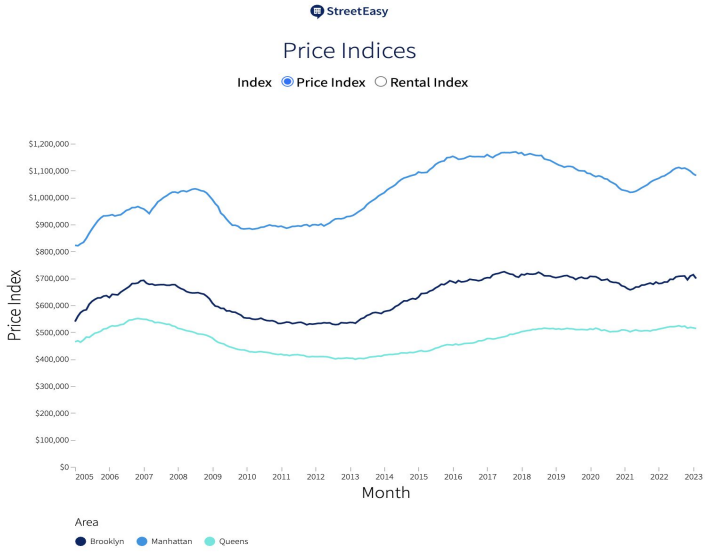
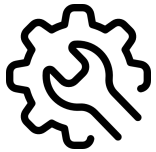
Low Frequency Systematic Signal for Real-Estate Investments in NYC

Real Estate in New York City

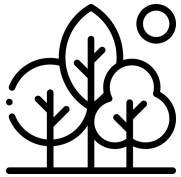


As New York City bounces back from COVID-19, former residents are moving back, tourists are traveling again, & the real estate market is returning to pre-pandemic prices.

Data



311 Service Requests
2010-Present



Tree Census
Data 2015

NYC Restaurant
Inspection Results

Intuition for Signal

Trees Affect Value of Urban Land

➔ **USDA Forest Service has developed a foundation for valuing trees as a structural asset in greater-NYC-metro area & goes in depth on how the loss of a single tree can cost a homeowner based on size, age, and species of tree**

David, J. Nowak. "Compensatory value of urban trees in the United States." Journal of Arboriculture 28.40 (2002): 194-199.

Restaurants Affect Value of Urban Land

➔ **UCLA white paper on predicting real estate value using restaurant data in 9 chinese cities indicates a strong correlation between the two**

Dong, Lei, Carlo Ratti, and Siqi Zheng. "Predicting neighborhoods' socioeconomic attributes using restaurant data."

311's Positive Correlation with Value of Urban Land

➔ **Despite what may seem intuitive, there is a slight positive correlation between value of land and 311 requests – *"For instance, an individual accustomed to seeing rodents in their building may be less likely to complain than someone seeing a rodent in their apartment for the first time"***

Kontokosta, Constantine E., and Boyeong Hong. "Bias in smart city governance: How socio-spatial disparities in 311 complaint behavior impact the fairness of data-driven decisions."

