

# The Effect of Macroeconomic Variables on Domestic Homeownership Rates

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## **Abstract:**

This paper investigates how various macroeconomic variables affect homeownership rates in the United States. Some of the variables explored in this study include interest rates, unemployment rate, average household income, inflation rate, GDP, population, and residential construction. The paper uses quarterly data from quarter one of 2000 to quarter three of 2012. The results show the economic indicators that are closely correlated with the rate of homeownership.

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## 1.0 INTRODUCTION

The focus of this study is to examine how independent macroeconomic variables affect the health of the housing market. Since the housing market is closely related to the overall health of the economy, this study seeks to determine how these independent macroeconomic variables affect the percentage of the US population that own houses. Given that the housing market depends on the economic situation of individuals, the chosen variables are broad components that show what these individuals are going through financially.

The housing market is a key indicator when looking at the health of the economy. Typically, when the economy is doing well, the housing market also does well. On the other hand, when the economy is in a slow period, the housing market will consequently struggle. This has and will continue to be the common belief among economists worldwide. Due to the way macroeconomic variables affect homeownership rates, it is vitally important to keep a close watch on these variables, and if possible assure that they are affecting homeownership rates in a positive fashion.

Owning a home has significant social and economic benefits. When looking at the social benefits that come from homeownership, it is evident that when individuals buy a home and intend on staying in it for the long term, they invest more in the communities in which they are located. A large number of people want to be in a stable community, and when they anticipate living in an area for several years, they will want to improve it and make it a suitable place for them to live. In terms of economic benefits, homeownership gives individuals a sort of “forced savings plan” (Surowiecki 2008). A home is a large investment regardless of the size or location, and when people purchase a home they give themselves financial security often without realizing

it. When held long enough, their investment could appreciate in value and increase their financial position. Also, homeownership stimulates the economy and can allow it to grow when housing purchases are on the rise.

Homeownership undoubtedly has its benefits, but can also have negative consequences. One issue that shows the negative consequences of the housing market can be seen during the subprime crisis. During this time, banks and credit institutions were charged with giving people mortgages who may not have been credit worthy. They would then turn around and sell mortgage backed securities to other investors in bundles that included some worthy instruments. When the mortgages began to default, these institutions were stuck with worthless investments, and in turn, the most recent recession began. This subprime crisis shows how severe an impact the housing market can have on the economy, and vice-versa (Surowiecki 2008). This problem had substantial repercussions for individuals as well. During this crisis, people were purchasing homes that they could not otherwise afford due to the extremely low qualifications for home loans and down payments on new homes. As the prices of homes dropped, individuals found themselves paying more on their mortgages than their homes were worth. This example shows how homeownership during this period was no longer an economic benefit for people who were in this situation.

This study aims to prove how several macroeconomic variables can affect the housing market as well as the overall economy. The past is a great predictor for the future, so if we are able to seek out trends in homeownership in relation to the economy, we will have more knowledge of what the economy is going to do in the future. The relevance of this study is that

by determining which macroeconomic factors have the greatest influence on homeownership rates, future economic hardships can be predicted.

