

Analysis of Hurricane Impact on Housing Markets

Introduction

Hurricanes significantly influence regional housing markets, impacting factors such as property prices and availability. This report examines the disruption in housing trends caused by these natural disasters, leveraging data from hurricane events and housing markets from 2010 to 2020. Our focus is on how hurricanes affect housing prices, inventory levels, and the recovery process.

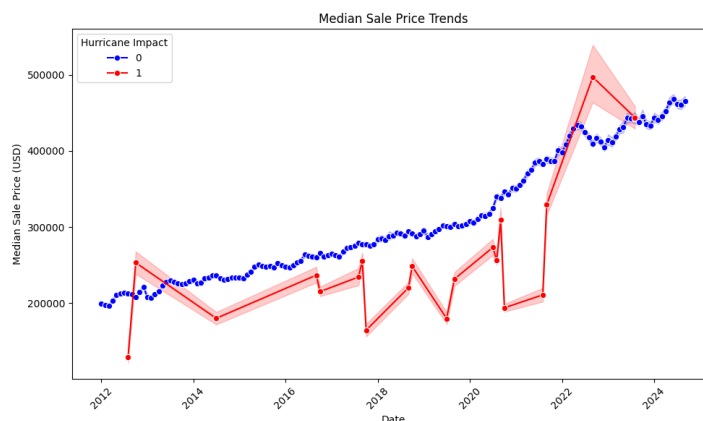
Data Sources

- **Hurricane Data (1851–2023):** Source: <https://www.kaggle.com/datasets/sandraroko/u-s-hurricanes-and-landfalls-1851-2023>Kaggle.
- **Housing Market Data:** Source: <https://www.kaggle.com/datasets/vincentvaseghi/us-cities-housing-market-data>Kaggle.

Analysis

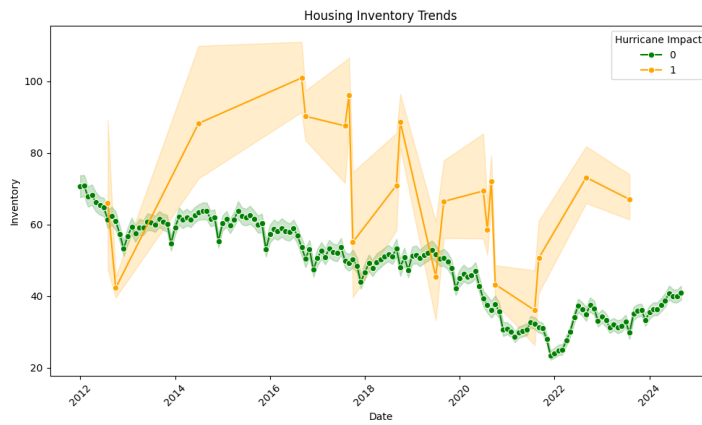
Median Sale Price Trends

- **Key Finding:** When hurricanes strike cities, housing prices generally experience a short-term decline. The duration of this decline is influenced by the storm's severity, with more intense hurricanes typically causing prolonged effects on property values. It is logical that disasters cause apprehension among buyers and sellers, leading to a gradual market recovery.



Inventory Trends

- **Key Finding:** Following a hurricane, the availability of housing in impacted regions significantly decreases. Many homeowners delay putting their homes on the market, uncertain about the state of the market and possible property damage. In contrast, unaffected cities experience steady or even rising inventory levels. This discrepancy may cause temporary shortages and price surges in the areas affected.



