PROPERTY PRICE PREDICTION (REGRESSION MODELS)

GROUP VII

OUTLINE

- Project Overview
- Business Problem
- Data Understanding
- Data Cleaning and preparation
- Data Analysis
- Conclusion
- Recommendation

PROJECT OVERVIEW

The project aims to support our stakeholder: **The National Association of Realtors** (NAR) with appropriate and comprehensive insights and information they can utilize to advice their clients: proprietors and homeowners about how different factors affect home sale prices in the county.

BUSINESS PROBLEM

1. To determine Property Valuation by considering the impact of various property attributes

2. To identify the most influential features in determining property prices.

3. To evaluate potential real estate investment opportunities thus assessing profitability and potential ROI

DATA UNDERSTANDING

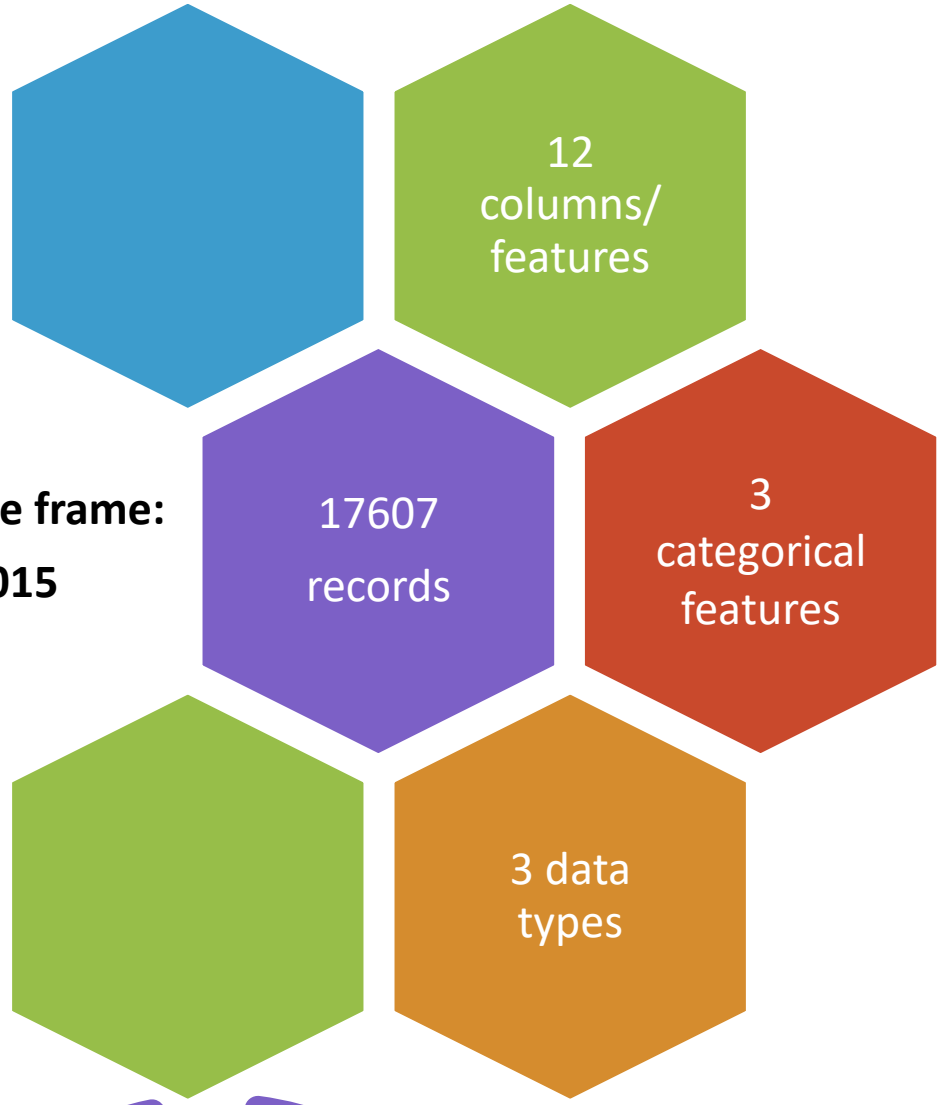
This project uses the north western county dataset.

It includes the below features:

- price
- bedrooms
- bathrooms
- sqft_living
- zipcode
- yr_built

Data time frame:

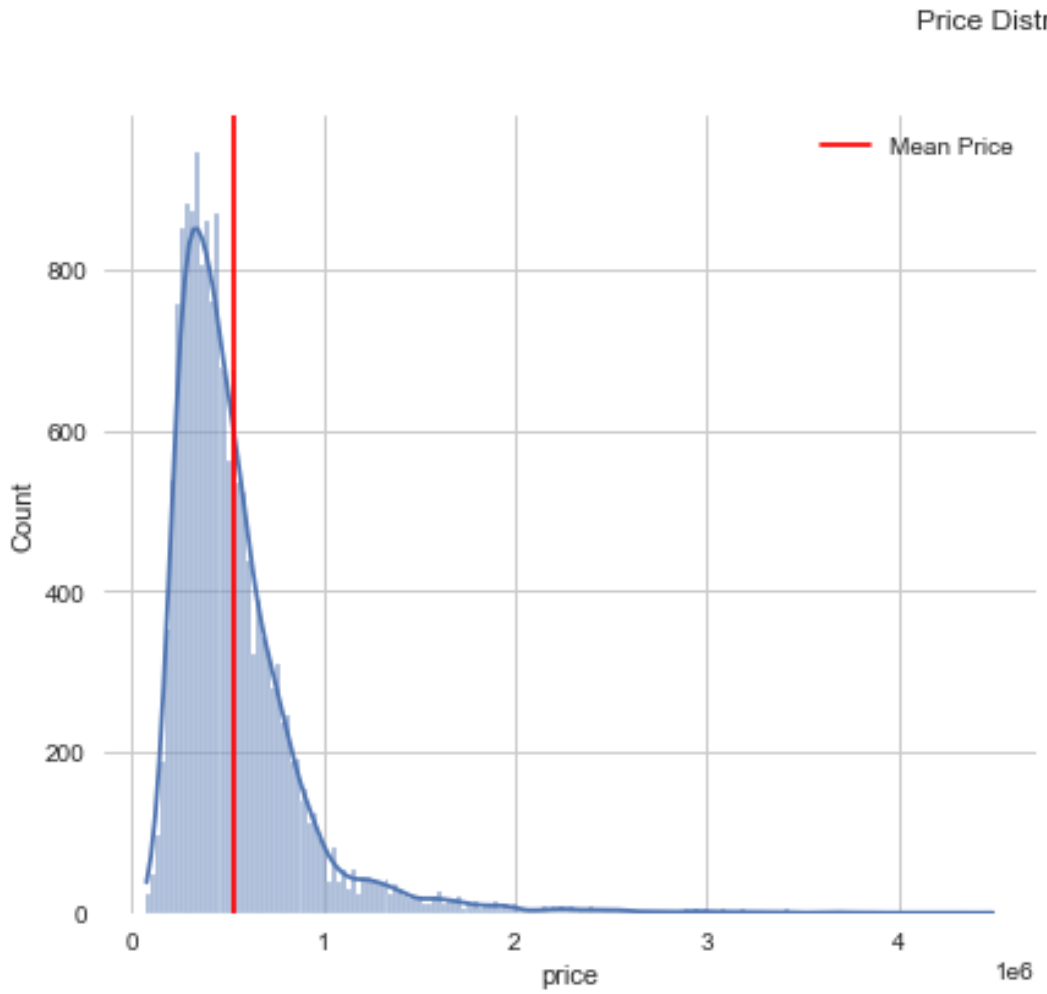
1900 - 2015

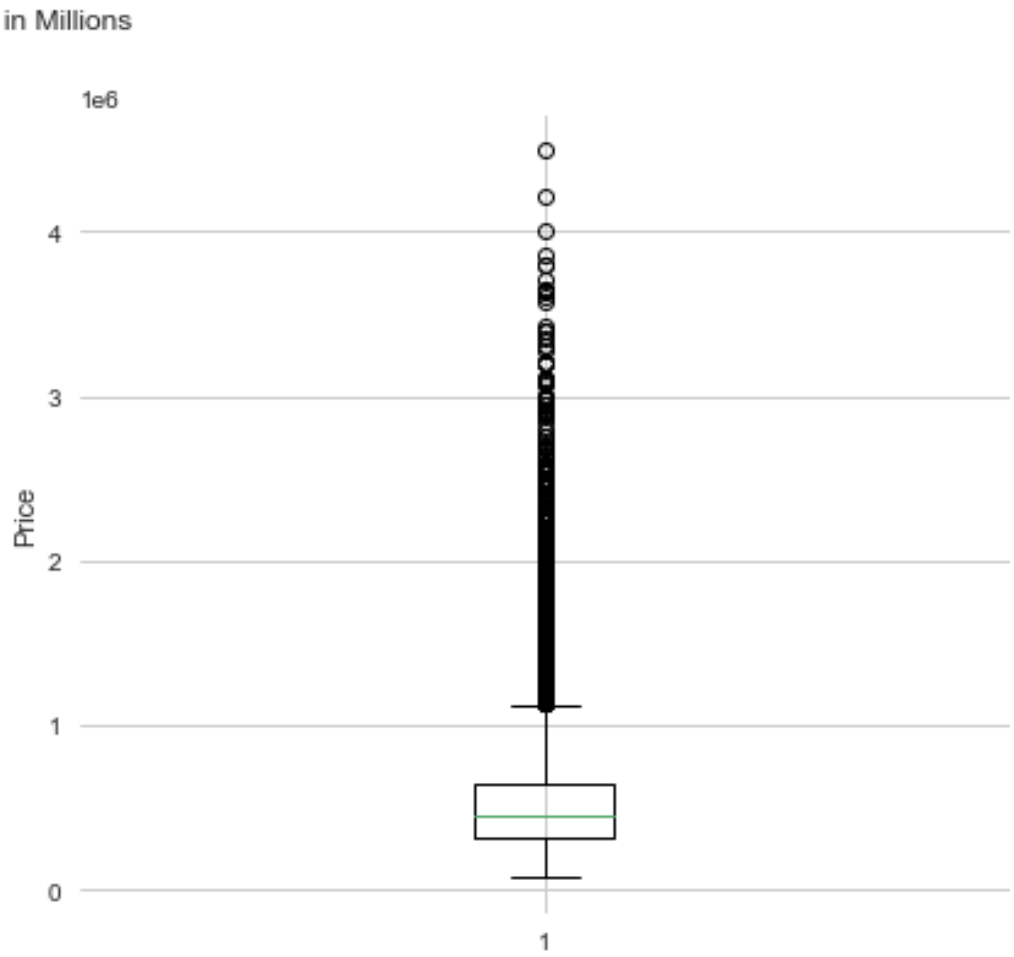


DATA CLEANING & PREPARATION

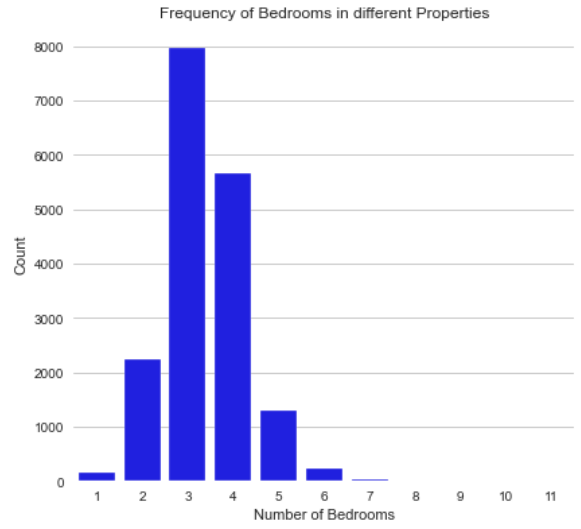
- ❑ Check and drop duplicates in the 'id' column
- ❑ Identify and handle missing values
- ❑ Check for place holders in 'price‘ column
- ❑ Convert data date types if necessary
- ❑ Identify outliers
- ❑ Feature Engineering by creating new columns i.e 'is_renovated'
- ❑ Dropping irrelevant columns