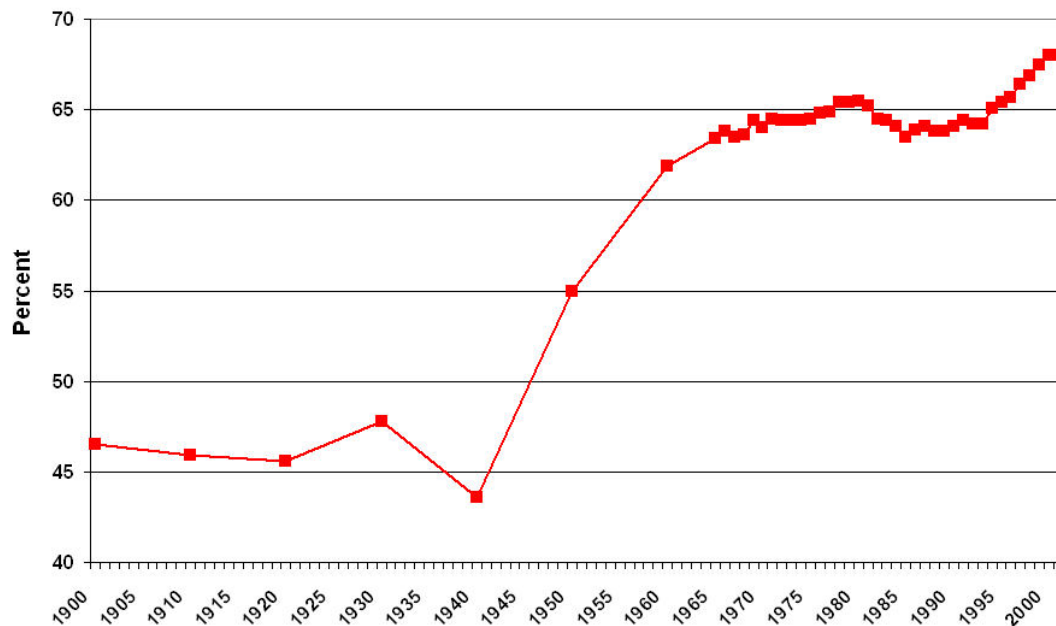
This paper is based on that of Fisher and Jaffe (2003). The three research objectives that differ from the previous paper are: It uses domestic data rather than international panel data. Also, it uses quarterly data that is up to date rather than monthly data, in an attempt to capture a larger time span. Finally, it includes several additional variables not mentioned in the previous paper, such as new residential construction, the interest rate, and the unemployment rate.

The rest of the paper is organized as follows: Section 2 shows current housing trends, Section 3 gives a literature review, Section 4 shows the empirical model, Section 5 deals with data and methodology, Section 6 presents the empirical results and discusses them, and the conclusion can be found in Section 7.

## **2.0 US. HOMEOWNERSHIP TRENDS**

The U.S homeownership rate has risen over the past decade, and is higher than most countries in the world. The only countries with higher homeownership rates than the United States include Ireland, Spain, and Italy according to the St. Louis Federal Reserve. That being said, the homeownership rate has not always been as high as it is today. It was at its lowest during the Great Depression, but there were policies put into place that caused them to rise by the end of World War II. From that point on, until around 1995 it stayed at about 64%. From 1995 to 2004, it began to rise again, reaching as high as 69%. The following is a graph of homeownership rates from 1900 to 2001.

**Figure 1: U.S Homeownership Rates from 1900 to 2000**



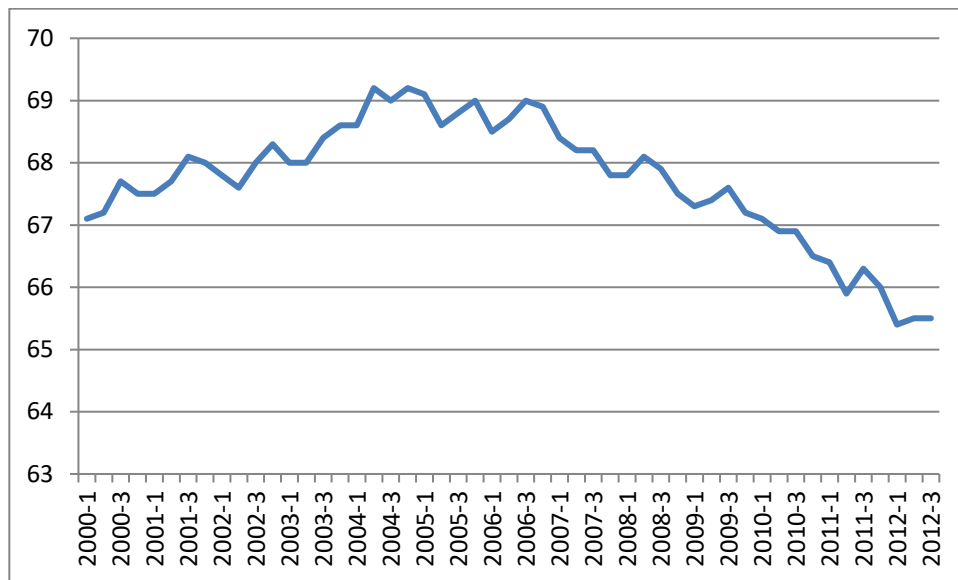
**Source: [Voteview.com/Congress](http://Voteview.com/Congress)**

From this graph you can see how the homeownership rate rose steadily after World War II and then stayed stagnant until 1995. From 1995 to 2004, however, they began to rise all the way to 69%.

