



Time Series Analysis on NYC

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House Price Forecasting

Overview

Business Problem

Determine the 5 best zip codes of NYC (excluding Manhattan) to invest in

Data

Monthly records of ZHVI from April 1996 - April 2018 for 106 zip codes

Methodology

Analyze growth, risk, and forecast performance to determine best regions

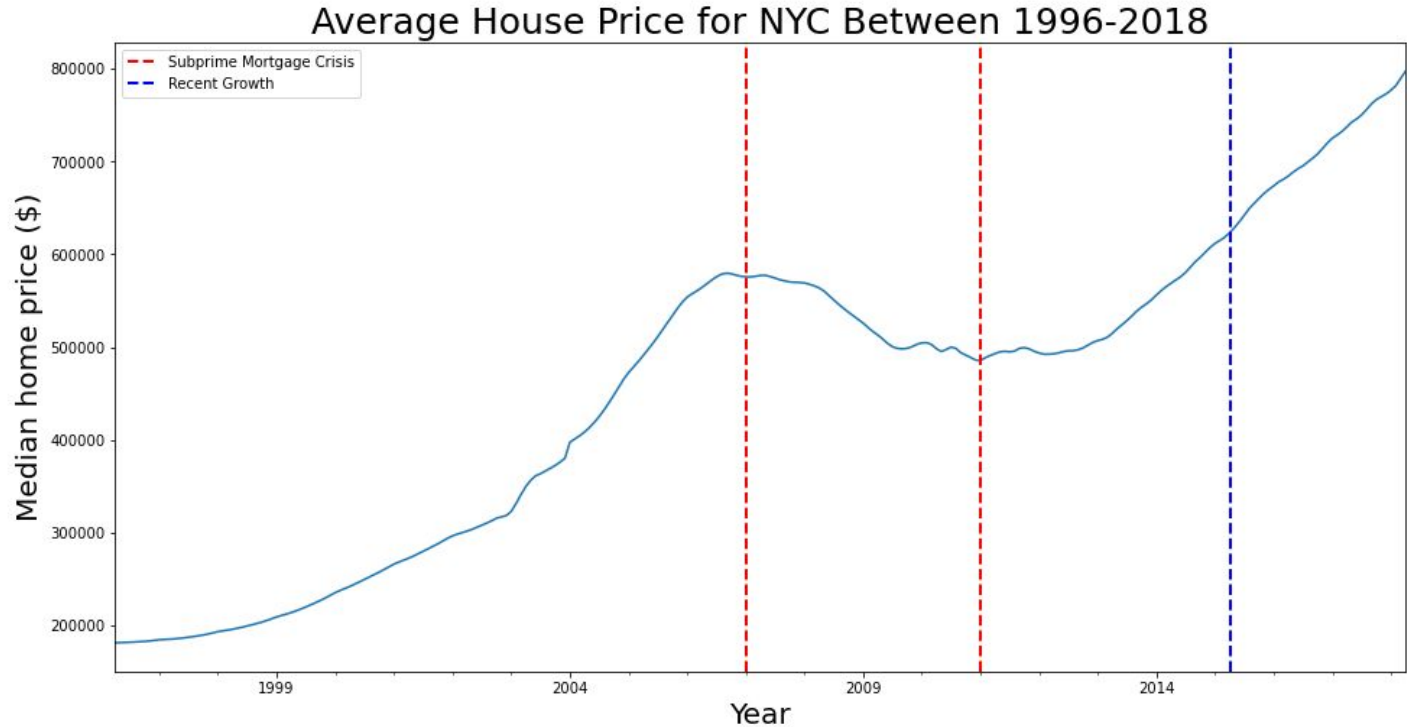
Selecting Regions

Growth

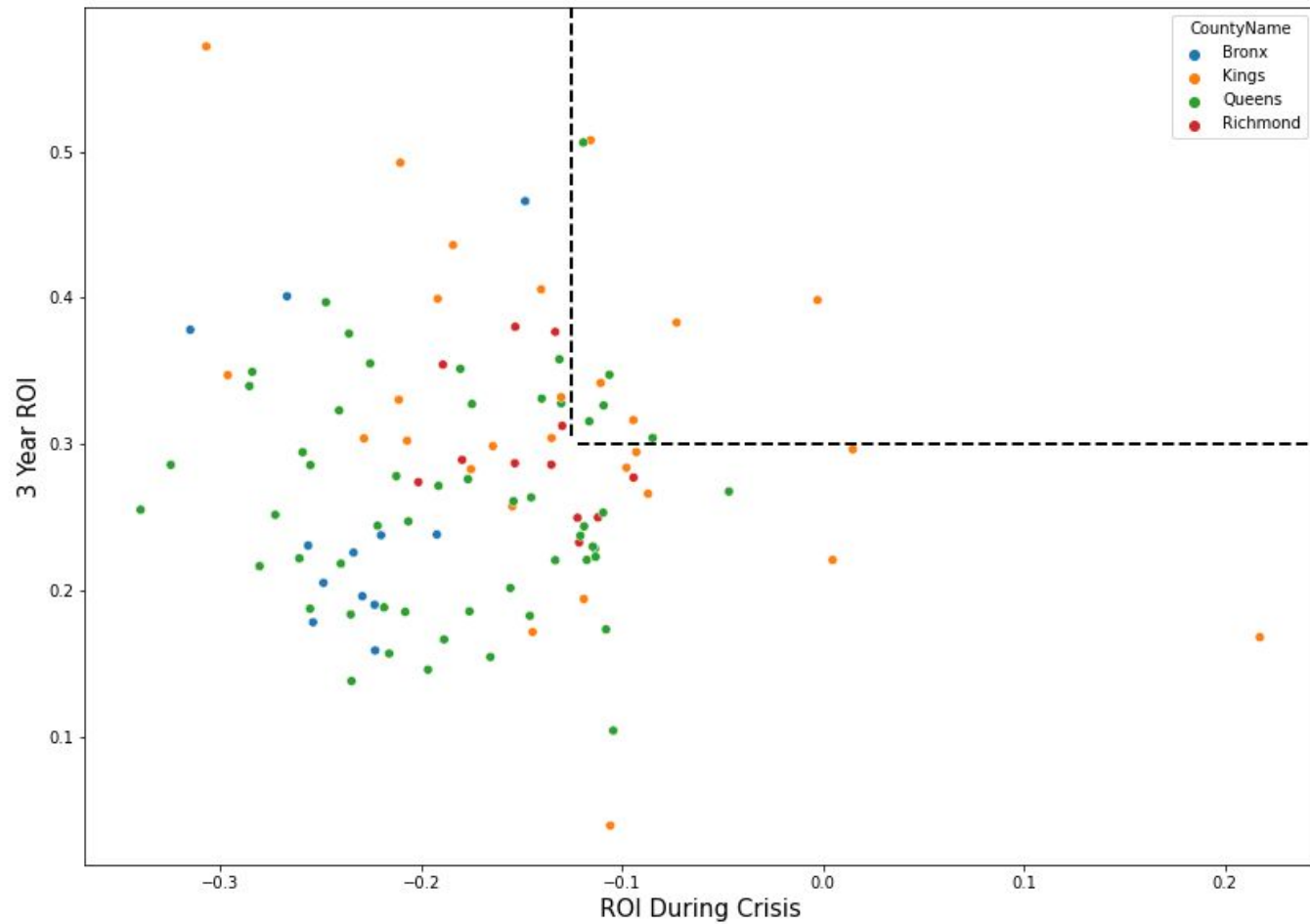
28% average growth
from past 3 years

Risk

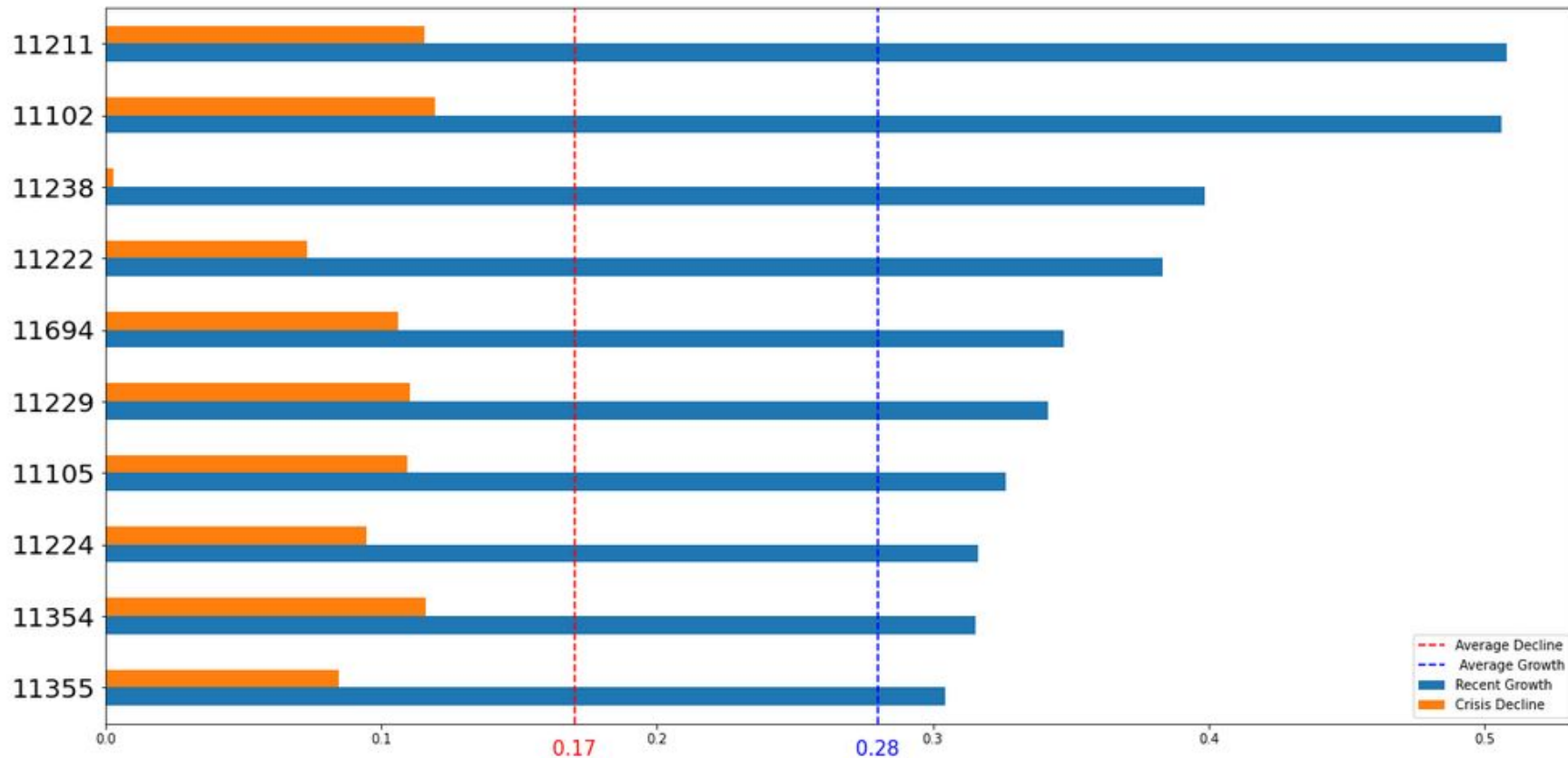
