USING TIME SERIES FORECASTING TO ANALYZE HOME PRICES

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BUSINESS CASE

- An investment firm would like to deploy **$500,000** across **five** different zip codes in **single family homes**

- They must analyze which **zip codes** are most suitable to invest in based on their **risk/return** profile

- Setting out to **hold** each property for **one to three years**

- Intend to purchase homes in the **immediate to near future** as interest rates are at all time lows, prices continue to rise, and supply remains limited

NARROWING THE SEARCH DOWN TO TEXAS

- Favorable **tax code** - no state income tax

- Strong in place industries – oil & gas
  - Home to HQ of 24 Fortune 500 companies

- Increasing popularity amongst legacy and new **technology** companies
  - Especially in Austin and other metros

- Impressive **migration** statistics
 - Over the pat 10 years, population has increased by 16%, 3rd largest out of all 50 states

ANALYZING THE TOP METRO AREAS

- Begin search by narrowing the state of Texas down to its **ten largest metropolitans** by population
  - **Primary Market:** Harris, Dallas, Tarrant, Bexar, Travis,
  - **Secondary Market**: Denton, Collin, El Paso, Montgomery, McLennan
- Investing in primary and secondary markets because they are both **high quality** but have slightly different make ups
  - Primary markets: Lower **capitalization rate** – more interest rate risk, stronger **migration** patterns, more **diverse economies**
  - Secondary markets: Higher **capitalization rate** – less interest rate risk, lower **migration** statistics, more **concentrated economies**
- Next Steps: Observe **economic resiliency** and **growth characteristics**

ECONOMIC RESILIENCY

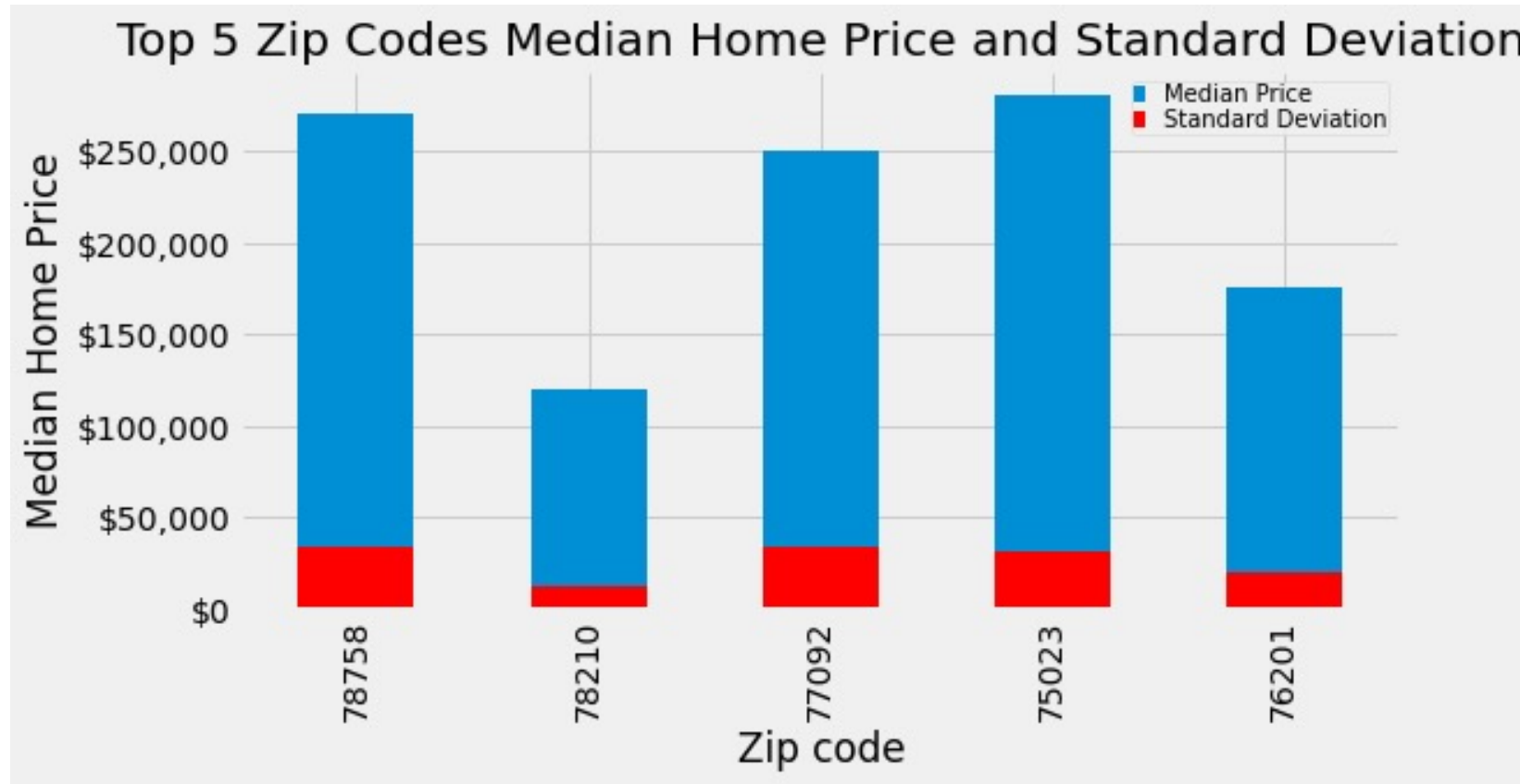- Use the strength of each zip code's recovery to the 2008 housing crisis as a proxy for economic resiliency