In regards to homeownership rates over the past decade, a different trend can be seen. Due to the subprime crisis and the most recent recession, the percentage of U.S residents that own homes has significantly declined. After the stunning rates in 2004, there has been a downward trend. Despite the few quarters from 2004 to 2012 where the homeownership rate increased a fraction of a percentage, the general movement has been downward. Over this period, the U.S

homeownership rate has declined by more than 3%. From 2000 to 2005, there seems to be an upward trend that was characterized by high consumer sentiment and was arguably the beginning of the subprime crisis. When the housing bubble burst, the recession began and homeownership rates began to decline with the economy. In the heat of the recession, interest rates were lowering in an attempt to spark lending and consumer spending. The following graph shows quarterly homeownership rates from 2000 to the third quarter of 2012, created from the data obtained from the United States Census Bureau. This graph shows how volatile the homeownership rate can be in relation to the events that happen in the economy.

**Figure 2: U.S Quarterly Homeownership Rate From 2000 to Q3 2012**

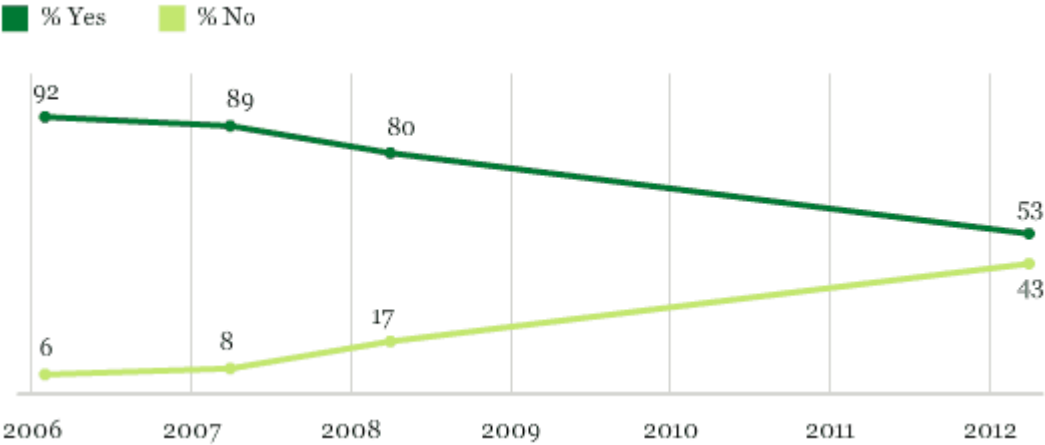


**Source: United States Census Bureau**

The downward trend in housing prices has been regarded as a positive for people who are seeking out new homes, but it is quite the opposite for existing homeowners. As previously mentioned, when the housing bubble burst, homeowners were finding that what they previously

regarded as a strong financial investment had turned into a financial liability. Because of the lax lending policies before the subprime crisis and the decline in housing prices that started shortly after, people who owned homes were discovering that they owed more on their mortgages than their homes were worth. Figure 3 shows how people thought about the value of their homes from 2006 to 2012. It can be seen that in 2006 there was a significant spread between the amount of people that believed their home was worth more than when they purchased it, but this gap narrows every year after that. As the economy and housing market worsened, the value of people's homes went down, and left them uncertain about how strong of an investment they made. Today, there is only a 10% difference in the amount of people who believe their home is worth more now than when they bought it. The fact that only about half of all people surveyed claim they made a solid investment in buying a home highlights the downward trend of the housing market when the economy is in a recession.

**Figure 3: Percentage of Americans Saying Their Home Is Worth More Than They Paid**



**Source: Gallup Economy**

Another interesting trend in homeownership in the United States is the change in the amount of homes owned by various racial groups. The US Census reported that among all ethnicities, non-Hispanic Whites had the highest homeownership rates of all races in 1994 at 70%, and in 2004 at 76%. The racial groups with the lowest homeownership rates were Blacks and Hispanics. That being said, Black and Hispanic households had the highest growth in homeownership from 1994 to 2004. This shows that as our country changes in composition, the homeownership rates for various races will change as well.

