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## Using Buy and Rent Discrepancies to Predict Real Estate Bubbles

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The University of Southern Mississippi

Using Buy and Rent Discrepancies to Predict Real Estate Bubbles

by

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A Thesis  
Submitted to the Honors College of  
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## **Abstract**

The cost of housing is one of the biggest recurring expenses Americans face. Real estate is also one of the largest asset classes of investments today. The decision of whether or not it is the right time to purchase a piece of residential real estate can be difficult for the everyday person as well as professionals. With the recent downturn of 2008, many people are reminded that the price of houses can spiral upward, and if one bought at the wrong time, their house could lose a tremendous portion of its value. This study focuses on looking at different economic measures and finding relationships between them and the cost of renting vs buying. The results of this study will hopefully help investors decide if market prices are too high based upon multiple factors.

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## **List of Abbreviations**

MSA	Metropolitan Statistical Area
FRED	Federal Reserve of St. Louis Economic Data
BH&J	Beracha, Hardin, and Johnson Buy vs Rent Index

## **Introduction**

In 2008, the financial world had a meltdown. The stock market fell close to 50%, and big banks started to fail. The world economy collapsed mostly due to a bubble in the real estate market. However, should we have seen it coming? This manuscript seeks to find out if bubbles in the real estate market can be predicted by looking changes in major economic factors such as changes in the unemployment rate and changes in the economic conditions index and comparing them to the BH&J buy vs rent index.

### **What Are Bubbles and How Are They Caused?**

Market bubbles result when the price of an asset rises beyond what is consistent with the underlying fundamentals and the buyers purchase the asset expecting the price to further increase (McCarthy & Peach, 2004). Therefore, people buy an asset, not because they believe it is undervalued or a good investment, but because they believe that the price of the asset will continue increasing. However, in the end, the people who bought because they believed the price will only go up, lose the majority of their money when the price comes crashing down. Events like these have occurred over hundreds of years, whether it was over tulips in 1600s or internet companies in the 2000s. This study aims to make people aware of situations that could signal that the housing market is in a market bubble.

### **Real Estate Crash in 2008**

In the early 2000s, shortly after the internet bubble popped, a familiar pattern started emerging. Due to cheap credit from the recent downturn, and the sub-prime lending market making it easier for people to buy homes they could not afford, there was growth in U.S. homeownership (Nechayev & Wheaton, 2008). The rapid increase in demand caused the price of homes to rapidly rise, and when people saw the price of homes rising rapidly, they

saw real estate as a way to earn a large and quick profit. According to Nechayev and Wheaton (2008), the housing market saw a number of sales to investors and second-home buyers. However, when people throw their money into a market just because they think the market is going to continue going up, market forces eventually correct the prices and the bubble pops. Only this time, large global financial institutions were in on it, and when they suffered huge losses, the world economy plummeted.

### **Literature Review**

This study looks at a way to predict a bubble in the real estate market; however, this definitely is not the first. Other studies have also looked at the buy vs rent ratio, as well as examined previous housing bubbles before the most recent in 2008 using other methods. McCarthy and Peach (2004) look at home price indexes to measure trends in housing prices. They use housing fundamentals to make assumptions as to why the market is fairly valued or not, while also including factors like interest rates. McCarthy and Peach (2004) concluded that at the time of publication in 2004, the rise in home values was justified by fundamentals. In hindsight, however, it is obvious this was not the case in many local markets. Agnello and Schuknechy (2011) study booms and bursts from 18 countries that have occurred in the last 40 years. They compare different recent housing bubbles and look for similarities to find early warning indicators. They concluded that short-term interest rates and liquidity play a role in housing booms. Beracha and Johnson (2012) look at the buy vs rent ratio and attempt to prove that renting is better than buying overall. The buy versus rent metric that the authors introduced is relevant to studies of housing bubbles as well. A ratio favoring renting over buying may indicate the end of a bubble period in local housing markets. Brunnermeier and Julliard (2008) examine the “money illusion” for inflated house prices and look at the price-

rent ratio and interest rates. Housing markets tend to be highly sensitive to changes in interest rates and increasing interest rates slow both the demand for housing and the supply of new housing units. Nechayev & Wheaton (2008) examine inflation and fundamentals for an explanation in housing price changes as well as sub-prime mortgages which played a big part in the most recent crash. Sub-prime mortgages originated between 2000 and 2007 not only increased demand for housing but also increased the overall level of risk in the lending market.

### **Research Question and Hypothesis**

Question: Do economic measures such as local unemployment and economic conditions serve as indicators of bubbles in the residential real estate market?

This research will see if real estate bubbles can be predicted by looking at the relative cost of renting versus buying a home and comparing that with certain economic factors. The analysis will analyze how local housing markets respond to changes in local macroeconomic variables. This information will allow real estate investors to assess the overall market and make better decisions before committing to an investment.