- Seeking zip codes that were **minimally impacted** and recovered quickly

- Ensure there will be an opportune time to **sell within one to three years** even if the housing market declines

- Move forward with: Travis, Harris, Bexar, El Paso, Collin, Denton

Days Until Median Home Price Reached Pre '08 Home Price
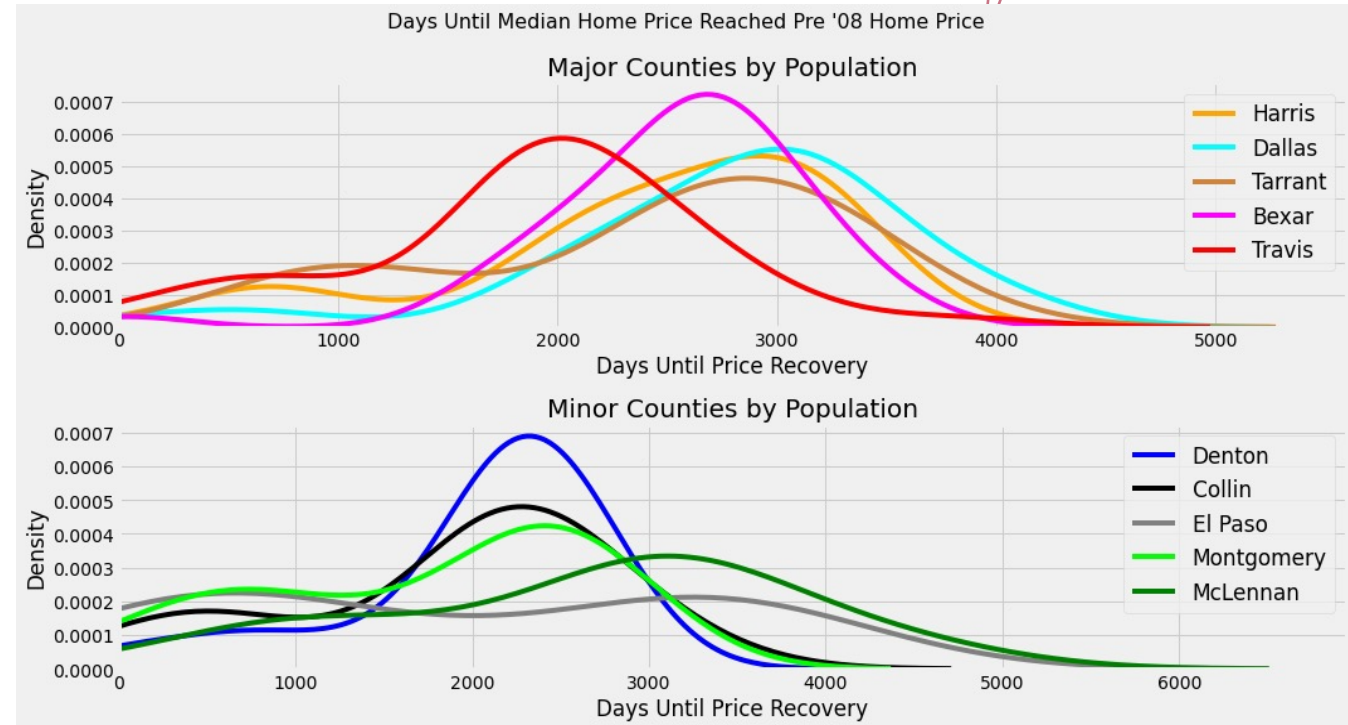
TOP GROWTH PROSPECTS
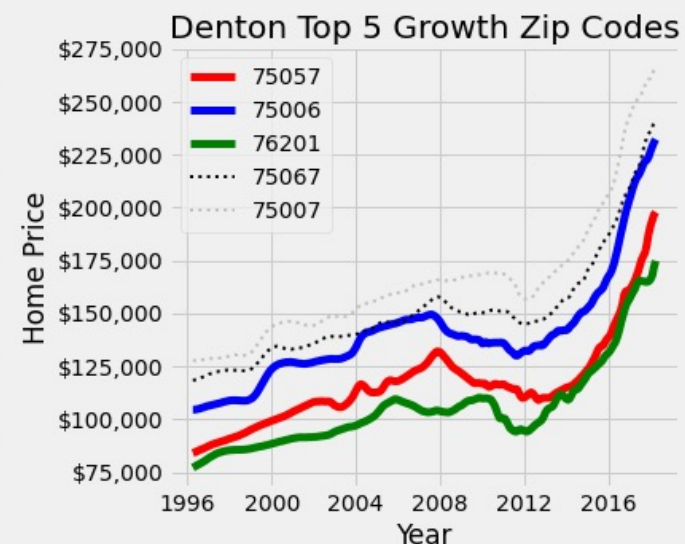