U.S. Regional Migration Patterns

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Motivation

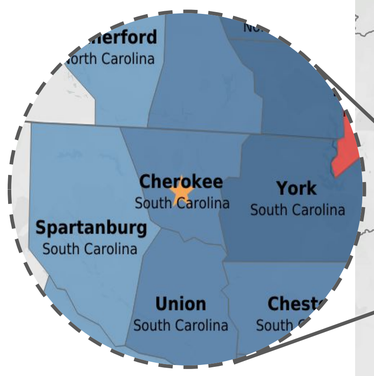
What is the problem? The COVID-19 pandemic has significantly increased work-from-home (WFH) opportunities, leading to a shift in residential preferences and impacting home prices, office demand, and migration trends. Studies suggest demand for real estate in urban centers has diminished in favor of larger, more affordable real estate in suburban areas

Why is it important and why should we care? Real estate developers need to understand these impacts and factor them into their business models in order to be successful in the changing market

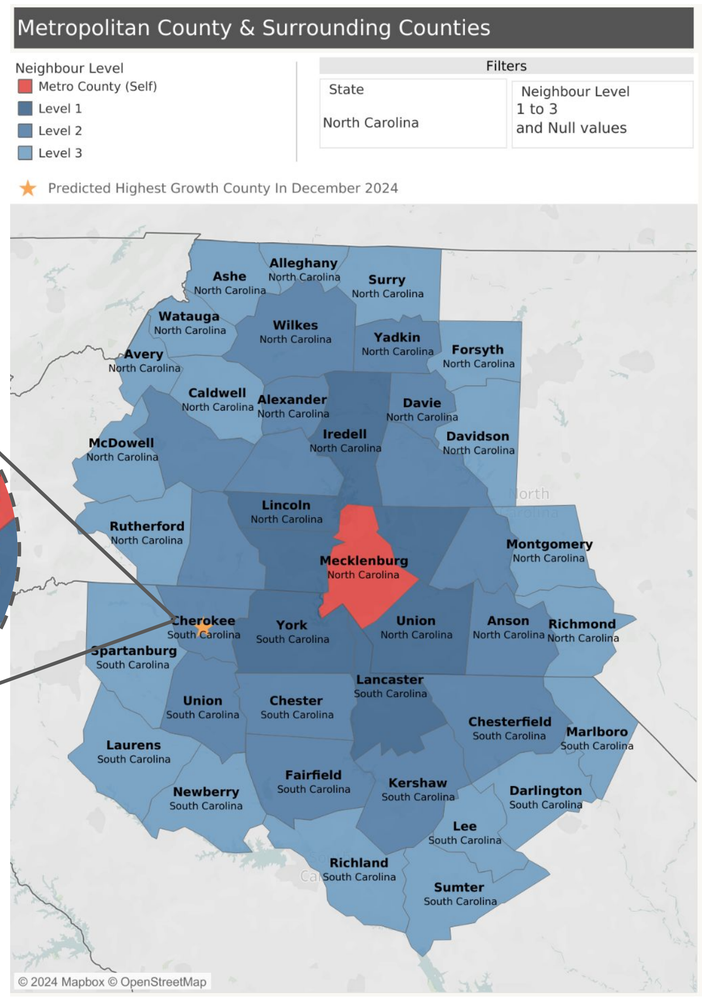
Approach

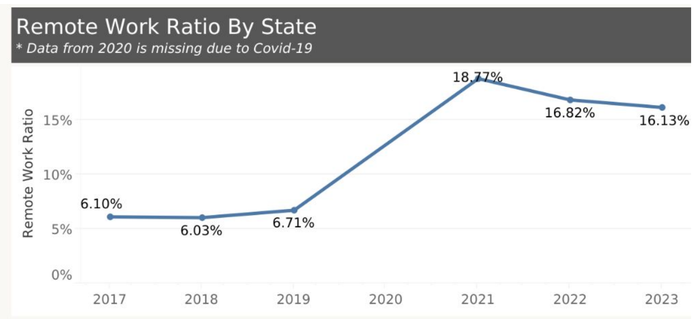
- ❖ Define a data structure that enables analysis of historical urban center real estate values relative to surrounding suburban areas within major metropolitans across the US
- ❖ Construct predictive models to forecast real estate values and identify high growth potential areas, taking into account remote work share and other county-level demographics
- ❖ Develop a highly interactive visualization tool to convey the results

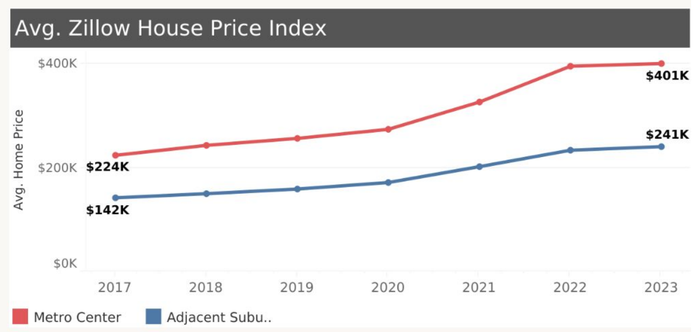
The most population-dense urban centers within each state are associated to up to five levels of surrounding counties to enable the analysis of urban center vs suburban trends within the metropolitan

