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## Exploring the Impact of Stock Market Performance on the Real Estate Market

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**Exploring the Impact of Stock Market Performance  
on the Real Estate Market**

**by**

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**Advisor: Dr. Dobrina Jandik**

**An Honors Thesis in partial fulfillment of the requirements for the degree Bachelor of  
Science in Business Administration in Finance and Accounting.**

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**April 1, 2022**

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## **Introduction**

Over the course of history, investors have invested their capital into both the real estate market and the stock market in hopes of generating large returns. These markets offer many different benefits when compared to each other. For example, the real estate market offers benefits such as a steady cash flow, long-term security, and protection against inflation. The stock market also has many benefits to offer like liquidity, tax advantages, and diversification. Although these markets seem very distinct, it is important to research the interactions between these two markets.

This paper goes on to analyze the impact of stock market performance on the real estate market. This is done through the analysis of the recent performance of the stock market, real estate market, and key indicators of both markets. The goal of this paper is to inform the reader of potential trends in the real estate market based on key indicators that play a large role in the stock market's performance in order to make more knowledgeable investments.

## **Literature Review**

Past studies have conducted research to understand the correlation between the stock market and real estate market (Dieci, 2018, Schmitt, 2018, Westerhoff, 2018, Okunev, 1997, Wilson, 1997). These studies use various forms of analysis such as regression, time series analysis, causality tests, etc. However, one thing tends to remain constant between them. Many of the studies were originally conducted to test the wealth effect theory. This theory states that as households become wealthier due to increased asset values, they tend to invest more in other assets like property. The rationale behind the wealth effect theory proclaims that when stock prices increase, households will rebalance their portfolios and have a tendency to sell stocks in order to buy other assets like real estate.

These studies have shown the wealth effect theory to be valid in many developed and emerging markets in both the short and long-term. Examples of this can be seen when strong evidence for long-term support for the wealth effect was found in Germany in 2017, and short-term support for the wealth effect theory was found in the UK in 2017 (Refai, 2021). Other reports have also shown support for the theory in various other countries, showing this is an international effect (Kakes, 2004, Den E, 2004). These studies have also noted that the wealth effect theory is more prevalent in booming market periods where the stock market is performing well. The studies previously mentioned analyzed short-term data, long-term data, data from many different markets across the world, and utilized numerous data analysis methods. In spite of the many unique research techniques, most of these studies came to the similar conclusion that the performance of the stock market does have a significant impact on the performance of the real estate market.

After noting past research, many studies have looked at the performance of the stock market and the real estate market as a big picture. Few of these studies have drilled down into the factors that impact the performance of both of these markets (Quan, 1999, Sheridan 1999).

This paper will go on to analyze these underlying drivers to understand what truly impacts these markets to find the root cause for the wealth effect.

## **Data and Methodology**

The data gathered in this thesis includes the median housing price per square foot for properties in the United States, the Dow Jones Industrial Average close, inflation, real interest rate, unemployment rate, real GDP, stock market volatility, the consumer confidence index, and the consumer price index. Each point of datum collected in these fields is on a monthly basis. This was done to help identify trends and create models. The median price per square foot for properties was chosen to represent the performance of the real estate market because it is resistant to buyer's and seller's markets. The value of homes can have drastic pricing swings depending on what kind of market the housing market is currently in. This can cause the data to become skewed and trends to become unclear. The Dow Jones Industrial Average was chosen to represent the performance of the stock market because it includes many of the major sectors of the economy while also being a good benchmark of stock market trends. Inflation, real interest rate, unemployment rate, real GDP, the stock market volatility index, the consumer confidence index, and the consumer price index were all chosen for analysis because they are key indicators that play a large role in the performance of both the stock market and the real estate market.

The most recent available data was gathered for each field of data mentioned in the paragraph above. More specifically, the data gathered for analysis in this paper is from July 1, 2016 through December 1, 2020. This is done to ensure the data is relevant and prevents the analysis of obsolete trends or impacts that may no longer exist. It is important to have a current analysis to represent the stock market's impact in times of high economic volatility like we are seeing now with Covid-19. This ensures the research is relevant and can be applied to our modern-day economy.

