

TOP 5

What are the best zipcode areas to invest in real estate?



Resources

Zillow Home Value Index (ZHVI)

April 1996 – April 2018

A measure of the typical home value and market changes across a given region and housing type. It reflects the typical value for homes in the 35th to 65th percentile range. Available as a smoothed, seasonally adjusted measure and as a raw measure



What does best mea

1. Long-Term Trends

Areas with the most consistent median house price growth over a data set period



2. ROI

Return on Investment comparing the start and end of dataset



Dataset details



14723 Rows of data



272 Columns



265 Columns as
monthly Median
house price



Ranging April 1996 –
April 2018



RegionName is the Zip
Code



DATASET

Project Strategy

1. Calculate ROI of all Region Names/ zipcodes
2. Select 5 Zipcodes that have the highest ROI
3. Evaluate the Zipcodes for trends and seasonality
4. Detrend the data to stationarity
5. Model the data
6. Forecast Median house prices in the selected areas

Determining Top 5 Region Names

1. Calculate Return on Investment ROI

$$\text{ROI} = \left(\frac{(\text{Return} - \text{Investment})}{\text{Investment}} \right) \times 100$$

Return on Investment (%)

2. Select top 5 RegionName with highest ROI

- 11211 – New York Kings
- 11222 – New York Kings
- 11216 – New York Kings
- 7302 – Jersey City Hudson
- 11215 – New York Kings

EDA – Explolatory Data Analysis

Annualized ROI Head & Tail

Top 5 Annualized ROI

	RegionName	City	CountyName	Annualized_ROI
117	11211	New York	Kings	11.847669
1155	11222	New York	Kings	11.571663
475	11216	New York	Kings	11.308317
191	7302	Jersey City	Hudson	11.056640
106	11215	New York	Kings	10.831426

Bottom 5 Annualized ROI

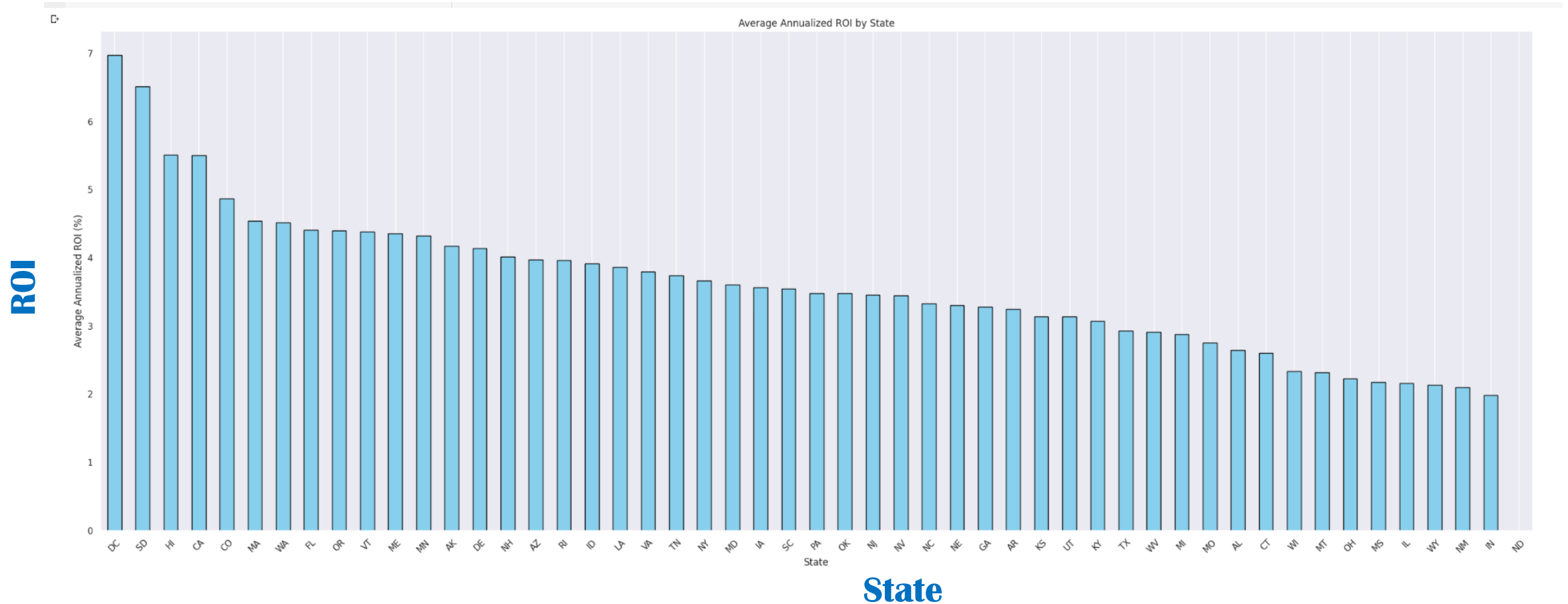
...
12016	13116	Minoa	Onondaga	2.047164
6938	13815	Norwich	Chenango	2.045872
12692	39663	Silver Creek	Lawrence	2.045789
12343	13480	Sangerfield	Oneida	2.045744
4	79936	El Paso	El Paso	2.045507

[12014 rows x 4 columns]