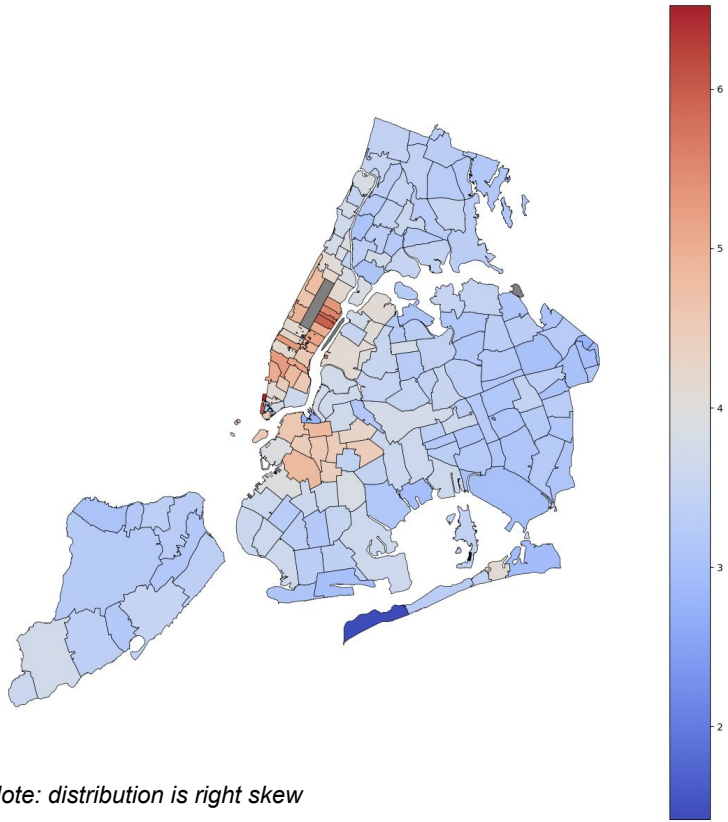
Approach

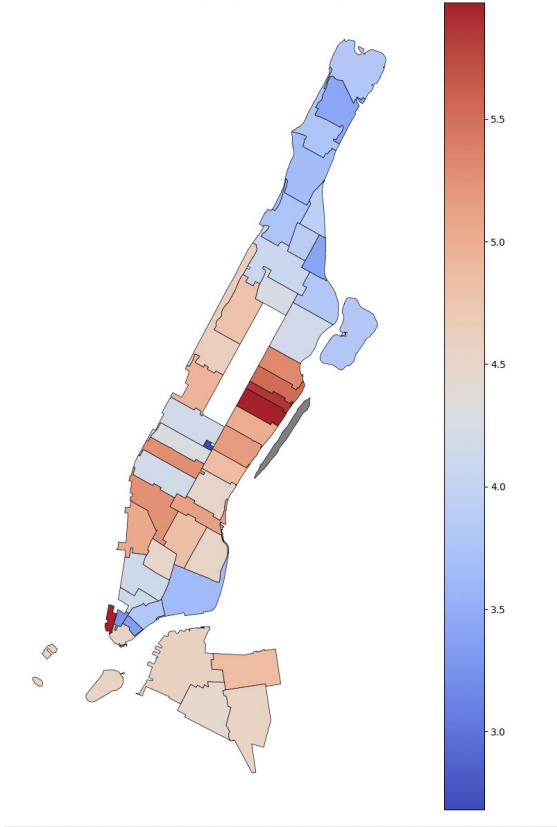
Blend 30-Day Moving Averages of 311 Request frequency & Restaurant Inspection scores scaled by 2015 Tree Census steward scores times overall tree health