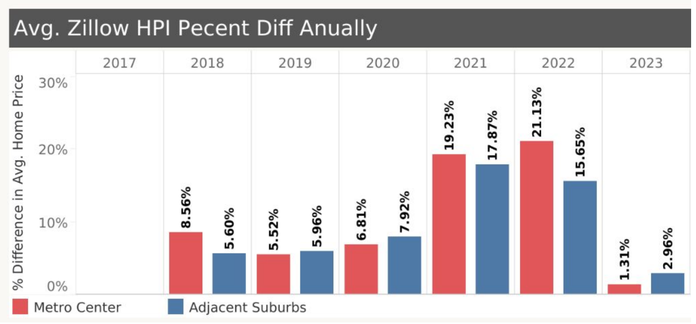


Real estate values are predicted using (best of) regression (Linear, Ridge, Lasso, Elastic Net) and time series (ARIMA, ARIMAX) models









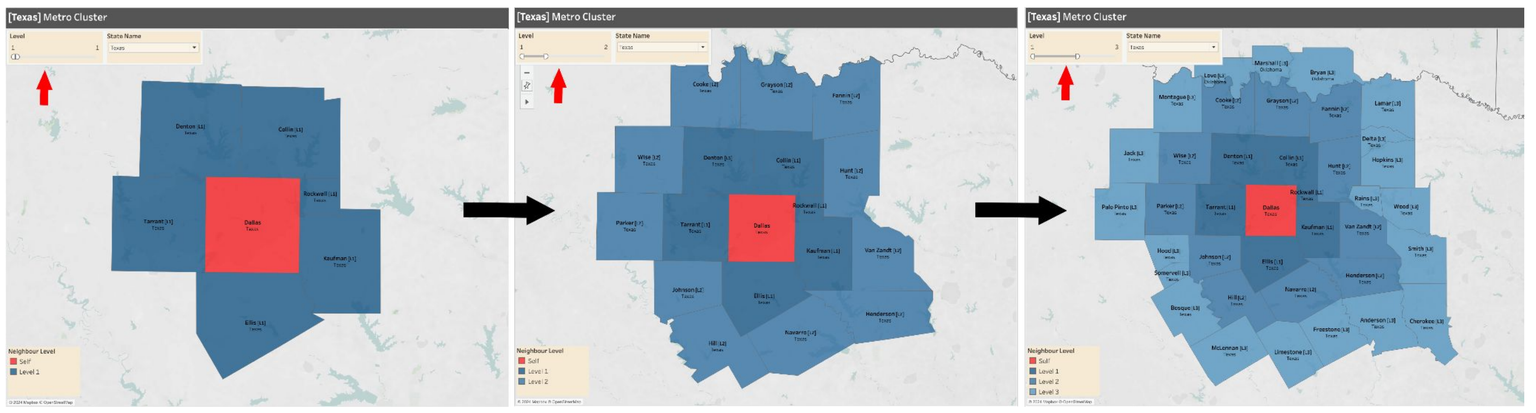
County data is extracted from various sources, merged by county FIPS code, cleaned, scaled, and imputed using python

How does this effectively solve the problem?

Users can intuitively explore different metropolitans across continental US, understand historical trends within areas of interest – i.e. has suburban real estate value outpaced that of the nearby urban center? – and learn where in that particular market value is likely to increase the most looking ahead

What is new in this approach?

- ➢ Contextualizes **remote work** into real estate analysis
- ➢ Focuses on **relation between major urban centers and surrounding suburban areas** – features ability to drill into different metropolitans across continental US
- ➢ Features ability to **expand radius of comparison**



Data

Census.gov *via direct download*
- US county adjacencies
- Remote work share (2017-2023)

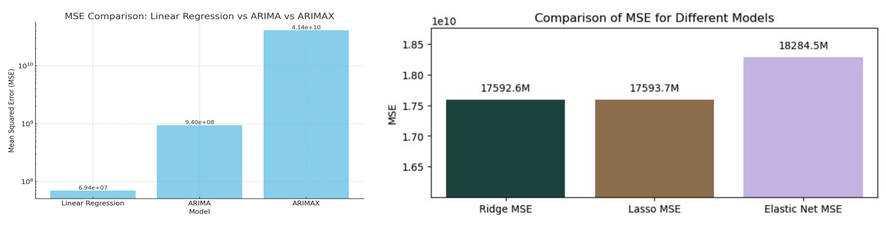
Federal Reserve Economic Data *via API extract*
- County demographics (2017-2023)

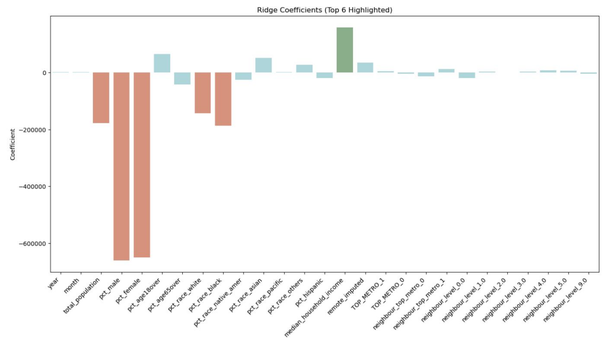
Zillow *via direct download*
- Home values (2017-2023)

~520k rows processed in total
~290k rows output into Tableau

Experiment Evaluation

Evaluated Mean Squared Error (MSE) between Linear Regression, ARIMA, ARIMAX, Ridge, Lasso, and Elastic Net Regressions – determined **Ridge Regression provided most accurate results**





Results

- ❖ From 2017-2023, **suburban areas overall saw higher growth** compared to urban centers
- ❖ Based on predictive modeling, counties with **younger, more diverse populations, a strong working-age demographic, and higher median incomes** may experience increased housing prices, particularly in areas with **greater remote work flexibility**

How do these methods compare to others?

The results of this analysis align with preliminary research in that suburban areas experienced greater growth compared to urban centers.

This approach goes beyond others by visualizing this trend between adjacent counties and accounting for remote work factors.