Government policies are often put into place in order to regulate the housing market. One of the ways they can influence homeownership is by tax laws. The St. Louis Federal Reserve website reports that state and local governments usually offer tax-exempt mortgage revenue bonds, as well as deducting interest payments on home mortgage loans for those who itemize their tax returns. There are also government programs such as the Federal National Mortgage Association, which allows the government to purchase mortgages on a secondary market. The Affordable Housing Programs are also an attempt to influence people to buy homes.

### **3.0 LITERATURE REVIEW**

There are several factors that influence the homeownership rate both domestically and internationally. Since the housing market tends to shadow the overall state of the economy, by observing the variables that affect everyone, the triggers for movements in the housing market can be determined. Fisher and Jaffe (2003) looked at a wide range of macroeconomic variable across 106 different countries to see how they affected the homeownership rates. They were able to determine that the variation in homeownership can be attributed to the overall supply of



housing, as well as the availability of inputs. This is the paper in which this empirical study is based on, but on a domestic level rather than an international level.

Chambers et al. 2009; Rosen and Rosen 1980; Gordon 2005 all show how the government has a hand in determining the homeownership rate. Through various programs, the government is able to influence the health of the housing market. Chambers et al. (2009) wanted to explore why the homeownership rate was increasing at a steady pace from 1965 to the early 2000's. They looked at the way demographic changes and mortgage innovations impact the homeownership rate, and argue that the introduction of the conventional fixed rate mortgage is responsible for at least 50% of the increase in homeownership rates from 1994 to 2005. Their paper shows how the government and lending institutions have a large impact on the health of the housing market.

Rosen and Rosen (1980) also looked at how the government influences the homeownership rate but they focused specifically on taxes. While looking at the determinants of the choice between renting or owning a house, they found that about one quarter of the growth in homeowners after World War II can be attributed to the tax systems "favorable treatment" of owner-occupied housing. This is important because as the government provides incentives for individuals who own homes, there will be more demand to own rather than rent. This relationship should be kept in mind when determining governmental policies.

Regarding the current homeownership trends, the demographic changes in homeownership rates have been said by Gordon (2005) to be tied to New Deal changes in bank regulations. He claims that the reason white homeownership rates are so much higher than Black homeownership rates is because Blacks have not been able to attain the kind of first homeowner

loans that whites have access to. In this sense, he is claiming that the reason for unequal homeownership among racial groups is government induced.

Follain and Ling (1988) looked at how homeownership rates fluctuate depending on inflation during a given time. They were able to find that as inflation increases, the homeownership rate will decline, and when inflation is low the homeownership rate will rise. This study goes against popular belief that inflation and homeownership have a positive relationship, but is consistent with this empirical study. Their paper on the impact of inflation on the demand for housing is evidence of why the government needs to keep inflation in check.

Expected inflation should also be considered when making a decision to purchase a home. When people believe that homeownership will be a good hedge against future inflation, they will tend to invest in homes rather than rent (Goodwin 1986). This study is suggesting that with low inflation comes higher home ownership, and as inflation rises, homeownership will become less attractive.

Green and Hendershott (1999) focused on the relationship between unemployment and homeownership. There have been several previous studies on this relationship, and this paper attempted to disprove the previous findings that homeownership leads to immobility, and in turn to unemployment. Instead, they were hoping to prove that an aging population is more important when looking at the relationship between homeownership and unemployment (Green and Hendershott 1999). They were unable to come up with substantial evidence against the common belief of a positive relationship between homeownership and unemployment due to immobility, and instead confirmed previous studies on the matter. This relationship should be considered,

however, when looking at homeownership and unemployment rates in the United States currently, due to the fact that the baby boomer generation is aging.

## 4.0 DATA AND EMPIRICAL METHODOLOGY

### 4.1 Data

This study uses quarterly data from the first quarter of 2000 to the third quarter of 2012, which was the most recent data available for this topic. Data were obtained from the U.S Federal Reserve website, the Bureau of Labor Statistics website, the U.S Census website, the Bureau of Economic Analysis website, and (Yahoofinance.com). Summary statistics for the data are provided in Table 1.