Three methods of data analysis were used for this paper. The first way the data was analyzed was by using time series analysis. This helped show the trend of each variable over time as well as provide information on the dependencies of some variables on one another. This can be seen in figures 2 through 10 in the appendix. The second form of analysis used in this paper was a correlation matrix. The correlation matrix shows which variables move in tandem with each other to help reveal which variables are good indicators of possible trends in the real estate and stock market. I've highlighted strong positive correlations (amounts between 0.7 and 1) in the data green and strong negative correlations (amounts between -0.7 and -1) red. Moderate correlations (amounts between 0.50 to 0.69 and -0.50 to -0.69) and weak correlations (amounts between 0 to 0.49 and 0 to -0.49) will not be highlighted. This can be seen in figure 1 in the appendix. The final form of analysis used to analyze the data was percent change analysis. This analysis allowed for a deep dive into the data to see the changes in each factor on a month-to-month basis.

## Results

### *Median Housing Price Per Square Foot*

This section of the data was chosen to represent the performance of the real estate market ([fred.stlouisfed.org/series/MEDLISPRIPERSQUFEEUS](https://fred.stlouisfed.org/series/MEDLISPRIPERSQUFEEUS)). The general trend for this section of data was to gradually increase over the 4.5 years of data collected. Time series analysis for this variable shows both the data and trendline for this section of data. The blue line in figure 2 represents the data, and the orange line represents the trendline. The percent change analysis also supports this with an average monthly percent change of 0.59%. On average, the housing price per square foot in the United States increased by 0.59% each month.

The correlation matrix revealed a few strong positive correlations for the median price per square foot. The first strong positive correlation was with the DJIA close. The correlation matrix shows that these two variables have a correlation amount of 0.8031. This represents a strong positive correlation between the two variables helping show that they move in tandem with one another. This helps show support for the impact the stock market performance has on the real estate market. The strong positive correlation also helps reinforce the wealth effect theory. As stock performance increases, real estate prices also increase due to a rise in demand. The increased value of stock assets allows for the purchase of other assets such as real estate. The second strong positive correlation was with the consumer price index. These two variables have a correlation amount of 0.9373. This shows a very strong positive correlation between the two variables. Consumer price index helps measure the change in prices paid for goods and services. In the real estate market, consumer price index is a good indicator for rental prices. If consumer price index increases, rent will also most likely increase. This could help explain the positive correlation between the variables. If rent prices are increasing, this could cause a larger demand for homes, causing an increase in the median price per square foot for a home.

Median price per square foot also had a positive moderate correlation with stock market volatility at 0.6239. It had a negative moderate correlation with the consumer confidence index at -0.6944. There were weak correlations with the variables inflation (-0.4168), real interest rate (0.2444), unemployment rate (0.4703), and real GDP (0.4249). These variables still play a role in impacting the median price per square foot, just to a lesser degree when compared to the other variables.

### *Dow Jones Industrial Average Close*

This section of the data was chosen to represent the performance of the stock market ([finance.yahoo.com/quote/%5EDJI/history?period1=949276800&period2=1640908800&interval=1mo&filter=history&frequency=1mo&includeAdjustedClose=true](https://finance.yahoo.com/quote/%5EDJI/history?period1=949276800&period2=1640908800&interval=1mo&filter=history&frequency=1mo&includeAdjustedClose=true)). The trend for this section of data was to also gradually increase over time. This can be seen through time series analysis on figure 3. The Dow Jones Industrial Average increased slightly faster than the median price per square foot. Percent change analysis helps show this. On average, the Dow Jones Industrial Average increased by 1.07% each month.

The correlation matrix helped reveal the relationship this variable has with other variables. The first strong positive correlation was with the median housing price per square foot variable. The correlation between these two variables was 0.8031. This relationship was previously explained in the median housing price per square foot section. The Dow Jones Industrial Average close also showed a strong positive correlation with the consumer price index. The correlation between these two variables was found to be 0.8864. As mentioned earlier, consumer price index helps measure the change in price paid for various goods and services. As consumer price index rises, consumers are spending more on products. This is reflected in the revenue of companies, helping to drive stock prices higher. This in turn increases the Dow Jones Industrial Average close, causing these two variables to move with each other.

The Dow Jones Industrial Average close had a positive moderate correlation with real GDP at 0.6730. There were also weak correlations with the variables inflation (-0.024), real interest rate (0.4110), unemployment rate (0.1180), stock market volatility (0.2846), and the consumer confidence index (-0.2562).

### *Inflation*

Inflation is defined as an upward movement in the prices of goods and services which results in a decrease in the purchasing power of currency. Inflation was chosen as a variable because it plays a big role in both the real estate market and the stock market ([usinflationcalculator.com/inflation/historical-inflation-rates/](https://www.usinflationcalculator.com/inflation/historical-inflation-rates/)). In the real estate market, inflation has many far-reaching effects. For example, inflation can lead to higher mortgage rates giving buyers less purchasing power in the real estate market. Inflation also causes the cost of building homes to increase through increased wages, more expensive supplies, and increased land prices. These extra charges are then reflected in the increased housing prices, giving buyers less purchasing power. In the stock market, rising inflation can lead to lower returns, lower dividends, and higher interest rates.

