

United States Homeownership Rates: The Effect of Macroeconomic Factors on the Domestic Real Estate Market

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Abstract:

This paper examines the correlation between U.S. economic indicators and the domestic real estate market. The analysis of the study's findings and results show that some indicators adversely affect homeownership rates in conjunction to the overall state of the market during the time frame depicted. The regression is from a model used on an international level and it is taken and applied here to the domestic market of one country; the United States. The results from the research and tests performed highlight the economic indicators that are closely correlated to the rate of homeownership.

JEL Classification: R21

Keywords: Homeownership Rates, Factors that influence

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1.0 Introduction

The focus of this study is that of a prevalent macroeconomic issue, the housing market. The test is to portray the effects that independent economic factors have on the percentage of residential homes in the United States which are owned (not rented or leased). The percentage of homes owned is a sound indicator of the economy and one that analysts frequently refer to and use as a benchmark to measure performance. Since the housing market is dependent on individuals, indicators chosen were broad independent factors that affect each and every individual therefore influencing their decision to own or rent/lease a home.

Basic economic theory supports that the housing market is pro-cyclical to the performance of the economy. That is if the economy is prospering the housing market will be on the upswing because all individuals will be reaping the benefits and purchasing new homes. The opposite is also true, if the economy is experiencing hardship it will be evident in the figures of the housing market. David A. Lareah, the senior vice president and chief economist of the National Association of Realtors was published stating “The housing sector directly and indirectly accounts for about 15 to 20 percent of our nation’s Gross Domestic Product (GDP) every year. Moreover, most studies indicate that households spend about 30 to 40 percent of their disposable income on housing-related expenses. Those expenditures help to support other sectors of the economy.”¹ The study’s mission is to use national economic data to test and further reinforce the economic theory that these factors have an effect, either positive or negative, on the housing market as a whole.

“NAR shared its findings with the Federal Reserve Board in mid-October, in response to a meeting between the association’s leadership and Chairman Greenspan earlier this year. “At the time, Mr. Greenspan theorized that the wealth effect of homeownership was offsetting some of the losses on Wall Street in the overall economy – this survey shows Mr. Greenspan is right.”²

Home ownership has tremendous social benefits, stabilizing neighborhoods and making people more willing to invest in their communities. And it has economic benefits, too, serving as a forced-savings program that allows people to leverage their incomes and build wealth. Thus is the correlation that exists with the homeownership rates and the stability and state of the

¹ <http://www.realtor.org/sg3.nsf/Pages/americashousing?OpenDocument>

² <http://www.realtor.org/PublicAffairsWeb.nsf/pages/WealthEffect?OpenDocument>

economy. The equity that one can gain from homeownership makes up for approximately 45% of the households wealth.

This study aims to enhance the overall perspective of the U.S. domestic homeownership rate and its impact on the economy along with the factors that contribute explaining the homeownership rate. This analysis is important because the housing market is a key component in the economy's well being. To discover and elaborate on the economic indicators that closely describe or that explain homeownership rates will help down the road in predicting housing market turbulence and simultaneously offer various reasons to why the troubles came about and how they can be aided. This study looks to offer a substantial analysis into these factors.

The economic model which this empirical analysis is based on is that of Fisher and Jaffe (2003). Their model however looked at homeownership rates through the span of 106 countries throughout the world, whereas this analysis will remain domestic and look at the homeownership rates in the U.S. The comparative differences and the contribution of this study do not simply lie in the contrast of regions taken into consideration but the variables in which the model uses to attempt to describe the homeownership rate. This examination has added numerous variables not taken into consideration by Fisher and Jaffe such as average household income, the DJIA, real GDP, spending on residential construction, the civilian unemployment rate, and the interest rate.

