

Business Fundamentals: Real Estate LP

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Abstract

The goal of this project was to assist a real estate LP in determining the best location for a residential real estate development. Likely, this would be a multi-family unit (such as an apartment complex, duplex, condo, etc.) for long-term rentals. My role is to build a data science model that assesses historical data to determine the locations within the US that offer the highest growth potential and lowest capital expense. The overall thesis is that unsaturated markets with the highest population growth would generate the greatest future cash flow and capital appreciation. The future goal of this project is to incorporate a regression model that inputs population growth, population demographics, and property valuations to predict revenue and determine the top areas for residential real estate development.

Design

The underlying hypothesis of this project relies on two key assumptions. First, population growth is the greatest determinant in assessing future cash flow and capital appreciation. Population growth drives up both housing demand and rental prices which lead to greater cash flows and property valuations. Second, we want to identify an emerging, high-growth market with low property valuations. Lower upfront capital expenditures reduce risk, shortens your break even point, and increases your return on investment (ROI).

I also approached this analysis from a top-down model. The strategy is to first identify the top states in the US with the highest population growth and lowest property valuations. This provides some optionality for the LP in choosing their location. Once a state has been identified, we'd perform a similar analysis at the county level, identify specific lots or properties, and run a regression model to estimate total revenue.

Data

All data came from the American Community Survey (ACS) and the United States Census Bureau. I pulled 10 years worth of population data by state, the median household income by state, median home price by state, and median gross rent by state.

Algorithms

For the population data, I first calculated the 10 year growth rate for each state and identified the top 13 states based on population growth. Then I identified the median property cost for each of these states to determine the cheapest emerging market with the highest growth prospect.

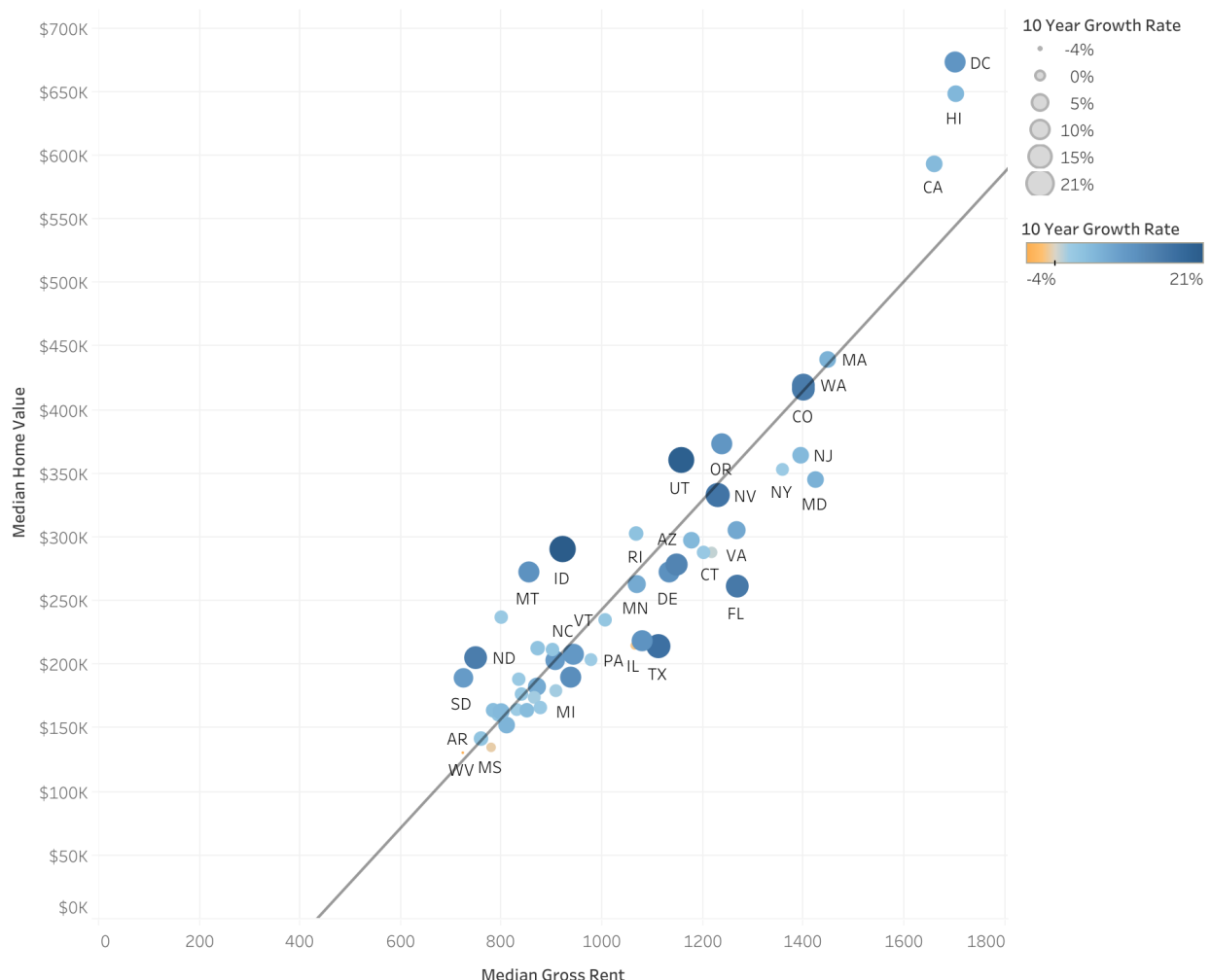
I also built a bubble plot to compare median gross rent to median home value by state. The size of each bubble represented the population growth rate for that state. There was a positive correlation between both sets of data; however, many high growth states were located below the trend line (such as Texas and Florida). The key takeaway is there are multiple arbitrage opportunities for real estate development

