Time Series Analysis For Home Price Prediction

Using data from 8 different zip codes in the Fort Lauderdale, FL area

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March 2021

Problem statement

I was hired by my wealthy friend to look into the best locations in and around Fort Lauderdale for her to make an investment in a second home.

She wants to hold onto the home for 2 years before selling. Additionally, she asked me to compile several investment choices for her, each with its own justification, and to select an overall winner from this group of top choices.

Primary goals:

1. Identify several different metrics or KPI's on which my friend can make his investment decision.

2. Calculate which zip code scores the best for each KPI.

3. Quantitatively select an overall winner

Dataset overview

Original dataset:

- Monthly data on the average home price by zip code for 14,723 zip codes between January, 1998 and April 2018.

Final dataset:

- Filtered for the 8 zip codes considered to be a part of Fort Lauderdale;

- Filtered for only the most recent 6.5 years of data (from January 1, 2012 onward, to avoid factoring the financial crisis of '08 into the resulting forecasts)
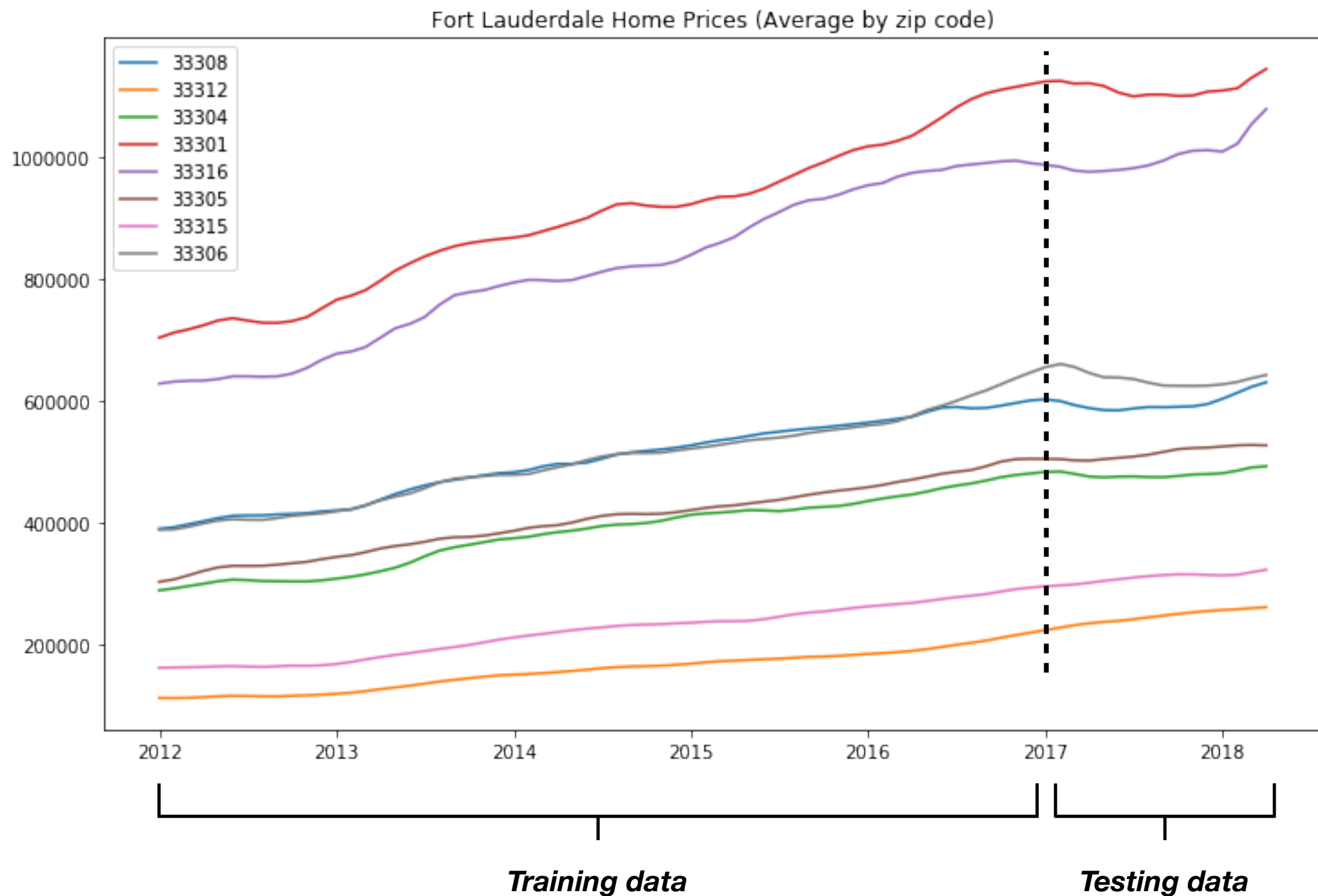
- **33308**
- **33312**
- **33304**
- **33301**
- **33316**
- **33305**
- **33315**
- **33306**

