**Home Purchasing Forecasting: First Analysis Project**

**1. Introduction**

This project is about trying to understand the housing market by looking at what might influence people to buy homes. The idea is to see if we can predict how many homes people will buy in the future by studying what has affected home purchases over the last 60 years. This is our first time working on something like this, so we focused on learning the basics and applying them to see what I could find out.

**2. Problem Statement**

The main questions we wanted to explore are:

* **Historical Patterns**: Which factors have the strongest connection to the number of homes sold in the past 60 years?
* **Future Predictions**: What factors might be important in predicting how many homes people will buy in the future?
* **Before and After 2010**: Is there a noticeable difference in home buying before and after 2010?

These questions helped us focus on the key things that might influence home buying and see if we could make sense of them.

**3. Key Factors Analyzed**

We looked at several things that we thought might affect how many homes people buy. These include:

* **Student Loan Debt**: With more people taking out loans for college, we wondered if this debt might make it harder for them to buy homes.
* **Price of Homes**: we also looked at how the cost of homes might affect whether people decide to buy.
* **Household Income**: we thought that as people’s incomes go up, they might be more likely to buy a home.
* **Mortgage Rates**: Since mortgages are how most people pay for homes, looking that the interest rates on these loans might be a big factor.

**4. Hypothesis**

We hypothesized that **mortgage rates** would be the most important factor in determining how many homes people buy. The thinking was that if interest rates are low, more people might be able to afford to buy a home.

**5. Data Analysis and Findings**

**5.1. Student Loan Debt vs. Number of Homes Sold**

**What We Did**: We checked to see if there was a relationship between how much student loan debt people have and how many homes were sold. The correlation coefficient of -0.29.

**Findings**: This weak negative correlation suggests that while student loan debt might make it a little harder for people to buy homes, it's not a strong factor. There are likely other things that have a bigger impact.

**Conclusion**: Student loan debt doesn’t seem to be a major factor in whether people buy homes or not.

**5.2. Household Income and Home Purchases**

**What We Did**: Looked at whether people with higher incomes are more likely to buy homes. The correlation coefficient was 0.47, which is considered a weak positive correlation.

**Findings**: There’s some connection between income and home buying, but it’s not as strong as possibly thought it might be. This suggests that while higher income can help, other factors also play a role.

**Conclusion**: Income alone isn’t a strong predictor of whether people will buy homes.

**5.3. Mortgage Rates vs. Number of Homes Bought**

**What We Did**: We thought mortgage rates would be the biggest factor, so we checked the correlation. However, the R² value was close to 0, which means there wasn’t much of a relationship.

**Findings**: Mortgage rates don’t seem to be as important as expected. This might be because other factors, like the overall economy or how confident people feel, also matter a lot.

**Conclusion**: While mortgage rates are important, they don’t tell the whole story when it comes to predicting home purchases.

**5.4. House Prices**

**What We Did**: Checked how house prices affected home buying. Like with mortgage rates, the R² value was close to 0, showing a weak relationship.

**Findings**: The price of homes doesn’t seem to strongly predict how many homes will be bought. This suggests that other factors are likely to influence decisions more.

**Conclusion**: House prices matter, but they aren’t the main thing driving home purchases.

**6. Discussion**

From this project, we learned that predicting how many homes people will buy isn’t straightforward. Even though mortgage rates, income, and home prices are important, none of them alone can predict home buying trends well. The realization was that the housing market is influenced by many different things, and you need to look at all of them together to get a better understanding.

**7. Implications for Future Research**

This project showed us that there’s a lot more to learn. In the future, it would be interesting to look at other factors like job availability, changes in population, or how people feel about the economy. Using more advanced techniques, like machine learning, might also help in making better predictions.

**8. Conclusion**

Working on this "Home Purchasing Forecasting" project was a great learning experience. We found out that while factors like mortgage rates and income are important, they don’t give a complete picture by themselves. To really understand the housing market, you need to look at many different things together.