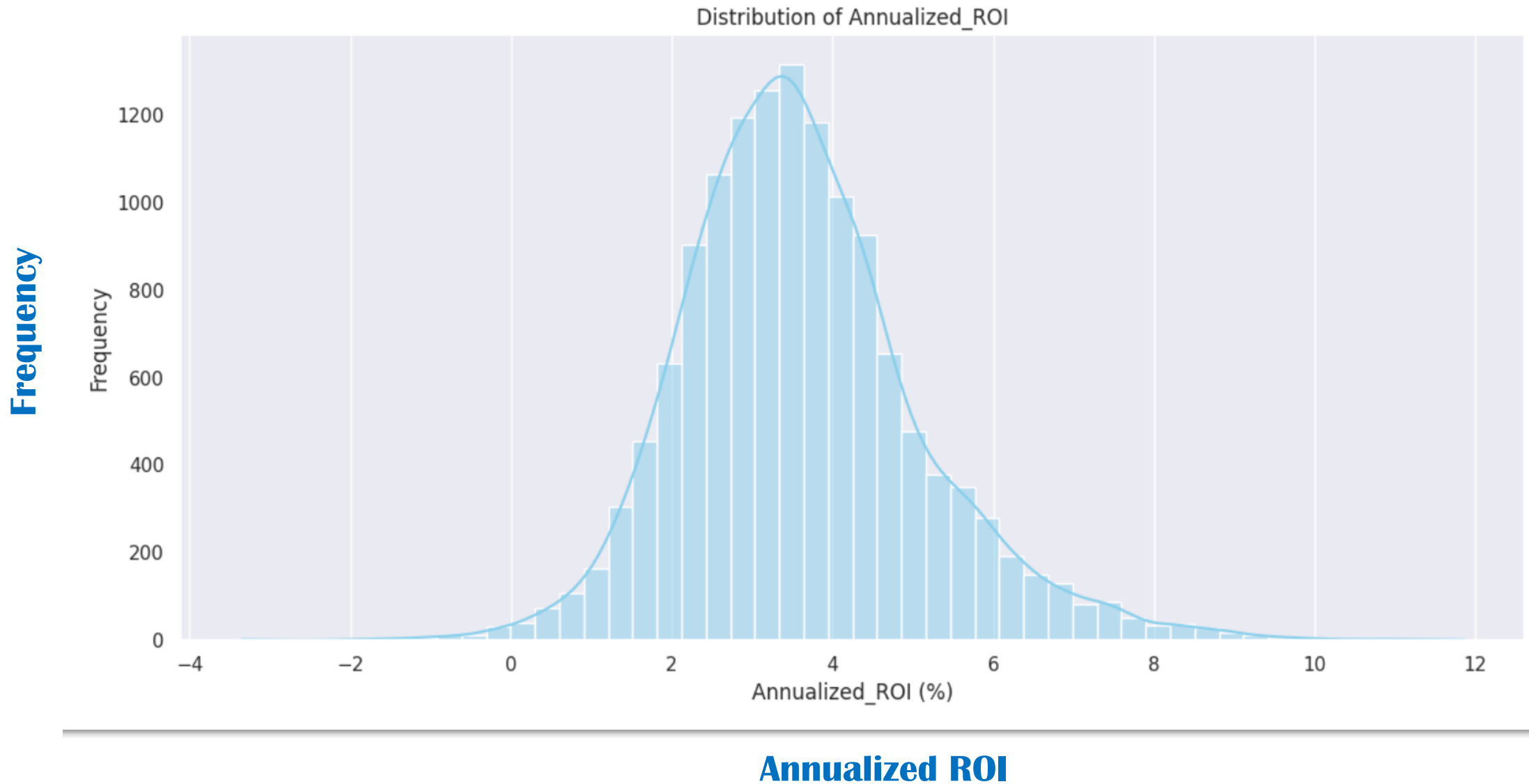
Annualised ROI by state

Highest is DC with 7%

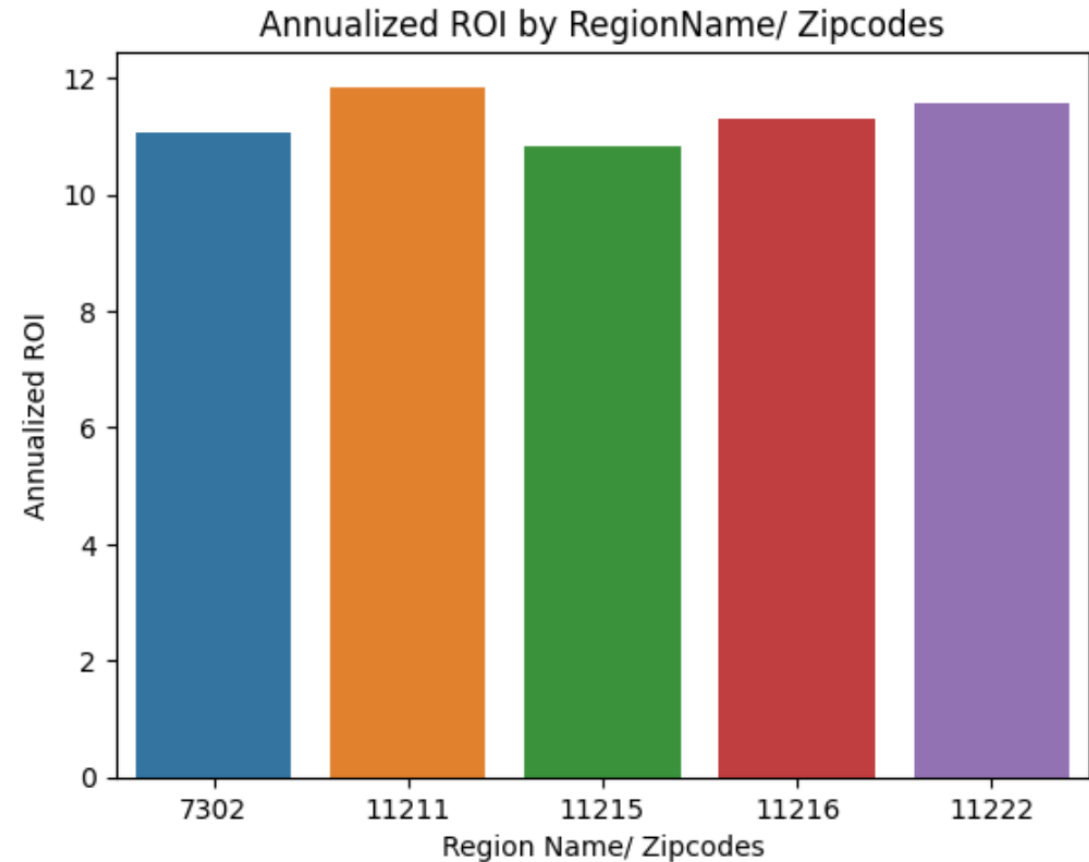
Lowest is IN with 2%



Annualised ROI by state

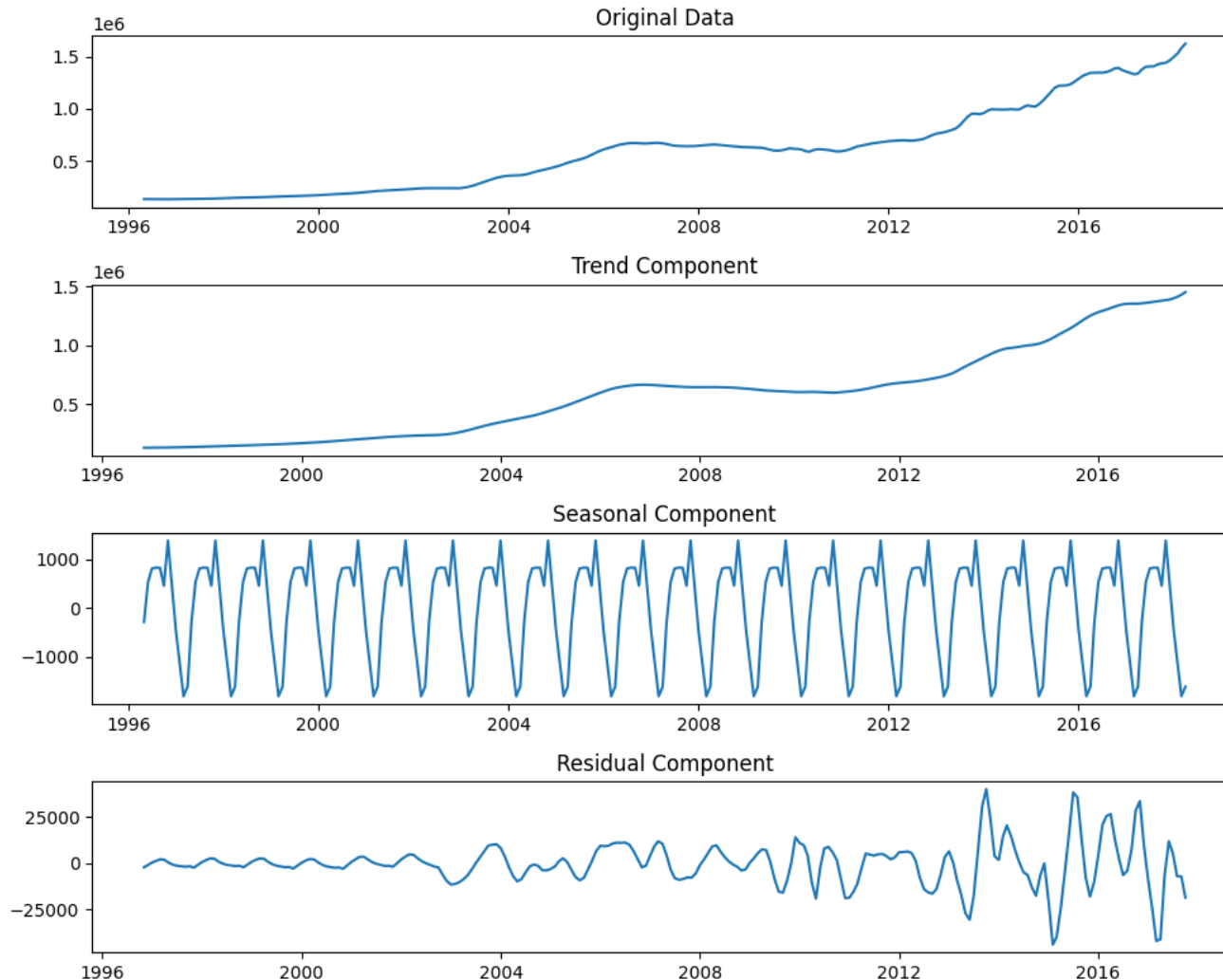


Top 5 Zipcodes with highest Annualized ROI



Trends and seasonality