2.0 Homeownership Trends in the U.S.

“The gains of the last ten years have lifted homeownership growth to a higher trajectory. Remaining on this path depends on whether the recent conditions that have strongly favored homeownership can continue. A major reason for the recent climb in homeownership is that house price appreciation has been unusually strong over the past five years. In addition, long-term interest rates have remained at historic lows even as short-term rates have returned to more normal levels. If the economy picks up steam, interest rates are likely to increase and the growing share of households with adjustable-rate mortgages will find themselves with rising payments. Interest-only borrowers who do not sell their homes or refinance before principal payments come due will also get hit by much higher payments. Already though, an increasing number of borrowers have refinanced their adjustable loans.”³

If the economy instead stumbles and job growth falters, a larger number of subprime borrowers will be at greater risk. At the same time, however, the lower interest rates that usually

³ http://www.jchs.harvard.edu/publications/markets/son2006/son2006_homeownership_trends.pdf

accompany such slowdowns would help adjustable-rate borrowers and create opportunities for other homeowners to refinance their loans on more favorable terms.

These trends in homeownership also come from promotion of homeownership through various organizations and programs aimed to making owning homes affordable and discovering different ways to finance more middle class Americans into owning homes.

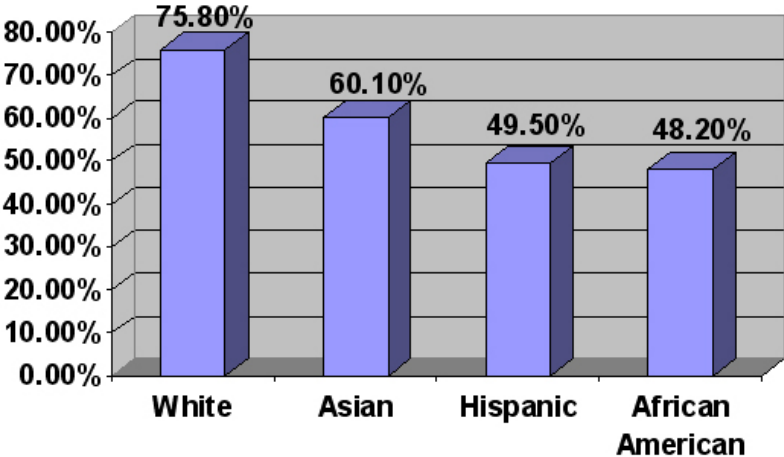


The housing trends are best looked at throughout the country broken up into four regions; Northeast, Midwest, South, and West. Rates vary from region to region due to the factors of population and industrialization which both are directly correlated with the amount of homes occupied and owned in the country. The four markets vary in their stability as well where the Northeast has been in turmoil where housing prices are increasing and it is becoming more and more expensive to own a home, yet this is somewhat offset by the higher income per capita in the region. This is in comparison to the West where housing is cheap comparatively to the Northeast, but the income is not what it is in the Northeast. In looking into trends in homeownership rates throughout this country, regions must be taken into account due to the various lifestyles explored by each region and the lending markets status in each respective region.

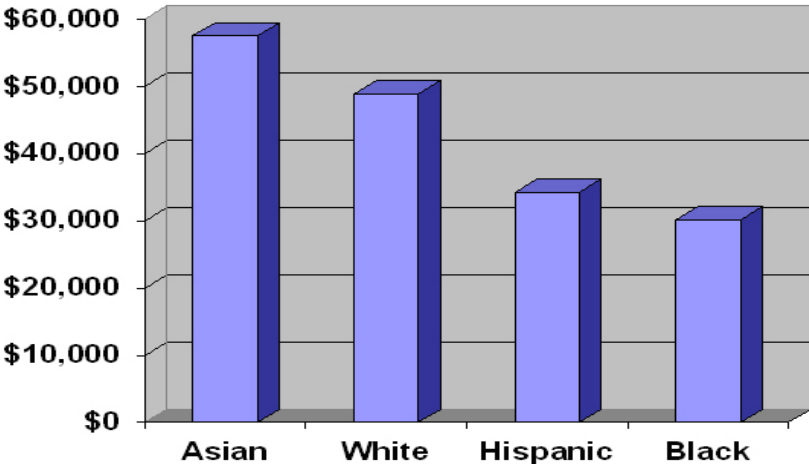
An interesting scenario is what takes place in the years 2001-2003, where the homeownership increased in the midst of the economy entering a recession. The practical belief would be homeownership would take a hit when the economy is in a recession, yet the graphs and data shows otherwise. Even through the recession homeownership rates continued to climb and it was the attributes of the recession which led to the climb. This paper will take a look into