The trend for this section of data was to decrease over time. This can be seen through time series analysis on figure 4. However, the percent change analysis did not reflect this same result. According to the percent change analysis, inflation increased by 10.71% on average each month. The main reason for this discrepancy is due to the large volatility seen starting in 2020. During 2020, inflation saw massive increases and decreases. This rapid change can be seen in the data. Covid also started at the beginning of 2020, which is the main reason for this extremely volatile state of inflation.

The correlation matrix helped to show the relationship this variable has with the other variables. Inflation had a strong negative correlation with unemployment rate at -0.7493. This shows that as inflation increases, unemployment decreases. This concurs with previously observed trends. It has been noted that at times of high unemployment rates, inflation decreases and sometimes even deflation occurs. The second strong correlation occurs with consumer confidence. Inflation had a strong positive correlation with consumer confidence at 0.7823. This is odd because usually consumer confidence will have a negative correlation with inflation.

As prices rise, consumer purchasing power is decreased also causing a decrease in confidence. While doing percent change analysis, consumer confidence decreased on average each month, while inflation increased, which reflects this expected relationship between the two variables. However, the large spikes and dips from inflation in 2020 mentioned earlier could be to blame for this positive correlation between the two variables.

Inflation had also had a negative moderate correlation with stock market volatility at -0.6449. The weak correlations related to inflation were real interest rate (-0.0375), DJIA close (-0.0236), real GDP (0.3738), and the consumer price index (-0.2301).

### *Real Interest Rate*

Real interest rate is an important factor that largely impacts the real estate market. Real interest rate represents the real cost to borrow funds because it has been adjusted for inflation. This plays a big role in the purchasing of homes. When interest rates rise, it costs more to purchase a home due to the increased borrowing rates. Due to this, demand for homes drops, and homes can take longer to sell having a negative impact on the real estate market.

The trend for this section of data was to very slowly increase over the duration of the data ([data.worldbank.org/indicator/FR.INR.RINR?end=2020&locations=US&start=1961&view=chart](https://data.worldbank.org/indicator/FR.INR.RINR?end=2020&locations=US&start=1961&view=chart)). Figure 5 helps show this through time series analysis. Percent change analysis shows that real interest rate increased on average by 0.2% each month. This concurs with the findings through time series analysis for this portion of data.

Real interest rate didn't have any strong positive or negative correlations as seen in figure 1. However, there was a moderate positive correlation with real GDP at 0.6292. Many factors go into real GDP like personal consumption, business investment, government spending, and net exports. These two factors likely moved in tandem with one another due to real interest rate staying fairly constant. Usually, as real interest rate rises, real GDP will fall due to increased prices. However, the economic growth was not stunted for real GDP due to prices remaining fairly constant during this time period. There were also many weak correlations associated with real interest rate. The weak correlations related to this variable were median housing price per square foot (0.2444), DJIA close (0.4110), inflation (-0.0375), unemployment rate (-0.2883), stock market volatility (-0.0280), consumer confidence index (0.1770), and the consumer price index (0.4026).

### *Unemployment Rate*

Unemployment rate can serve as a key indicator for the performance of both the stock market and the real estate market. In the stock market, a high rate of unemployment could reflect a weak economy. This in turn will cause stock prices to drop. In the real estate market, high levels of unemployment signal a lower expected future income for many people. Due to this, there is a much lower demand for housing when income is unstable. The lower demand for housing can cause a decrease in the real estate market overall.



The pattern for this portion of the data was to increase over time ([bls.gov/charts/employment-situation/civilian-unemployment-rate.htm](https://bls.gov/charts/employment-situation/civilian-unemployment-rate.htm)). This is mainly due to the massive spike of unemployment seen in 2020. Figure 6 helps to display this. Prior to 2020, unemployment was on the decline, but this rapid rise caused unemployment to trend upwards over this period of time. This is also reflected through percent change analysis. Through percent change analysis, it was found that unemployment rate on average increased by 2.95% each month.