Impact of Hurricane Severity on Median Sale Price

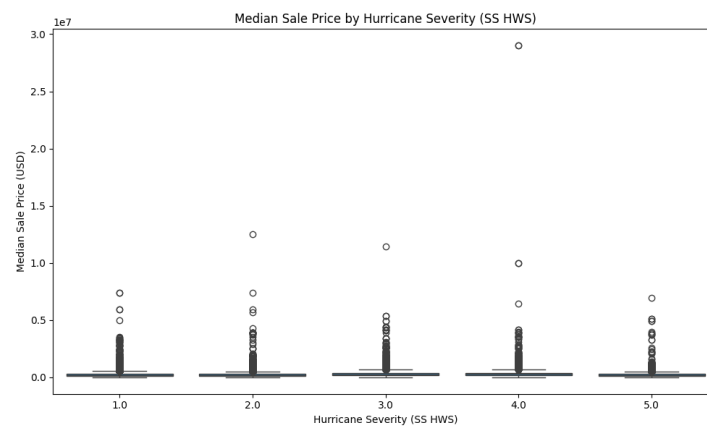


Figure 1: Median Sale Price by Hurricane Severity

Correlation Analysis

To investigate the connection between hurricane intensity, gauged by peak wind speeds, and the median home sale price in impacted cities, we conducted a Pearson correlation analysis. The analysis revealed a low correlation coefficient of 0.065; however, the p-value was highly significant (3.75×10^{-38}). This indicates that despite the weak association between hurricane strength and home prices, the relationship is statistically significant, particularly for the strongest storms.

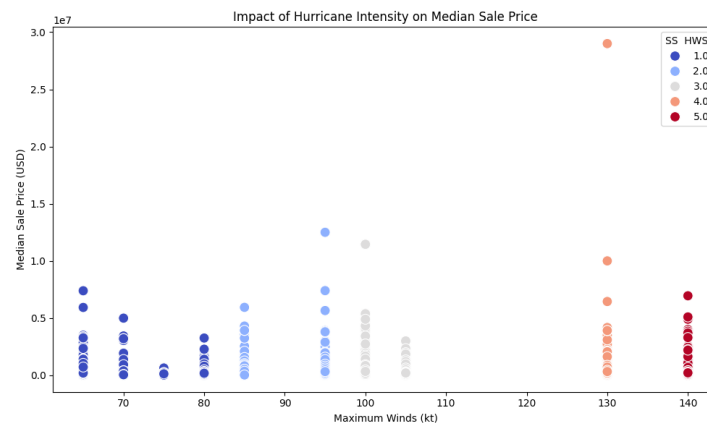


Figure 2: Scatterplot: Max Winds vs Median Sale Price

Seasonal Patterns Analysis

- **Key Finding:** The plot illustrates a distinct seasonal variation in median sale prices, highlighting a significant contrast between cities affected by hurricanes and those that are not. The red line, representing impacted cities, demonstrates more pronounced price fluctuations during hurricane months, whereas the blue line, representing non-impacted cities, maintains a steadier seasonal trend.