Restaurant Inspection Scores & 311 Service Requests are weighted 70/30

Tree Scaling factor exaggerates extrema by 20% & normalizes internal scores

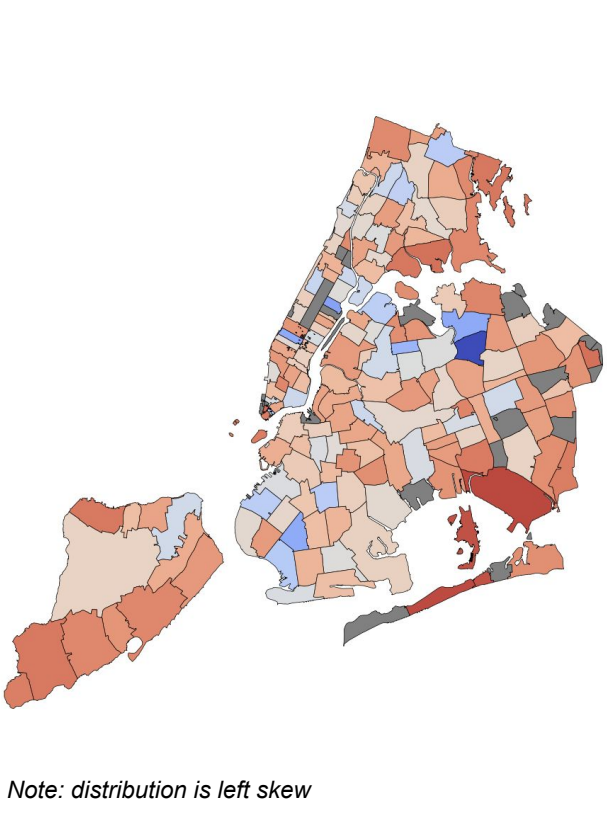
Tree-Score Heat Map

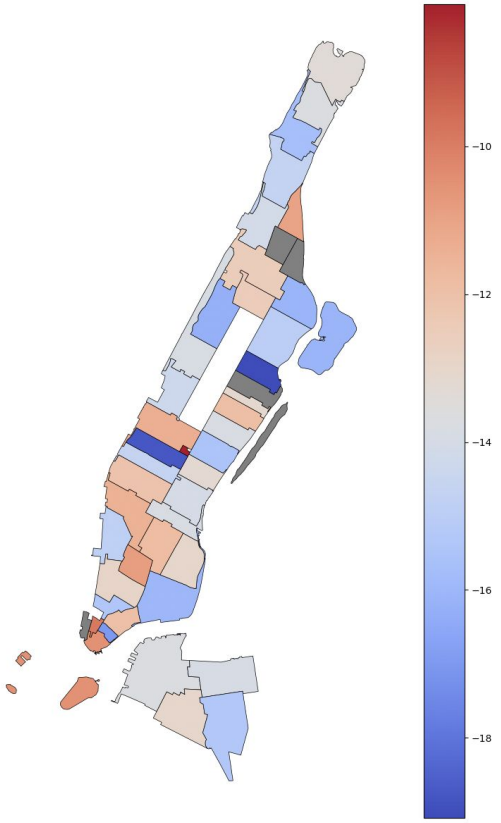