11211 – New York, Kings



Several detrending options were explored including:

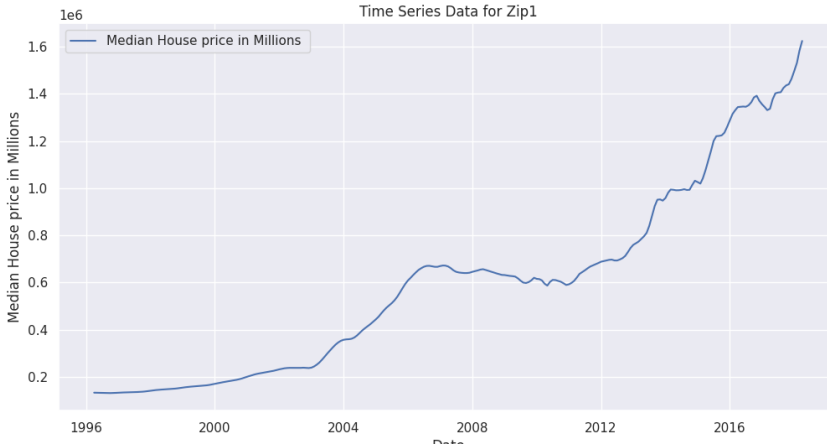
1. Differencing and higher order differencing
2. Polynomial Fitting
3. Moving average
4. And combination of log transformation and higher order differencing