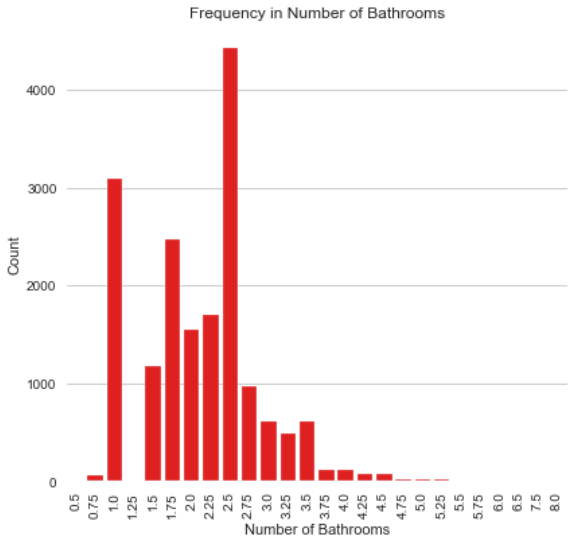
PRICE DISTRIBUTION

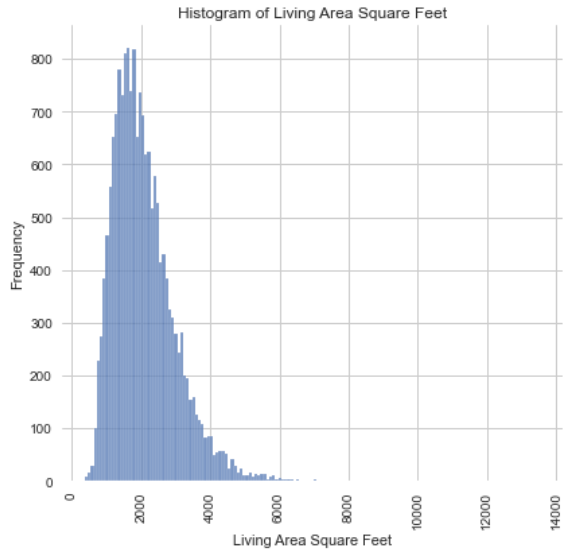


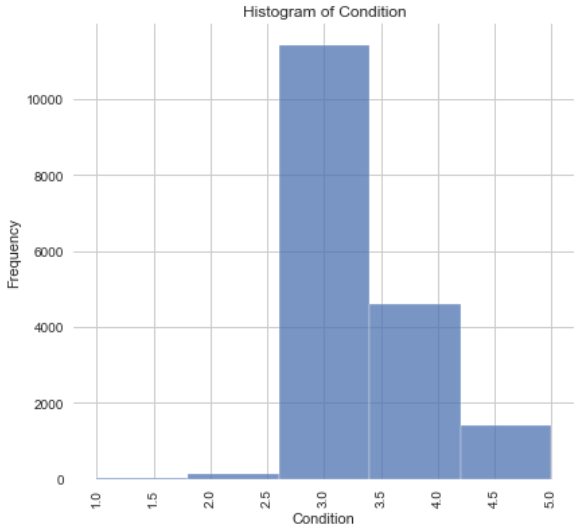


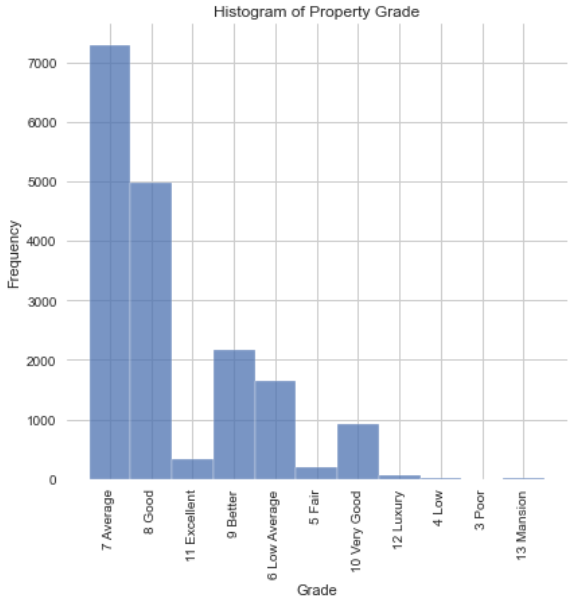
UNIVARIATE ANALYSIS



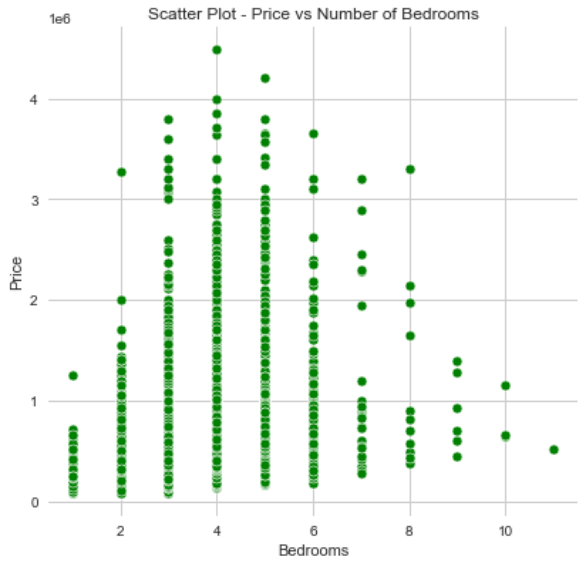