how a high unemployment rate and a high inflation rate actually boost home ownership and there is empirical evidence and resaearch to credit the validity of their positive influence.

A factor also taken into consideration when describing homeownership rates is that of race. Through the different races the U.S. has to offer, homeownership rates fluctuate considerably from one to another as the graph shows.



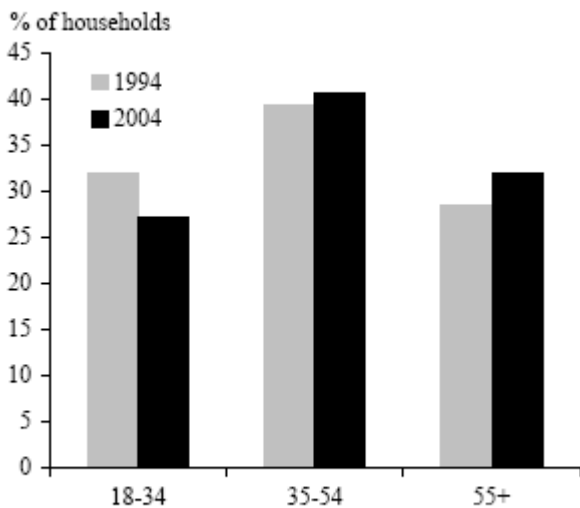
Minorities seem to be less likely to own a home in the U.S. and it boils down to the income inequality among each race. Race however was not included or described in the research to be considered a significant economic indicator. Its implications have no direct impact on the economy therefore it was not taken into account as a variable in the regression. However, race and income are correlated and income indeed was one of the factors chosen to be a variable, so there is an intuitive link with race in the regression. As the graph previously showed the average homeownership rates among different races, this graph shows the average income between the races in the U.S.



The graphs together show the correlation between race and income and how the effect of race can be captured in the data that supports average household income in this model. Overall trends in homeownership are attributed to the aging of the population as well.

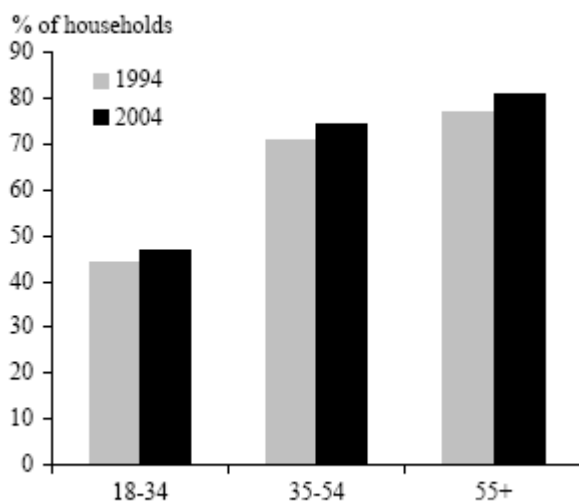
“To explore the role of changing demographics in the increase in the U.S. homeownership rate, we first look at broad trends between 1994 and 2004 using data from the Current Population Survey, which is conducted by the Bureau of Labor Statistics. Figure 2 breaks the population into three age groups, and the results confirm the well-known fact that the age distribution has shifted as the baby boom generation has moved up the age scale. Figure 3 shows the changes in homeownership rates within these three age groups, and, as expected, it shows that households headed by older people are more likely to be homeowners; it also shows that homeownership rates increased between 1994 and 2004 for young, middle-aged, and older Americans. Given these data, it seems natural to explore whether the aging of the population or the greater propensity for households within each age category to be homeowners accounts for most of the increase in the overall homeownership rate.”⁴

Figure 2
Population share by age group, 1994 and 2004



Source: Authors' calculations from monthly Current Population Survey (CPS) files.