Hypothesis: The buy vs rent index moves in relation to changes in economic factors like unemployment and the economic index.

The buy vs rent index is a common metric used to value residential real estate and is expected to move between a certain range (Beracha & Johnson, 2012). It looks at the cost between renting a living space or purchasing one. When the index favors renting over buying, this can be an indicator that there is a bubble in the local housing market. As a result,

the BH&J index should also move with the changes in the economic factors chosen in this study.

### **Rationale**

The rationale is that before the 2008 real estate crisis, the buy vs rent index was far away from its normal range, which means an investor could have seen the prices of residential real estate were overvalued and stayed away from the sector or hedged against the future correction in prices. A reason to use the buy vs rent index as a primary measure is that the buy vs rent index is less likely to fluctuate widely due to changes in fundamentals, and it is a good tool for prediction of future movements in price and rent changes (Brunnermeier & Julliard, 2008). The buy vs rent index is a relatively stable ratio and any big swings in it should raise a big red flag. If these large swings can be compared with certain fundamentals in the economy, and a relationship exists, then it will allow investors to predict what will be coming in the recent future.

### **Goals**

The goal of this project is to measure the relationship between the BH&J index of different MSAs across the United States and the changes in the economic index and unemployment rate. Once this has been done, it should paint a picture of the real estate market moves with the local economy. The external goal of this paper is to help prevent professional investors and everyday people investing their money into real estate from becoming trapped in another bubble if one were to occur again. Individual homeowners lost a lot of their savings by getting wrapped up in the thrill of rising real estate prices. Hopefully,

this research helps people make more rational and research-based decisions before making large investments.

### **Contribution to Real Estate Finance**

This research will contribute to the field of real estate finance by giving researchers another method to evaluate current residential real estate market conditions. Asset price bubbles occur when the real estate prices skew from their trends by a specific threshold (Agnello & Schuknecht, 2011). By looking at the buy vs rent index, it should be a good indicator of overall real estate conditions. It should also provide a good threshold for what is normal in price-rent fluctuations, and any movement outside the threshold should be seen as a red flag that needs to be looked into before making an investment decision. In addition, this study will evaluate the extent to which local real estate markets are moving in accordance with local macroeconomic conditions. This research could contribute to better performance by investors and help future residential academic research.

### **Data**

Table 1 presents the three variables of interest for each city: BH&J index, change in unemployment rate, and change in economic conditions. Also, it is important to note that the number of observations for some MSAs vary due to the lack of availability of data for some time periods.

**Table 1: Data**

Variable	Obs	Mean	Std. Dev.	Min	Max
ATL_BHJ	118	0.0413285	0.3641497	-0.4964574	0.8283892
ATL_Unemployment	117	0.0009367	0.0930327	-0.2071294	0.4402926
ATL_EconCondition	94	0.0431548	0.3534754	-0.5778379	2.164396
BOS_BHJ	118	0.0208934	0.3618107	-0.3203793	0.9453635
BOS_Unemployment	117	0.0009434	0.118173	-0.2040824	0.5244665
BOS_EconCondition	97	0.0343608	0.257972	-0.802052	1.33147
CHI_BHJ	118	0.0541284	0.3511552	-0.3404616	1
CHI_Unemployment	117	0.0007241	0.1075935	-0.1794261	0.4073574
CHI_EconCondition	88	0.0386294	0.3436585	-0.8386704	1.453574
CLEV_BHJ	118	0.0497931	0.3545573	-0.5578419	0.7051313
CLEV_Unemployment	117	0.0497931	0.3545573	-0.5578419	0.7051313
CLEV_EconCondition	79	0.0590536	0.5040552	-0.7947104	2.682844
DAL_BHJ	118	-0.0250853	0.3671588	-0.5264305	0.9877312
DAL_Unemployment	117	-0.000842	0.0858473	-0.1872987	0.2462549
DAL_EconCondition	100	0.2323796	1.614922	-0.5776653	15.7253
HOU_BHJ	118	0.0063154	0.3668113	-0.6368973	0.7731842
HOU_Unemployment	117	-0.0000848	0.0796333	-0.1774922	0.2052426
HOU_EconCondition	81	0.0138649	0.3176717	-0.8818877	1.132012
LA_BHJ	118	0.0479257	0.3446271	-0.2915336	1
LA_Unemployment	117	-0.0002685	0.0521286	-0.0804337	0.1614487
LA_EconCondition	91	0.0939946	0.5301601	-0.6253762	4.087574
MIA_BHJ	118	0.0605959	0.3484127	-0.2830575	1
MIA_Unemployment	117	-0.0020218	0.089383	-0.1652	0.2914347
MIA_EconCondition	73	0.1878994	0.8644369	-0.742527	2.990974
NYC_BHJ	118	0.0117592	0.3606211	-0.3104066	1
NYC_Unemployment	117	0.0010046	0.0999661	-0.1900962	0.3550953
NYC_EconCondition	83	0.0782295	0.5048811	-0.8466132	2.255173
PHIL_BHJ	118	0.0515742	0.3500225	-0.3071808	1
PHIL_Unemployment	117	0.002201	0.1016382	-0.1752515	0.340121
PHIL_EconCondition	91	0.0783946	0.5273448	-0.7980977	3.5014
PITT_BHJ	118	0.1035531	0.3043962	-0.3408684	0.7606752
PITT_Unemployment	117	0.0054557	0.1420048	-0.2012416	0.3923516
PITT_EconCondition	70	0.1357226	0.6297374	-0.8373306	2.601323
SF_BHJ	118	0.0697899	0.3430962	-0.3145892	0.9784028
SF_Unemployment	117	0.0001963	0.0621876	-0.0831523	0.2142857
SF_EconCondition	92	0.0708675	0.3578012	-0.7366625	2.44729

