



ZILLOW TIME SERIES PREDICTION



Moringa School
Phase 4 Project

OUR TEAM

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BUSINESS PROBLEM

BUSINESS OVERVIEW INTRODUCTION:

- Zillow is a leading online real estate marketplace focused on providing services and tools for home buyers, sellers, renters, and real estate professionals.
- The firm aims to leverage data-driven insights to identify the best zip codes for real estate investment and make strategic investment decisions.

CHALLENGES:

- Ambiguity of data and determining the best approach for analysis based on the firm's objectives and strategy.
- Selecting the appropriate forecasting model considering the diverse nature of real estate data and evaluating its performance effectively.

1.

PROBLEM STATEMENT:

- The objective is to maximize profitability while considering associated risks and determining the optimal time horizon for real estate investments.

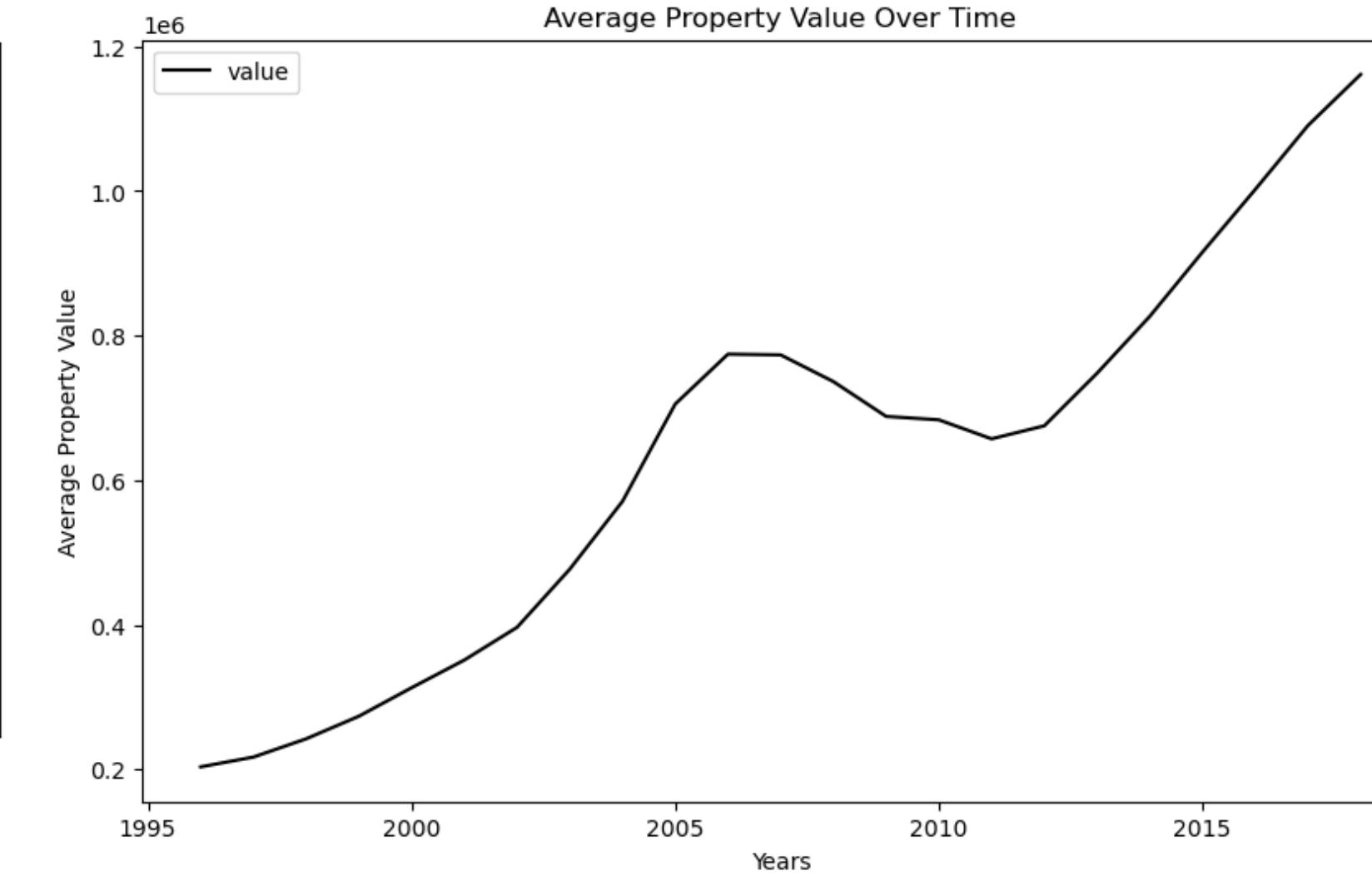
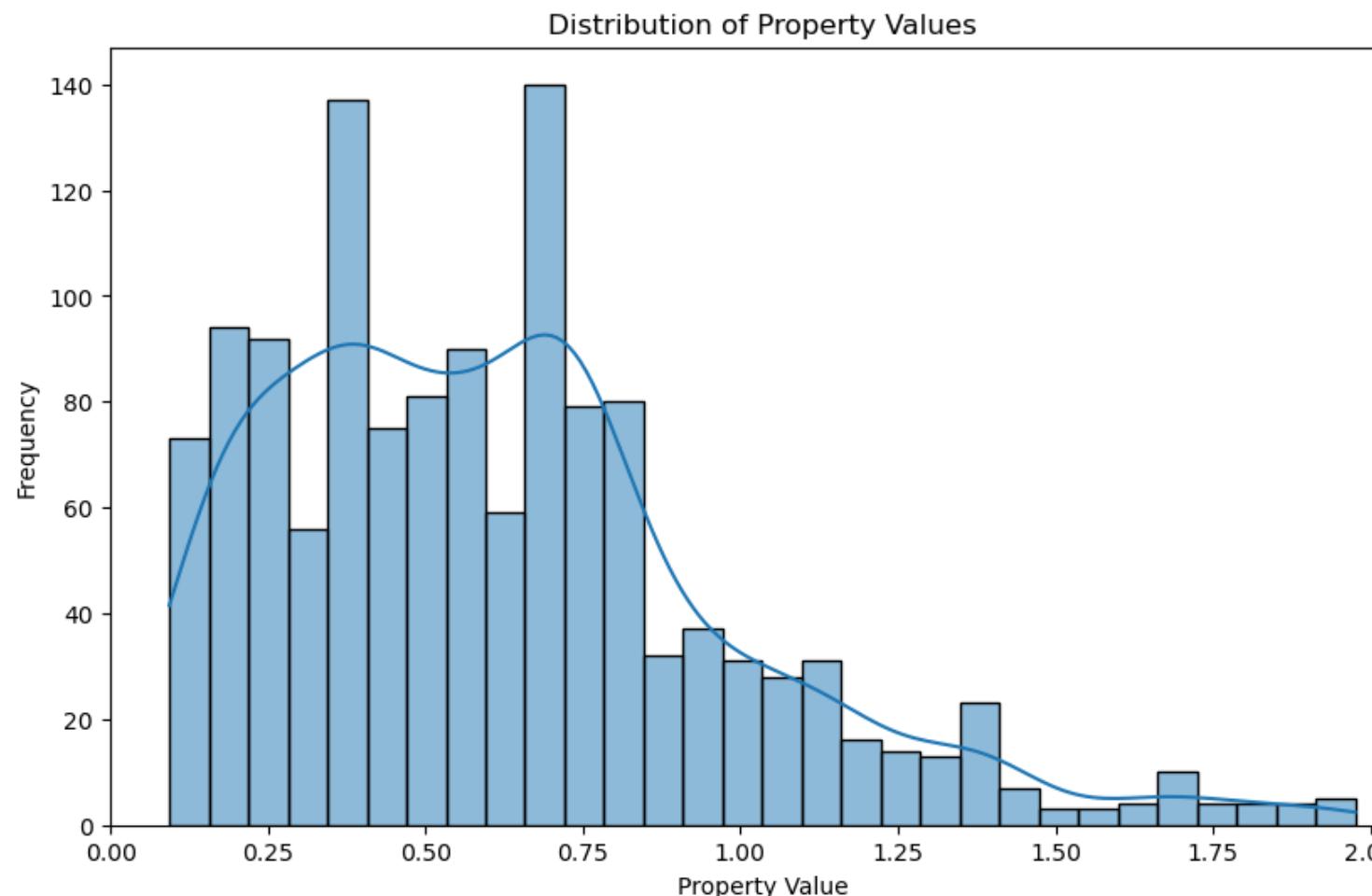
OBJECTIVES