Figure 3
Homeownership rate by age group, 1994 and 2004



Source: Authors' calculations from monthly CPS files.

The trends in homeownership rates have been affected by many different characteristics of this country's demographics including region, race, and age breakdowns of the population. Yet, these factors are not conclusive to the point where they give an idea of how the economy and the rate itself are directly correlated. To do so this paper will examine economic indicators

⁴ <http://www.frbsf.org/publications/economics/letter/2006/el2006-30.html#sub1>

that take into account the demographics discussed along with factors that directly measure economic growth and the overall stability of the economy; macroeconomic factors.

3.0 Literature Review

In the determining of factors that affect the domestic homeownership rates, different analysts and economists come from varying schools of thought. Chevan (1989) discusses that there is economic incentive for owning a home rather than renting because of the very high return on equity, due in part to high rates of inflation. The model that Chevan uses in his study is in conjunction with the financial trend side of the homeownership and focuses on various trends this country has seen in accordance with owning homes. The ideals brought up in his paper that are really scrutinized in this study is the in the likes of inflation and its effect on homeownership.

Fisher and Jaffe (2003) believe that variation in homeownership rates deal with in the availability of inputs to the housing sector and the overall supply of housing. This analysis was that of international scope and took into account 106 countries. Their variable model will be the model in which this paper has based its model on. What was taken from Fisher and Jaffe analysis was the theory of availability of inputs and overall supply. Essentially this paper was the inspiration of the empirical study at hand simply to apply its international analysis on a domestic level, particularly the U.S.

The research of Green and Hendershott (1999) has found that there is a positive relationship between homeownership rates and unemployment due to the psyche of the public through their research of a British economist A.J. Oswald. Green and Hendershott provided a much specified look into the relationship between the homeownership rate and unemployment in the U.S. The look at strictly unemployment and its effects offers great intuition into how the two variables are intertwined.

Yabaccio, Rubens, and Ketcham (1995) took an in depth look into how real estate can be used to be a partial hedge against inflation measures. Their study showed this through the observation of REITs or Real Estate Investment Trusts, which is a vehicle for investment in the financial markets. This is where the study at hand varies REITs are not taken into consideration due to the level of economics in which it applies. It is more so a microeconomic level where this paper takes into account mainly macroeconomic factors that focus on nationwide indicators that have an effect on homeownership rates.

What this study adds to the overall research of homeownership rates is the U.S. perspective and a look at a country's macroeconomic factors that have potential to affect the rates. It will attempt to explain the unexpected contribution of factors such as unemployment and inflation that actually, contrary to popular belief and economic theory application, are positively correlated to the homeownership rate. Regression analysis will provide intuition into the factors that actually should be pegged to the homeownership rates. All research, variables, and analysis sustained within the literature taken into account, will indefinitely be used to provide a sound foundation for the study at hand.

4.0 Data and Empirical Methodology

4.1 Definition of Variables

$$OWN = \beta_0 + \beta_1INT + \beta_2DOW + \beta_3UNEMP + \beta_4INC + \beta_5INF + \beta_6GDP + \beta_7HHSIZE + \beta_8POP + \beta_9CONSTSPEND + \varepsilon$$

OWN is the percentage of the country that has ownership in residential real estate. *OWN* is used here as the dependent or endogenous variable. The variables that are considered the independent variables in this model were researched and developed to assure that they will explain the dependent variable and prepare a model that would seek to give a competent report of the factors that can describe the dependent.

