



Decoding Commercial Real Estate:

Data-Driven Insights for Smarter Office Investments!

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Project Overview

Problem

- Identify trends in commercial real estate to help Savills advise clients on **where, when, and how** to lease office space.

Approach

- 3 key aspects of real estate data to examine: **industry, region, and the economy**
- Analyze **leasing activity** by industry and region to uncover key patterns.
- Build a **linear regression model** to predict future leasing trends.

Solution

- Highlights which **industries and regions** are driving demand
- Forecasts 2025 **leasing demand**





Industry

What is the status of different industries after the pandemic?

Where is the demand for office space increasing or declining, and why?

Industry Leasing Trends: A Post-Pandemic World

TAMI (Tech & Media)

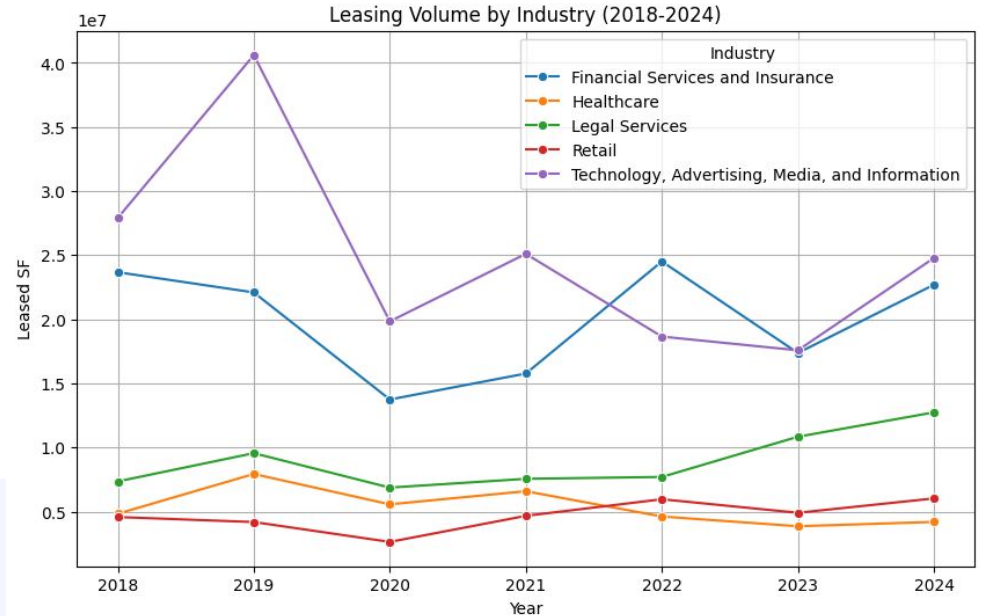
- **Highest demand** but **volatile** with a sharp drop in 2020
- Better for **short, flexible leases**

Financial Services

- Also dropped in 2020, but has shown **steady growth** since
- Opt for **long-term leases**