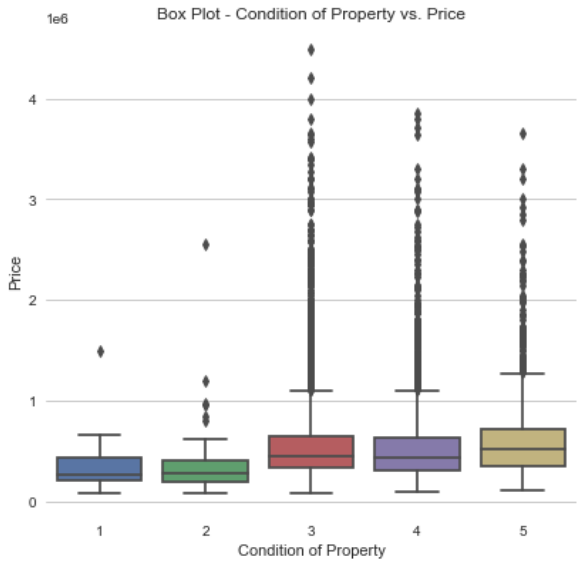


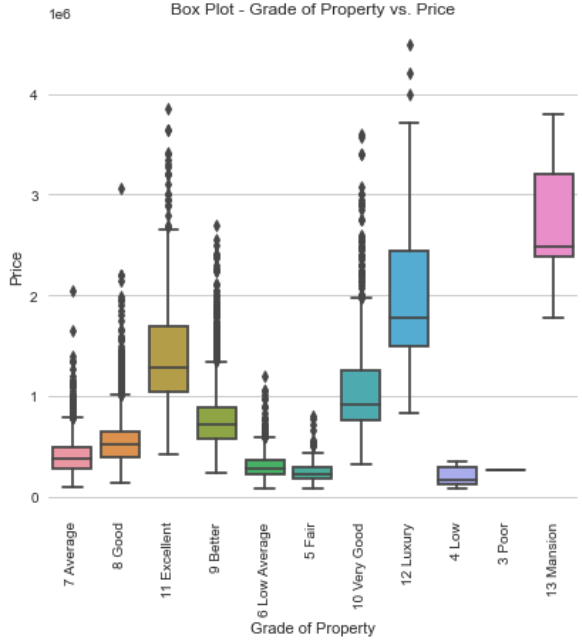


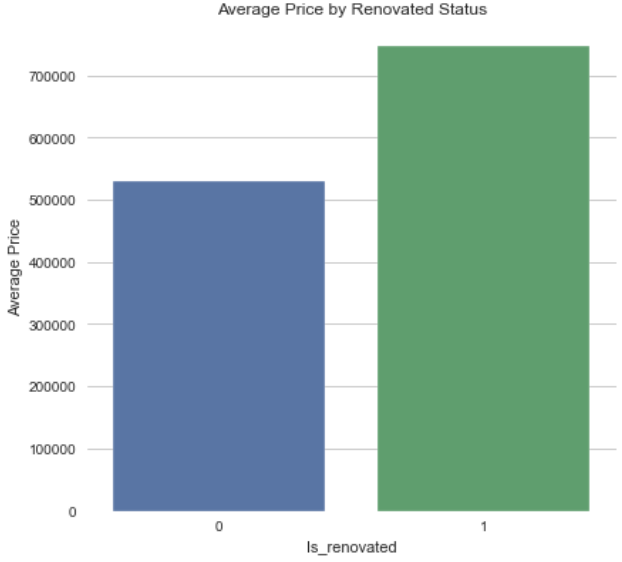


BIVARIATE ANALYSIS









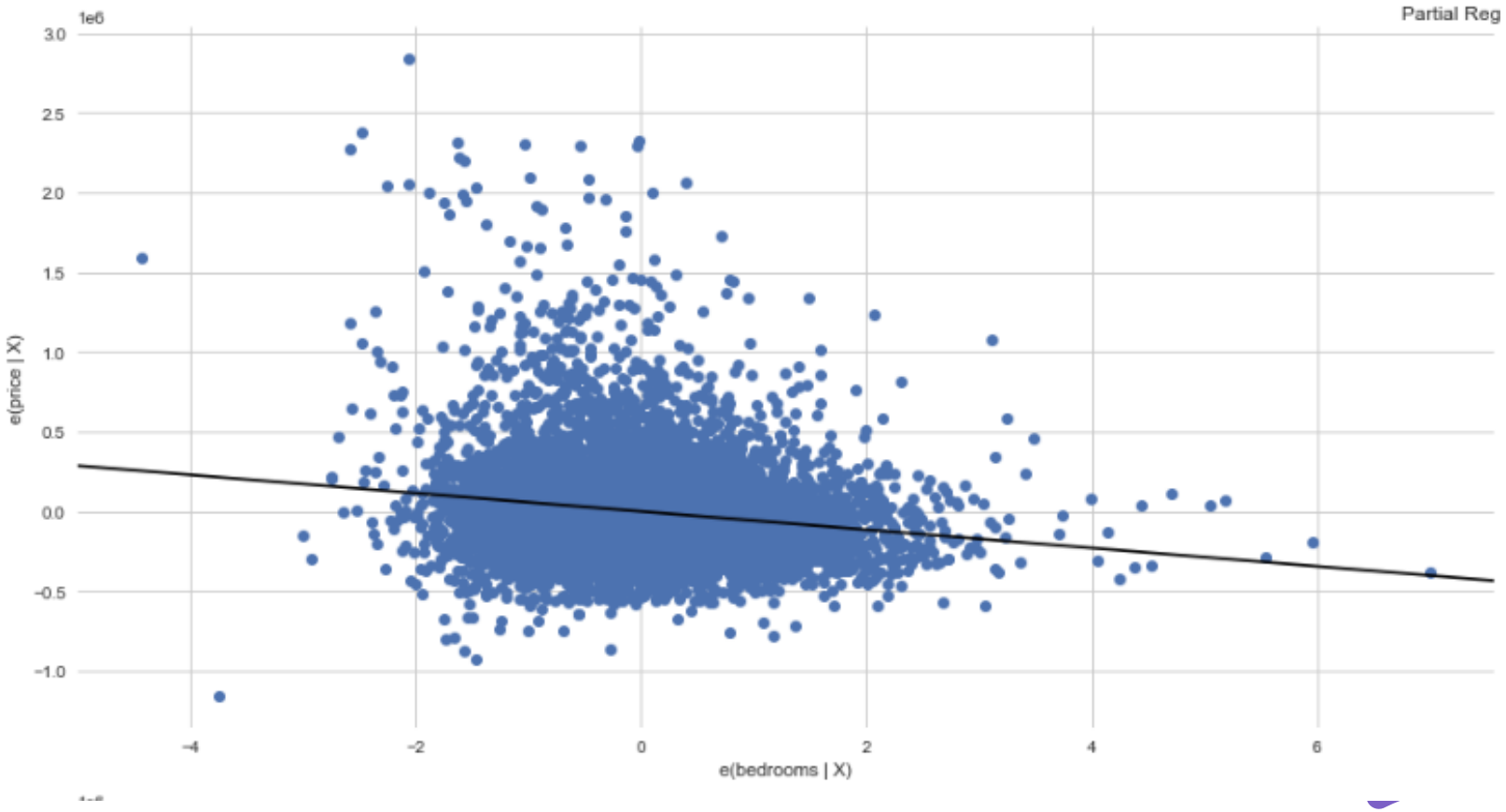
PROPERTY EVALUATION MODEL

The Model built illustrates price as below:

PRICE = 4,208,000 -57,350 BEDROOMS + 272.46 SQUAREFOOTLIVING + 20,350 CONDITION - 2180.09 YEAR_BUILT + 94,430 IS_RENOVATED +94.58 SQFTLIVING15

The model is statistically significant with an F-statistic p-value well below 0.05 and explains approximately 55% of the variability in the dependent variable (price)

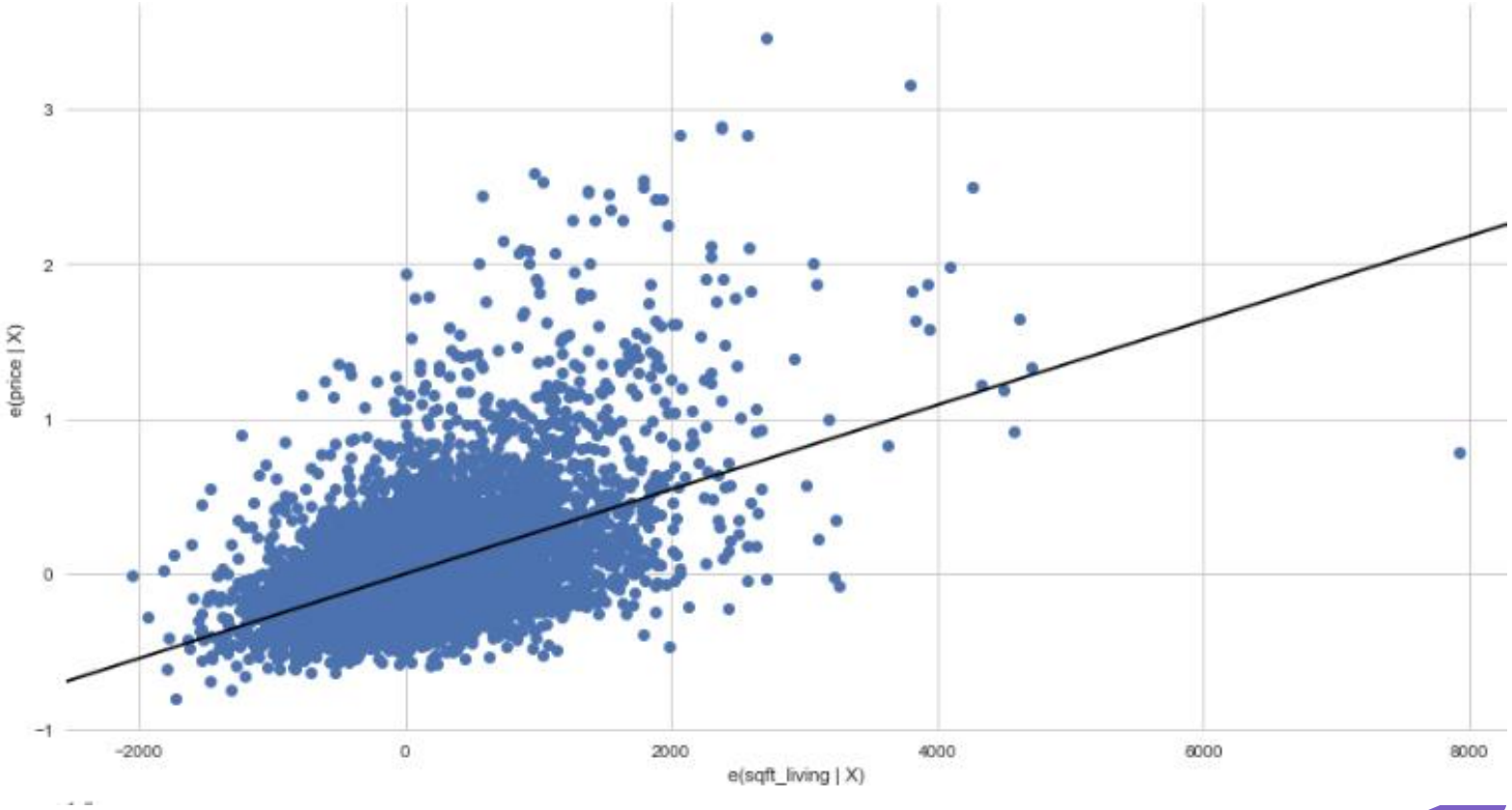
BEDROOM FEATURE



On average, each additional bedroom is associated with a decrease of approximately USD 57,350 in the price.

The model coefficient for bedrooms is statistically significant, with t-statistic p-value well below 0.05.