Tools

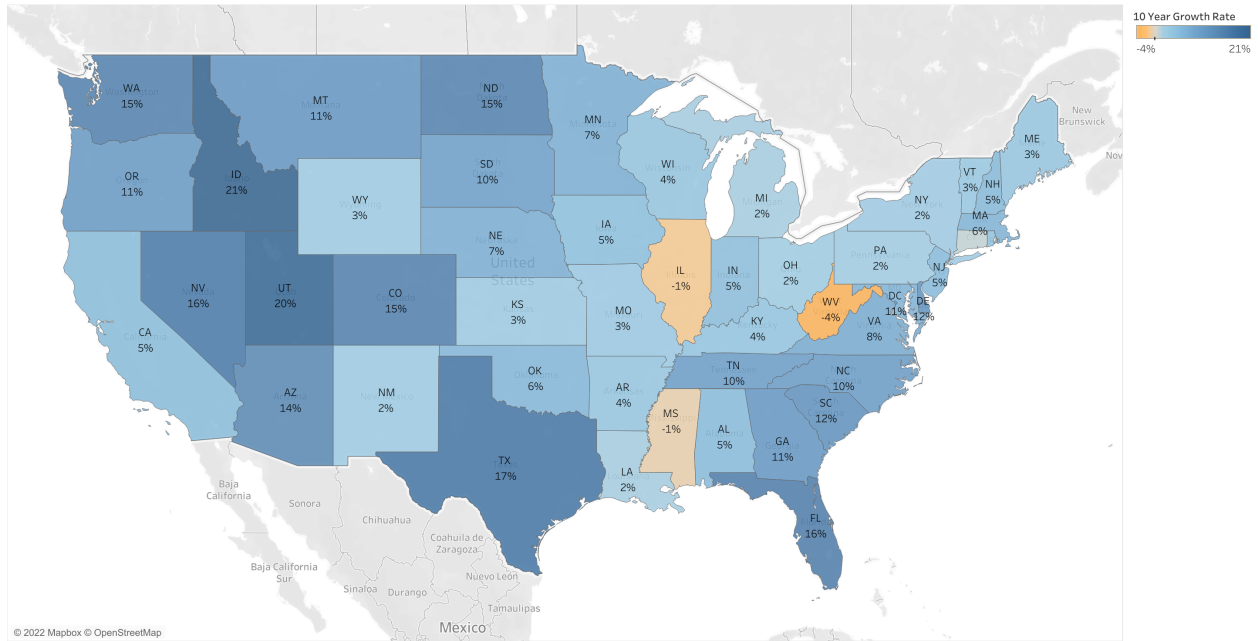
- Tableau for data visualization
- Google Sheets for data cleaning and calculations

Communications

Home Value vs Gross Rent



10 Year Population Growth



Median Home Value for Top Growth States