This research collected monthly data on 12 Metropolitan Statistical Areas from January 1990 through June 2019. The 12 cities were Atlanta, Boston, Chicago, Cleveland, Dallas, Houston, Los Angeles, Miami, New York City, Philadelphia, Pittsburg, and San Francisco. These cities were chosen because of the availability and consistency of their data. The monthly data for each MSA on unemployment and economic conditions came from the Federal Reserve Bank Economic Data. The buy vs rent index data for each MSA came from Beracha, Hardin, and Johnson<sup>1</sup>. The monthly data collected was converted into quarterly data to match the frequency of the BH&J index.

The BH&J index identifies whether buying or renting a home is preferable under current market conditions over a fixed holding period relative to historical conditions and other opportunities to invest. The value of the index moves between -1 and 1. If the value is greater than 0 and less than or equal to 1, the market conditions favor renting. If the index number is below 0 and greater than or equal to -1, current conditions favor buying. The further away from 0 the index moves, the better it is to buy or rent.

### **Methodology**

The regression models were made using Stata, and the change in the buy vs rent index was compared to the change in unemployment rate and economic conditions for each MSA. For economic conditions, we ran an ordinary least squares regression analysis for each MSA where the dependent variable was the local BH&J buy vs rent index, and the independent variable was the change in the local economic conditions. To analyze the impact of unemployment, we ran an ordinary least squares regression analysis for each MSA where the

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<sup>1</sup> <https://business.fau.edu/departments/finance/real-estate-initiative/>



dependent variable was the local BH&J buy vs rent index, and the independent variable was the change in the local unemployment rate. The models will show if there is any significant relationship between economic conditions and unemployment within the housing market in each MSA.

## **Results**

Table 2 presents each of the individual regression results for changes in local unemployment rate and the BH&J index. In Atlanta, there is statistical significance at the 10% level. So, in Atlanta, it is more favorable for people to rent when the unemployment rate rises. Results were similar in Los Angeles and San Francisco. The change in the unemployment rate was positive and significant at the 10% level in both of those regressions as well. This result is what we would expect to see. When unemployment is higher, fewer people can qualify for mortgage financing. This type of market favors renting over buying housing. Lower demand for purchasing homes should also exert a downward pressure on rising home prices in those markets. Also, if someone owns a house, their house will be decreasing in value, lowering their wealth creation, which the BH&J index factors into their index.

**Table 2: Unemployment to BH&J**

	Coef.	t	P > t	Number of obs	R-squared
ATL	0.6952467	1.73	0.086	117	0.0314
BOS	0.2824169	1.28	0.203	117	0.0084
CHI	0.4123118	1.46	0.148	117	0.0159
CLEV	0.2437659	1.29	0.199	117	0.0109
DAL	0.0822909	0.21	0.836	117	0.0004
HOU	-0.2708976	-0.63	0.528	117	0.0034
LA	0.9024355	1.79	0.077	117	0.0185
MIA	0.3186716	0.76	0.45	117	0.0067
NYC	0.3531133	1.08	0.282	117	0.0095
PHIL	0.3448896	1.06	0.293	117	0.0099
PITT	0.0982773	0.47	0.637	117	0.0021
SF	0.6321952	1.86	0.065	117	0.013

In Boston, Chicago, Cleveland, Dallas, Houston, Miami, New York City, Philadelphia, and Pittsburgh, there was no statistical significance in the relationship between changes in the local unemployment rate and the favorability of buying versus renting housing. There may be a number of explanations for this result that can range from not following a long enough time period or a disconnect between the housing market and job market in those locations. When there is a disconnect between the local housing market and the local macroeconomic fundamentals, however, the area may be at a higher risk for experiencing a housing bubble in the future.