17% average decline
during crisis



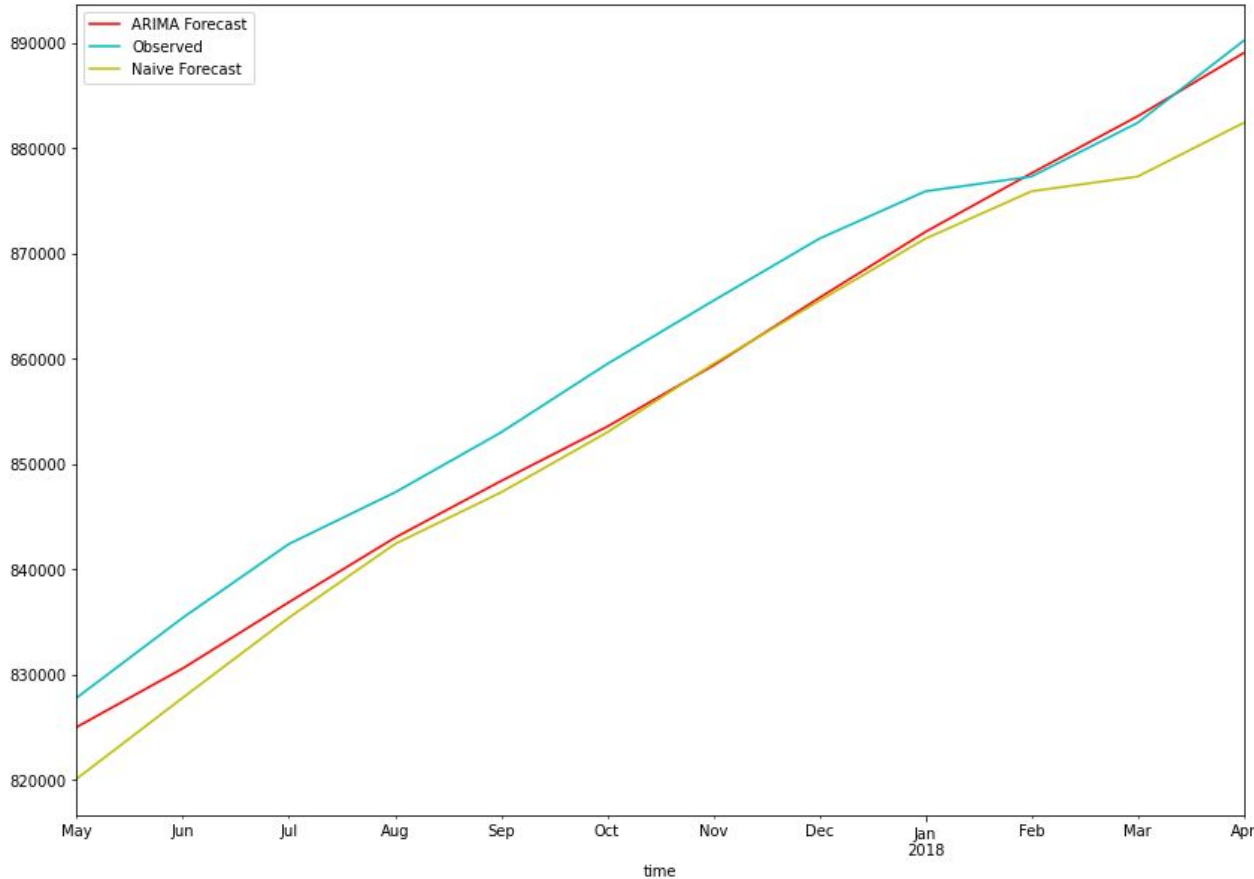
Growth vs Risk



Top Performing Regions



Forecasting Performance



Metrics for 11355:

Models tested on data
from May 2017 - April
2018

Naive Error: \$6087

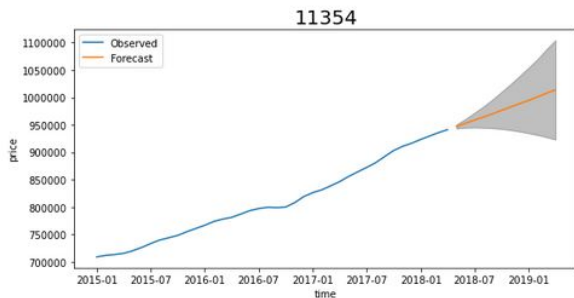
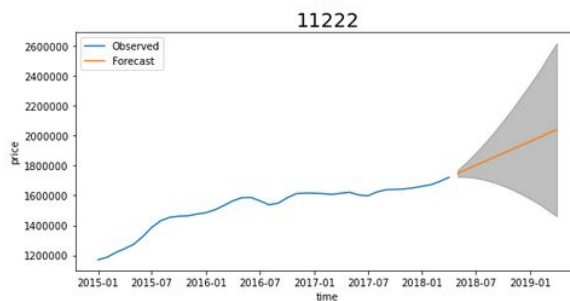
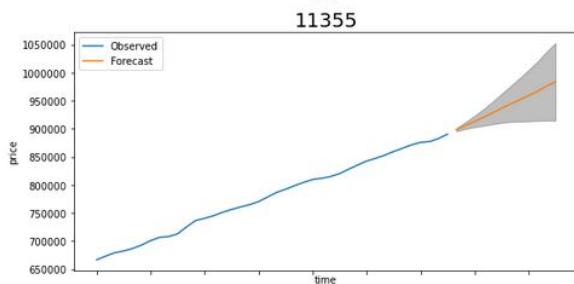
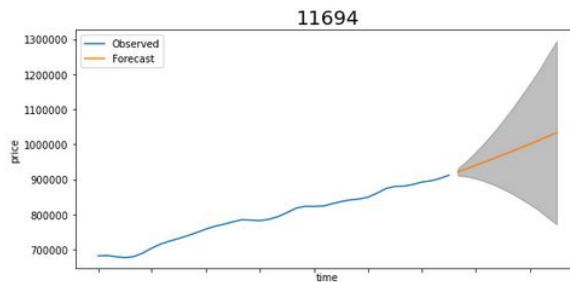
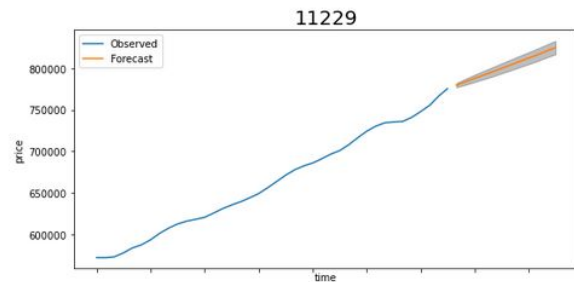
ARIMA Error: \$4310

Performance Results

	Zipcode	Naive Error	ARIMA Error	Difference
0	11354	8132.290000	5819.310000	-2312.980000
1	11355	6087.350000	4310.580000	-1776.770000
2	11694	7198.550000	7075.320000	-123.230000
3	11222	15125.750000	21464.650000	6338.900000
4	11229	6870.830000	13235.190000	6364.360000
5	11238	24660.170000	32969.390000	8309.220000
6	11224	4742.880000	13110.200000	8367.320000
7	11102	14333.290000	24581.230000	10247.940000
8	11105	7287.540000	45008.300000	37720.760000
9	11211	28681.620000	107397.580000	78715.960000

- Best regions determined by comparing forecast performance
- ARIMA out performed naive in 3 regions

Forecasting Details



Forecast Summary

Zip Code	Cost	1 Year Growth	Risk
11229	\$775,500	6.9%	±0.9%
11355	\$890,200	10.5%	±7.7%
11354	\$941,200	7.7%	±9.6%
11694	\$912,100	13.3%	±28.7%
11222	\$1,721,100	18.6%	±33.7%

Conclusion

Limitations

- Forecasts based on past prices
- External factors can affect prices

Next Steps

- Test out other modeling methods
- Include external factors such as income, mortgage rates, inflation

THANKS!

For additional questions or comments please contact me below:

Email: to.wesleyyu@gmail.com

Github:

<https://github.com/whyyoutoo/Forecasting-House-Price-Time-Series>

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