 DATA AND EMPIRICAL METHODOLOGY**

### **4.1 Data**

The study uses data from the Panel Study of Income Dynamics. This publicly available data includes survey results from more than 7,000 households in each year since 1968. The study is conducted and run by faculty at the University of Michigan. It collects information related to employment, income, marriage, education, housing, etc. For this paper data from 1999, 2005, and 2009 were analyzed.

Summary statistics for the panel data are presented below in Table 1.



**Table 1 Summary Statistics**

Variable	Obs.	Mean	Std. Dev.	Min	Max
STATE	4189	24	14	0	51
AGE	4189	49	26	18	99
#CHILDREN	4189	0.83	1.01	0	7
MARITALST	4189	1.72	1.19	0	5
OWN/RENT	4189	1	0	0	1
HOUSEVAL	4189	484,942	1,601,915	0	9,999,999
REMPRINC	4189	86,626	102,961	0	1,500,000
WORKSELF	4189	1.08	0.84	0	9

## 4.2 Empirical Model

Following Engelhardt (1996) this study adapted and modified the model used in that paper. While that study used PSID data from the 1980s, this study focused on three years: 1999, 2005, and 2009. Data available through the PSID changed over the course of the twenty years so the two models attempt to study the same issue utilizing slightly different variables. We excluded the following variables: presence of college degree, head's race, and change in family composition. In addition we have added the following variables: number of children, marital status, and remaining mortgage principal.

The model could be written as follows:

$$\text{SAVINGS} = \beta_0 + \beta_1 \text{STATE} + \beta_2 \text{AGE} - \beta_3 \text{\#CHILDREN} - \beta_4 \text{MARITALST} + \beta_5 \text{OWN/RENT} + \beta_8 \text{WORKSELF}$$

Savings represents the total amount of savings measured on the household level. Savings is calculated first by adding up respondents' answers to several questions about debt to determine the total debt load by household. Then that amount is subtracted from the answer to the question asking for the respondents' total amount in savings, pension accounts, etc. This definition of savings was adapted from the definition used in Engelhardt (1996).

Independent variables consist of eight obtained from the PSID data. Appendix A and B provide details about the independent variables such as data source, acronyms, descriptions, and expected signs. First, *STATE* represents the state of resident of the person filling out the PSID questionnaire. Second, *AGE* represents the age of the person reporting to be the head of the household. Third, *#CHILDREN* represents the number of children reported by the respondent to be living in the household. This captures the number of children being financially supported by the head of household. Fourth, *MARITALST* captures the marital status of the head of household. Fifth, *OWN/RENT* signifies whether the respondent to the questionnaire owns or rents the house for which they are reporting data. Sixth, *HOUSEVAL* captures the approximate value of the household as reported by the respondent. Seventh, *REMPRINC* represents the amount of remaining principal, if any, on the household's primary mortgage. Finally, *WORK/SELF* captures whether the head of household is employed exclusively by someone else, by him/herself only, or by some combination.

The regression was run three different times, once for each of three different years. The years studied were 1999, 2005, and 2009. Initially, just 1999, 2005, and 2009 were chosen. These years were chosen to represent time periods before, during, and after the United States' most recent housing bubble, allowing the study to capture differences in behavior related to this housing bubble.

A second regression was run using only data from those individuals that own their home. This regression included the variables *HOUSEVAL* and *REMPRINC* to capture the reported value of the home and the amount of principal remaining on the primary mortgage. This regression was run once for each of the three different years studied.

That model could be written as follows:

$$\text{SAVINGS} = \beta_0 + \beta_1 \text{STATE} + \beta_2 \text{AGE} - \beta_3 \# \text{CHILDREN} - \beta_4 \text{MARITALST} + \beta_6 \text{HOUSEVAL} - \beta_7 \text{REMPRINC} + \beta_8 \text{WORKSELF}$$

## 5.0 EMPIRICAL RESULTS

The empirical estimation results are presented below in Tables 2 and 3. Table 2 shows the regression results studying whether or not owning a home impacts savings. This regression shows a strong correlation between whether the person owns or rents their home and their savings. In each of the three years, the own/rent variable was significant at 1%. As time went on, owning a home meant lower levels of savings. In the recovery period, captured by the 2009 data, owning a home meant saving more than \$108,000 less.

The results show that the state in which the individual resides was only significant once house prices began to rise in 2005 and remained important during the recovery period. The age of the head of household showed a similar correlation both before and during the bubble but had a bigger impact during the recovery, when each year older the head was they saved \$2,500 more. The number of children in the family unit had relatively the same impact in each of the three years, negatively impacting savings by about \$10,000 for each additional child. The head of

household's marital status only became significant in 2005, when being married increased savings by \$4,132. Being self-employed had a negative relationship with savings in each of the three years; however the impact became less severe over time.