Methodology

Fort Lauderdale Home Prices (Average by zip code)

KPI's for analysis:

- **Which zip code is the least risky to invest in** (where risk is defined as the one-sided range of the 95% confidence interval divided by the forecasted price for the final period)**?**

- **Which zip code will display the greatest overall price increase** (i.e. which zip code will return the most cash, nominally)**?**

- **Which zip code will deliver the greatest return on investment** (i.e. which zip code will return the most cash as a percentage of the cost of the initial investment)**?**

- **Forecast timeframe:** May, 2018 through January 2020

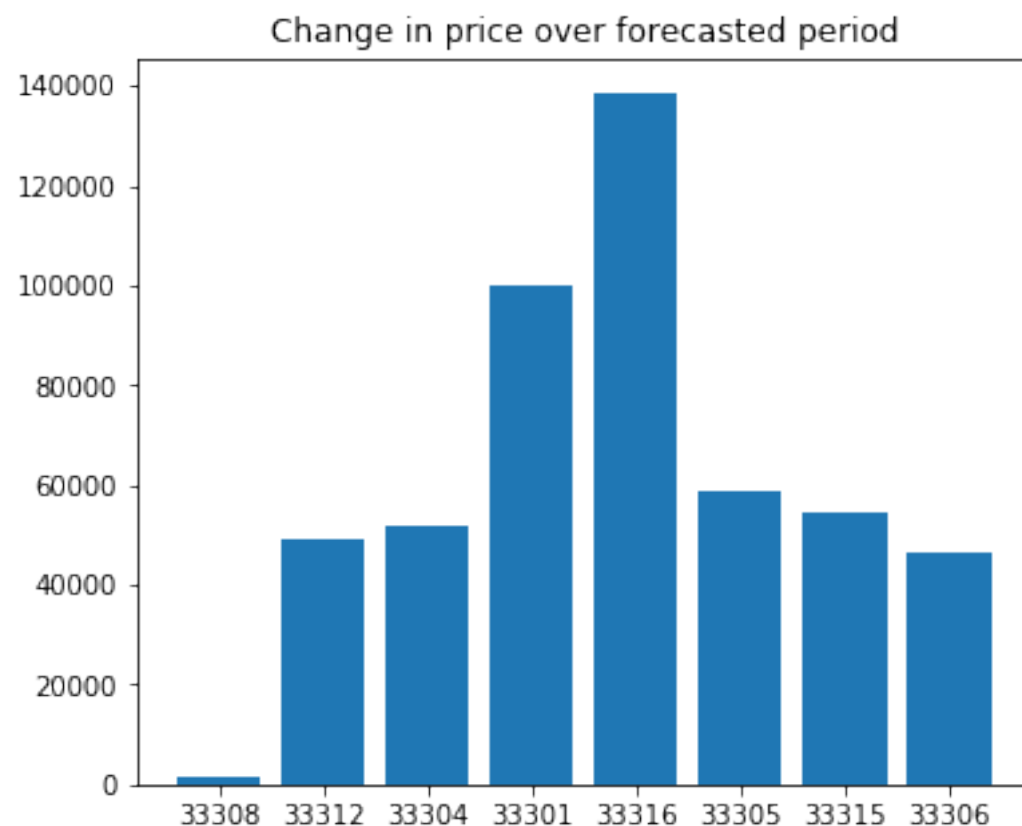# RESULTS

1. Which zip code is the least risky to invest in?

Risk (C.I. range as a % of final forecasted price)