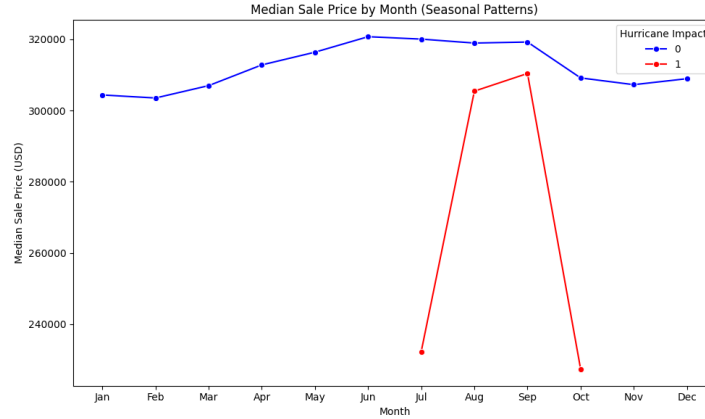


Figure 3: Seasonal Median Sale Price

Lagged Effects of Hurricane Impact on Sale Price

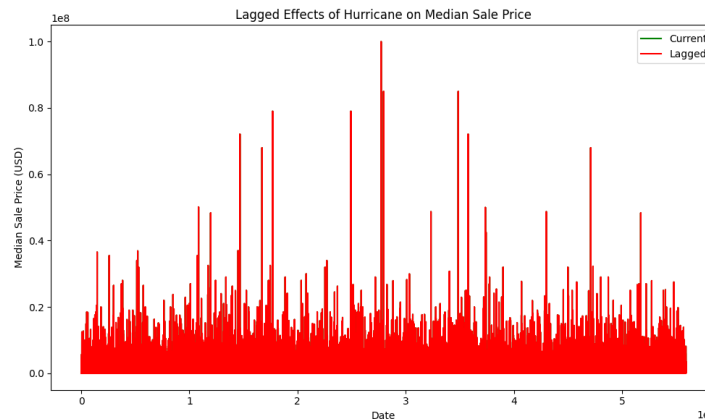


Figure 4: Lagged Effects of Hurricane on Sale Price

Conclusion

This analysis offers significant insights into the effects of hurricanes on the housing market, with a particular emphasis on **median sale prices** and **inventory levels** in cities hit by these natural disasters. The study investigated temporal trends, contrasted impacted cities with those unaffected, and considered both immediate and long-term effects. Below is a summary of the primary findings and their implications..

1. **Impact on Housing Prices:** Hurricanes significantly influence housing markets, particularly in cities directly affected by such events. In these cities, the **median sale prices** show considerable **volatility** around hurricane incidents. Specifically, there is often a **drop in sale prices** post-storm, with more intense hurricanes (Category 4 and 5) causing greater fluctuations. Conversely, cities not hit by hurricanes exhibit a more stable pricing trend.
2. **Lagged Effects on Housing Prices:** Our analysis revealed notable **lagged effects** of hurricanes on the housing market. Even after the initial damage from a hurricane subsides, the **median sale**

prices in affected cities continue to be lower for **several months**, indicating long-term recovery challenges like home damage, job losses, and potential resident displacement.

3. **Inventory Trends:** There's generally a **reduction** in inventory levels in cities impacted by hurricanes, likely due to decreased listing activity, as homeowners delay selling until the market stabilizes or repairs are done. Meanwhile, inventory in cities unscathed by hurricanes remains more steady, reflecting typical market dynamics.
4. **Seasonal and Regional Differences:** The study's review of **seasonal trends** revealed that hurricanes disturb the normal seasonal patterns in the housing market. Cities not affected by hurricanes experience regular seasonal changes, whereas those impacted show more unpredictability, with price shifts associated with hurricane occurrences. These results highlight the need to understand **regional market distinctions** and **seasonal shifts** in housing prices.

Implications for Stakeholders

The study's findings provide valuable insights for key stakeholders in the housing market:

- **Policymakers:** By understanding how hurricanes affect the economy and housing markets, policymakers can devise more effective recovery strategies and allocate resources efficiently to assist both immediate relief and longer-term recovery in affected areas.
- **Real Estate Professionals:** Agents, developers, and investors can tailor their approaches based on the observed market volatility in impacted cities. The findings stress the importance of **adapting pricing** and **managing inventories** in hurricane-prone regions.
- **Insurers:** Insurers can use these results to assess **changing risk levels** and refine their pricing models and coverage options for properties at risk of hurricane damage.

Future Directions

While this study sheds light on the link between hurricanes and the housing market, additional research areas remain:

- **Long-term recovery:** Future studies might examine long-term market recovery following multiple hurricanes or successive severe weather seasons.
- **Impact of rebuilding and infrastructure:** Researching how rebuilding and infrastructure enhancements influence the market could offer deeper insights into the housing market's long-term resilience post-hurricanes.
- **Behavioral factors:** Studying how psychological factors, like fear or uncertainty about future storms, impact home-buying and selling decisions could enhance our understanding of recovery trends.

In conclusion, this analysis highlights the intricate relationship between hurricanes and the housing market. It emphasizes the importance of comprehensive disaster preparedness and recovery plans by outlining the price volatility, inventory changes, and lagged recovery effects experienced during such events.