The independent variables are that of macro proportions as they take a look into economic indicators of the country in aggregate. *INT* represents the interest rate and captures the rate at which a consumer can borrow capital to invest in various ventures including buying a home. *DOW* measures the monthly Dow Jones average which is measure of the stock market's performance and indirectly the state of the economy. *UNEMP* depicts the civilian unemployment rate contributing what percentage of the work force is unemployed. *INC* is household income which combines the gross income of all the members of a household who are 15 years and older. Individuals do not have to be related in any way to be considered members of the same household. *INF* is the inflation rate and it captures the rate at which the general level

of prices for goods and services is rising, and subsequently, purchasing power is falling. *GDP* is gross domestic product which reflects the value of all goods and services produced in a given year, expressed in base-year prices. *HHSIZE* is household size and shows the average size of the families in the US. The number of normally resident members of a house is its size. It will include temporary stay ways but exclude temporary visitors and guests. *POP* represents the population of the country in each year. *CONSTSPEND* is the monetary spending on residential construction which majority is private homes in the country.

4.2 Data

The study uses monthly real data from 2000-2005. Data was obtained from the Bureau of Labor Statistics (BLS), the Bureau of Economic Analysis (BEA) and the U.S. Census Bureau. The summary of the statistics is exhibited in Table 5 in the Appendix. (**Table 5: Summary of Statistics**)

5.0 Empirical Results and Analysis

(See Tables 2 and 3 in Appendix)

The analysis is based on 72 observations for each independent variable. The data collected spans over a 6 year period (2000 – 2005) and was reported in monthly intervals. Each variable was logged to rid the equation of too much serial correlation and therefore strengthen its accuracy. The summary statistics of the regression can be interpreted as follows.

As the nationwide civilian unemployment rate (UNEMP) increases by 1% the percentage of homes owned will increase by .03918%, this varies from the negative expected sign that was assumed. As the average monthly inflation rate (INF) increases by 1% the percentage of homes owned will increase by .0084%. These concepts are a little harder to grasp than the other variable analysis. The regression runs into the problem that two of the variables in the model's output have the opposite effect of what initially was expected. There was an expectation that the nationwide civilian unemployment rate and the average monthly inflation rate would have a negative impact on the percentage of homes owned. More simply stated when unemployment and inflation increased the percentage of homes owned would have decreased. According to this study's data this initial hypothesis is not true, both the unemployment rate and inflation rate have a positive effect on the percentage of homes sold or as unemployment and inflation increase so does the percentage of homes owned. After this discrepancy much research found evidence to support the regression output and disregard the initial hypothesis.

Unemployment is likely to have a positive impact on the percentage of homes owned because when the unemployment rates rise, homeowners are less likely to move because of the increased cost of moving out while unemployed, compared to moving from an apartment. This concept is detailed in an academic account written by Richard Green and Patric Hendershott and specifically states, “Oswald (1999) emphasizes a number of "indirect" effects. For example, areas with high home ownership rates have greater planning laws and restrictions on land development, discouraging business start-ups, and have greater congestion owing to owners commuting further than renters, increasing the cost of having a job. Of course, the primary reason for the ownership-unemployment relation is simply the larger costs of vacating a home (selling costs) versus moving out of an apartment.”⁵

The positive relationship between homeownership and inflation is a concept that requires a great deal of intuition. One would tend to believe that if the inflation rate increases the home ownership rate would decrease however upon further research it was found that the two are positively related. The home ownership rate and the inflation rate are said to be positively correlated, but the relationship is minimal at best. There has been no conclusive research to date that has explained why home ownership rates and inflation are positively related. The following account from an academic essay written by Elizabeth Yobaccio, Jack Rubens, and David Ketcham explains the positive relationship between the inflation rate and home ownership more precisely:

“This study examined the inflation-hedging effectiveness of REIT returns using a model that posits real estate returns are a function of expected inflation, unexpected inflation, and the real return to a market index. Four types of REIT return measures (equity, mortgage, hybrid, and a composite index) were used, as were four expected inflation forecasts across an extended time period (1972:02 through 1992:12). Results indicate that REITs act as poor hedges against any measure of inflation (actual, expected or unexpected) with the poorest performance relative to unexpected inflation. In this respect, REIT returns mirrored results involving equity returns in general and would seem not to be proxies for direct investment in real estate. Studies that have shown the real estate's ability to act as at least a partial inflation hedge may be the result of the well-documented appraisal basis in such returns, rather than real estate's innate ability to act as