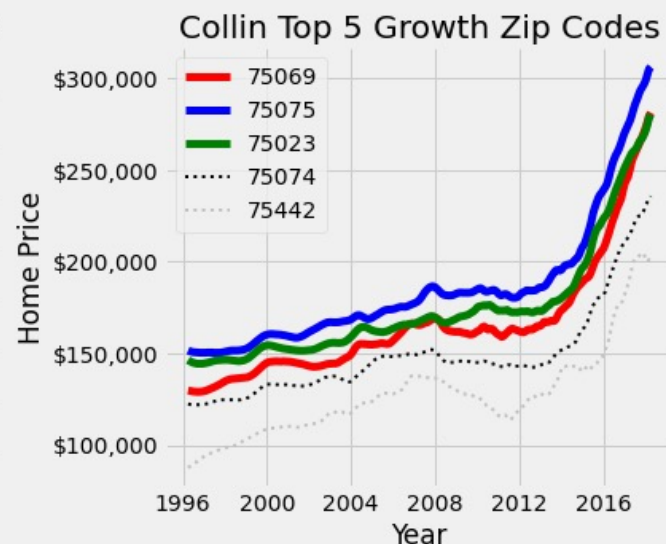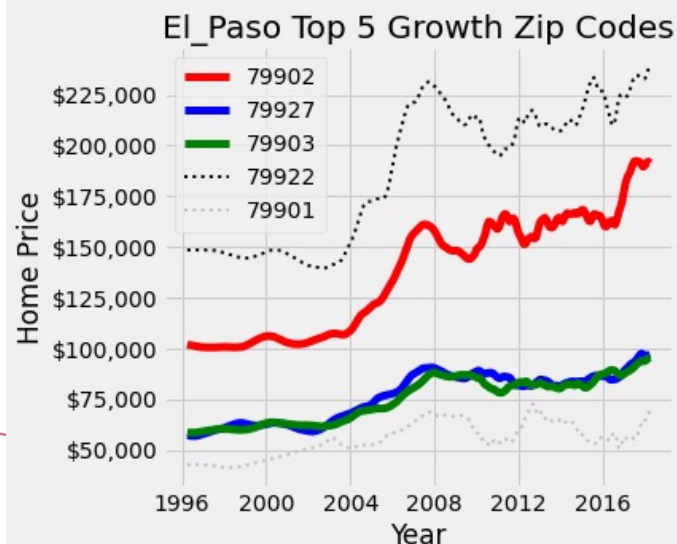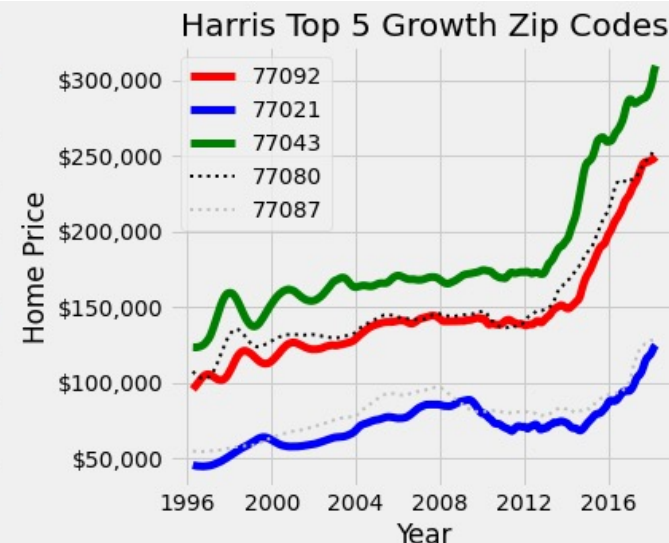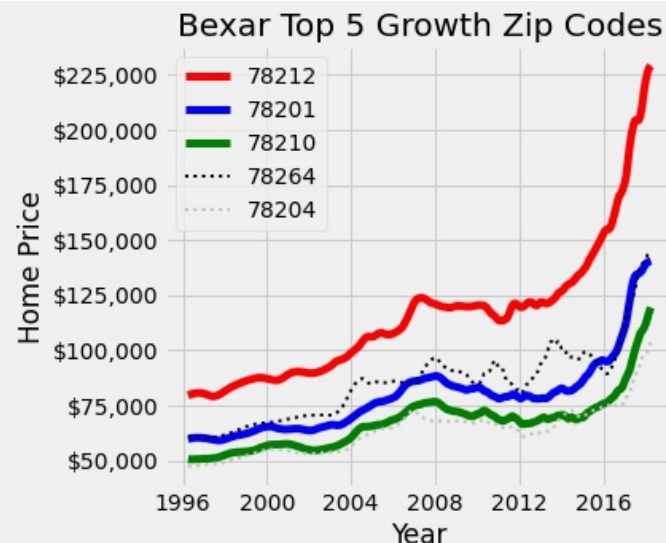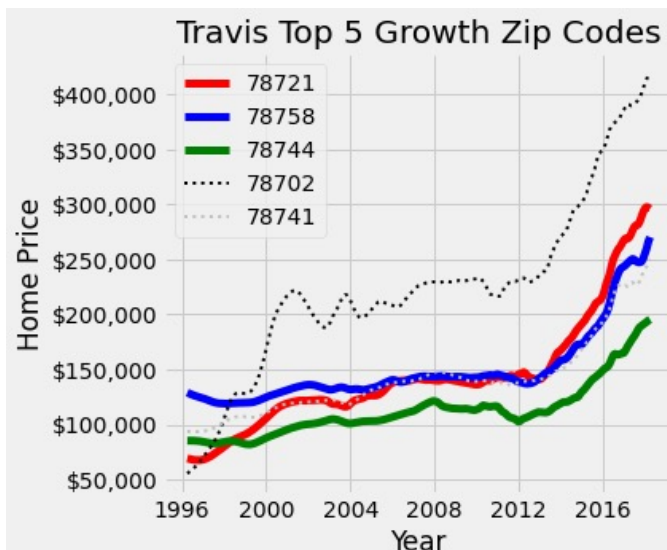
PRICE OF THE TOP ZIP CODES TODAY

