Juhi, Kesha, Hima, Austin, Lora

UNC Data Analytics Bootcamp

Project 1 Analysis: Housing Market

1. **Is there a correlation between house price and mortgage rate?**

There is no correlation between house price and mortgage rate based on a scatter plot created from the Kaggle dataset on house price and mortgage rate. Since the r-squared value (-0.007304294665406224) is so close to 0 for this scatter plot, there is no linear correlation between the x- and y-variables.

1. **How are the following macroeconomic factors (i.e., unemployment rate, real disposable income, House Price Index (HPI), mortgage rate, inflation, Consumer Price Index (CPI), GDP) associated with each other?**

**Unemployment Rate & Real Disposable Income**

Yearly data from 1975 to 2021 showed that there is a low negative correlation between the unemployment rate and real disposable income. The results showed a r-value of -0.34. In other words, as income increases, unemployment decreases and as income decreases, the unemployment increases. Looking at each macroeconomic factor individually, the real disposable income increases over time while the unemployment is variable. Therefore, there are likely outside macroeconomic factors impacting the correlation. Further exploration into other macroeconomic factors is recommended for future research.

**CPI and HPI + Unemployment Rate and HPI**

There is a strong correlation between Consumer price index and house price index. This follows what would be expected, as consumer goods increase in cost we would expect house prices to also increase, However, it is worth noting that there has been approximately a 400% increase in CPI and over a 750% increase in HPI. There is no strong correlation between unemployment rate and any of the other macroeconomic factors, as it tends to fluctuate over time rather than steadily increase or decrease. It is worth noting that one would expect with a steady increase in CPI and HPI, the unemployment rate would decrease accordingly.

**Inflation and Mortgage Rate + GDP and HPI**

Although there exists a moderate correlation (0.32) between GDP and Mortgage rates, the correlation (-0.03) between GDP and the house price index is not directly apparent. However, it is worth noting that fluctuations in inflation and GDP can still have an impact on house prices. For instance, as inflation increases, individuals may opt to increase their spending, anticipating that their money will be worth less in the future. This could lead to a temporary surge in GDP as seen in the line graph (GDP vs. House price index), which might prompt future price hikes. It is also important to acknowledge that the effect of inflation may not be constant over time and can fluctuate in its impact. Furthermore, high inflation is associated with a gain in material costs, rendering construction and renovation of homes excessively expensive for building teams. This dynamic can lead to increased home prices for new constructions.

1. **What do our comparisons tell us, and how are they related to household income?**

While the dataset did include disposable income as a macroeconomic factor, household income tends to be a more accurate indicator of purchasing power, especially when it comes to housing. The dataset did not contain information on household income, but we were able to obtain it from the US Census Bureau’s website. We are able to see that over the last half century or so, HPI, CPI, GDP, and disposable income have increased at a fairly steady rate, albeit HPI at a steeper rate than the other macroeconomic factors. However, when we look at household income and adjust for inflation, it is clear to see the faux pas in unilaterally utilizing that data. Once adjusted for inflation, the median household income hasn’t increased even 3%, while CPI has increased over 400% and HPI has increased approximately 750%.

This disparity gives a number and a visual to an issue currently ongoing in the United States, as it has become increasingly more difficult to purchase a house. There are numerous societal implications this can, and currently is creating. As younger generations have a more difficult time becoming homeowners, marriage, children, and other aspects of life commonly associated with home ownership are also delayed. One might be able to argue that this is the greatest reason as to why the US population is currently below the replacement level, however, more data and research would be needed. As a whole, we can see there is a glaring disparity between the amount of spending power people currently have relative to the cost of goods and more specifically housing.