Unemployment rate had many strong correlations. The first strong correlation is noted with inflation. This was a strong negative correlation at  $-0.7493$  and mentioned earlier in the inflation section. The second strong correlation was with stock market volatility. There was a strong positive correlation between these two variables at  $0.7877$ . These two variables moved in tandem with one another mostly due to uncertainty and insecurity. If unemployment rates rise, income insecurity for individuals causes many to sell off their stocks causing a decrease in the value of stocks. Uncertainty about the economy can also have a similar effect. Investors might worry that the rising rates of unemployment could be a signal for a weak economy. If less people are working, companies are producing less, ultimately impacting their revenue. The third strong correlation involves the consumer confidence index. There was a strong negative correlation between these two factors at  $-0.8768$ . This shows these two factors move in opposite directions of each other. If unemployment rates rise, consumer confidence decreases. Once again this is due to insecurity. An individual without a job has much more income insecurity when compared to one with a job. Due to this insecurity, consumer spending drastically decreases in times of high unemployment, causing a decrease in consumer confidence.

Unemployment rate was also seen to have a moderate negative correlation with real GDP at  $-0.5351$ . Lower levels of people working means decreased productivity and output for companies. This often negatively impacts real GDP. As mentioned earlier, if unemployment is on the rise, consumers will often spend less due to a decrease in consumer confidence, also negatively impacting real GDP. The weak correlations associated with unemployment rate were median housing price per square foot ( $0.4703$ ), DJIA close ( $0.1180$ ), real interest rate ( $-0.2883$ ), and the consumer price index ( $0.2959$ ).

### *Real GDP*

Real GDP is a measurement of a country's economic output that has been adjusted for inflation. It was important to use real GDP instead of nominal GDP so that the variable could be singled out and analyzed on its own. Real GDP can provide great insight into the health and current state of the economy. In general, a rise in real GDP is a sign of a strong economy. This can have a large impact on both the real estate market and the stock market. A strong economy can cause these two markets to flourish.

The trend for this section of data was to steadily increase over time ([fred.stlouisfed.org/series/GDPC1](https://fred.stlouisfed.org/series/GDPC1)). This can be seen through time series analysis on figure 7. Despite the large dip in mid-2020, real GDP quickly recovered to continue with the expected

trend line for this section of data. The same conclusion is drawn through percent change analysis. It was found that real GDP increased by 0.12% on average each month.

Real GDP didn't have any strong positive or negative correlations related to the other variables used in this study. There were moderate correlations with the Dow Jones Industrial Average close (0.6730), real interest rate (0.6292), unemployment rate (-0.5351), and the consumer price index (0.6118). The moderate correlations with real interest rate and unemployment rate were previously explained in their respective sections. The positive moderate correlation with the DJIA close follows the expected relationship between these two variables. As real GDP increases, so does the DJIA close. A higher economic output has many benefits on impacting the stock market and can be seen through rising stock prices. The positive moderate correlation between consumer price index and real GDP also compliments each other well. The consumer price index is a measure of the average change over time in prices paid for goods and services. When the consumer price index rises, consumers are on average spending more for their goods and services. This will increase the personal consumption aspect of real GDP, ultimately increasing real GDP. This explains why these two variables would move in tandem with one another. The weak correlations with real GDP were median housing price per square foot (0.4249), inflation (0.3738), stock market volatility (-0.1482), and the consumer confidence index (0.2729).

### *Stock Market Volatility*

Stock market volatility can play a large role in the performance of the stock market. Investments in the stock market are considered riskier in times of high volatility. This can cause investors to lose interest in investing in the market during this time, and some are inclined to take their assets out of the market all together. Overall, this causes stock prices to decline having a negative impact on the stock market. Times of extremely high volatility can also be a sign of a potential upcoming recession.

This section of data had a tendency to increase over the observed timeframe ([cboe.com/tradable\\_products/vix/vix\\_historical\\_data/](http://cboe.com/tradable_products/vix/vix_historical_data/)). Figure 8 in the appendix helps to show this trend through time series analysis. Percent change analysis draws this same conclusion. It was found that stock market volatility increased by 4.10% on average each month.

There was a strong negative correlation with the consumer confidence index at -0.7855. As stock market volatility rises, consumer confidence decreases. The consumer confidence index helps to measure how hopeful consumers are about their financial situation. High levels of volatility in the stock market can leave individuals uncertain about the future causing this decrease in confidence. As investments become riskier, consumers become more fearful of their investments. There was another strong correlation between stock market volatility and unemployment rate. These two factors had a positive correlation at 0.7877. It has often been noted that unemployment tends to rise in periods of high volatility. The data has followed this expected course during this time frame. Uncertainty breeds more uncertainty. This is also noted in the previous section about unemployment rate.

