

# **Key Factors That Influence Housing Market in Boston, MA**

## **Introduction:**

Among all critical economic pointers, house prices top the list because they directly influence the quality of life and investment decisions along with the course of urban development.

This study will uncover patterns, correlations, and possibly even causations, leading to actionable insights for Homebuyers, Real Estate Investors, Urban Planners and Policymakers.

## **Outcome of the Exploratory Data Analysis:**

- PMF showed that neighborhoods with lower crime rates tend to have higher property values than neighborhoods with high crime rates.
- The CDF revealed that the housing market is moderately concentrated around mid-range property values, with fewer low-cost or high-cost homes.
- Scatter plot showed Crime Rate has a weak to moderate negative linear relationship with Median Value.
- Hypothesis Test Using Chi-Square Test for independence suggested Highway Access and proximity to the Charles River are likely independent.
- Regression Analysis explained that all four predictors are statistically significant, with varying effects on "Median Value."

## **Limitations (Missed during analysis)**

- The Boston Housing dataset was collected in the 1970s, hence this dataset may not reflect the current real estate landscape, limiting the applicability for today's consumers.
- Since the dataset focuses exclusively on the Boston metropolitan area, the insights may not generalize to other cities or regions with different urban, economic, and cultural characteristics.
- The crime rate variable has a high variance with potential outliers, which may skew results.
- Variables like highway access and crime rate impact prices, but doesn't fully capture buyer preferences or subjective perceptions

## **Additional Variables That Could Have Helped**

- Interest Rates: would allow the analysis to account for the economic conditions that influence housing affordability and market dynamics.

- Unemployment Rate: would help assess the relationship between economic health and the affordability of homes in Boston.
- Income Levels: would allow for a deeper understanding of how local economic conditions impact on the housing market.
- Seasonality: Would help account for cyclical variations in housing prices, making the analysis more accurate and reflective of actual market conditions.

### **Assumptions Made and Potential Issues**

- The analysis assumed linear relationships between variables, but there might be non-linear relationships.
- The analysis assumes that the model captures all the key factors, but external factors such as interest rate hikes or natural disasters may have a significant impact.
- The analysis assumes housing market is largely efficient, but it may be inefficient due to market manipulation, or incomplete information.

### **Challenges Faced and Areas Not Fully Understood**

- Missing/incomplete data and measurement errors
- Using Advanced Modeling Techniques
- Exploring Multivariate Relationships
- External Influences and Unobserved Factors like Local Market Trends and Speculation
- Complexity of Housing Prices like time and market cycles

### **Conclusion**

While EDA provided foundational insights, further analysis is needed to address the challenges and limitations. By exploring more complex relationships and including broader economic variables, we can develop a more comprehensive understanding of the housing market.

Ultimately, this deeper analysis could have significant implications for stakeholders in the real estate market including investors, policymakers, and urban planners, who rely on accurate models to make informed decisions.