DF7 33315

DF2 33312
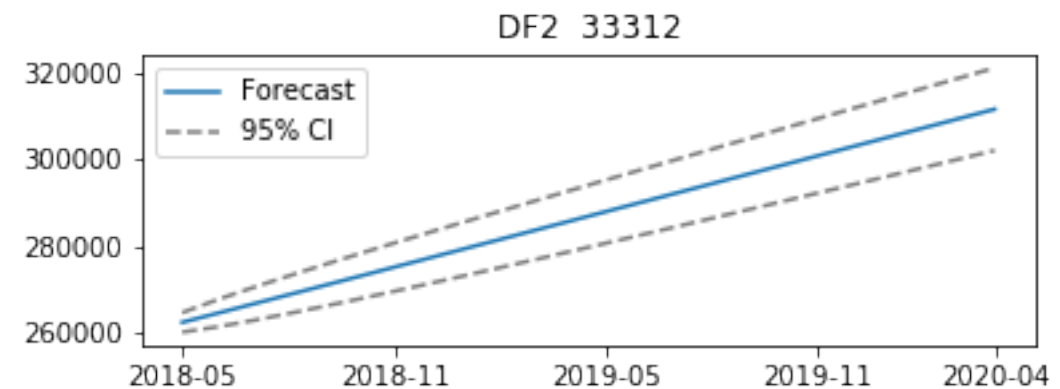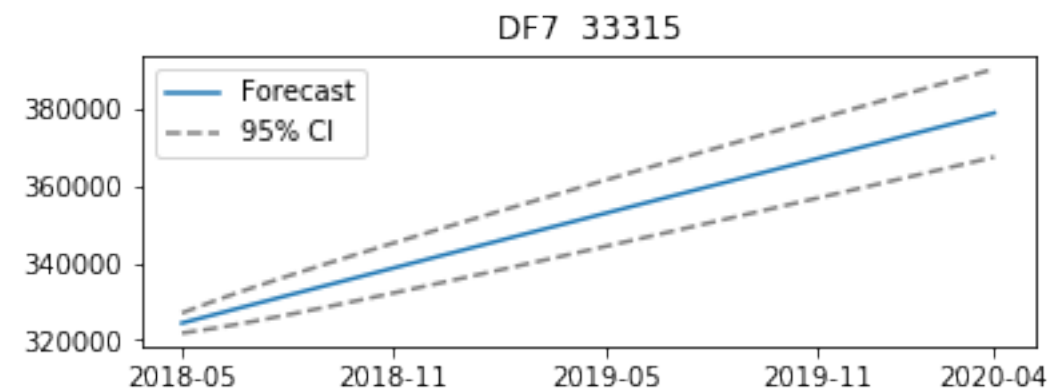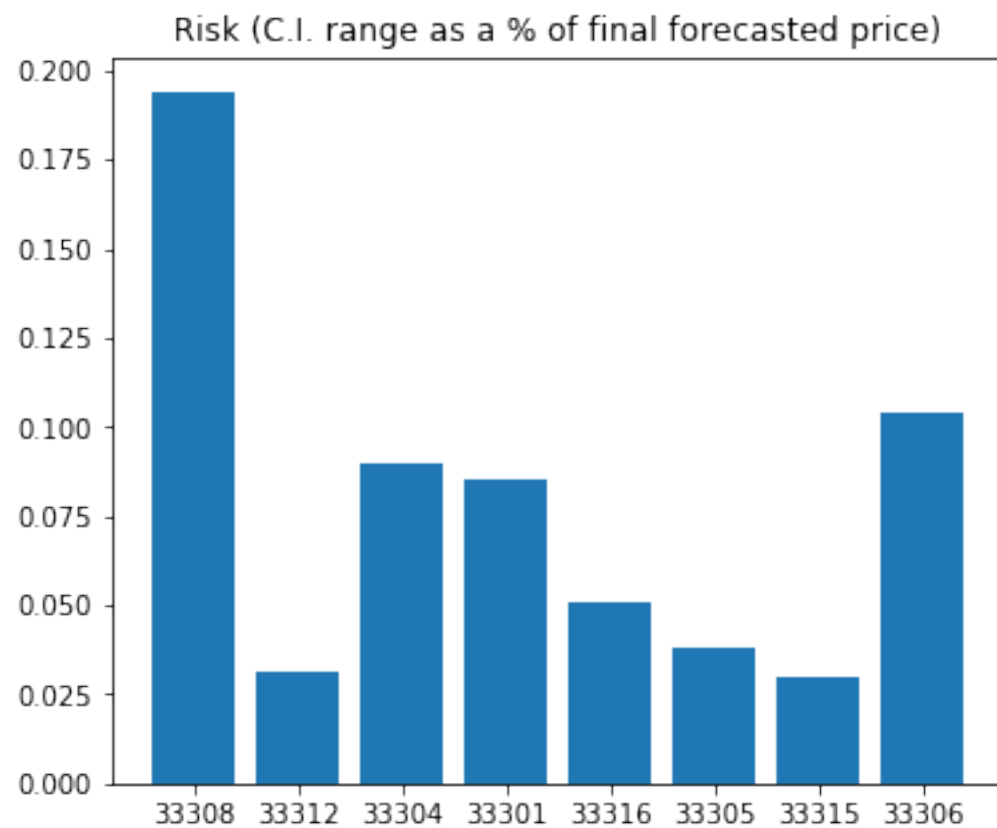