Note: distribution is right skew

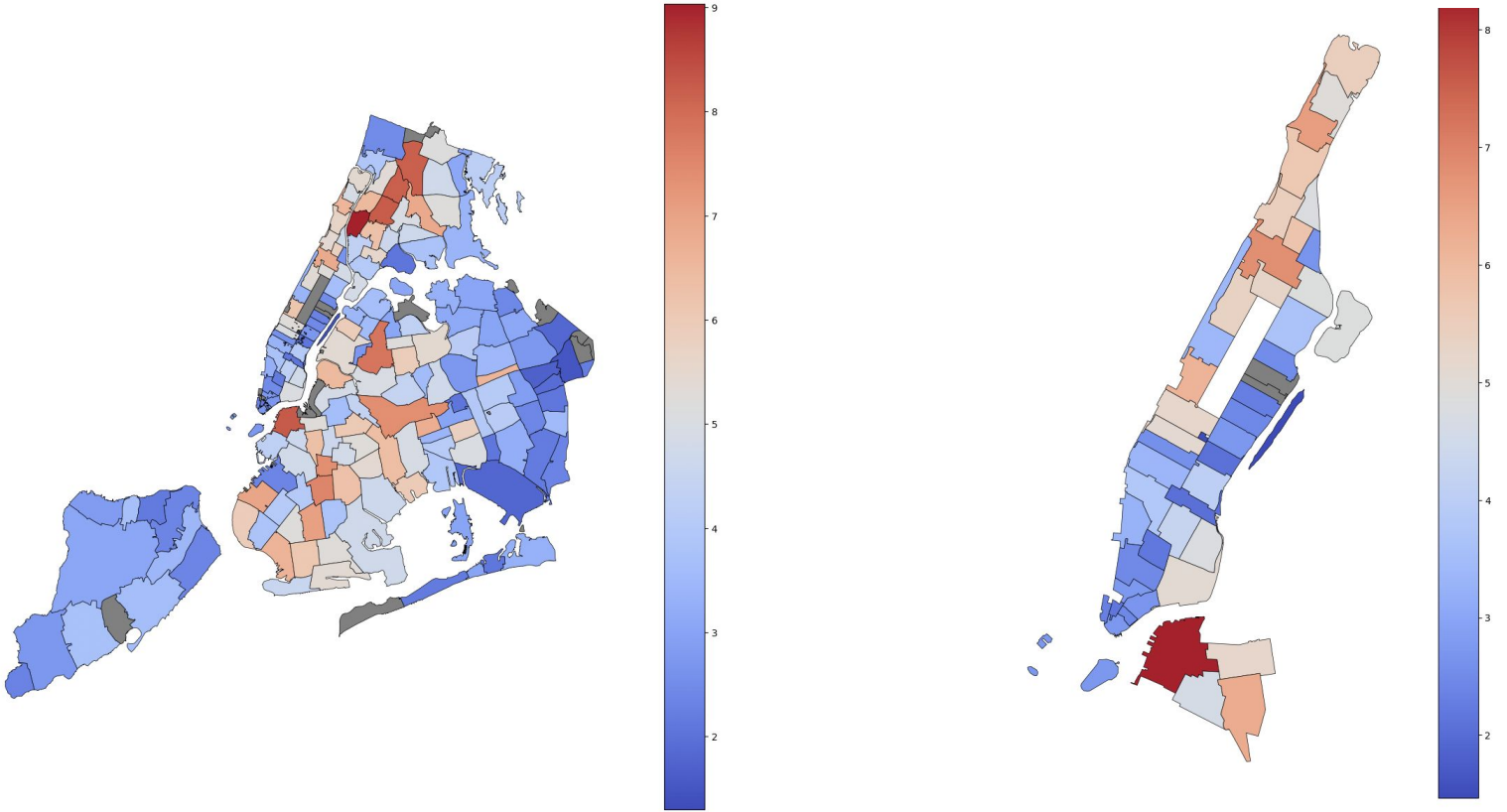
Restaurant-Score Heat Map



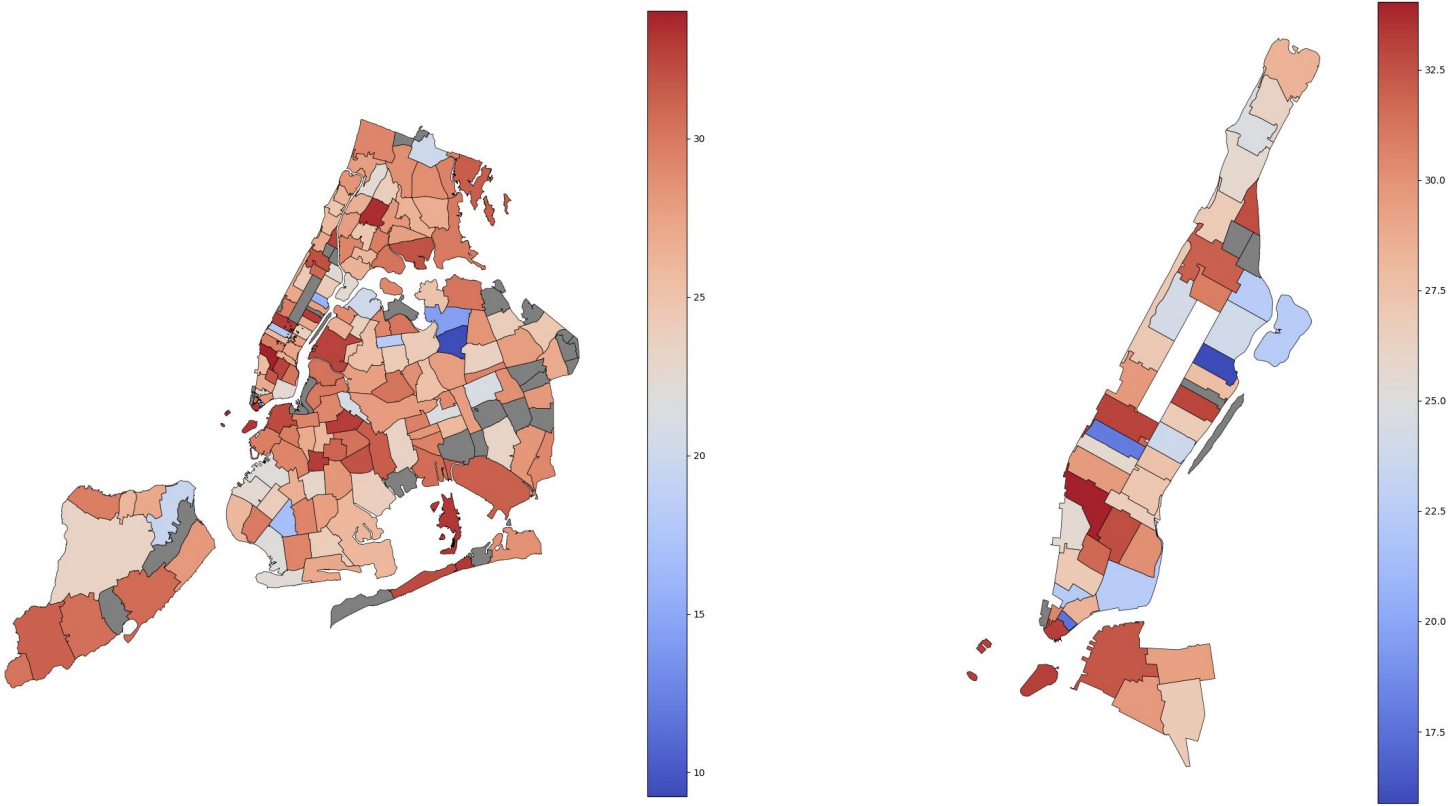


Note: distribution is left skew

311-Score Heat Map

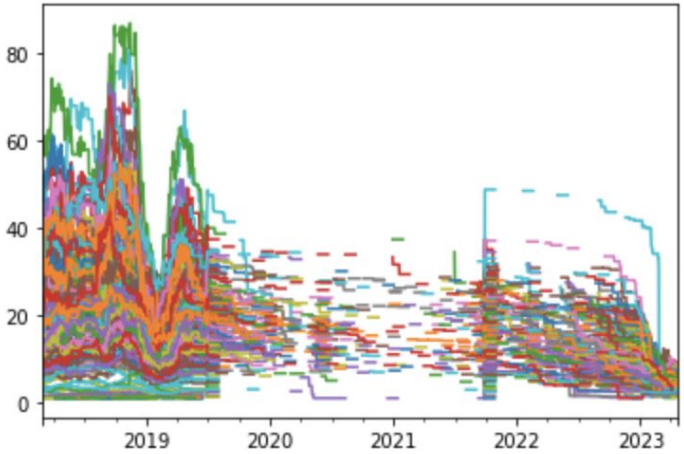


Aggregate-Score Heat Map