- To provide a recommendation for the top 5 best zip codes for a real estate investment firm to invest in.
2. What are the historical trends and patterns in real estate prices for different zip codes?
3. What are the key factors that influence real estate prices in each zip code?
4. How do different zip codes compare in terms of risk and return on investment?



DATA EXPLORATION

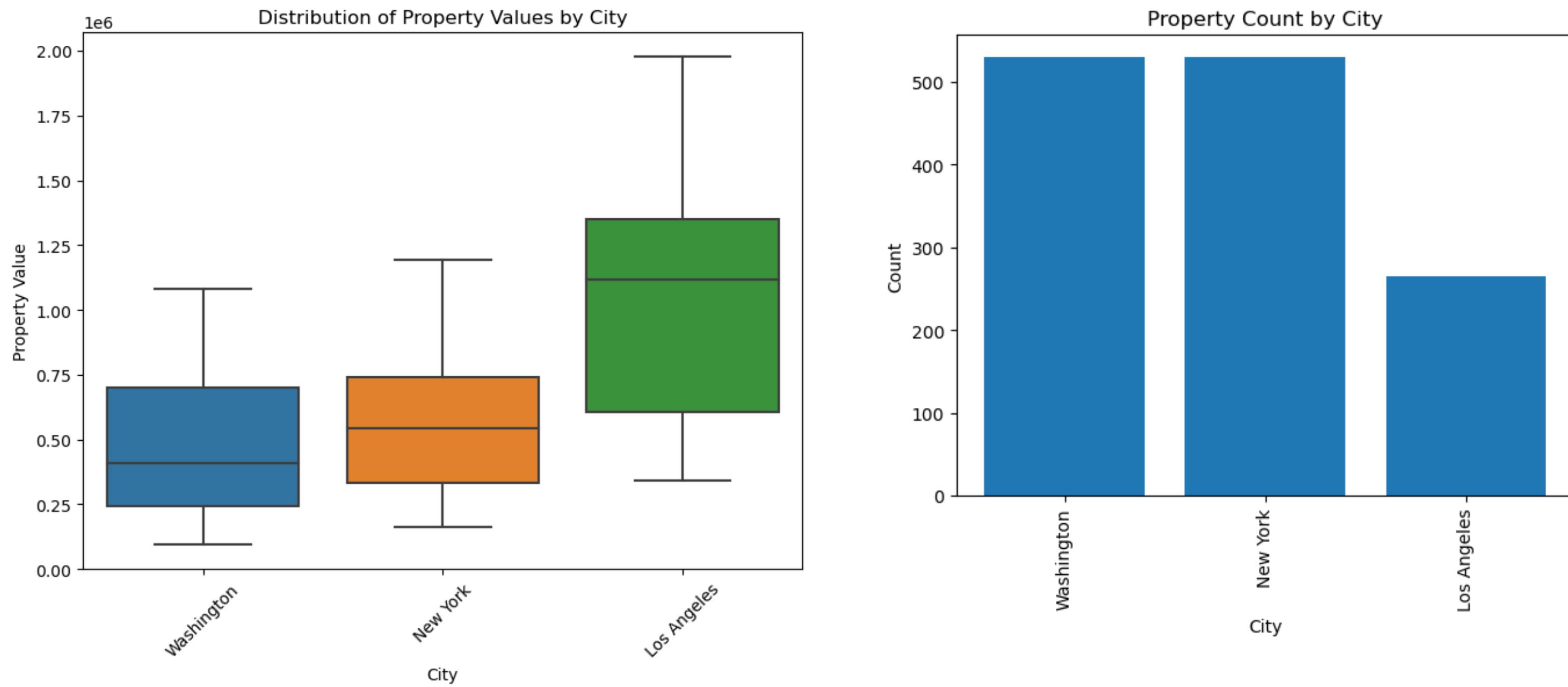
Exploratory Data Analysis



- there is average property value increase from 1996 to 2007, where it drastically dropped to 2012 and increased from 2012 onward
- The shape of the distribution suggests that the real estate market consists of a mix of moderately priced properties and a smaller number of high-priced properties.