Recommendations:
- Zip code 33315 had the lowest "one-sided C.I. to final-forecasted-price" ratio of 3%
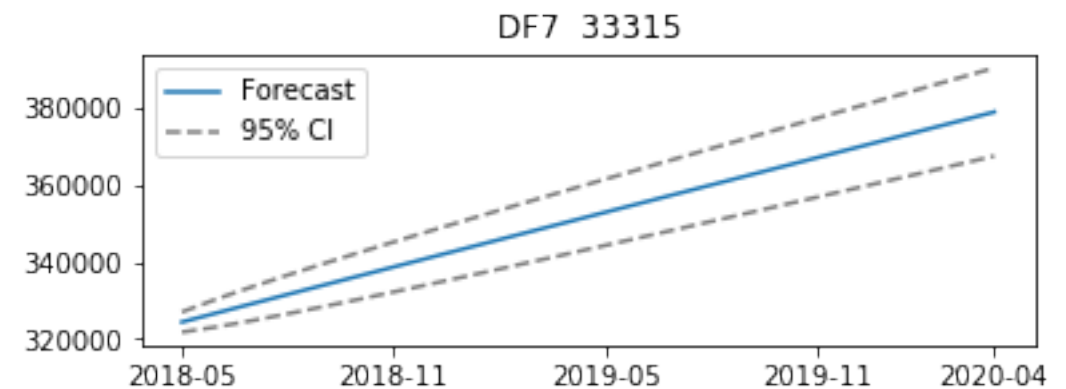