**Table 1: Summary Statistics**

<b>Variable</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
HOWNRT	51	67.72	1.00	65.40	69.20
INF	51	2.52	1.29	-1.63	5.30
INT	51	5.39	2.10	3.25	9.50
HHINC	51	63998.25	4721.38	57135.00	69677.00
CONST	51	266.20	123.89	78.00	485.00
POP	51	298000000.00	10243852.00	274000000.00	314000000.00
GDP	51	12820.61	1845.72	9709.50	15811.00
UNEMP	51	6.28	1.94	3.90	9.93

### 4.2 EMPIRICAL MODEL

The empirical model used in this study is based after the model used by Fisher and Jaffe (2003). Adaptations that were made to the model by Fisher and Jaffe (2003) for this study were

that the data used was quarterly, domestic data was used rather than international data, and there were also several variables added that were not included in the original study. The variables that have been added include household income, real GDP, new residential construction, the unemployment rate, and the interest rate. The model could be written as follows:

$$\text{HOWNRT} = \beta_0 + \beta_1 \text{INT} + \beta_2 \text{UNEMP} + \beta_3 \text{HHINC} + \beta_4 \text{INF} + \beta_5 \text{GDP} + \beta_6 \text{POP} + \beta_7 \text{CONST} + \varepsilon$$

HOWNRT represents the homeownership rate in the United States. It is the percentage of people in the United States that own a home, and this variable is the dependent or endogenous variable as it is used in this study.

The independent variables in this study are chosen because they have been proven to explain the dependent variable. These independent variables serve as signs of how the economy is operating on a large scale, and consequently how the housing market is doing. By examining these independent variables, the domestic homeownership rate can be explained. The data source, acronyms, descriptions, expected signs, and justification for using each variable can be found in Appendix A. To begin, INT represents the interest rate. Since there are several interest rates to choose from, the Bank Prime Rate was used and it shows the rate at which people can borrow money to finance investments they make, like buying a home. UNEMP represents the civilian unemployment rate. This variable was chosen because there is a proven relationship between the unemployment rate and homeownership rates. HHINC is the average household income in the United States, and shows the mean income in current dollars of the average household. INF is the inflation rate. This variable was chosen because when the inflation rate changes, it affects the value of currency. When the real value of a dollar changes, people will consequently feel either more or less wealthy, and will base their expenditures accordingly. GDP

is the Gross Domestic Product in current dollars, and is a reflection of how well an economy is doing in terms of production. It is related to the homeownership rate because it is a broad representation of the health of a country's economy. Depending on how the economy is doing, people in aggregate will change their investment decisions. POP is the residential population of the United States at a given period of time. As population changes, the supply of available homes will either increase or decrease, and in turn will cause the homeownership rate to fluctuate. CONST represents the number of new privately owned housing units started in the United States. It shows the amount of new residential construction that is going on at a given time, and will affect the homeownership rate by increasing or decreasing the supply of available homes in the United States.

## **5.0 EMPIRICAL RESULTS AND ANALYSIS**

The empirical results are listed in Table 2. The analysis is based on a period of 12 years (2000-2012), and includes 51 observations for each variable. The study uses data from Q1 2000 to Q3 2012, and is a time series study using quarterly data. The data can be interpreted as follows.

The inflation rate has a negative correlation with the homeownership rate, and this means that as inflation increases, the homeownership will go down. Since there is a negative correlation between the two, as inflation increases 1%, the homeownership rate will decrease by .12%. This is consistent with the expected positive sign of inflation. The reason this variable has a negative correlation with the amount of homes that are owned in the United States is because as inflation increases, the value of the dollar drops, and people have less real value per dollar. This makes it harder for them to be able to afford buying a new home. Consequentially, as inflation rates

become lower the homeownership rate rises according to Follain and Ling (1988). This negative relationship between inflation and homeownership rates is consistent with Goodwin (1986). That study claimed that as people expect inflation to be low in the future, they will use homeownership as a hedge against future non-housing inflation.

The interest rate was also negatively correlated with the amount of homes owned in the United States. The reason for this is that as money becomes more expensive to borrow, people become less likely to borrow it. When there are high interest rates, people will not borrow money to finance a new home. As the interest rate increases by 1%, the homeownership rate will decrease by .16%. This finding was in line with the expected sign of INT, and is consistent with the analysis by Gordon (2005). While Gordon focused specifically on the demographics of homeownership, his study showed that when people are given higher interest rates on home loans, they will be less likely to purchase a home.