⁵ <http://www.nmhc.org/Content/ServeFile.cfm?FileID=165>

an effective hedge. Evidence on REITs indicates that real estate, at best, acts as a partial hedge against expected inflation and a perverse hedge against unexpected inflation.”⁶

Coinciding with the belief that inflation and homeownership are positively correlated, a study done by Albert Chevan states, “Although not usually viewed as a protection against inflation, homeownership has served this function because house values have generally kept stride with or exceeded the pace of inflation.....Peiser and Brueggeman (1982) found a decided economic incentive for owning a home rather than renting because of the very high return on equity, due in part to high rates of inflation.”⁷ The findings of Chevan only strengthen the case of the positive relationship of inflation to homeownership rates, coming from an earlier study and being the basis of a newer study done by Yobaccio, Rubens, and Ketcham.

As the fixed monthly mortgage rate (INT) increases by 1% percentage of homes owned will decrease by .0092% making the interest rate negatively correlated with the homeownership rate. This is what was hypothesized as (INT) had a negative expected sign showing that when the interest rate is high it negatively affects the homeownership rate. In theory this is correct because as it becomes more expensive to lend from creditors and banks more and more people steer away from such methods that are imperative for majority of the country to own a home. For every 1 dollar the Dow Jones Industrial Average (DOW) increases the percentage of homes owned will increase by .0149%. With the DJIA increasing homeownership is increasing which is practical because the DJIA is one measure of how well the economy is doing and as it positively increases so do the benefits for society, especially that of homeownership.

For every 1 dollar average monthly household income (INC) increases the percentage of homes owned will increase by .21434%. This relationship between income and homeownership is one that was expected and easily explained. As income for a household rises, they tend to steer away from renting or leasing and begin owning homes with an increase in purchasing power. As the GDP increases by 1% the homeownership rate will increase by .393%. Along with the DJIA, GDP is a measure how a country’s overall well-being and stability but it’s more of an aggregate look at the country’s goods and services as whole, all industries included. One would expect that if GDP were to increase so would homeownership, so the expectations of the variable were correct. As CONSTSPEND increased by 1% the homeownership rate decreases by .0197%. The expected sign of this variable was initially positive but when one thinks about the rationale overview of the spending on residential construction, the more money and capital

⁶ Yobaccio, Rubens, and Ketcham, “The Inflation-Hedging Properties of Risk Assets: The Case of REITs”

⁷ Chevan, “The Growth of Home Ownership:1940-1980”

that go into the construction of homes, the higher the prices of homes hindering homeownership. As HHSIZE increases by 1% the homeownership rate also increases, by .838%. With the household size higher, there are more occupants within the household with the chance of increasing the overall average household income, making homes more affordable. Lastly, as POP goes up by 1% the homeownership rate goes down by 1.33%. Population also varied from its positive expected sign and seemed to have a negative impact on homeownership. This relationship can be loosely interpreted by the thought process that as more people enter this country the demand for housing rises and in doing so, prices rise. There was no empirical evidence or papers found to properly describe the relationship between population and homeownership.

Since the data is financial and therefore captured in a time series fashion it is almost inevitable that a certain degree of multicollinearity and serial correlation will be present. This is not as worrisome as if the data wasn't time series because all financial data tends to move together because it is a reflection of the economy as a whole. That is all of these independent variables have some effect on each other.

It is imperative to know that when conducting this analysis the coefficient of each independent variable was measured while holding all other independent variables constant. Other important summary statistics of the regression output are as follows. T-statistics are the next portion of summary statistics to examine after the coefficients of the independent variables are interpreted. T-statistics are a measurement used in hypothesis testing and are calculated for each individual independent variable by dividing the variables' coefficient by its standard error. The rule of thumb for these is if the t-statistic is greater than 2 at 95% confidence the null hypothesis can be rejected. By rejecting the null hypothesis you can conclude that the effects of the individual independent variable on the dependent variable are significant in the expected direction.