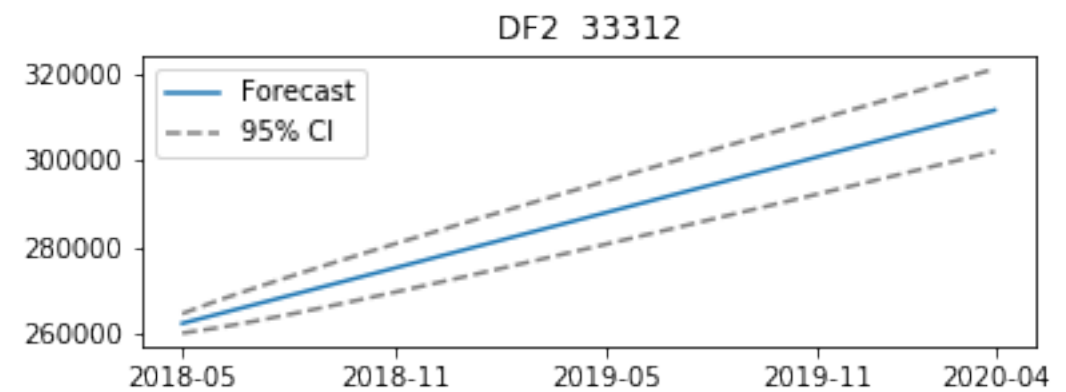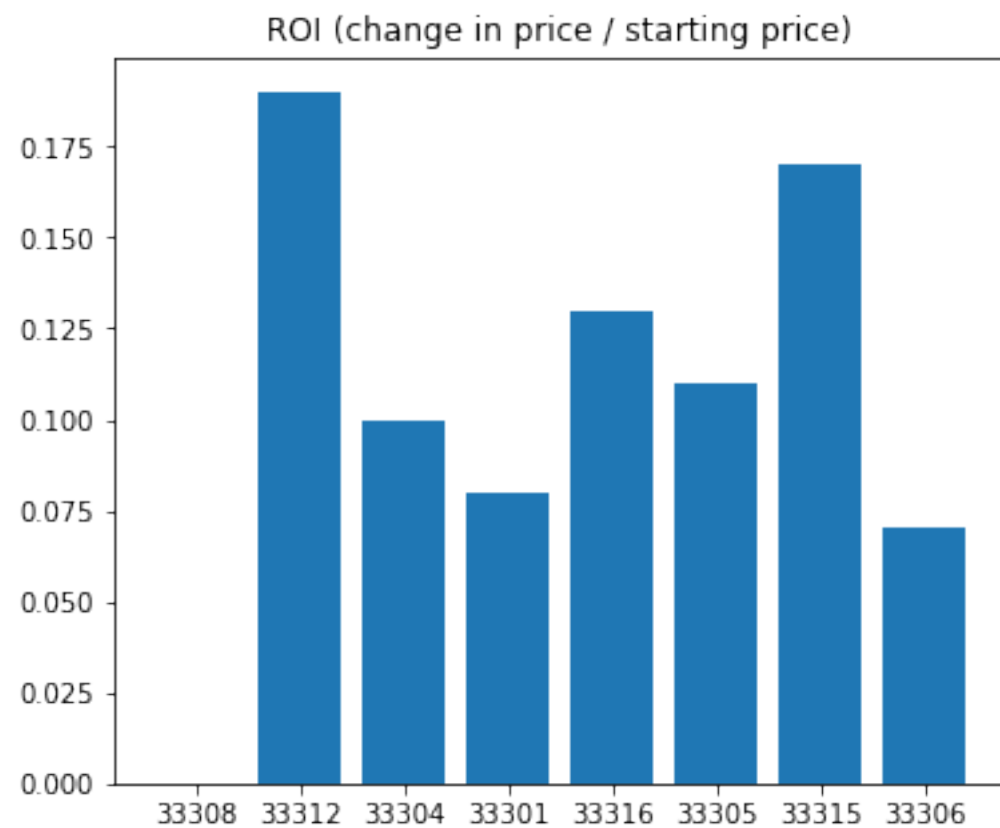- Zip code 33312 was a close second with a ratio of 3.1%