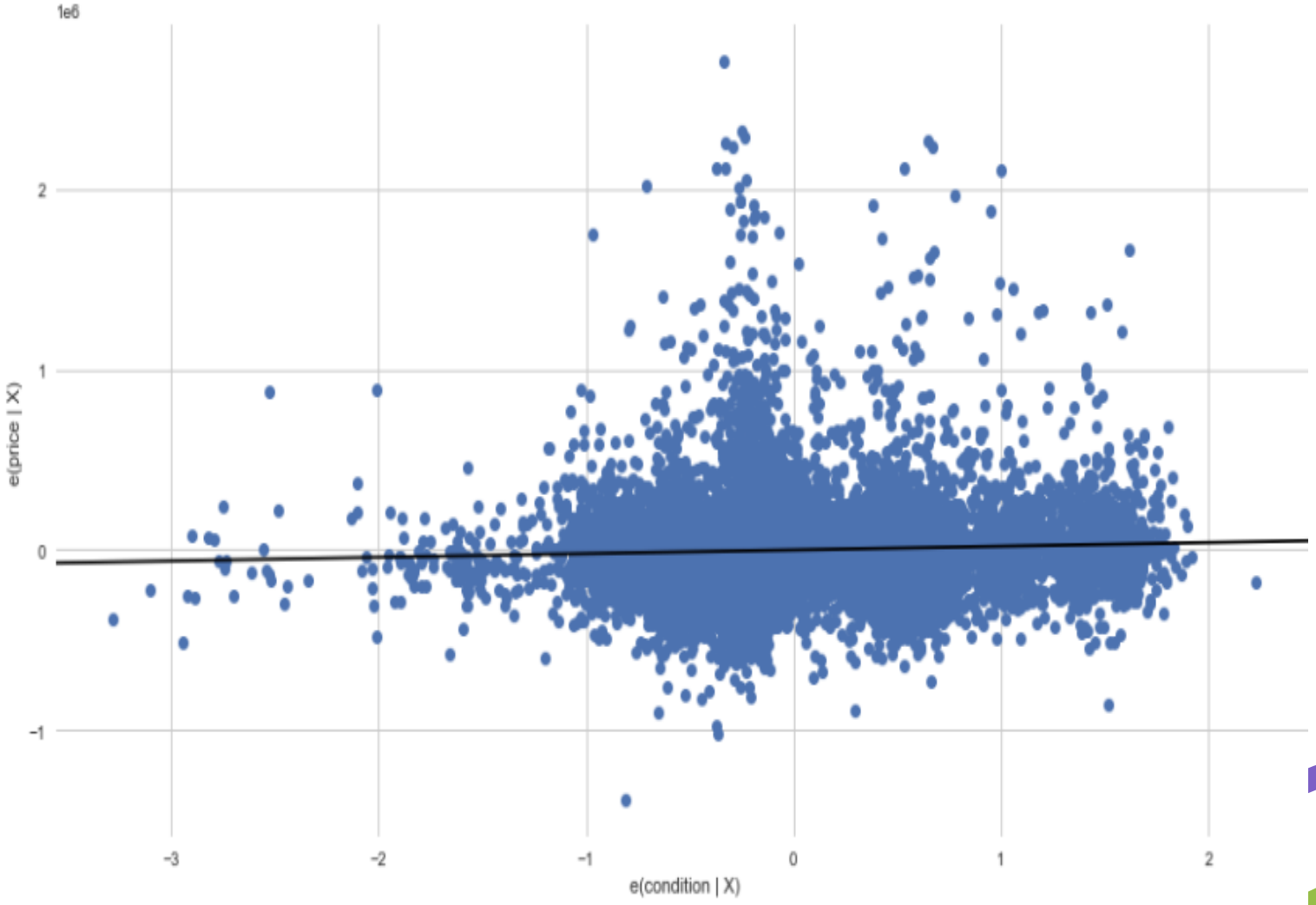
SQUARE FOOT LIVING FEATURE



The model coefficient sqft_living is statistically significant, with t-statistic p-value well below 0.05.

For each additional square foot of living area is associated with an increase of approximately USD272.46 in the price.

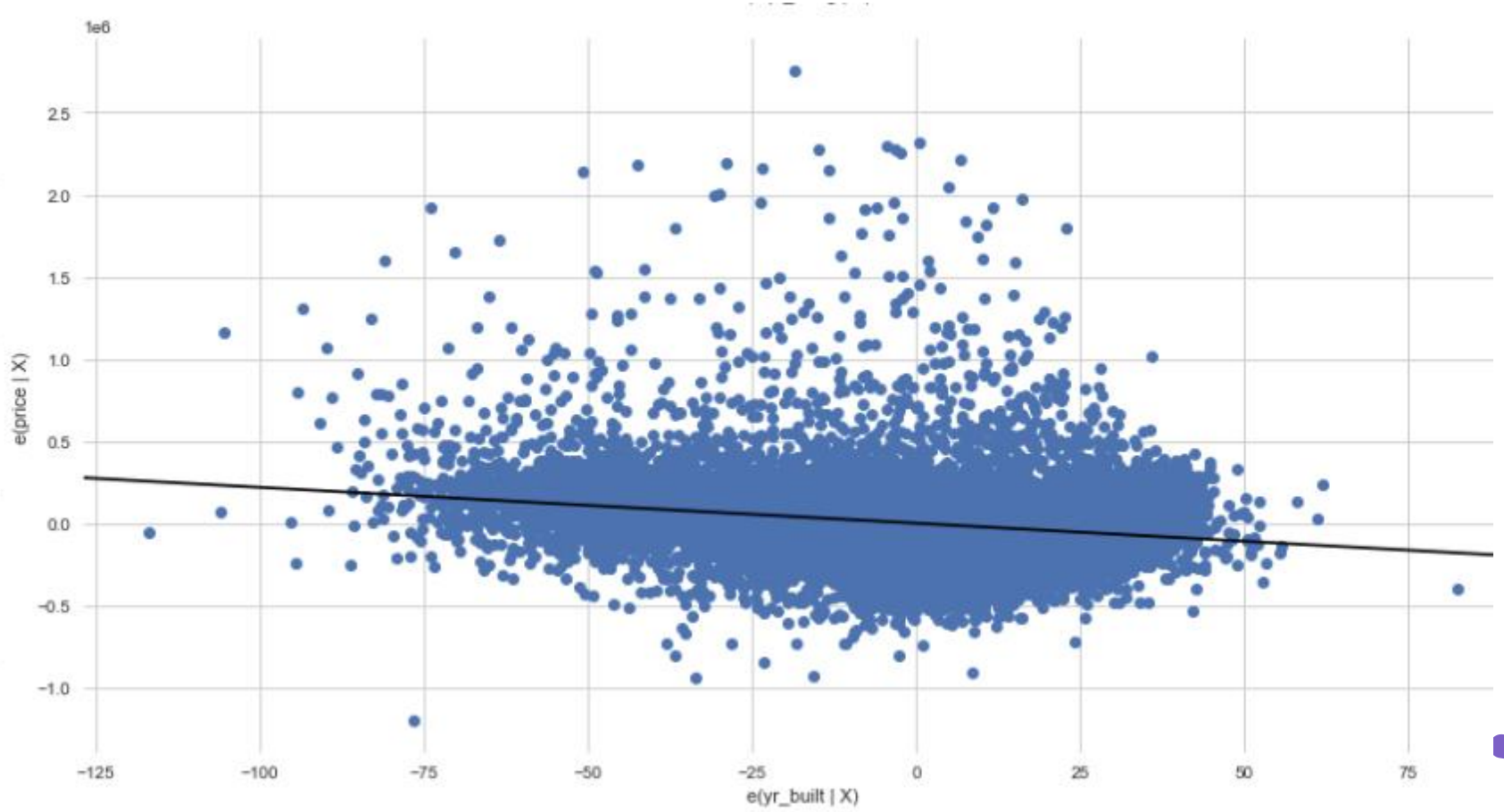
CONDITION FEATURE



The model coefficient condition is statistically significant, with t-statistic p-value well below 0.05.

On average, each unit increase in condition is associated with an increase of approximately USD20,350 in the price.