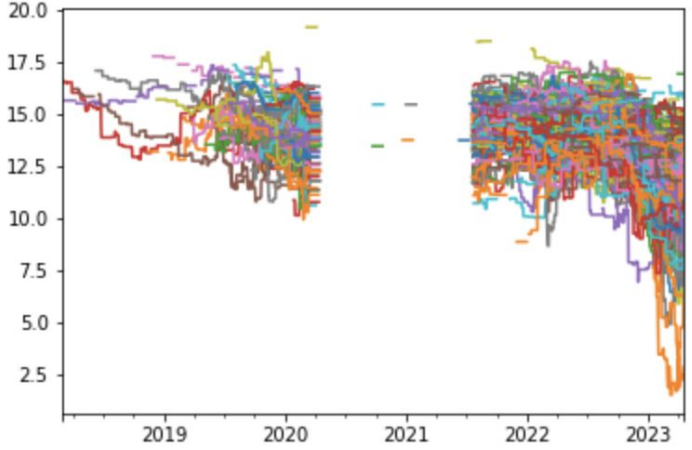


Time-Series of Components for Signal

311 Service Requests

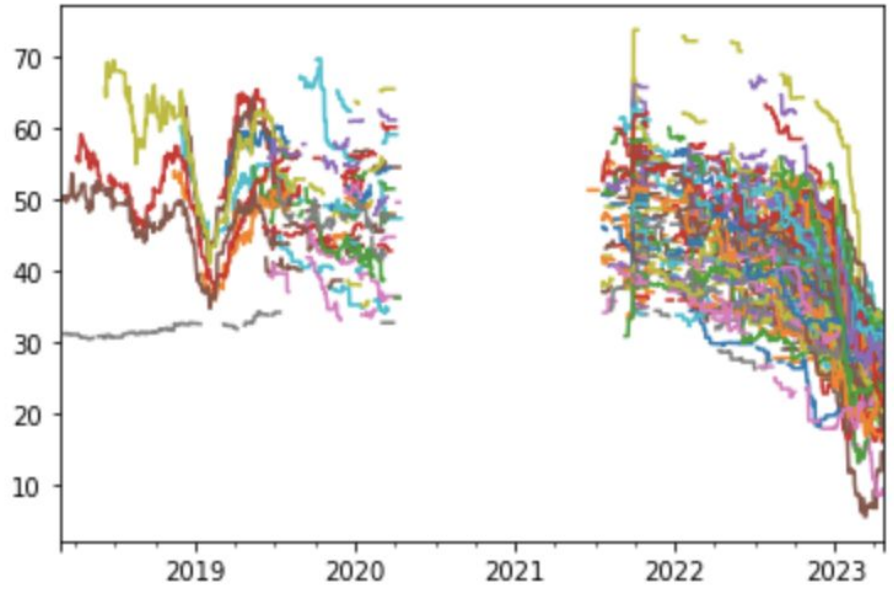


Restaurant Inspections



Note: Lack of data for 311 requests & restaurants inspections during Covid had a major impact on the continuity of the