Stock market volatility had many moderate correlations. These correlations include median housing price per square foot (0.6239), inflation (-0.6449), and the consumer price index (0.5304). The relationship between stock market volatility and the median housing price per square foot is especially interesting. The results suggest that when market returns are uncertain and risk increases, investors turn to more secure assets like property. Housing is less prone to volatility when compared to the stock market, which can make property a more attractive investment in times of high volatility. This can be seen through the increase in housing prices during high periods of stock market volatility. The weak correlations with stock market volatility were real interest rate (-0.0280), Dow Jones Industrial Average close (0.2846), and real GDP (-0.1482).

### *Consumer Confidence Index*

The consumer confidence index is used to measure how hopeful or doubtful consumers are when it comes to their expected financial situation. Consumer confidence can be important to understanding the general feeling consumers have towards the market. A hopeful market can cause increases in both the stock market and real estate market while a doubtful market can cause decreases in each of these markets. The general trend for this section of data was to decrease over time ([data.oecd.org/leadind/consumer-confidence-index-cci.htm](http://data.oecd.org/leadind/consumer-confidence-index-cci.htm)). This can be seen on figure 9 through time series analysis. Percent change analysis also supports this trend. Consumer confidence was seen to decrease each month by .03% on average.

There were many strong correlations, both positive and negative, associated with consumer confidence. These include inflation (0.7823), unemployment rate (-0.8768), and stock market volatility (-0.7855). Each of these strong correlations have been previously touched on in their respective sections. The moderate correlations with the consumer confidence index include median housing price per square foot (-0.6944), and the consumer price index (-0.5016). The moderate negative correlation with median housing price per square foot is important to understand for its effect on the real estate market. Housing investments in general are considered to be more risk averse when compared to investments in the stock market. When consumer confidence is on the rise, it is usually a sign of a healthy economy with little doubt or insecurity for the future. This hopefulness in the economy can cause many investors to put their investments into riskier assets such as the stock market. Ultimately, this means less investment in real estate and a decline in the real estate market. This way of thought can be used to explain the negative correlation between consumer confidence and median housing price per square foot. The weak correlations related to the consumer confidence index include real interest rate (0.1770), DJIA close (-0.2562), and real GDP (0.2729).

### *Consumer Price Index*

Consumer price index is used to measure the change in prices paid for goods and services by consumers. Consumer price index can have a large impact on both the real estate market and

the stock market. As mentioned earlier, consumer price index can impact rental prices and the ability a consumer has to purchase a home due to its change in price. The consumer price index can also be used to understand movement in the stock market because consumer price index impacts wages, retirement benefits, and other economic indicators.

The trend for consumer price index was to increase over time (bls.gov/regions/mid-atlantic/data/consumerpriceindexhistorical\_us\_table.htm). This can be seen on figure 10 through the use of time series analysis. Percent change analysis also supports this conclusion. From percent change analysis, consumer price index was seen to increase by 0.15% on average each month.

Consumer price index was found to have strong positive correlations with median housing price per square foot (0.9373) and the DJIA close (0.8864). Both of these correlations have been previously explained in their corresponding sections. The moderate correlations with consumer price index include real GDP (0.6118), stock market volatility (0.5304), and the consumer confidence index (-0.5016). The moderate correlation with real GDP has also been touched on in its section. Both moderate correlations with stock market volatility and the consumer confidence index can be explained through changes in price. As prices rise, increasing consumer price index, stocks tend to become more volatile and consumer confidence decreases. Consumers have less purchasing power when prices rise, causing the decrease in confidence. The supply and demand for stocks tend to shift in times of rising prices, which leads to the increased volatility. The weak correlations with consumer price index include inflation (-0.2301), real interest rate (0.4026), and unemployment rate (0.2959).

### **Constraints**

This paper reports the time trend and correlation of each variable on a national level. In particular, the median housing price per square foot is based across the United States. Median housing price per square foot can vary from state to state or even from city to city. The relationships and impacts for each variable found in this paper might change when analyzed at a more in-depth state or city level. The data gathered for each variable in this paper is current. To be specific, the data in this paper is from July 1, 2016 through December 1, 2020. This is done to make sure the data is relevant in our current time of high economic volatility. However, this may not represent the long-term trends and impacts of each variable analyzed in this paper. In addition, median housing price per square foot and the Dow Jones Industrial Average close were selected as the variables to represent the performance of the real estate market and stock market. Other variables could be used to represent the performance of these markets, which might have an impact on the overall findings. Future research could take these differences into account to explore the influence on a smaller level or use a wider span of data to explore long-term impact and trends.