Table 3 presents each of the individual regression results for changes in local economic conditions and the BH&J index. In San Francisco, there is statistical significance at the 5% level. The negative relationship between economic conditions and the BH&J index means it is more favorable to buy housing when there is an increase in the economic

conditions index. It is expected that buying is more favorable than renting when the economy is growing because the cost of buying and renting increase as the economy grows. So, having a mortgage payment is more beneficial because the cost of rent will constantly grow as the mortgage cost will stay fixed. In addition, if someone owns a house while the economy is growing, their house will be increasing in value, raising their wealth creation, which the BH&J index factors into their index.

**Table 3: Economic Conditions to BH&J**

	Coef.	t	P > t	Number of obs	R-squared
ATL	-0.0379388	-0.26	0.794	94	0.0013
BOS	0.1608642	1.15	0.255	97	0.0117
CHI	0.0259601	0.18	0.859	88	0.0006
CLEV	-0.00187	-0.02	0.985	79	0
DAL	-0.0030685	-0.51	0.611	100	0.0002
HOU	0.0067683	0.05	0.959	81	0
LA	-0.0981256	-1.44	0.152	91	0.0186
MIA	0.0042244	0.09	0.928	73	0.0001
NYC	0.0361233	0.48	0.636	83	0.0023
PHIL	-0.0675077	-1.3	0.198	91	0.0092
PITT	-0.0002155	0	0.997	70	0
SF	-0.1416207	-2.13	0.036	92	0.0185

In Atlanta, Boston, Chicago, Cleveland, Dallas, Houston, Los Angeles, Miami, New York City, Philadelphia, and Pittsburgh, however, there is no statistical significance between economic conditions and favorability to buy or rent. Not finding a statistically significant relationship was surprising but could be due to having generally good economic conditions over most of the period of time in which data was available for this study. In general,

however, a disconnect between the local economic conditions and the relative affordability and return to housing markets is not a good sign. That would call into question the validity of all models of housing markets that rely on economic fundamentals. In other words, detecting a housing bubble in these markets would become much more difficult.

### **Conclusion**

The purpose of this study was to find any direct correlation between the prices in real estate to the overall health of the economy and if that knowledge would be a good predictor for investors in real estate. The expectation was that in 2008 as the economy improved, home prices moved up significantly faster than rent prices, making renting more desirable. In using that thinking, if by looking at the BH&J index and renting became far more desirable than buying past its normal range, it could be a sign of a soon to drop housing market due to buying real estate being overpriced. If the price of renting was really desirable, then a correction in housing prices should occur to bring the ratio back down into normal range and an economic correction could occur as well. Also, as economic conditions growth and unemployment growth slowed, the housing prices should follow the trend.

The outcome of this study was not the expected outcome; however, the results are useful to take into consideration when looking at real estate investments or personal real estate choices. For the majority of the MSAs, there was no significant correlation between economic conditions and unemployment with the BH&J index. So, when making investment decision in residential real estate, looking at the overall health of the local economy may be helpful in making a choice; however, it should not be a strong factor in the overall decision because it does not have a correlation in the majority of areas. However, in certain MSAs, like Atlanta, Los Angeles, and San Francisco, there was a significant correlation between the

economic conditions and unemployment with the BH&J index. In Atlanta, Los Angeles, and San Francisco, unemployment rates had significant correlation to the BH&J index, meaning that you could make a strong assumption that when the unemployment rate rises in these MSAs, that it would be a better choice to rent property, rather than buy a property, because its value very likely will be dropping in the future. Only in San Francisco was there a significant correlation between economic conditions and the BH&J index. McCarthy and Peach (2004) stated in their research that even during a recession, home prices only decline moderately; however, on the east and west coast, weak fundamentals can have a greater effect because of the inelastic supply, strong price appreciation, and historic volatility. So, it is not entirely surprising that Atlanta, San Francisco, and Los Angeles are impacted more by the overall economy than some of the other MSAs tested. Another way to say it is that during this time period, housing markets may be less sensitive to macroeconomic measures and more sensitive to microeconomic factors like supply and demand.

As seen by some of the MSAs in this study, this method of evaluating the overall market of an area can be useful, but it won't always be significant. This analysis can be done on an area by area basis to see if there is any significant correlation between the price to buy vs rent and the unemployment rate and economic conditions. If there is any significant correlation in the areas one is looking at investing in, they should consider the factors significantly in the decision process.

The process outlined in this study can be used across different economic factors as well to find other correlations that may exist within the housing market of an area. As seen in this study, major cities in California seem to be impacted more by unemployment rates than major cities in other states. This would contribute to the field on finance by helping

academics and professionals find accurate ways to predict abnormal fluctuations in the buy vs rent index which could prevent either another real estate bubble or at least save informed investors from losing a significant portion of their investments.

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