Combination of log transformation and higher order differencing was found to be the most effective in detrending

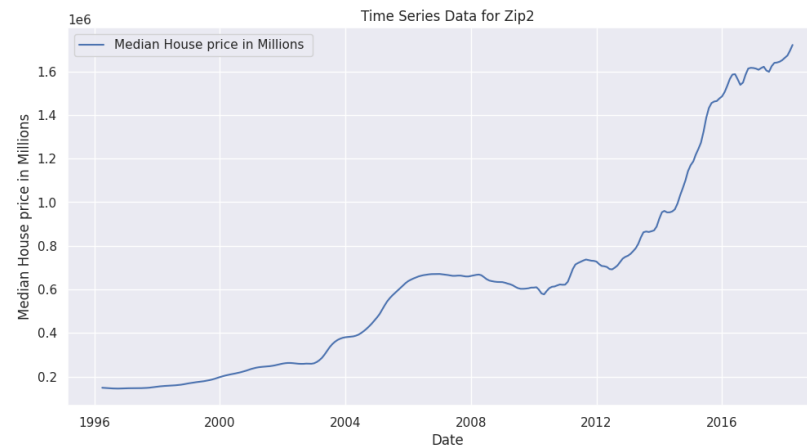
Trends and seasonality

Original Time Series

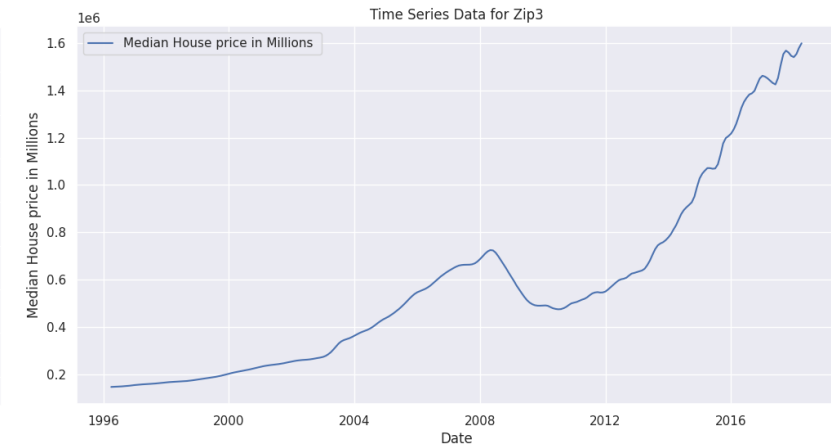
11211 – New York, Kings



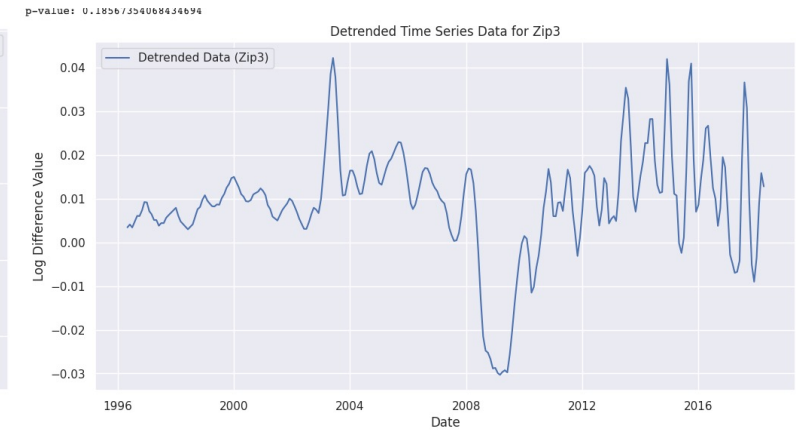
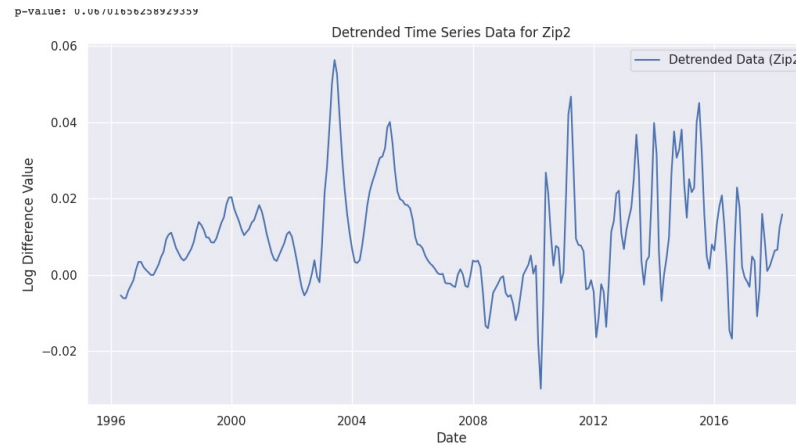
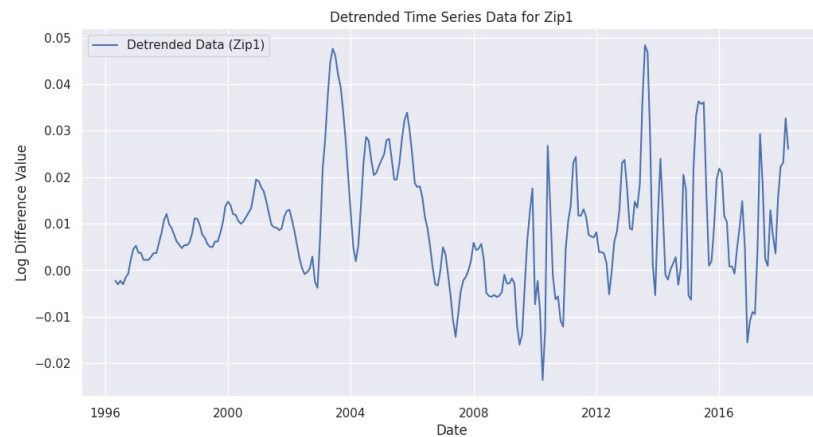
11222 – New York Kings