YEAR BUILT FEATURE



The model coefficient yr_built is statistically significant, with t-statistic p-value well below 0.05.

The yr_built on the other hand has an associated decrease in price the older the house is by approximately USD 2184

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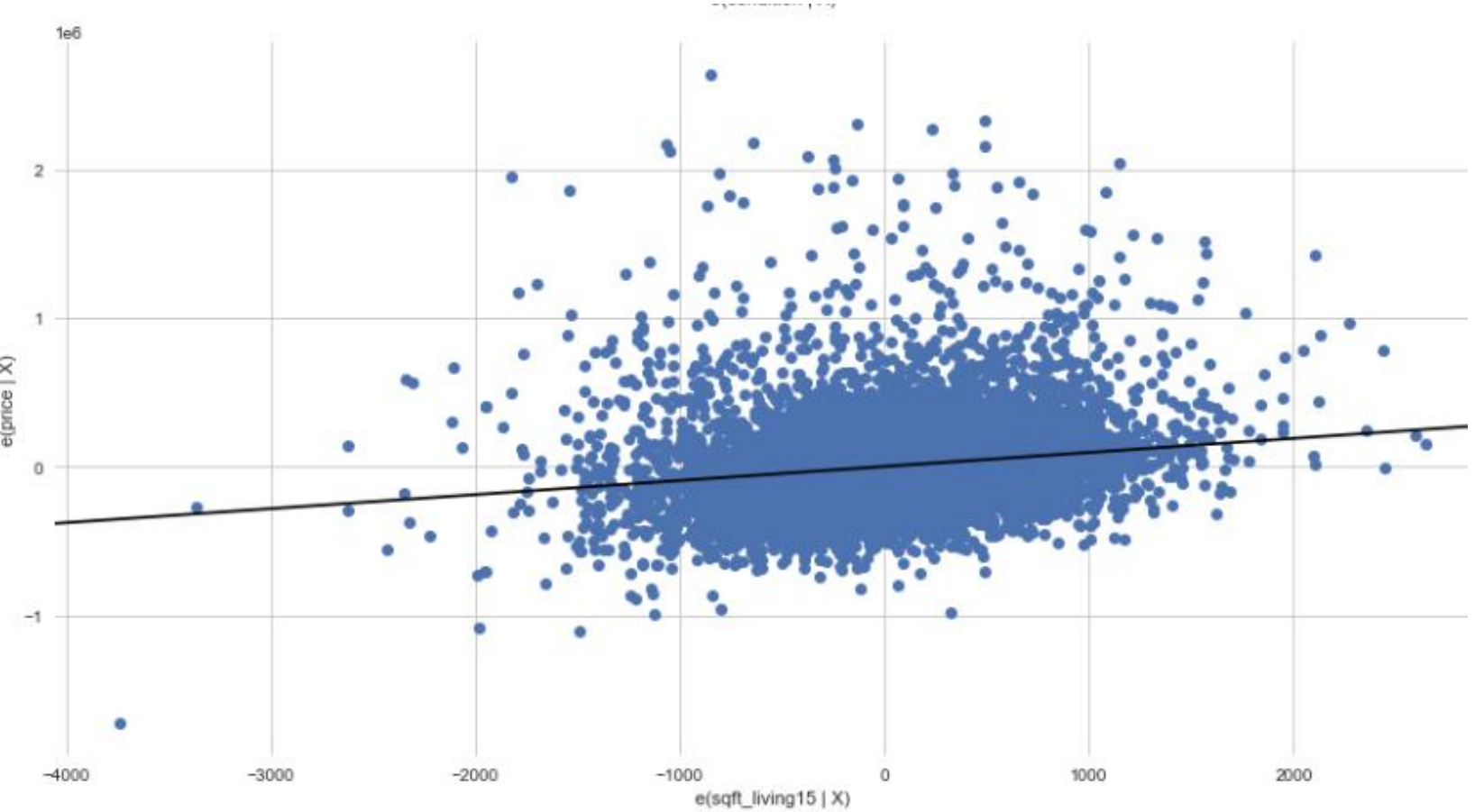
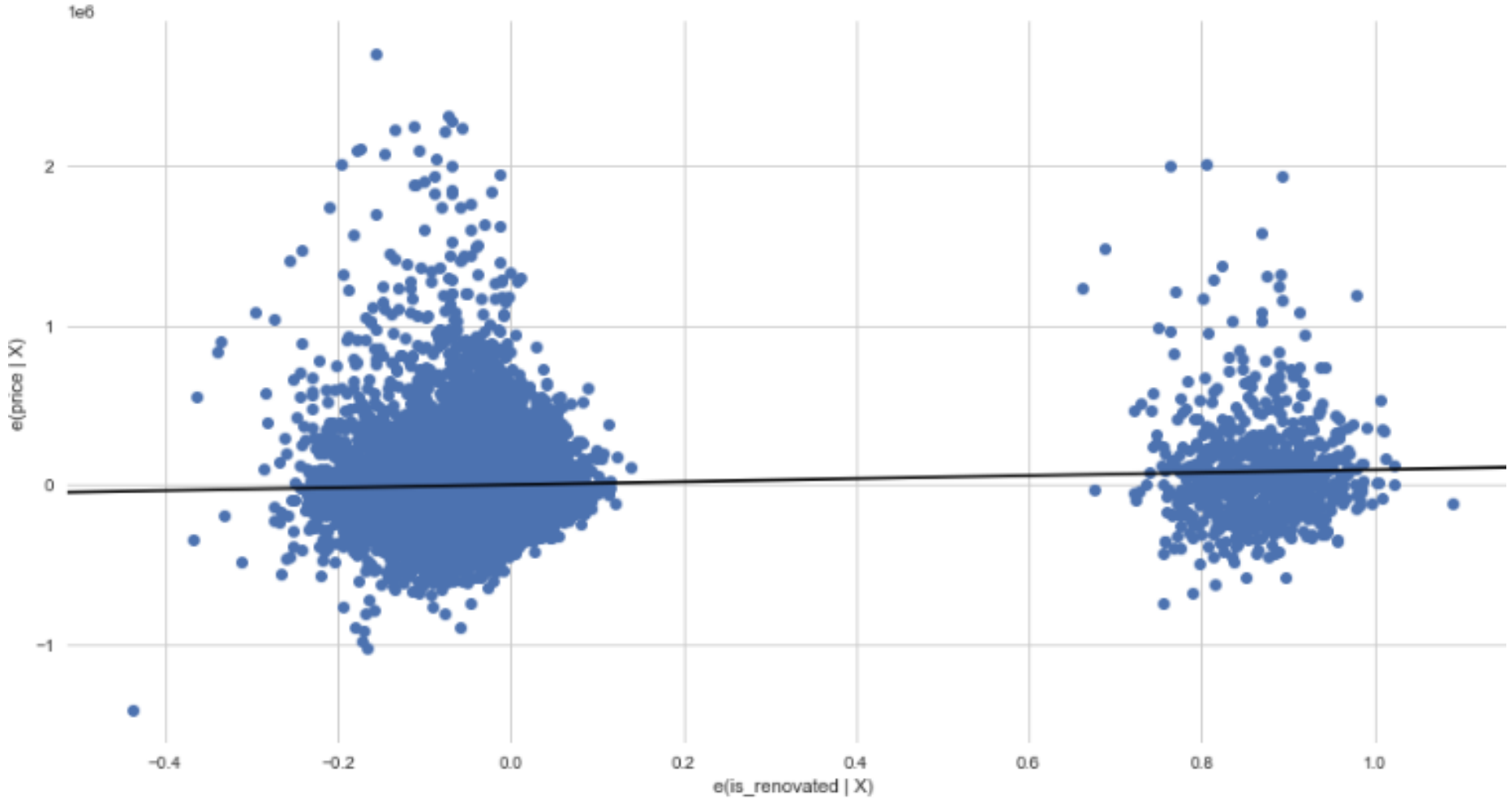
SQUARE FOOT LIVING FOR THE NEAREST 15 NEIGHBOURS FEATURE