signal. Also important to note that overall 311 claims have reduced since Covid

Time-Series of Final Signal Scores



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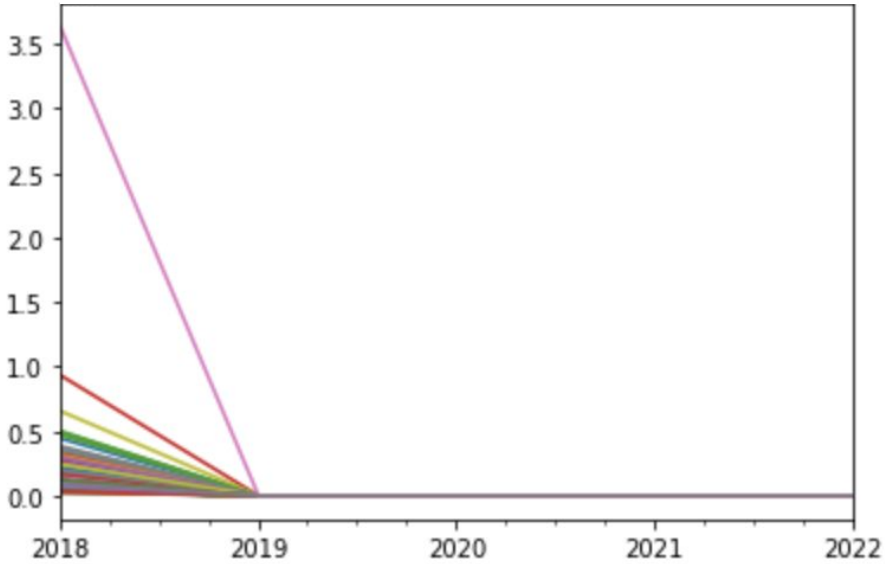
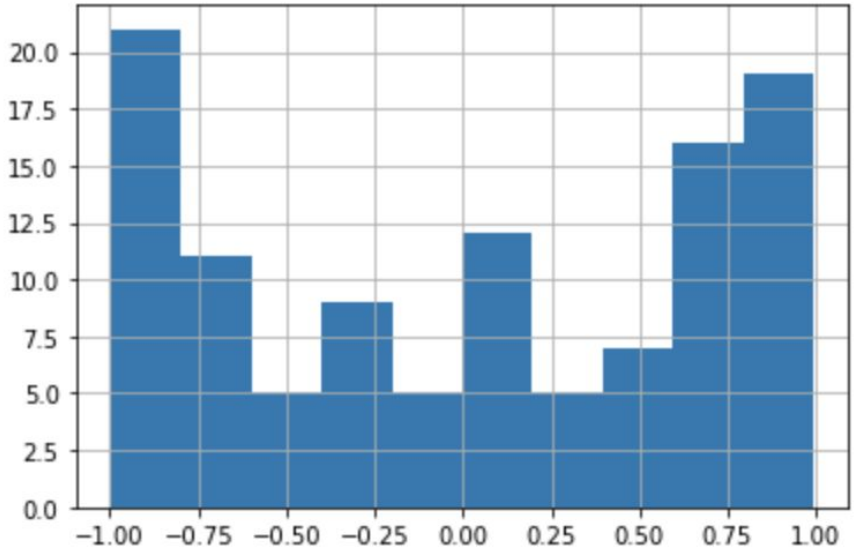
Signal Performance