DATA EXPLORATION

Exploratory Data Analysis



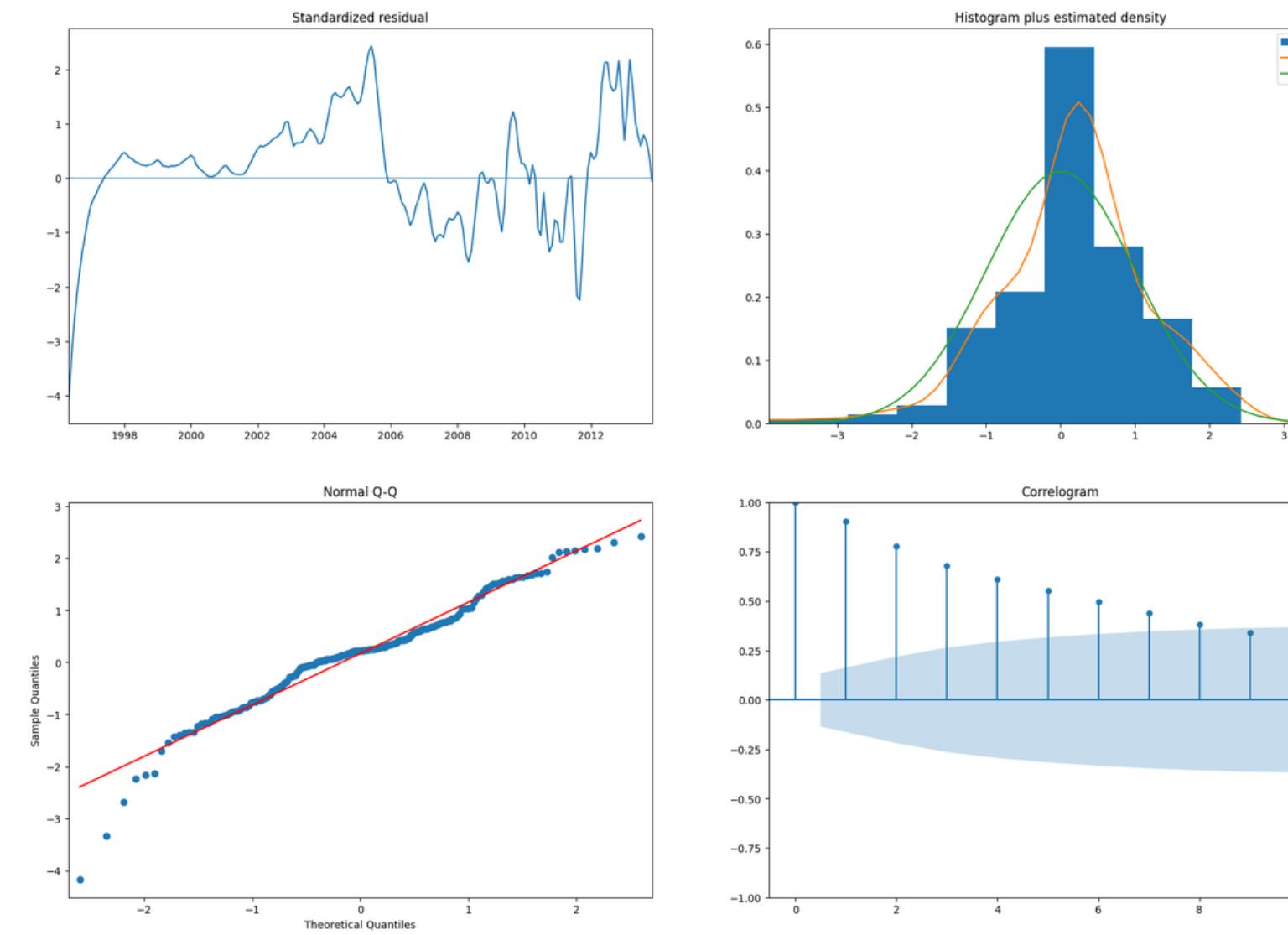
- Los Angeles exhibits a wider spread of property values, suggesting a greater diversity and variability in the housing market.
- The number of properties varies across different cities, indicating variations in the real estate market.
- Some cities (Washington & New York) have a higher count of properties, suggesting a larger availability and demand for real estate in those areas.

MODEL: ARIMA

ARIMA MODEL

New York_11230

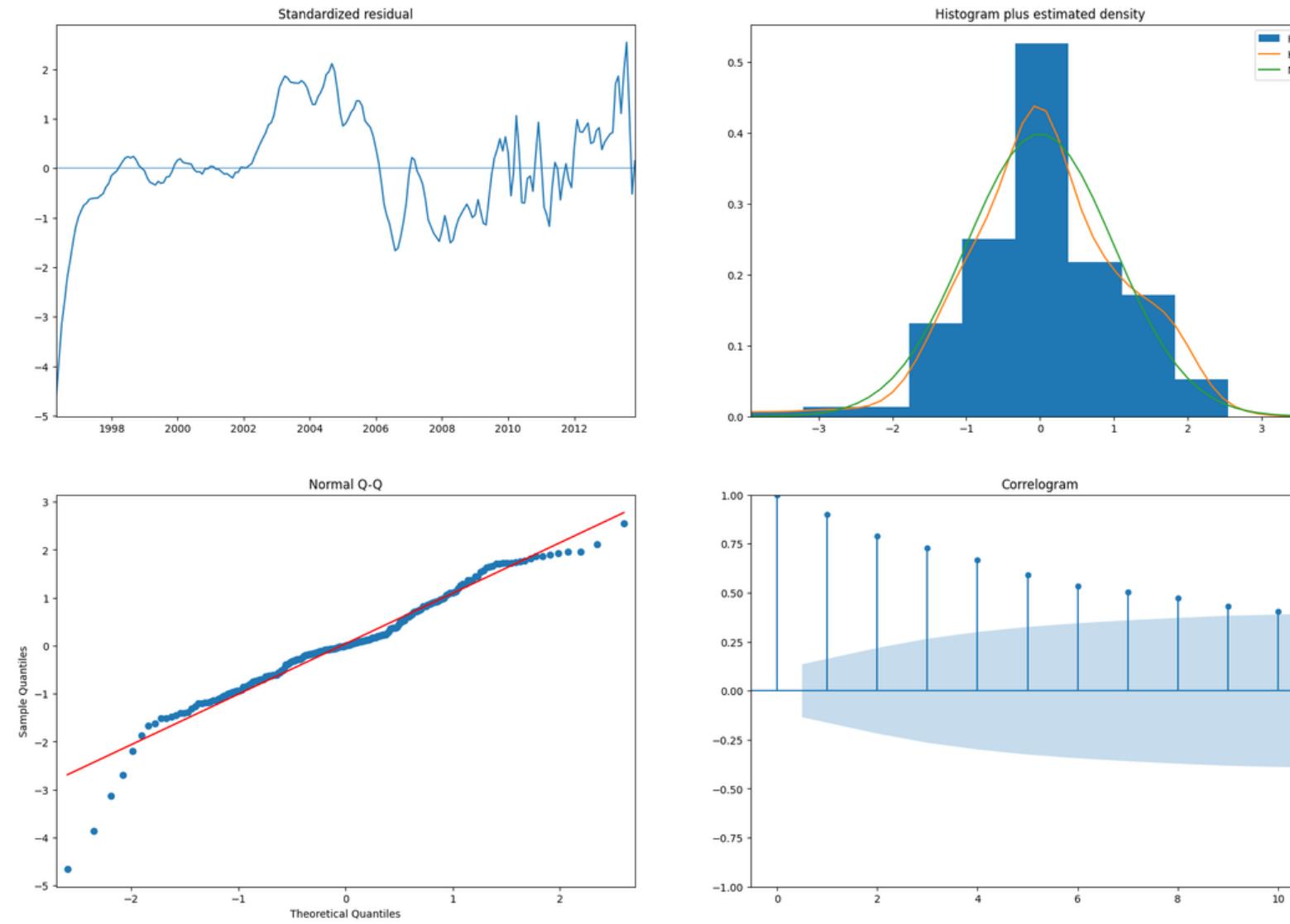
- The selected AutoArima model (1, 1, 1) with a reduced AIC value of 4439.355 effectively captures the data's patterns, utilizing significant autoregressive and moving average components.