Top 5 Zip Codes Median Home Price and Standard Deviation

TOP ZIP CODES' PROJECTED RETURNS

- Observe the growth rate of the top five zip codes

- Black bar represents the growth of the average zip code in Texas

- Focused on percent change as opposed to absolute increase in dollar amount

Annual Return of Top 5 Zip Codes Compared to Avg. Texas Median Home

Legend:
- 78758
- 78210
- 77092
- 79903
- 76201
- Avg Texas Home Price

Y-axis: Home Price ($), ranging from $50,000 to $350,000

X-axis: Time (years), from 1996 to 2020

ESTIMATED RETURNS

- Hold Period

- Holding until at least May makes a significant difference on overall return
  - Highest marginal return in Nov 2019 and Apr 2020

- $500,000 invested in May 2018 has a project value of $687,000 in May 2020
  - 1 year hold - 15% return (15% Annualized RoR)
 - 2 year hold - 37% return (18.5% Annualized RoR)

Projected Returns ($500,000)

$687,003

$568,947

$550,227

$519,792

Median Home Price ($) — $750,000, $700,000, $650,000, $600,000, $550,000, $500,000

Time (Months) — Apr 18, Jul 18, Oct 18, Jan 19, Apr 19, Jul 19, Oct 19, Jan 20, Apr 20, Jul 20
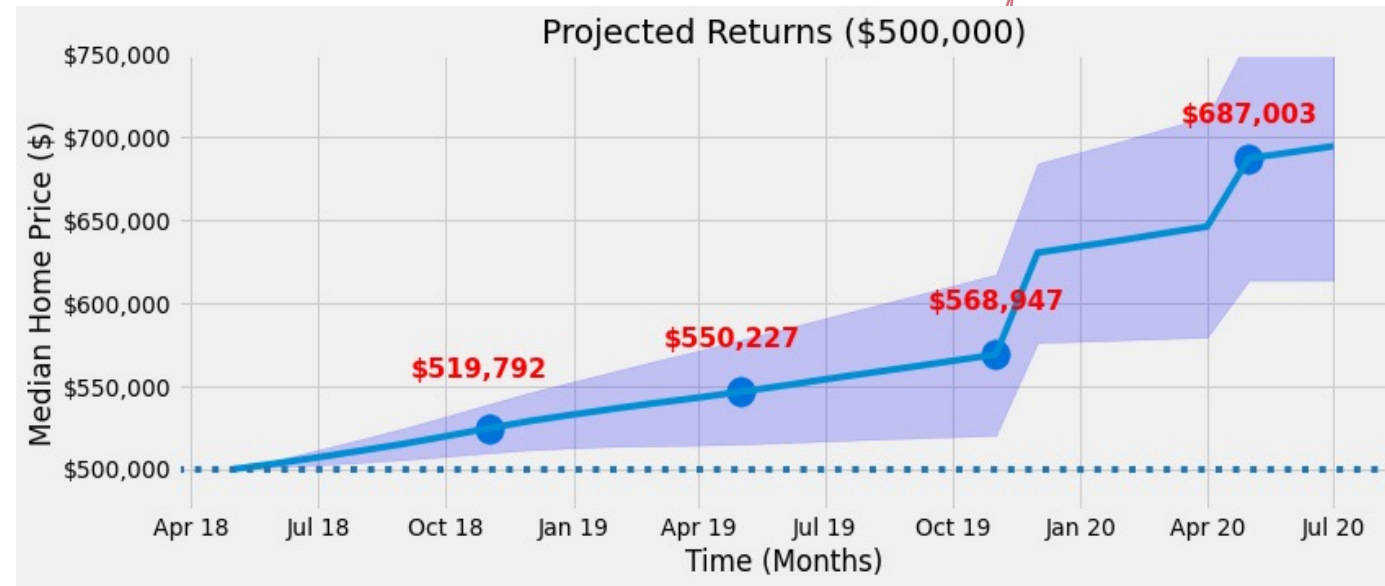
Based on a $500,000 initial investment spread across five different homes and zip codes