2. Which zip code will display the greatest overall price increase?
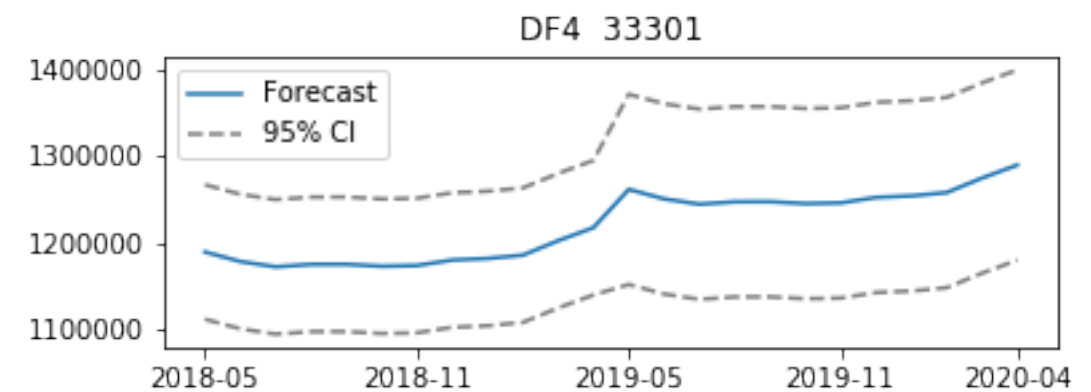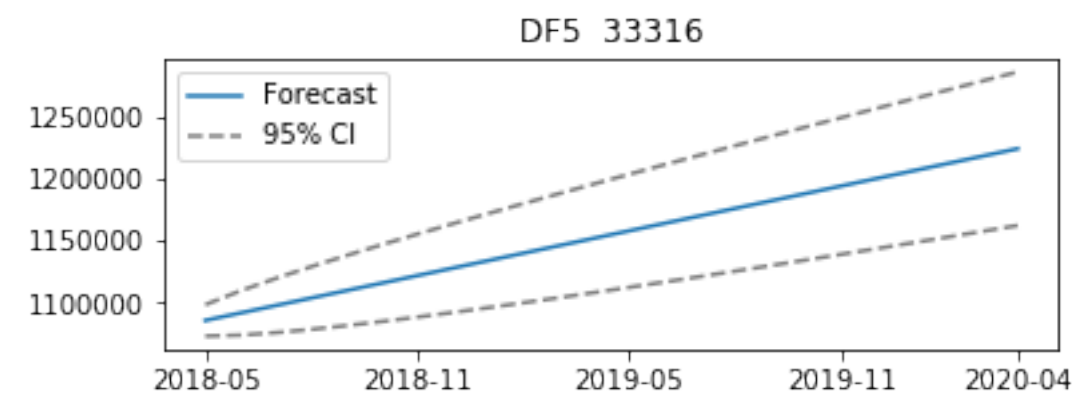
Recommendations:
- Homes in zip code 33316 will increase by $138.5k on average over a 2-year period
- Homes in zip code 33301 will increase by $100.1k on average over a 2-year period

3. Which zip code will deliver the greatest return on investment?

Recommendations:
- Homes in zip code 33312 will deliver an ROI of 19% on average over a 2-year period.
- Homes in zip code 33315 will deliver an ROI of 17% on average over a 2-year period.

Summary of Recommendations

	Least risky	Greatest price increase	Best ROI
Winner:	33315 (3.0%)	33316 ($138.5k)	33312 (19%)
Runner-up:	33312 (3.1%)	33301 ($100.1k)	33315 (17%)

Overall winner:
- 33312
- *33312 has a slightly lower risk to ROI ratio than 33315, making 33312 the overall winner*

Future work

1. Which zip code would return $50k the fastest with the least associated risk?

2. How do the investment opportunities in the Fort Lauderdale area compare to those in other major Floridian cities, such as Miami, Orlando, Tampa?

Thank you!

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