The R-squared is an important summary statistic which measures the extent to which the dependent variable is explained by the corresponding independent variables. R-squared must fall between 0 and 1 and in this case is measured to be .884430. This high of an R-squared coefficient places a significant amount of confidence in the variable choice of the analysis because approximately 88% of the movement of the dependent variable is explained by the independent variables. This means that variables that were researched and hypothesized fit the

model or explained the dependent variable, homeownership rate, sufficiently well. A high R-squared gives credibility to the model and therefore the research and ideals that it claims.

6.0 Conclusion

In summary the variables researched and chosen to depict and describe the U.S. domestic homeownership rate were all relevant and fit the model. Though there were some discrepancies with a few variables and their expected correlation to the dependent variable, empirical studies were found to support the theories that were created and noted in this regression. The study finds that high unemployment and inflation rates are essentially positively correlated with homeownership rates defying the common practical belief of their negative relationship. The examination also has findings that the interest rate has very little relevance to the homeownership rate along with the result of population having a negative impact. These two flaws in the model however were not explained by and empirical data and leave room for more explanation.

Overall the variables that were put together in this model serve their main purpose and in doing so have created a model that is sufficient in relating the macroeconomic factors to the percentage of homes owned in the U.S. With the given information and analysis one can propose various programs aimed to stimulate these factors with the ultimate goal of raising the homeownership rate. Some programs have been in the making such as the immigration laws that look to limit the amount of people in the use which would help the population which, from the empirical results, has a negative impact on homeownership. Also minimizing overhead costs of construction in dealing with residential real estate, with lower costs, homes become cheaper and more attractive and affordable to different income brackets boosting the homeownership rate. What is important about this study is that it offers a macroeconomic view making the initiation of changes and programs a lot easier say if it were the other way around coming from the micro view. In addition, this country needs to see its homeownership rate grow establishing more wealth and capital throughout its communities and much can be done by catalyzing change through the watch and stimulation of various macroeconomic indicators.

Acronym	Description	Data Source	Expected Sign
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8.0 Appendix

INT	The interest rate captures that rate at which consumer borrow capital to invest in buying a home.	BEA	(-)
DOW	The Dow Jones average measures the stock market's performance and indirectly the state of the economy.	BEA	(+)
UNEMP	The civilian unemployment rate depicts the rate at which a percentage of the work force is unemployed.	BLS	(-)
INC	Household income is the combined gross income of all the members of a household who are 15 years old and older. Individuals do not have to be related in any way to be considered members of the same household.	Census Bureau	(+)
INF	Inflation rate captures the rate at which the general level of prices for goods and services is rising, and, subsequently, purchasing power is falling.	BLS	(-)
GDP	Gross Domestic Product reflects the value of all goods and services produced in a given year, expressed in base-year prices.	BEA	(+)
HHSIZE	The average size of the families in the US. The number of normally resident members of a household is its size. It will include temporary stayaways but exclude temporary visitors and guests.	Census Bureau	(+)
POP	Population is the number of people occupying the country at a given time.	Census Bureau	(+)
CONSTSPEND	Construction spending is the amount of money and capital spent on the building of residential homes in the US.	Census Bureau	(+)

Table 1: *Variables, Descriptions, Sources, and Expected Signs*

Table 2: *Actual Regression*

Dependent Variable: LOGOWN
Method: Least Squares
Included observations: 72

	Coefficient	Std. Error	t-Statistic	Prob.
LOGINT	-0.009164	0.010529	-0.870415	0.3874