- The kernel density estimate (KDE) of the residuals resembles a normal distribution, indicating that the differences between observed values and model predictions follow a symmetric pattern.
- The residuals exhibit consistent spread or dispersion across the range of predictor variables, indicating that the assumption of homoscedasticity is met.
- These findings suggest that the model adequately captures the variability in the data, as the residuals display characteristics of normality and homoscedasticity.

ARIMA MODEL

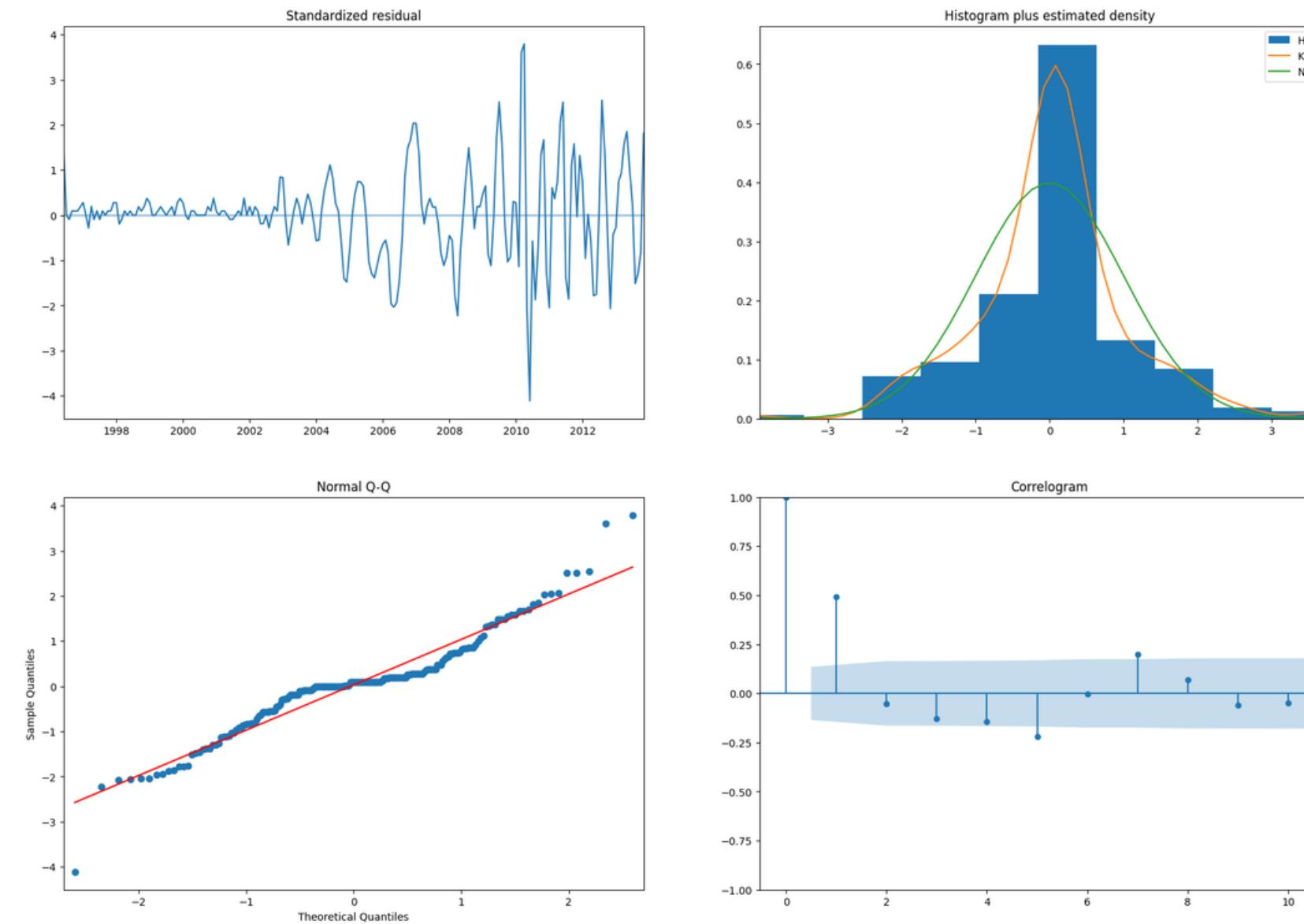
Washington_20002



- The AutoArima model with parameters $(1, 1, 1)$ and a reduced AIC value of 3836.345 is a good fit for the data, as it successfully captures the underlying patterns with statistically significant autoregressive and moving average components.

ARIMA MODEL

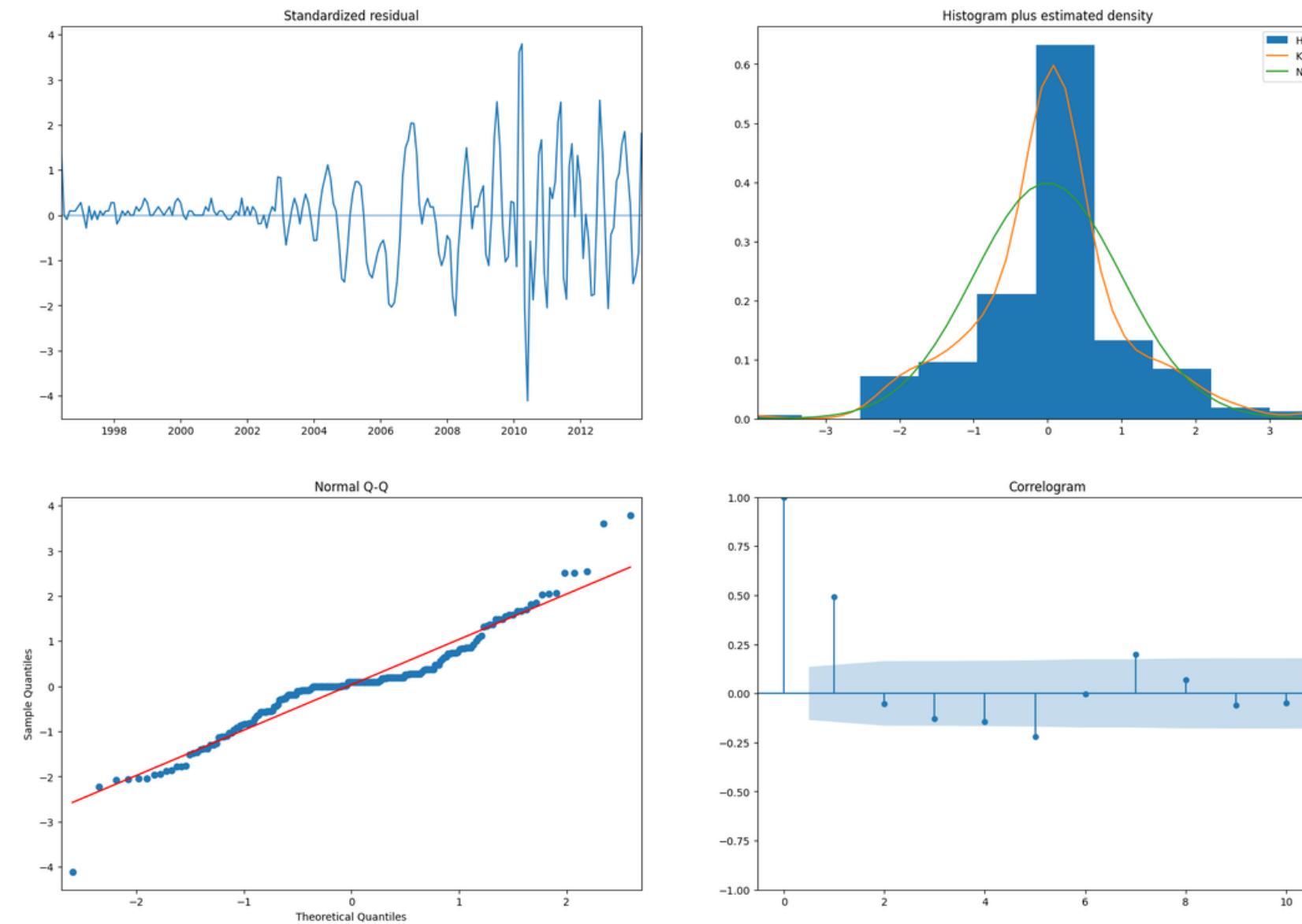
Washington_2009



- The chosen AutoArima model (1, 2, 0) with a reduced AIC value of 3527.700 effectively captures the data's patterns using significant AR and MA terms.