11216 – New York Kings

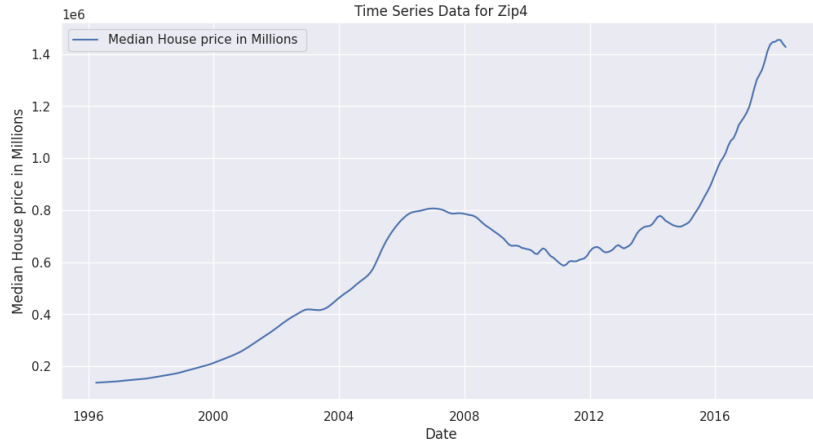


Detrended Time Series – Log Transformation and higher order differencing

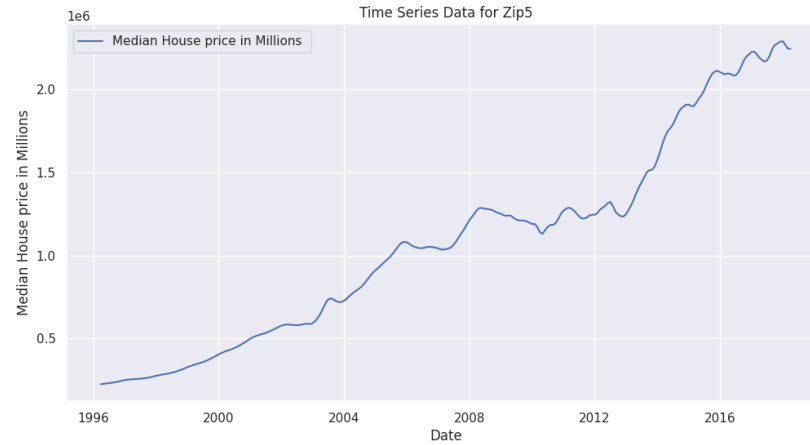


Trends and seasonality

11215 – New York Kings

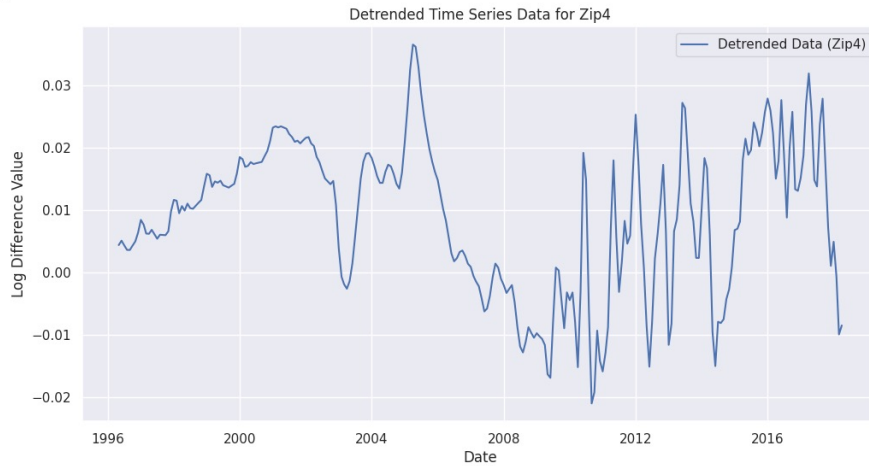


7302 – Jersey City Hudson

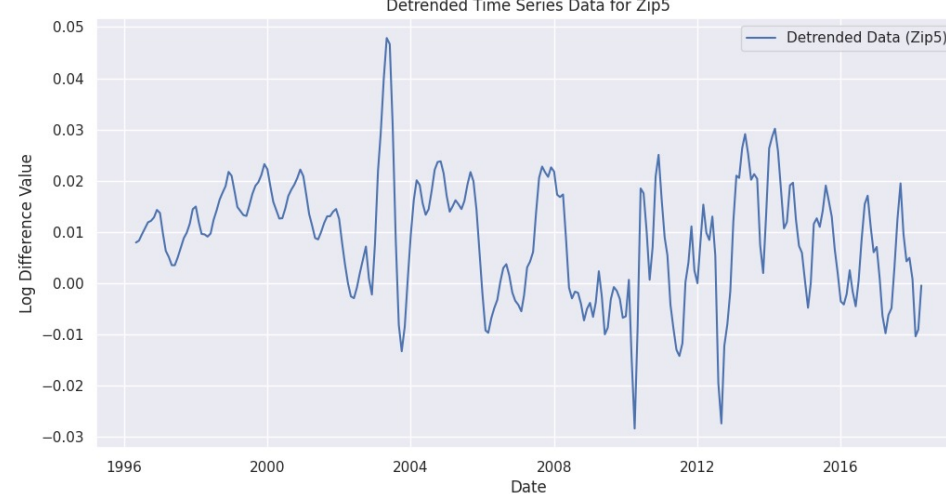