**Table 2: Regression I results**

	1999	2005	2009
CONSTANT	-12899.26** (6261.769)	-35611.84*** (7020.832)	-102758.7*** (9668.307)
STATE	111.5456 (106.4165)	522.8540*** (123.5590)	412.9582*** (146.5890)
AGE	708.4752*** (74.69601)	801.8799*** (77.57943)	2508.680*** (152.4916)
#CHILDREN	-10643.71*** (1355.551)	-11762.19*** (1606.922)	-10809.61*** (4896.267)
MARITALST	623.4545 (1289.767)	4132.528*** (1479.289)	1575.449 (1777.175)
WORK/SELF	-12482.84*** (1948.036)	-11423.67*** (2238.958)	-4056.807 (2715.252)
OWN/RENT	-48110.23*** (3488.971)	-75861.06*** (3967.083)	-108668.6*** (4896.267)
R <sup>2</sup>	0.100514	0.103271	0.114684
F-statistic	0.000000	110.0398	0.000000
Number of obs.	4260	5740	6151

Note: \*\*\*, \*\*, and \* denotes significance at the 1%, 5%, and 10% levels respectively. Standard errors are presented in parentheses.

Table 3 shows the regression results for only those that own a home, looking at the effect of the reported value of the home and the amount of principal remaining on the primary

mortgage. Among those that own, whether you were self employed was only significant in 2009 and being self employed boosted your savings by \$8962. The reported house value was only significant during the recovery period with each additional dollar in value increasing savings by \$0.003. The amount of principal remaining on the primary mortgage had basically the same effect in each of the three years, with each additional dollar of mortgage principal reducing savings by roughly \$1.

**Table 3: Regression II results**

	1999	2005	2009
CONSTANT	-25190.51*** (8896.014)	10902.42 (7586.382)	-41994.96*** (13463.25)
STATE	47.74814 (114.8839)	-119.4691 (137.4414)	-468.9676*** (171.7483)
AGE	988.1963*** (127.4475)	387.3071*** (76.54865)	1634.259*** (187.4976)
#CHILDREN	-1597.005 (115771.449)	-4816.238*** (1801.770)	-2341.300 (2394.895)
MARITALST	-4288.336*** (1477.123)	-3509.416** (1663.9590)	-5958.709*** (2076.376)
HOUSEVAL	0.000460 (0.001954)	0.002119 (0.001423)	0.003405** (0.001706)
REMPRINC	-1.031531*** (0.025442)	-1.008385*** (0.019309)	-1.054216*** (0.020582)
WORK/SELF	1554.288 (2025.494)	-640.3624 (2382.061)	8961.801*** (2948.045)
R <sup>2</sup>	0.425041	0.448246	0.451539
F-statistic	0.000000	0.000000	0.000000
Number of obs.	2998	3931	4013

## 6.0 CONCLUSION

In summary, age, number of children, marital status, whether a person owns or rents, and the remaining amount on the mortgage, are all relevant to the amount of the household's savings. The results found in this paper indicate that the older the head of household, the fewer children he has, owning the home, and the less he has remaining on his mortgage indicate higher levels of savings. Furthermore, 2009, after the housing bubble burst were the only years when one's employer played a significant role in the level of savings. In each of the three years studied, owning a home meant lower levels of household savings. There has been very little research into the correlation between savings and home ownership in the past decade so this paper serves to fill a void in existing research. As countries throughout the world try to recover from the burst of the housing bubble this research is relevant to the global economic situation.

Contrary to popular belief, a family's perception about the value of their home does not have a significant impact on their spending and saving decisions. The study shows that even when home prices were rising incredibly, house value did not have any significant affect on household savings.

Further research could focus on a change in the value of one's home as opposed to an absolute value. Additionally, a future study could have included data about differences in the amount of rent paid each month and the amount of mortgage payment. As more data becomes available, additional research could be done on data in later years to fully understand the after effects of the housing bubble.

## Appendix A: Variable Description and Data Source

Acronym	Description	Data source
STATE	Represents the state of residence of the respondent	Panel Study of Income Dynamics
AGE	Age of the head of household ranging from 18–99	Panel Study of Income Dynamics
#CHILDREN	Number of children being supported by the head of household	Panel Study of Income Dynamics
MARITALST	The reported marital status of the head of household. Married, single, divorced, widowed	Panel Study of Income Dynamics
OWN/RENT	Whether the reported home is owned or is being rented	Panel Study of Income Dynamics
HOUSEVAL	The market value of the home as reported by the respondent	Panel Study of Income Dynamics
REMPRIN	The amount of principal remaining on the home's primary mortgage	Panel Study of Income Dynamics
WORK/SELF	Whether the head of household is employed exclusively by someone else, solely by him/herself, or by some combination of the two	Panel Study of Income Dynamics

## Appendix B: Variables and Expected Sign

Acronym	Variable Description	Expected Sign
STATE	State of residence	+/-
AGE	Age of head of household	+
#CHILDREN	Number of children in the family unit	-
MARITALST	Marital status of head of household	-
OWN/RENT	Own or rent the home	+/-
HOUSEVAL	Reported market value of the home	+
REMPRIN	Amount of principal remaining on the primary mortgage	-
WORK/SELF	Employed by someone else, by him/herself, or some combination	+



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