Household income has a positive correlation with the amount of homes owned, and as the average household income increases by 1%, the homeownership rate will also increase by .000288%. As mentioned before, the independent variables are a strong representation of how the macro economy is doing, and that in turn reflects how the housing market performs. This also has to do with GDP, and explains why the correlation of GDP and homeownership rate is positive. These positive correlations were in line with the expected signs of HHINC and GDP.

The amount of new privately owned homes started (CONST) was expected to be positively correlated with the homeownership rate, because as the amount of homes increase, the supply rises and more people can afford houses. This proved to be consistent with the regression,

and it was found that as CONST increases by 1%, the homeownership rate in the United States will increase by .00584%.

Since population is positively correlated with the homeownership rate, it means that as the population rises, more people will have homes. It was found that as the population rises by 1%, the homeownership rate rises by a very small percentage since population is so large. This was consistent with the expected sign of POP. Fisher and Jaffe (2003) found the opposite of this result, however, and concluded that there is a significant negative relationship between population and homeownership. A possible explanation for this discrepancy could be that their study included international results rather than data from the United States. It is possible that other factors such as governmental policy and lending practices which influence the homeownership in the United States do not have as much of an impact in foreign countries.

As more people become unemployed, the homeownership rate in the United States is expected to go down. That is because when people lose their jobs, they do not have a lot of money to spend on expenses that may come with owning a home. Instead of owning a home, they may choose to rent or live with family. The regression shows that as unemployment increases by 1%, the homeownership rate will in turn decrease by .31%. This finding is inconsistent with Green and Hendershott (1999), and could be explained by the aging population of the United States. As the "Baby Boomer" generation gets older, our country's average age is also increasing. It is proven that as age increases, unemployment decreases because people drop out of the labor force. Also, older people typically have higher home ownership rates.

The regression shows that there are three variables that are significant at the 5% level. These variables are INT, HHINC, and UNEMP. There is also one variable that is significant at

the 1% level, which is CONST. The fact that there are four variables which are statistically significant shows that those variables are the most influential to the homeownership rate.

Construction spending is the most closely related to homeownership in the US, and can explain the positive relationship between the supply of housing and the homeownership rate.

**Table 2: Regression Results**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF	-0.121019	0.088495	-1.367516	0.1786
INT	-0.159767	0.09216	-1.733582	0.0902 **
HHINC	0.000288	0.000116	2.48607	0.0169**
CONST	0.00584	0.001233	4.735096	<0 ***
POP	1.48E-08	0.000000088	0.168276	0.8672
GDP	-0.000676	-0.000537	-1.257757	0.2153
UNEMP	-0.308216	0.153167	-2.012285	0.0505 **
<b>R-Squared</b>			0.69211	
<b>F-Statistic</b>			13.80846	
<b>Mean Dep Var</b>			67.70000	
<b>S.D. Dep Var</b>			0.99892	
<b>Durbin Watson Stat</b>			0.81069	

Note: \*\*\*, \*\*, and \* denotes significance at the 1%, 5%, and 10% respectively.

## 6.0 CONCLUSION

In summary, the results of this study show that the variable which are most closely related to the fluctuation in the housing market and homeownership rates are interest rate, household income, unemployment, and new residential construction. The results of this paper imply that as these macroeconomic variables change, so too will the homeownership rate in the United States as a result of these changes.



There were some limitations in this study that should be noted. Due to the most recent recession and the fact that the independent variable in this study represent the wellbeing of the economy, the results may be somewhat skewed. The irregularity of the data during the time span observed could account for fluctuations from previous studies on this topic. Also, several of the variables in this study were closely related, and needed to be eliminated from the regression. The remaining variables show an accurate picture of their correlation with homeownership, but macroeconomic indicators that should have been observed needed to be omitted due to their close correlation with each other. Where discrepancies were found in results from previous studies, additional studies were used to explain these differences.

The findings of this study should be something for economists or the government to consider when trying to stabilize an economy or spur growth. They could put legislation in place to affect these macroeconomic variables, and that would in turn cause the homeownership rate to expand or contract. An example of a policy that could be put in place to improve homeownership is taxes. If the government is trying to increase the homeownership rate, they could lessen the tax laws associated with property taxes. They could also allow for more tax incentives for owning a home. One of the results that would come from making tax laws less strict is that people would be more likely to own a home because they will pay less in taxes. They would also be less likely to avoid homeownership because of the high taxes that come with owning a home.