ARIMA MODEL

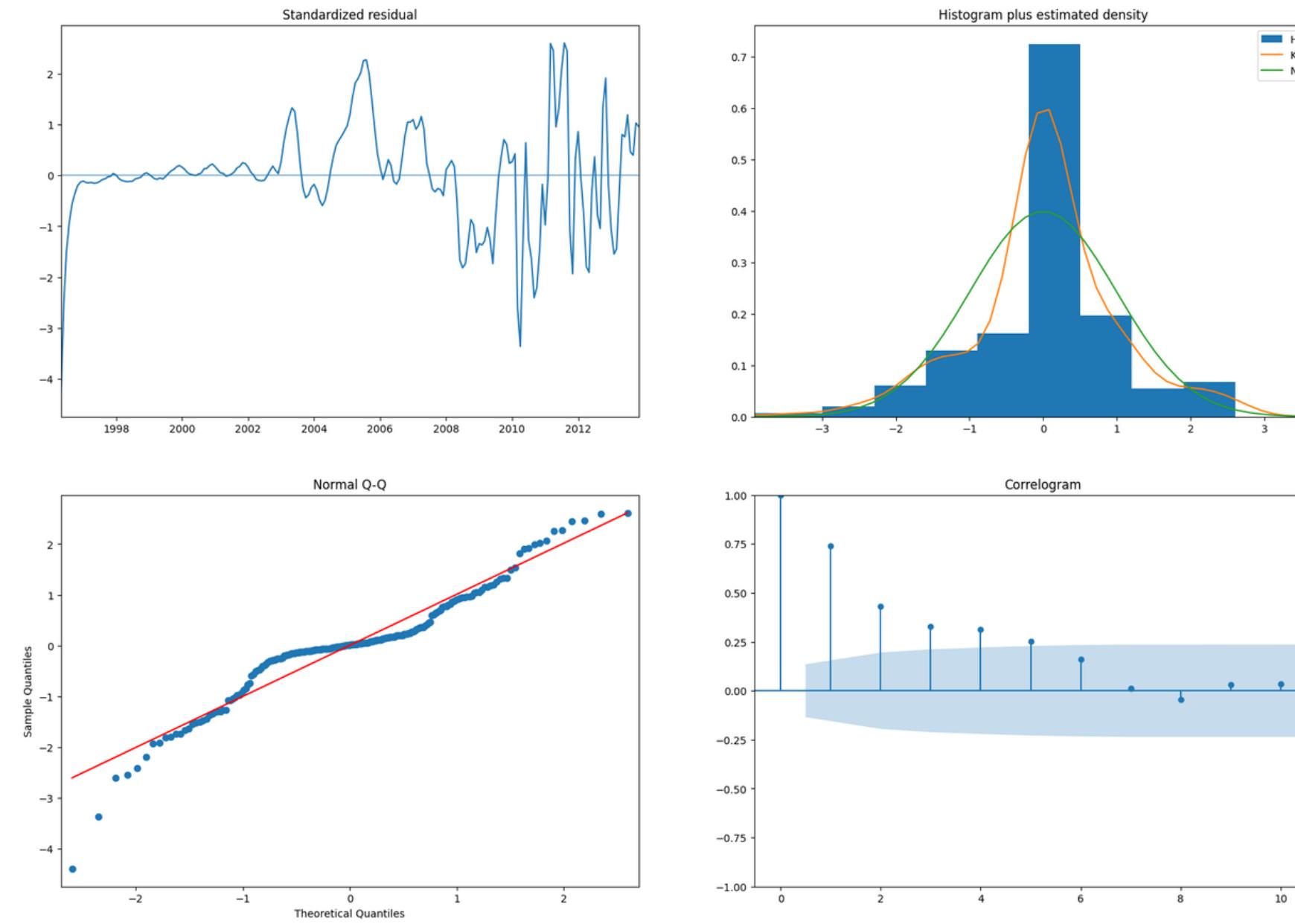
New York_11226



- The chosen AutoArima model (1, 2, 0) with a reduced AIC value of 3527.700 effectively captures the data's patterns using significant AR and MA terms.