SEASONALITY – TIMING IS ESSENTIAL

- ## Zip Codes
  - 78210: Buy in April, sell in December
  - 78758: Buy in July, sell in November
  - 77092: Buy in July, sell in October
  - 76201: Buy in April, sell in January
  - 75023: Buy in April, sell in July
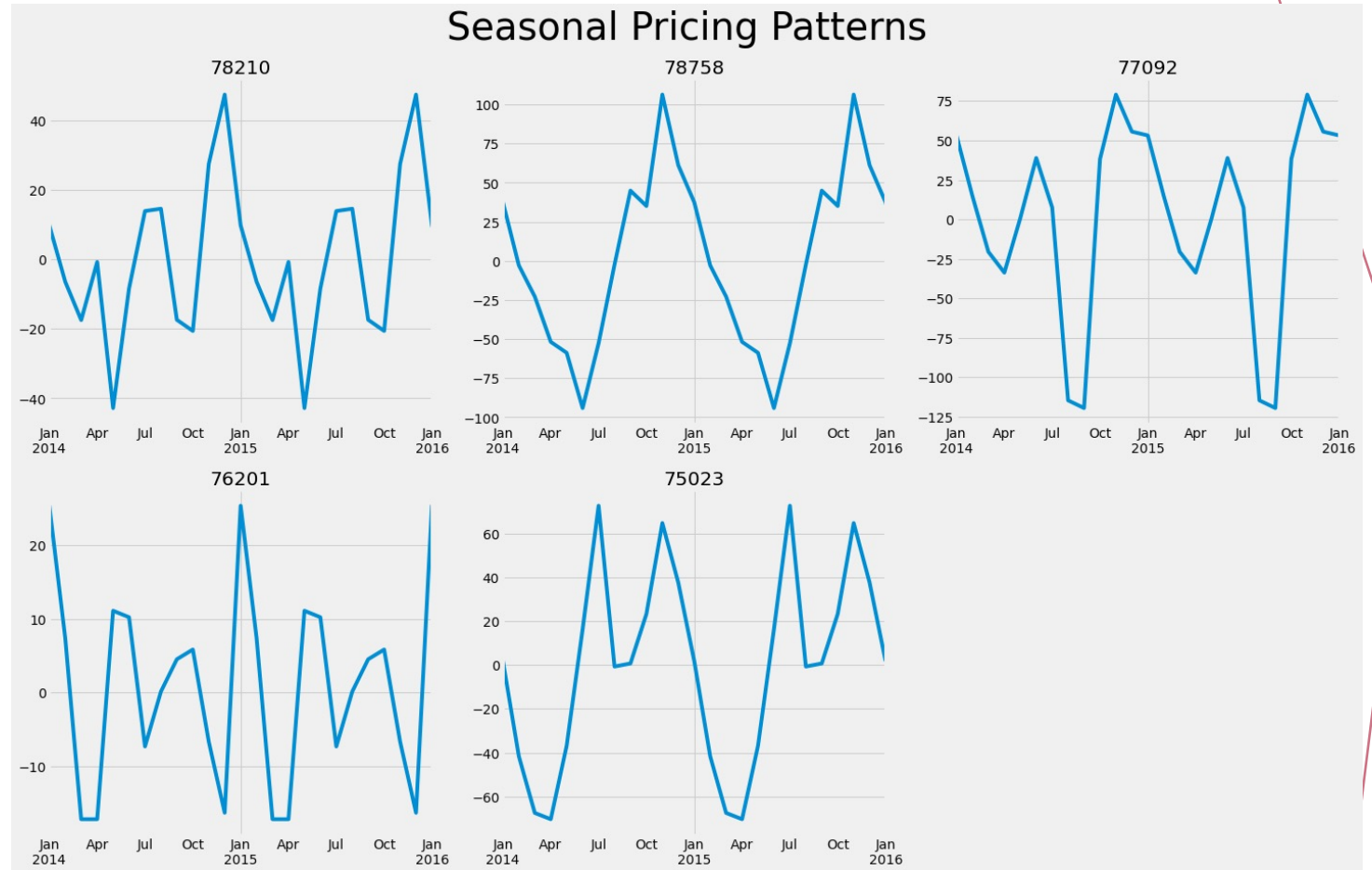
Seasonal Pricing Patterns

THANK YOU FOR YOUR TIME

Are there any questions or comments?