Detrended Time Series – Log Transformation and higher order differencing

p-value: 0.37041910802889655



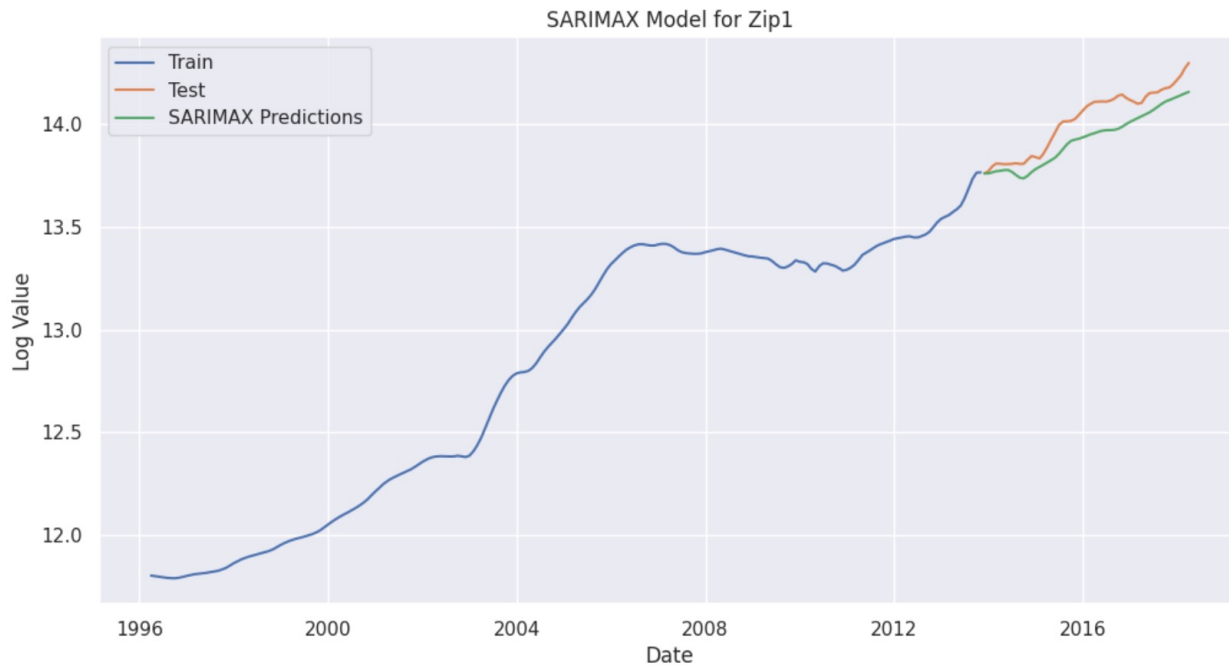
p-value: 0.00000000000000000



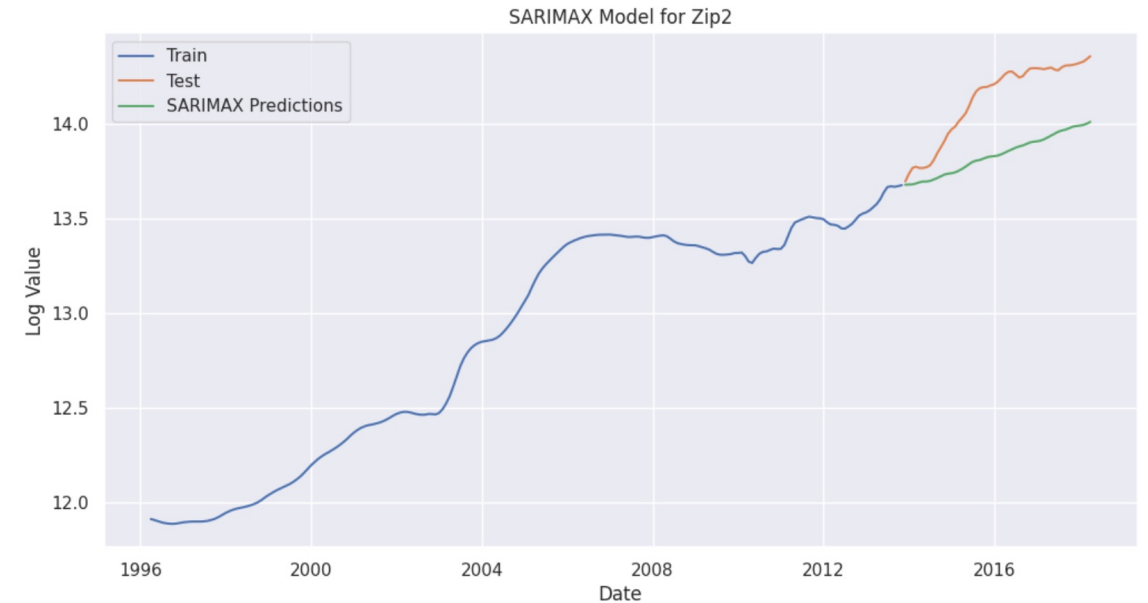
Modeling

After exploring several modeling options including SARIMAX was noted to be the best as it included Seasonality and Exogenous variables

