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DATA 512

Economic Impact of Wildfire Smoke on Real Estate in Hartford, CT

Motivation

This extension plan aims to explore the possible long-term effects of smoke events on Connecticut's real estate market. The research will focus on analyzing property values and transaction volumes. Understanding the economic impact of smoke events on real estate values and sales is crucial as more communities experience worsening air quality due to wildfires.

In the state of Connecticut, the Real Estate, Rental, and Leasing sector is a key driver of the state's GDP, contributing significantly alongside the Finance, Insurance, and Manufacturing sectors. In 2024, these three sectors alone accounted for over 41.3% of the state's GDP.

This analysis aims to help stakeholders—including residents, real estate agents, and policymakers—anticipate potential future declines or fluctuations in property values and transaction volumes. Insights from this project could inform local planning, taxation, and public health strategies.

Impact focus

This extension focuses on the **economic impact** of wildfire smoke, particularly the impact within the real estate industry in Hartford, CT. As climate change intensifies, wildfire smoke incidents have become more frequent, raising concerns about the potential long-term economic effects on various sectors, especially real estate. For Hartford, which has a significant real estate sector contributing to local and state GDP, understanding how smoke and poor air quality might affect this industry is crucial for city planning, economic forecasts, and public policy.

In this analysis, I plan to explore how increased smoke levels correlate with...

1. **Property Valuation Trends**: By examining fluctuations in property values over time in response to worsening air quality from smoke, we can forecast potential future declines or shifts in real estate worth. As smoke becomes more prevalent, certain neighborhoods or property types may experience devaluation, leading to broader economic impacts on property tax revenues and market stability.

2. **Transaction Volume Shifts**: Decreased transaction volumes due to environmental factors could indicate a lack of demand, potential property abandonment, or movement to less affected regions.

Data and Model Proposed

The main addition to the existing work I've completed in this project is the Real Estate Sales 2001-2022 GL dataset from the Connecticut Open Data site provided by the Connecticut State Agencies. This data was obtained through the Office of Policy and Management of Connecticut, which lists all real estate sales with a $2,000 or greater sales price between October 1st and September 30th of each year.

A detailed look at the features included in this data can be found below:

- `Serial Number:` Serial number of the sale.
- `List Year:` Year the property was listed for sale.
- `Date Recorded:` Date the sale was recorded locally.
- `Town:` Name of the town
- `Address:` Address of the sale.
- `Assessed Value:` Value of the property used for local tax assessment.
- `Sale Amount:` Amount the property was sold for.
- `Sale Ratio:` Ratio of the sale price to the assessed value.
- `Property Type:` Type of property including Residential, Commercial, Industrial, Apartments, Vacant, etc
- `Residential Type:` Whether the property is single or multifamily residential
- `Non-Use Code:` A non-usable sale code typically means the sale price is unreliable for determining a property value.
- `Assessor Remarks:` Remarks from the assessor
- `OPM remarks:` Remarks from OPM
- `Location:` Lat / lon coordinates

The fields in this dataset allow for easy sales tracking over time through the **Date Recorded** field, which offers insights into how property sales might fluctuate with wildfire smoke impacts over the years. The **Sale Amount** provides a basis for calculating property value trends, while the **Assessed Value** and **Sales Ratio** offer a comparative perspective on property valuation versus actual sale price. This comparison is particularly useful for identifying any discrepancies that may arise during periods with heavy smoke, potentially revealing valuation adjustments made under environmental pressures. The **Property Type** and **Residential Type** fields allow for segmentation by property categories, such as Residential versus Commercial, to determine whether certain property types experience more significant impacts. Finally, the **Location** coordinates enable me to filter based on proximity to smoke events.

The Real Estate Sales 2001-2022 GL dataset is provided on the Connecticut Open Data Site. As stated in their User Handbook and Terms of Use, the data present on the site is freely available, accessible in machine-readable format, and unrestricted in terms of use. The site shares public data "as is," with no guarantees regarding accuracy, completeness, or fitness for a particular purpose. Users are informed that the State of Connecticut assumes no liability for errors, omissions, decisions, or actions based on this data. This open data format allows me to use and analyze the real estate information without restrictions, with the understanding that the State of Connecticut may modify or remove data at any time. Additionally, the metadata provided with this data clarifies its context and any limitations, helping ensure accurate and transparent analysis within my project.

Unknowns and dependencies:

Several factors outside my control might impact my ability to address the supplementary questions effectively. Some of the key challenges include:

External Economic Factors: The real estate market is influenced by numerous external factors beyond smoke exposure, including economic policies, interest rates, and broader market trends. These factors are complex and may confound the impact of smoke alone, making it challenging to isolate the exact effect of air quality deterioration on property values and transaction volumes.

Market Behavior and Public Perception: The real estate market's response to environmental issues can be unpredictable. Public perception of smoke impact might influence buyer and investor decisions in ways that are difficult to predict or quantify. For example, if public awareness around smoke and health risks rises dramatically, it could lead to sudden changes in demand that are hard to forecast.

Data Completeness and Quality: The accuracy of my analysis is highly dependent on the completeness and reliability of both real estate sales data and smoke event records. If there are gaps or inaccuracies in the recorded sales data, such as missing transactions or incomplete details about property characteristics, it could limit the ability to draw conclusions about the impact of smoke events on property values and transaction volumes.

Timeline

Task	Description	Deadline
Week of Nov 11th - 15th		
Data Cleaning	Collect and Clean AQI, smoke impact, and real estate sales data for Hartford.	Nov 11th
Model Development	Develop MLR model to analyze the relationship between AQI levels, smoke impacts, and real estate prices/sales volume.	Nov 15th
Forecasting	Forecast future real estate market impacts (e.g., property values, sales volume) over 25 years.	Nov 15th
Week of Nov 18th - 22nd		
Visualization	Create visualizations to illustrate projected changes in real estate metrics over time, specifically during high-smoke years.	Nov 20th
Week of Nov 25th - 29th		
Presentation Preparation	Prepare slides for the Pecha Kucha presentation	Nov 27th
Week Dec 2nd - 6th		
Draft Report	Write a report summarizing methods, findings, and policy recommendations.	Dec 4th
Final Repository Submission	Finalize and submit repo.	Dec 4th