ARIMA MODEL

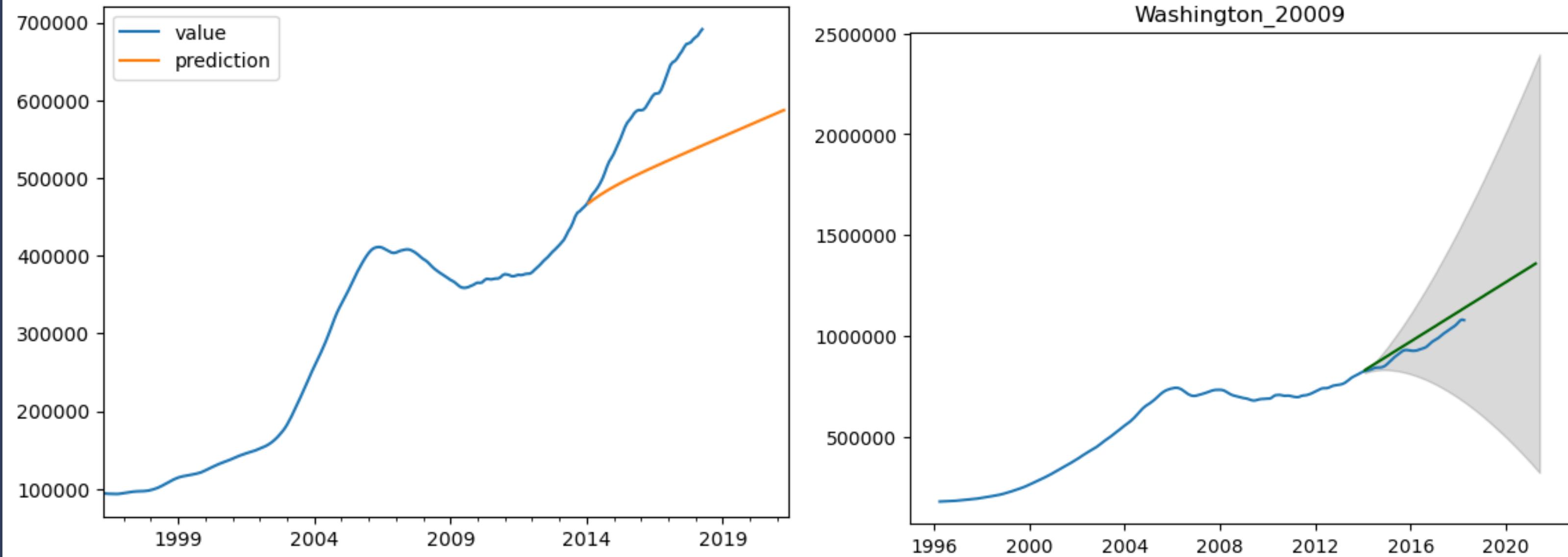
Los Angeles_90046



- The selected AutoArima model $(1, 1, 1)$ with a reduced AIC value of 4185.081 captures the data's patterns well, supported by significant AR and MA terms.

FORECASTING

Model Forecast



Our forecasts tend to provide more conservative estimates compared to the test data. The predicted values are generally lower or more moderate than the actual values observed during the evaluation phase.

RESULTS



	Return on Investment
Washington_2002	0.255852
Washington_2009	0.636823
NewYork_11226	0.243891
LosAngeles_90046	0.694970
NewYork_11230	0.039664

1. The analyzed zip codes have shown varying levels of Return on Investment (ROI), with values ranging from 0.04% to 0.69%. This indicates the potential profitability of real estate investments in these areas.
2. Among the analyzed zip codes, Los Angeles (90046) and Washington (2009) have exhibited the highest ROI values, indicating a relatively higher potential for profitable real estate investments in these areas compared to others.

	prediction
Washington_2002	323.402636
Washington_2009	518.163312
New York_11226	502.198111
Los Angeles_90046	511.920597
New York_11230	18.296471

1. The predicted real estate prices for the specified zip codes range from \$18.30 to \$518.16, indicating the potential value of properties in these areas based on the forecasting model.
2. Among the predictions, the highest estimated real estate price is for Washington (20009), followed by Los Angeles (90046) and New York (11226). These zip codes are expected to have relatively higher property values according to the forecasting model.

Conclusion

Conclusion

- Los Angeles (90046) and Washington (20009) demonstrate high Return on Investment (ROI) and are promising locations for real estate investment.
- Property values in these areas have shown significant growth over time, indicating favorable market conditions and potential for profit.
- Conducting thorough market research, financial analysis, due diligence, and seeking expert advice are crucial steps to make informed investment decisions and maximize returns in these regions.

RECOMMENDATIONS

Recommendation

- - Consider real estate investment in Los Angeles (90046) and Washington (20009) due to their higher Return on Investment (ROI) of approximately 69.5% and 63.6% respectively.
- - These cities offer favorable market conditions, desirable locations, and potential for future property value appreciation, making them attractive investment opportunities.

STEP

RNEXT

Next Step

- Conduct thorough market research to understand the real estate dynamics, including market trends, rental demand, vacancy rates, and future development plans in Los Angeles and Washington.
- Identify and evaluate suitable properties in the recommended areas based on location, property condition, price, and potential for value appreciation.
- Perform a comprehensive financial analysis, considering factors such as potential rental income, expenses, and projected cash flow, to assess the investment's financial viability and expected return.