## **Conclusion**

The real estate market and stock market are two unique markets that provide investors with many distinct benefits, but it can be seen that these markets play a role in impacting one another. This paper has shown this through the analysis of stock market performance, real estate market performance, and the key factors that impact both of these markets. Through the use of time series analysis, correlation, and percent change analysis, it can be seen that some variables have more influence than others on the real estate market. The two variables with the most impact on the real estate market are the consumer price index and the Dow Jones Industrial Average close. While these variables provided the most support for influence, each variable analyzed in this paper plays a role in the performance of the real estate market. Understanding each factor with respect to its influence on the real estate market is crucial in order to make knowledgeable investments. Therefore, it can be concluded that the performance of the stock market does have a significant impact on the performance of the real estate market.

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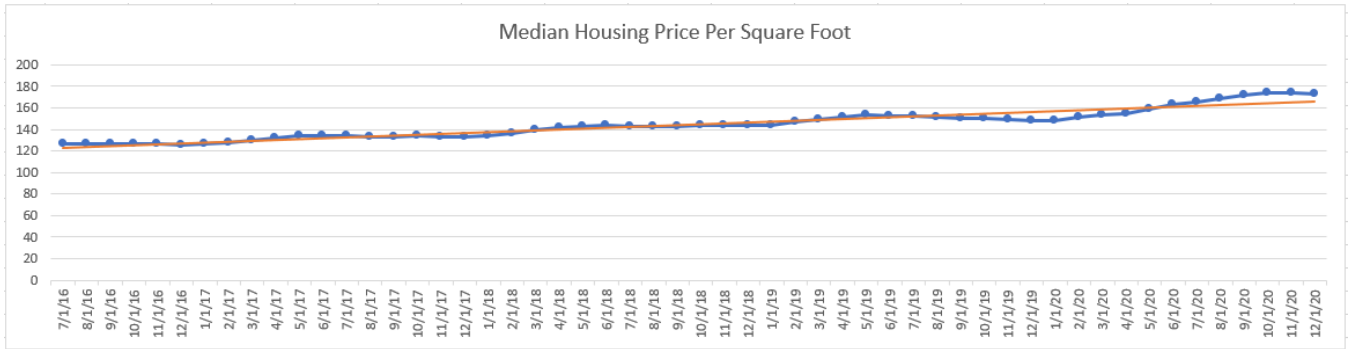
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# Appendix

## Figure 1

|                                      | Median Housing Price Per Square Foot | Inflation    | DJIA Close   | Real Interest Rate | Unemployment Rate | Real GDP     | Stock Market Volatility | Consumer Confidence Index | Consumer Price Index |
|--------------------------------------|--------------------------------------|--------------|--------------|--------------------|-------------------|--------------|-------------------------|---------------------------|----------------------|
| Median Housing Price Per Square Foot | 1                                    |              |              |                    |                   |              |                         |                           |                      |
| Inflation                            | -0.4167763                           | 1            |              |                    |                   |              |                         |                           |                      |
| DJIA Close                           | 0.803080217                          | -0.023588699 | 1            |                    |                   |              |                         |                           |                      |
| Real Interest Rate                   | 0.244372576                          | -0.037530846 | 0.411027458  | 1                  |                   |              |                         |                           |                      |
| Unemployment Rate                    | 0.470266172                          | -0.749347168 | 0.11797351   | -0.288253537       | 1                 |              |                         |                           |                      |
| Real GDP                             | 0.42485787                           | 0.373839628  | 0.673007975  | 0.629235075        | -0.535074986      | 1            |                         |                           |                      |
| Stock Market Volatility              | 0.623938084                          | -0.644928348 | 0.284644667  | -0.027970225       | 0.787694441       | -0.148216218 | 1                       |                           |                      |
| Consumer Confidence Index            | -0.694430652                         | 0.782302218  | -0.256245291 | 0.177007234        | -0.67684582       | 0.272873538  | -0.78554824             | 1                         |                      |
| Consumer Price Index                 | 0.937246388                          | -0.230112326 | 0.886359134  | 0.402613634        | 0.2959113         | 0.611778506  | 0.53043852              | -0.501641891              | 1                    |

