Analyzing the Impact of Inflation on Family Income and House Prices

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Abstract

This report aims to analyze the effects of inflation on family income and house sale prices in the United States. The data used in this analysis is sourced from the FRED Economic Data Database provided by the Federal Reserve Bank of St. Louis. The dataset includes information on the median sales price of houses, mean family income, and the inflation rate for the United States. Our primary research questions are focused on understanding how inflation influences the affordability of housing for families. Our proposal is to merge the datasets and use linear regression to predict house sale prices using income and inflation. This report discusses the data sources, methods, potential challenges, and limitations of the analysis.

Introduction

This report focuses on understanding how inflation affects family income and the affordability of houses. We will use data from the FRED Economic Data Database provided by the Federal Reserve Bank of St. Louis. We'll focus on three important datasets: Median Sales Price of Houses Sold in the US, Mean Family

Income in the US, and Consumer Price Inflation in the US. The analysis will span from 1953 to the present, and the Median Sales Price of Houses data is collected quarterly.

Methodology

To investigate the research questions, we followed the following :

- **Data Integration:** The first step involves merging the three datasets to create a unified dataset. This integration allows us to work with the data collectively and facilitates the use of a model to analyze the data.

- **Linear Regression:** We employ supervised learning, specifically linear regression, to predict house sale prices based on income in tandem with inflation. This method helps us understand the relationship between inflation, family income, and house prices.

Benefits of the Approach

This method offers several benefits:

- **Comprehensive Analysis:** Merging the datasets provides a comprehensive view of the factors affecting family income and house prices, considering both inflation and family income.

- **Prediction Capability:** Linear regression allows us to make predictions about house sale prices based on income and inflation. This information is valuable for understanding the changing affordability of housing.

Model Performance

In assessing the performance of our linear regression model, we encountered certain challenges previously mentioned. The small size of the datasets and the absence of important variables like cost of living and the number of incomes within a family did impact our analysis. However, we have obtained some meaningful insights from the model.

- **R2 Score:** Our model yielded an R2 score of 0.58. This metric indicates that 58% of the variance in house prices can be explained by the predictors (inflation-adjusted incomes). While this suggests a moderate level of explanatory power, it also implies that there are other factors not accounted for in our model.

- **Mean Absolute Error (MAE):** The MAE for our model is $29,308. This metric measures the average absolute difference between our predicted house prices and the actual house prices. The MAE gives us a sense of how far off our model's predictions are on average. In this case, it suggests that our model's predictions have an average deviation of approximately $29,308 from the actual house prices.

- **Coefficients:** In our model, we observed that the inflation coefficient is 479.8, while the Mean Family Income coefficient is 2.946. These coefficients are essential in understanding the impact of these variables on house prices. The inflation coefficient of 479.8 suggests that, for each unit increase in inflation-adjusted income, house prices increase by a factor of 479.8. On the other hand, the Mean Family Income coefficient of 2.946 implies that for each unit increase in mean family income, house prices increase by a factor of 2.946. These coefficients provide valuable information about the strength and direction of the relationships between these variables.

Graphs:

Actual House Price vs. Predicted House Price: The graph of actual house prices against predicted house prices will visually demonstrate how well our model aligns with the actual data. This comparison will help us identify any patterns or deviations in our predictions.
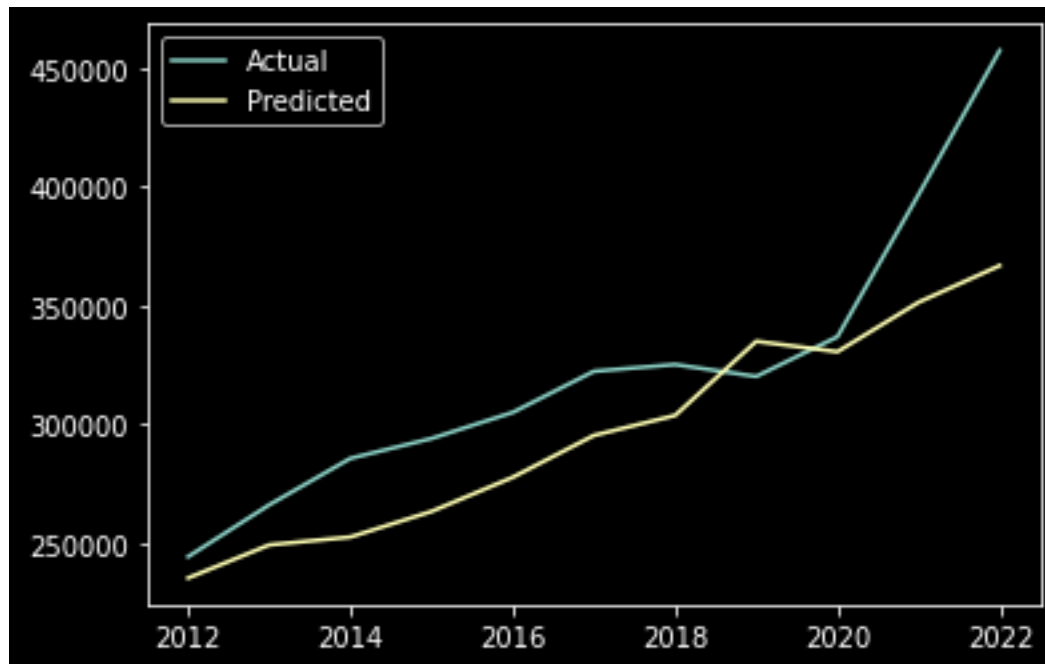
Figure 1: Actual vs Predicted House Price

2. House Price vs. Mean Family Income: This graph will depict the relationship between house prices and mean family income. It will help us understand how changes in family income influence house prices, as suggested by the Mean Family Income coefficient.
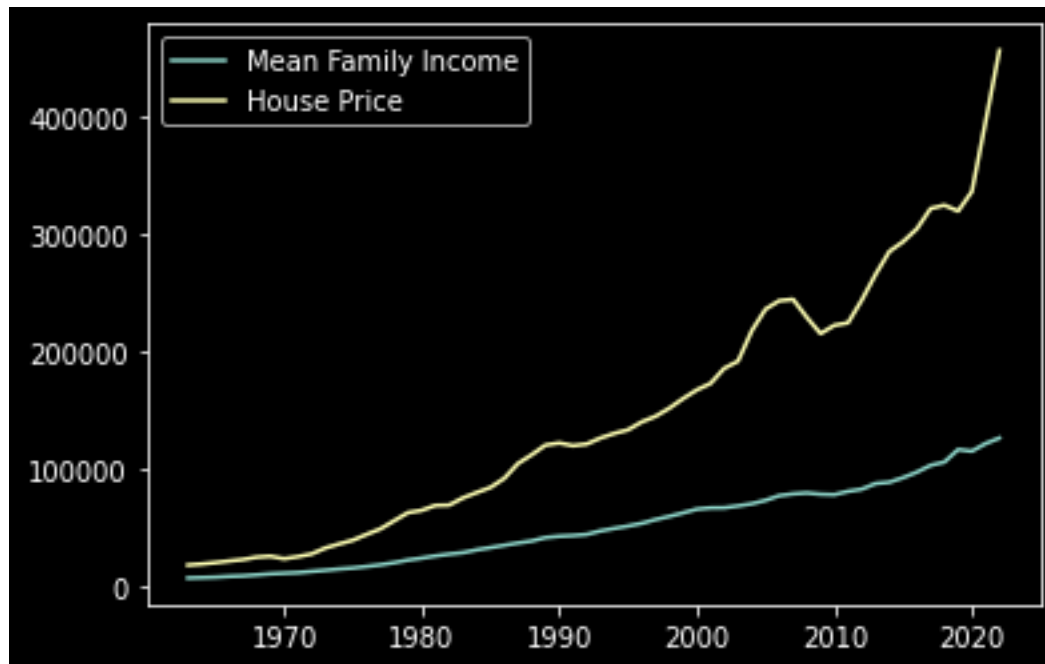
Figure 2: House Price vs Mean Family Income

Conclusion

This report outlines the methodology and objectives for analyzing the impact of inflation on family income and house prices. By merging the datasets and applying linear regression, we aim to shed light on how inflation affects housing affordability. While small datasets and missing variables pose challenges, this analysis can provide valuable insights into the financial implications of inflation for American families and homebuyers. The results will contribute to a better understanding of the evolving relationship between inflation, family income, and housing affordability in the United States.

References

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