The model coefficient sqft_living15 is statistically significant, with t-statistic p-value well below 0.05.

On average, each additional square foot of the neighboring properties' living area is associated with an increase of approximately USD 94.59 in the price.

RENOVATION STATUS FEATURE



The model coefficient is_renovated is statistically significant, with t-statistic p-value well below 0.05.A renovated property increases the price by USD 94,300

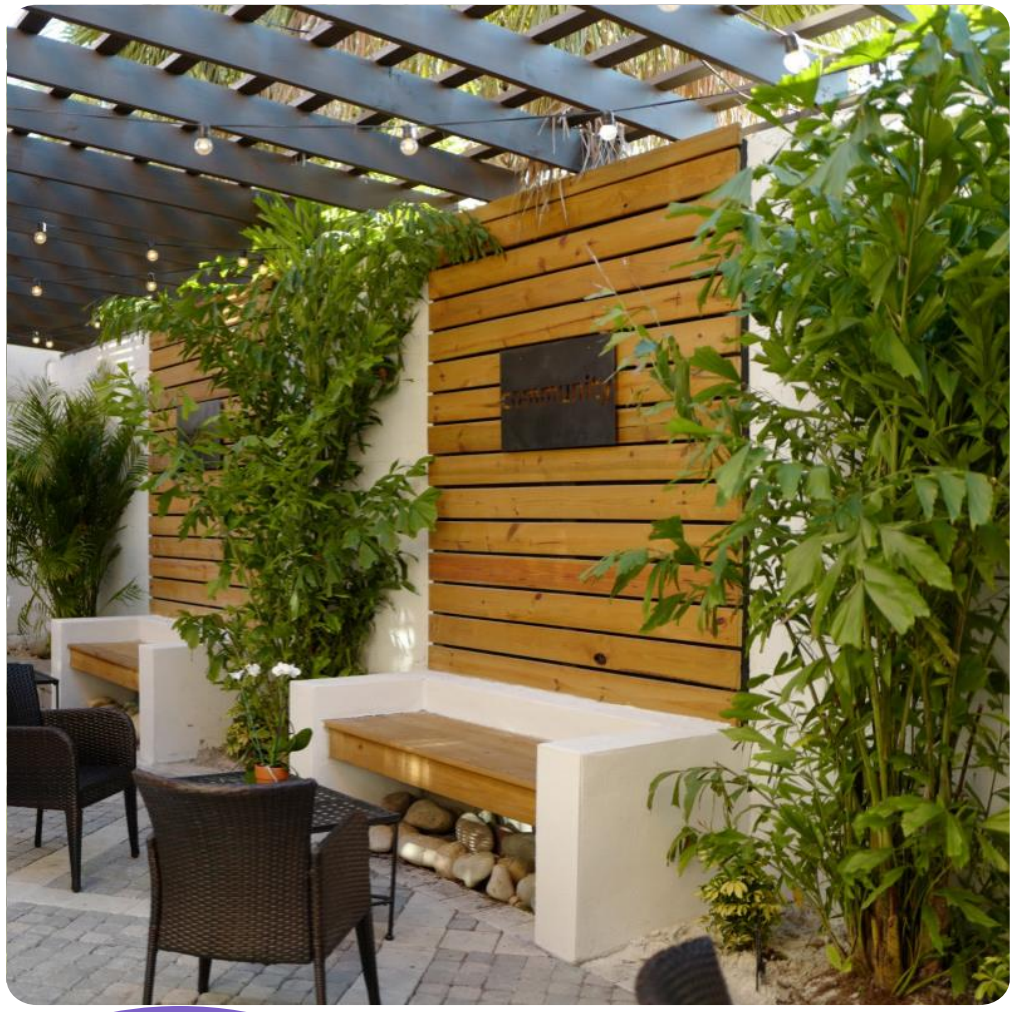
CONCLUSION

1. The model shows a moderate level of predictive power . The model can explain approximately 55% of the variability in home prices.

2. Significant predictors of price as per the model are ;

- the number of bedrooms
- square footage of living area
- condition of house
- year built
- whether the property has been renovated
- the square footage of neighboring properties

3. Normality assumption: The Q-Q plots of the model's residuals suggest that they approximately follow a normal distribution.



RECOMMENDATIONS TO HOMEOWNERS

- Consider the influence of neighboring properties
- Renovations can add value
- Pay attention to the year built
- Consider the number of bedrooms
- Focus on the square footage
- Maintain the condition of the property

RECOMMENDATIONS TO MEMBERS NAR

- Stay updated on market trends
- Educate clients on the impact of features
- Stay informed about regulations and policies
- Collaborate with appraisers
- Conduct thorough market analyses
- Provide renovation recommendations

Any Questions….

Thank you!