## Figure 2



## Figure 3

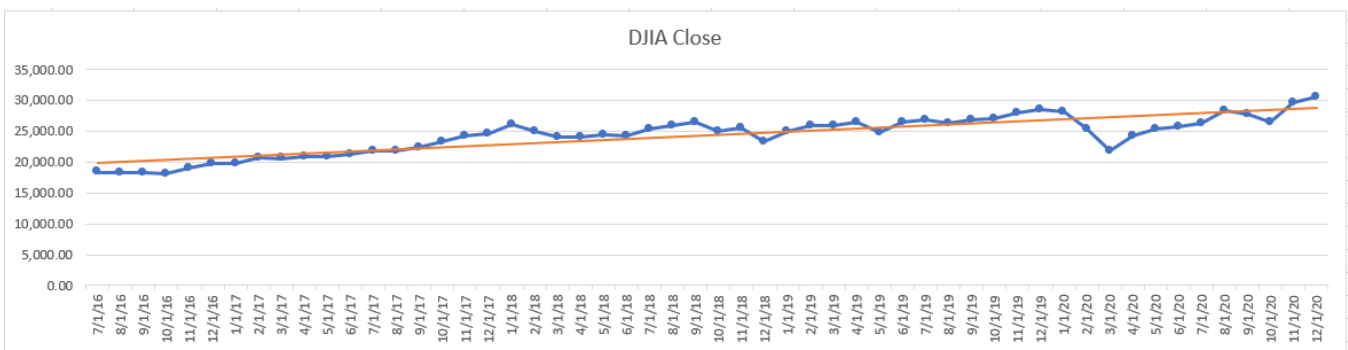




Figure 4

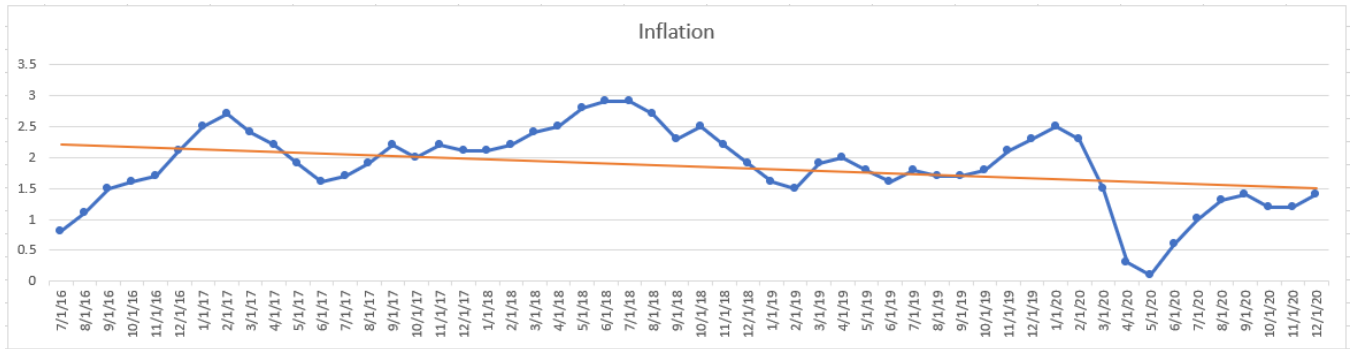


Figure 5

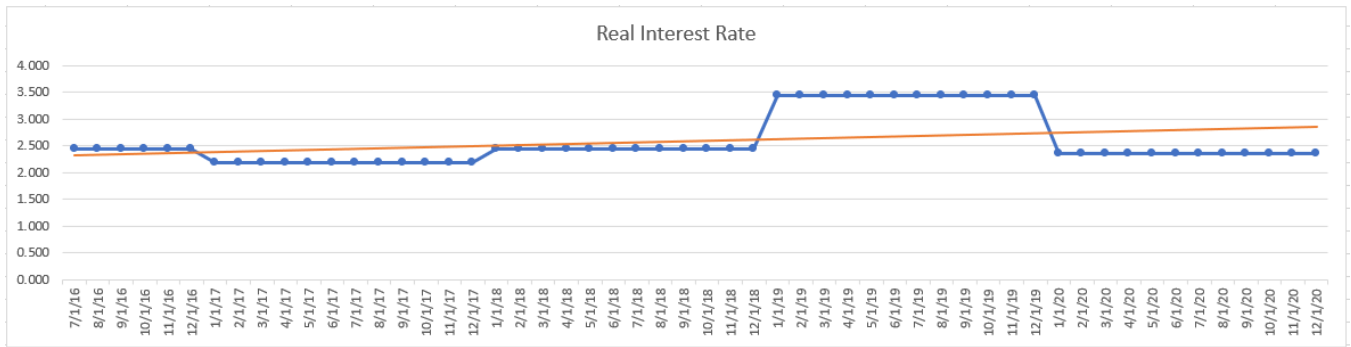