%Δ YoY NYC Property Value by Zip



Correlation Prop-ValΔ & Signal Scores



Note: We only wanted to pull data from Open NYC Data and there is much better alpha metrics to analyze return on investment

REIT Implementation of Signal

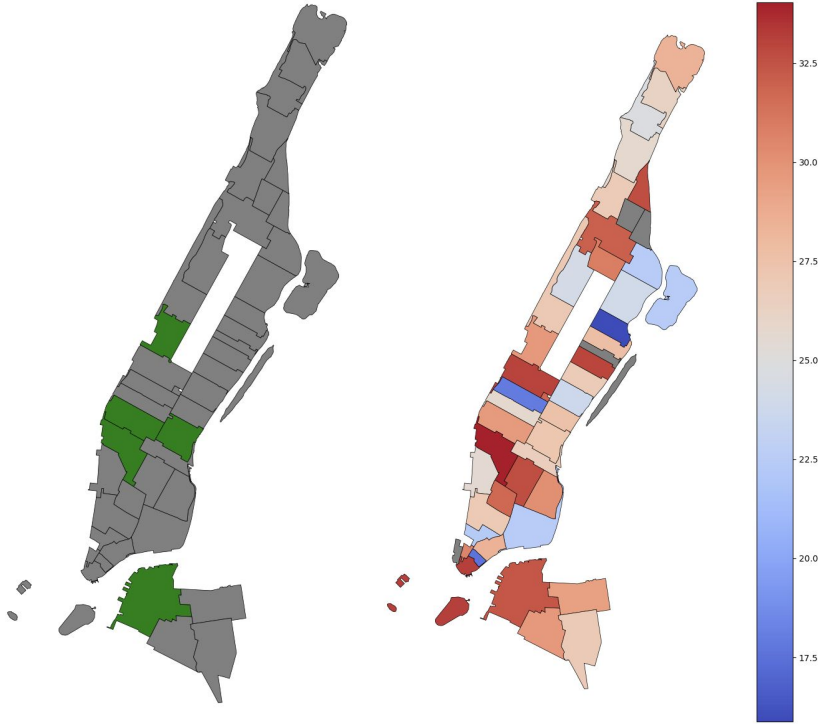
Current EQR developments

- 500 West 23rd Street -- 111 units (10011)
- 400 Park Avenue South -- 265 units (10026)
- 170 Amsterdam Avenue -- 230 units (10023)

Current AVB developments

- West Chelsea -- 715 units (10001)
- Avalon Willoughby Square -- 861 units (11201)

** SeekingAlpha: Residential REITs With Highest New York City Exposure (2012)*



Before we take your money...

Biases

- ➔ Lack of continuity in data through Covid-19 pandemic
- ➔ Tree census data is outdated relative to the other two inputs
- ➔ 311 request frequency can be situationally misleading

Proof of Alpha

- ➔ There is correlation, but are we beating the market?
- ➔ Is the signal consistently accurate & profitable?
- ➔ What are the capital requirements for employment?

Bottom Line:

We may have something here, but more rigorous back testing & risk analysis must be done before we can consider implementing this strategy.