11215 – New York Kings



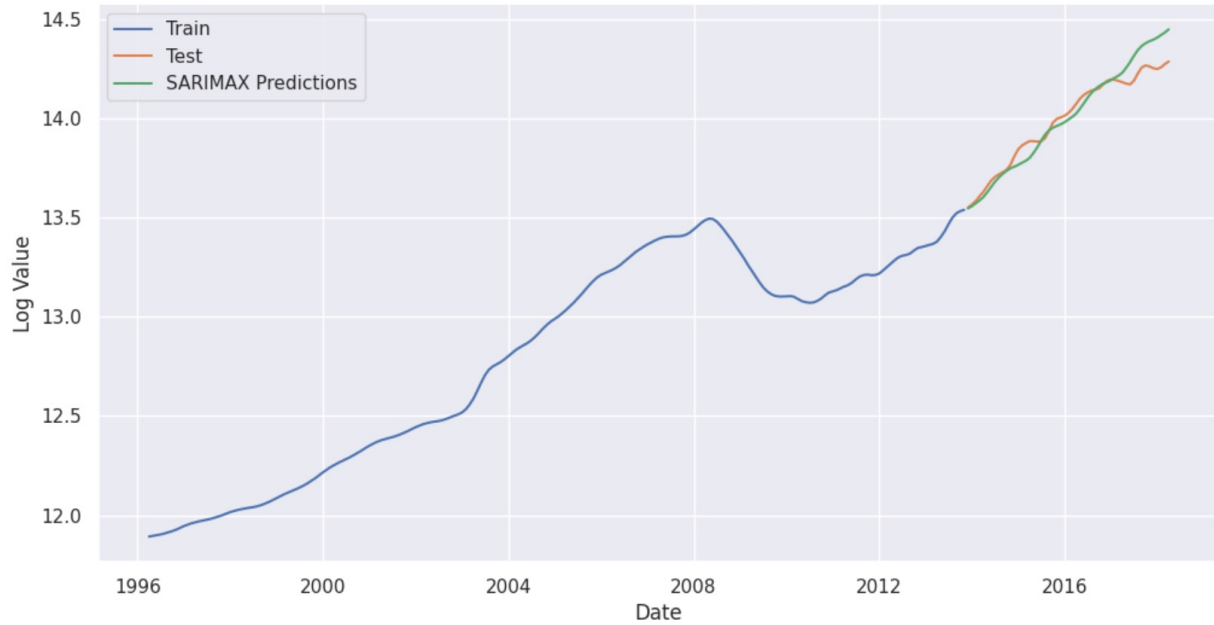
11222 – New York Kings



Modeling

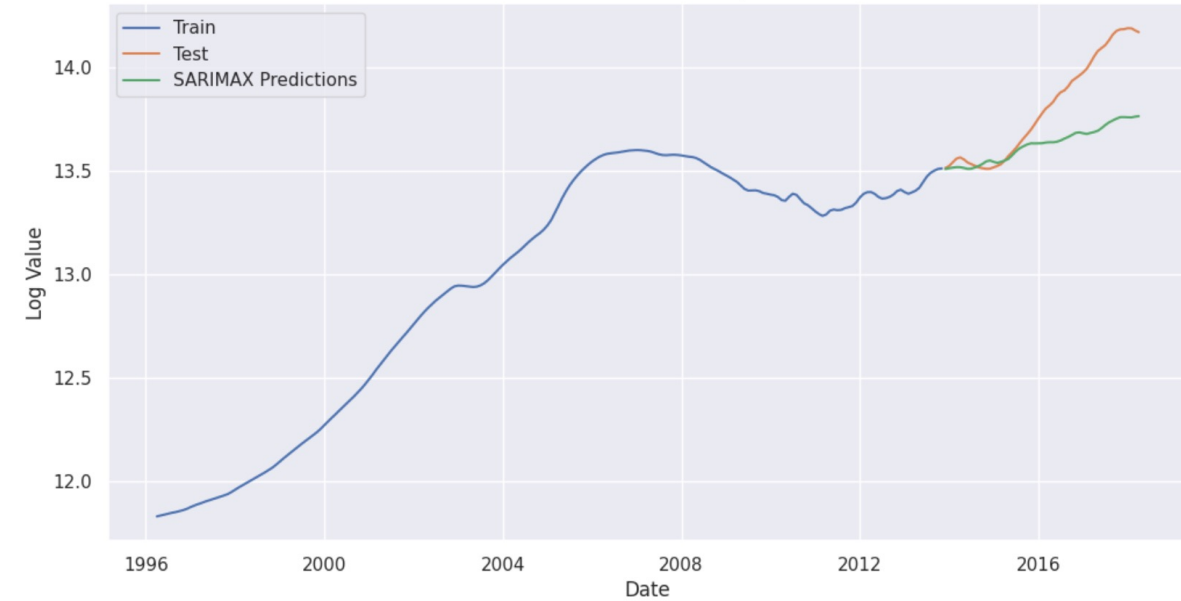
11216 – New York Kings

SARIMAX Model for Zip3



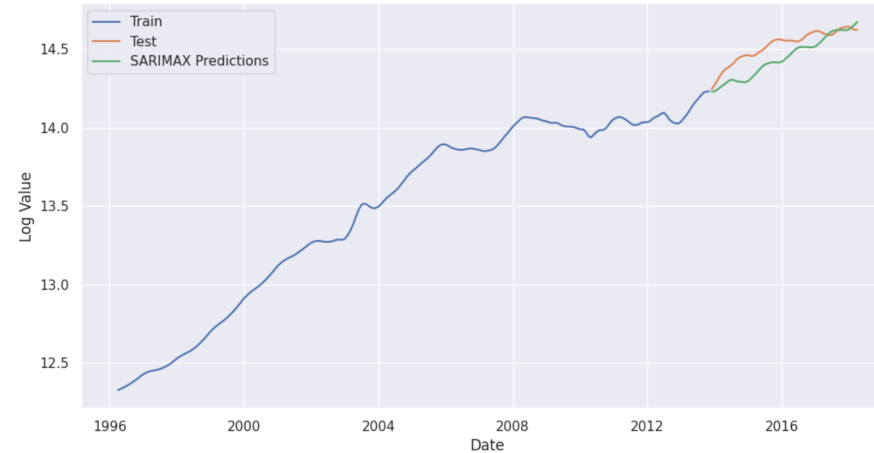
11215 – New York Kings

SARIMAX Model for Zip4

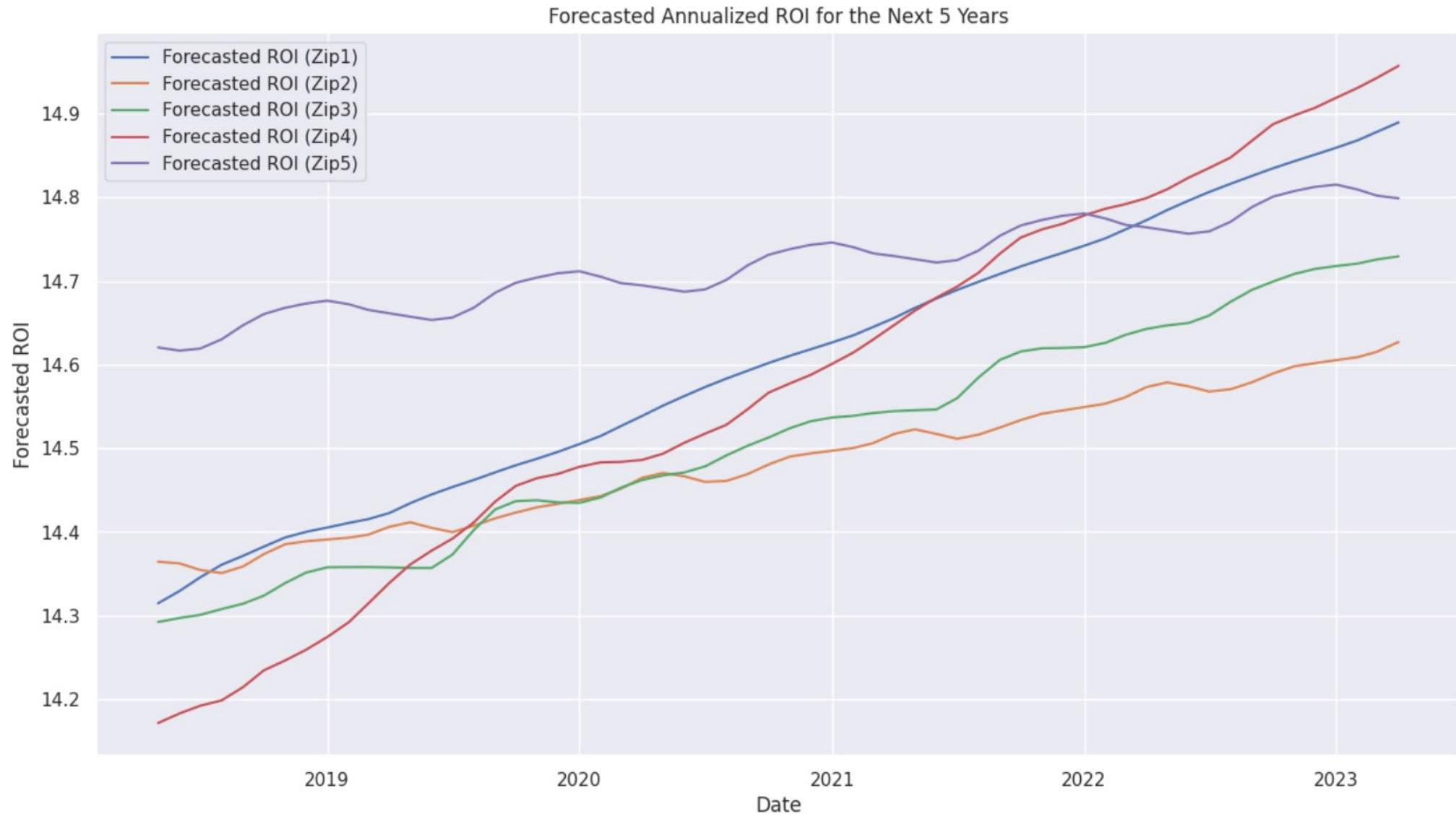


7302 – Jersey City Hudson

SARIMAX Model for Zip5



Forecasting – 5 Year Forecasted ROI



Conclusion

- Based on our model assumptions, the selected zipcode will continue to experience an annualised ROI of about 14% which should lead in significant growth in their investments
- Therefore it will be prudent to consider investing in any these 5 zipcodes

1. 11211 – New York Kings
2. 11222 – New York Kings
3. 11216 – New York Kings
4. 7302 – Jersey City Hudson
5. 11215 – New York Kings