Figure 6

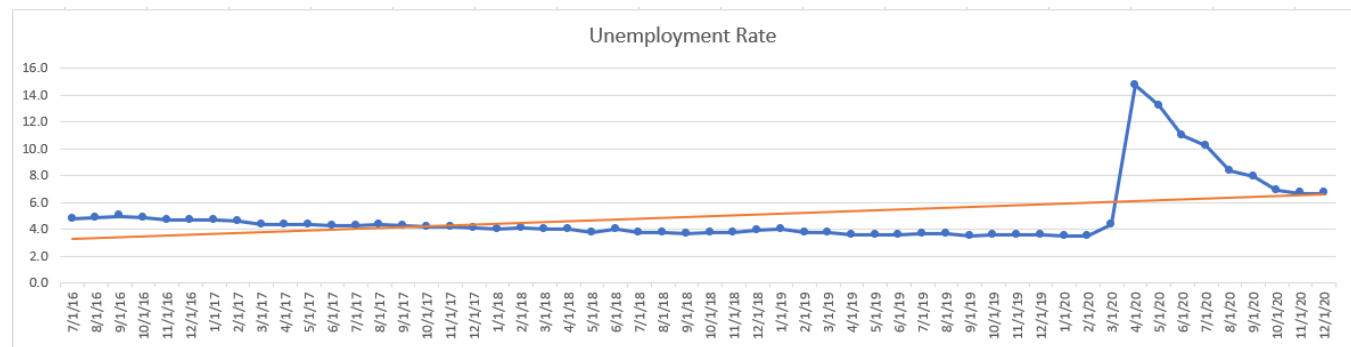


Figure 7



Figure 8

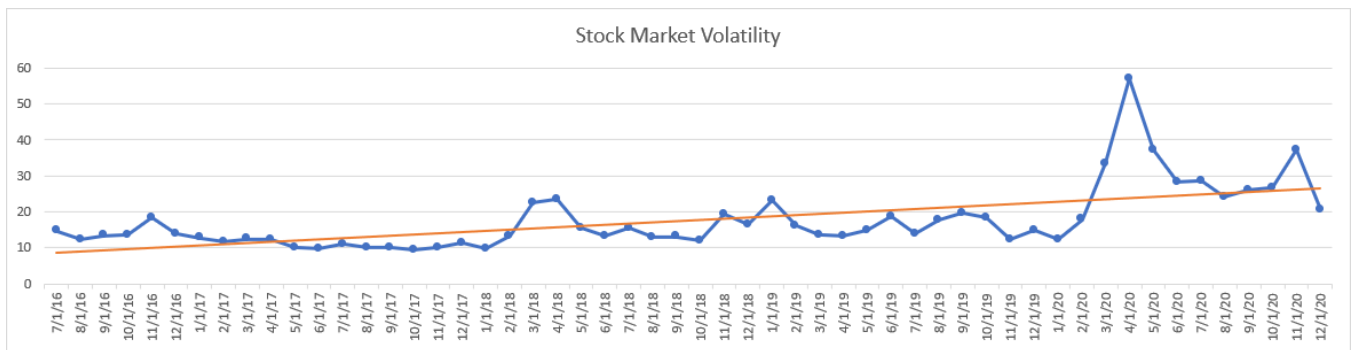


Figure 9

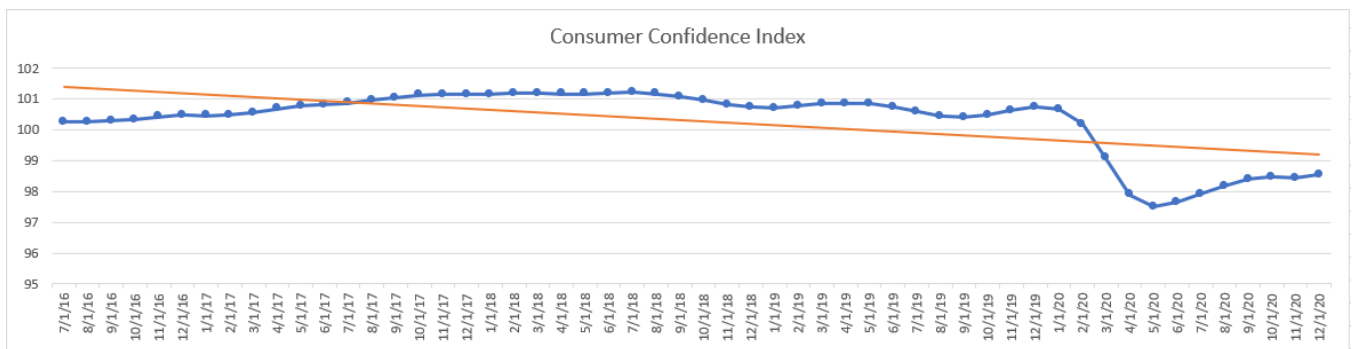


Figure 10