Another policy the government could put in place is to lessen the costs associated with hiring contractors in order to build a new home. The results of this study show that construction has a positive correlation with the homeownership rate, and if the government were able to limit the costs associated with new construction of privately owned homes, they would find that people would be more apt to build new homes.

There are countless opportunities for economists and the government as a result of this study, and they have the ability to significantly impact this nation if they monitor these independent macroeconomic variables. If the government is able to increase homeownership rates, communities will improve and individuals will become more financially stable. Homeownership has the ability to increase the wealth of the United States Economy, and by monitoring and improving the independent variables in this study, there could be a substantial increase in the quality of life in the US.

### Appendix A: Variable Description, Source, and Expected Sign

<b>Acronym</b>	<b>Description</b>	<b>Source</b>	<b>E Sign</b>
<b>INF</b>	The rate at which general level of prices is rising.	Bureau of Labor Statistics	(-)
<b>INT</b>	The rate at which money can be borrowed for investment.	Federal Reserve	(-)
<b>HHINC</b>	The average income per household.	US Census Bureau	(+)
<b>CONST</b>	Total number of new privately owned housing units started.	US Census Bureau	(+)
<b>POP</b>	The number of people in the US at a given time.	US Census Bureau	(+)
<b>GDP</b>	The value of all goods and services produced in the US in a given year.	Bureau of Economic Analysis	(+)
<b>UNEMP</b>	The rate at which a percentage of the workforce is unemployed.	Bureau of Labor Statistics	(-)

## **BIBLIOGRAPHY**

Blackburn, Robin (2008). "The Subprime Crisis".  
<http://faculty.washington.edu/sparke/blackburn.pdf>

Bureau of Economic Analysis, [online data file],  
<<http://www.bea.doc.gov/bea/di/home/directinv.htm>>.

Bureau of Labor Statistics, [online data file],  
< [www.bls.gov/](http://www.bls.gov/)>

Chambers, M., Garriga, C. and Schlagenhaut, D. E. (2009), Accounting for Changes in the Homeownership Rate. *International Economic Review*, 50: 677–726.

Fisher, Lynn M., and Austin J. Jaffe (2003). "Determinants of International Home Ownership Rates." *Housing Finance International*: 34-42

Follain, J. R. and Ling, D. C. (1988), Another Look at Tenure Choice, Inflation, and Taxes. *Real Estate Economics*, 16: 207–229.

Gordon, Adam (2005). "The Creation of Homeownership: How New Deal Changes in Banking Regulation Simultaneously Made Homeownership Accessible to Whites and out of Reach for Blacks." *The Yale Law Journal*, Vol. 115, No. 1, pp. 186-226.

Goodwin, Thomas (1986). "Inflation, Risk, Taxes, and the Demand for Owner-Occupied Housing" *The Review of Economics and Statistics*, Vol. 68, No. 2 (May, 1986), pp. 197-206

Grande, Alexander. (2000), United States Homeownership Rates: The Effect of Macroeconomic Variables on the Domestic Real Estate Market.

Green , Richard K., and Patric H. Hendershott. "Home Ownership and Unemployment in the U.S." *National Multi Housing Council* (1999): 1-15

Jacobe, Dennis. "U.S. Homeownership Hits Decade Low, 26 Apr. 2012. Web. 22 Apr. 2013.  
<<http://www.gallup.com/poll/154124/u.s.-homeownership-hits-decade-low.aspx>>.

Rosen, Harvey S., and Rosen, Kenneth T. (1980). "Federal Taxes and Homeownership: Evidence from Time Series. *Journal of Political Economy*, Vol. 88, No. 1, pp. 59-75.

St. Louis Federal Reserve, [online data file],  
[www.stlouisfed.org](http://www.stlouisfed.org)

Surowiecki, James. "Home Economics." *The New Yorker*. N.p., 10 Mar. 2008. Web. 22 Apr. 2013. [http://www.newyorker.com/talk/financial/2008/03/10/080310ta\\_talk\\_surowiecki](http://www.newyorker.com/talk/financial/2008/03/10/080310ta_talk_surowiecki)

United States Census Bureau, [online data file],  
<[www.census.gov/](http://www.census.gov/)>