LOGDOW	0.014852	0.008172	1.817442	0.0740
LOGUNEMP	0.039175	0.010603	3.694665	0.0005
LOGINC	0.214337	0.106522	2.012134	0.0486
LOGINF	0.008382	0.002403	3.488482	0.0009
LOGGDP	0.392706	0.092035	4.266932	0.0001
LOGHHSIZE	0.837873	0.357475	2.343863	0.0223
LOGPOP	-1.327252	0.346474	-3.830738	0.0003
LOGCONSTSPEND	-0.019732	0.008018	-2.460869	0.0167
C	11.35168	2.483590	4.570675	0.0000
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R-squared	0.884430	Mean dependent var	1.833819	
Adjusted R-squared	0.867653	S.D. dependent var	0.004003	
S.E. of regression	0.001456	Akaike info criterion	-10.09764	
Sum squared resid	0.000131	Schwarz criterion	-9.781436	
Log likelihood	373.5150	Hannan-Quinn criter.	-9.971758	
F-statistic	52.71886	Durbin-Watson stat	1.018926	
Prob(F-statistic)	0.000000			
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Table 3: Summary of Regression Statistics

	Homeownership Rates
LOGINT	-0.009164 (.3874)
LOGDOW	0.014852 (.0740)
LOGUNEMP	0.039175 (.0005)
LOGINC	0.214337

	(.0486)
LOGINF	0.008382 (.0009)
LOGGDP	0.392706 (.0001)
LOGHHSIZE	0.837873 (.0223)
LOGPOP	-1.327252 (.0003)
LOGCONSTSPEND	-0.019732 (.0167)
Constant	11.35168
R ²	.884430
F-Statistic	52.71886
Observations	72

Table 4: Variable Correlation Table

	<i>int</i>	<i>dow</i>	<i>unemp</i>	<i>inc</i>	<i>inf</i>	<i>gdp</i>	<i>constspend</i>	<i>pop</i>	<i>hhsiz</i>
<i>int</i>	1.00	0.37	-0.77	0.84	0.24	-0.71	0.10	-0.78	-0.56
<i>dow</i>	0.37	1.00	-0.63	0.45	0.48	0.17	0.52	0.08	-0.07
<i>unemp</i>	-0.77	-0.63	1.00	-0.89	-0.67	0.33	-0.42	0.41	0.35
<i>inc</i>	0.84	0.45	-0.89	1.00	0.49	-0.55	0.22	-0.60	-0.45
<i>inf</i>	0.24	0.48	-0.67	0.49	1.00	0.16	0.56	0.13	0.15

gdp	-0.71	0.17	0.33	-0.55	0.16	1.00	0.48	0.98	0.53
constspend	0.10	0.52	-0.42	0.22	0.56	0.48	1.00	0.42	0.45
pop	-0.78	0.08	0.41	-0.60	0.13	0.98	0.42	1.00	0.63
hhsz	-0.56	-0.07	0.35	-0.45	0.15	0.53	0.45	0.63	1.00

This table looks to explain the correlation amongst the variables in the equation. Too much serial correlation would render some variables redundant and therefore serve no purpose in the equation. The highlighted red box indicates when the correlation between variables became a little too high.

Table 5: Summary of Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
OWN	72	68.21	.628826	67.10	69.20
INT	72	6.52	.863313564	5.23	8.52
DOW**	72	9980.32	860.118816	7591.93	11215.10
UNEMP***	72	5.18	.730854	3.80	6.30
INC*	72	4902.61	161.0441	4767.33	5213.00
INF***	72	2.69	.81675	1.07	4.69
GDP***	72	38.27	1.983311	36.20	41.60
HHSIZE**	72	2.59	.011132999	2.58	2.61
POP***	72	287197500.00	4916805.619	281421000.00	295507000.00
CONSTSPEND**	72	6316601.00	1237520.425	4653416.00	7804216.00

Note: *, **, *** depict each variable as a 10%, 5%, and 1% confidence level.

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12. All Data was found through U.S. government databases including the Bureau of Labor Statistics, the Bureau of Economic Analysis, and the U.S. Census Bureau.