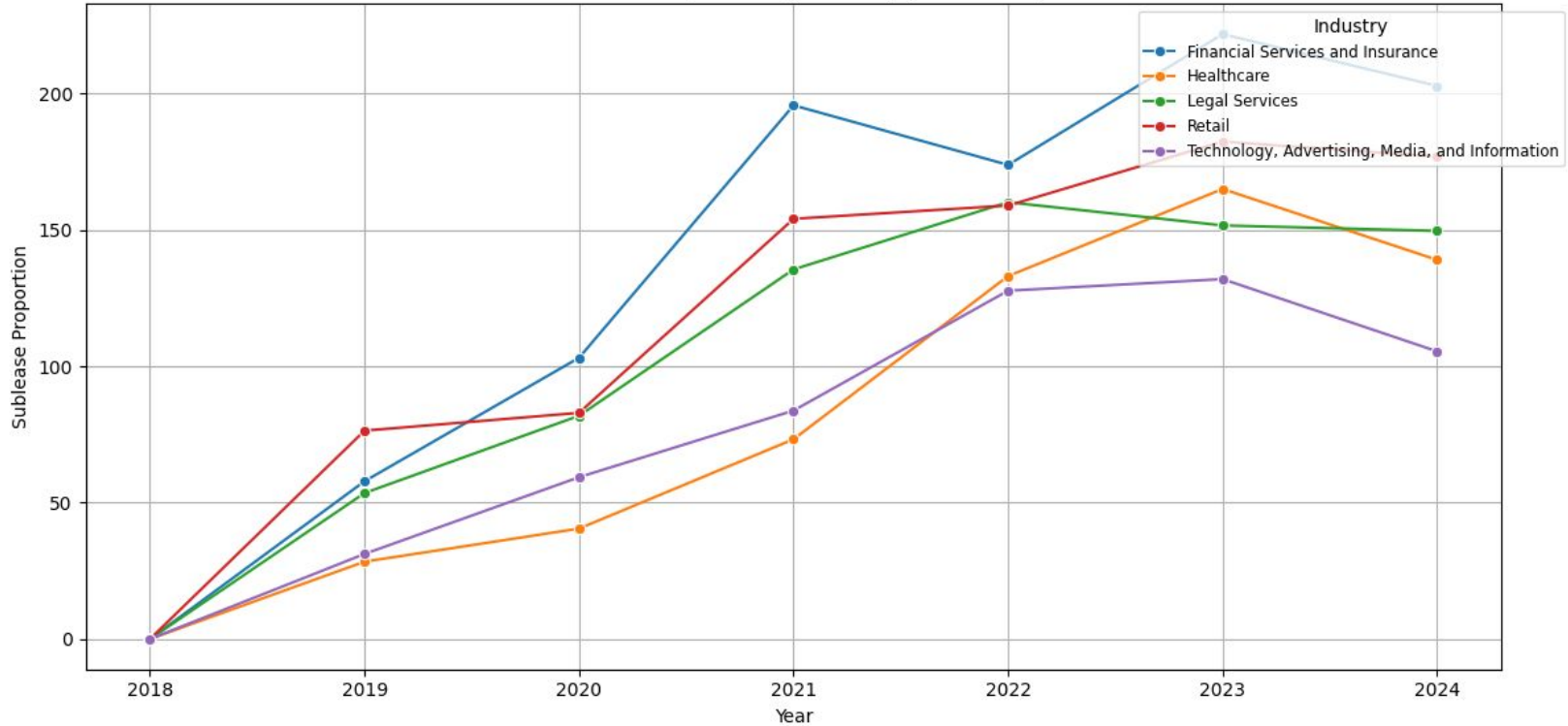
Healthcare, Legal & Retail

- Stable but **lower activity**
- Ideal for **low-risk** and **steady tenants** and long-term leases



Industry Leasing Trends: A Post-Pandemic World

Sublease Proportion by Industry (2018-2024)



The Great Real Estate Split

K-means and PCA

- Each point is One observation per market–quarter–industry (e.g., Healthcare in Atlanta, Q2 2023).
- Used **K-Means (k = 3)** on leasing metrics.
- Used **PCA** to reduce dimensions (PC1: 42.6%, PC2: 21.0%).



The Great Real Estate Split

K-means and PCA Results

Cluster	Leasing (Mean)	Available Space (Mean)	Leased SF (Mean)	Overall Rent (Mean)	Unemployment Rate (Mean)	Top Industries
0	686k	10.3M	27k	\$33.86	4.70%	Tech (315); Healthcare (273); Legal (265)
1	1.68M	28.0M	47.5k	\$35.07	4.43%	Tech (154); Legal (136); Construction (112)
2	3.88M	36.2M	37.5k	\$77.39	5.39%	No dominant industry; evenly distributed (~28 each)

Cluster 0: Stable, mid-tier markets (e.g., Tech, Healthcare, Legal).

Cluster 1: Larger, active markets with lowest unemployment.

Cluster 2: Premium, high-demand markets with high rent.



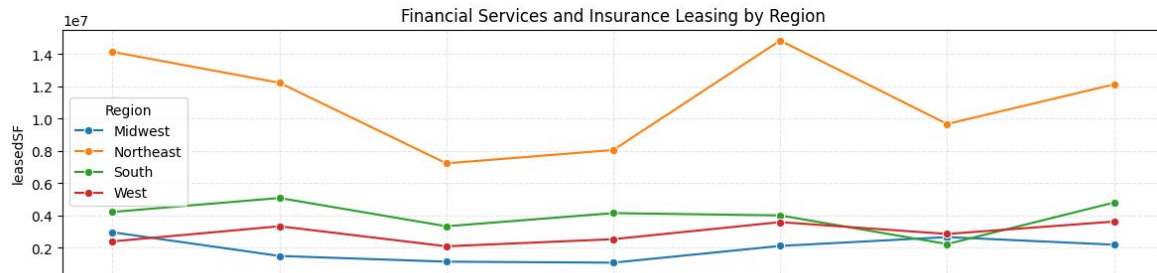
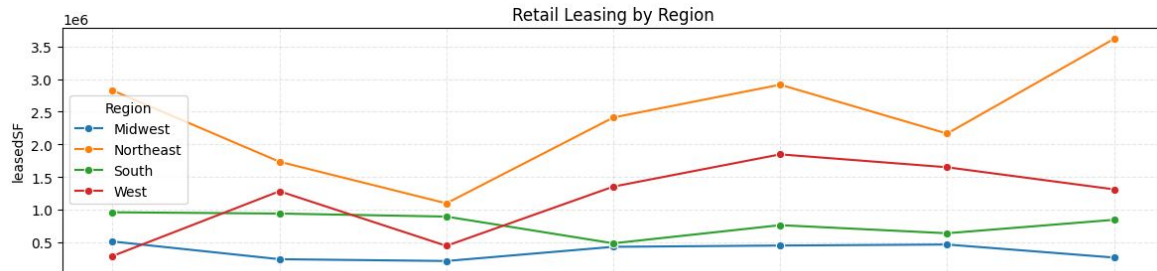
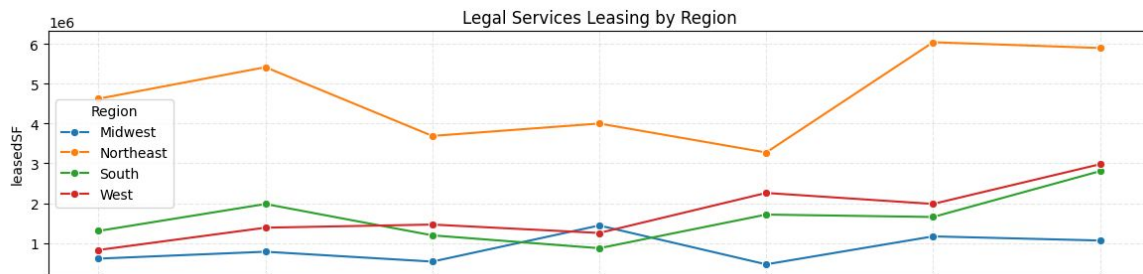
Regions

Where are industries occupying space?

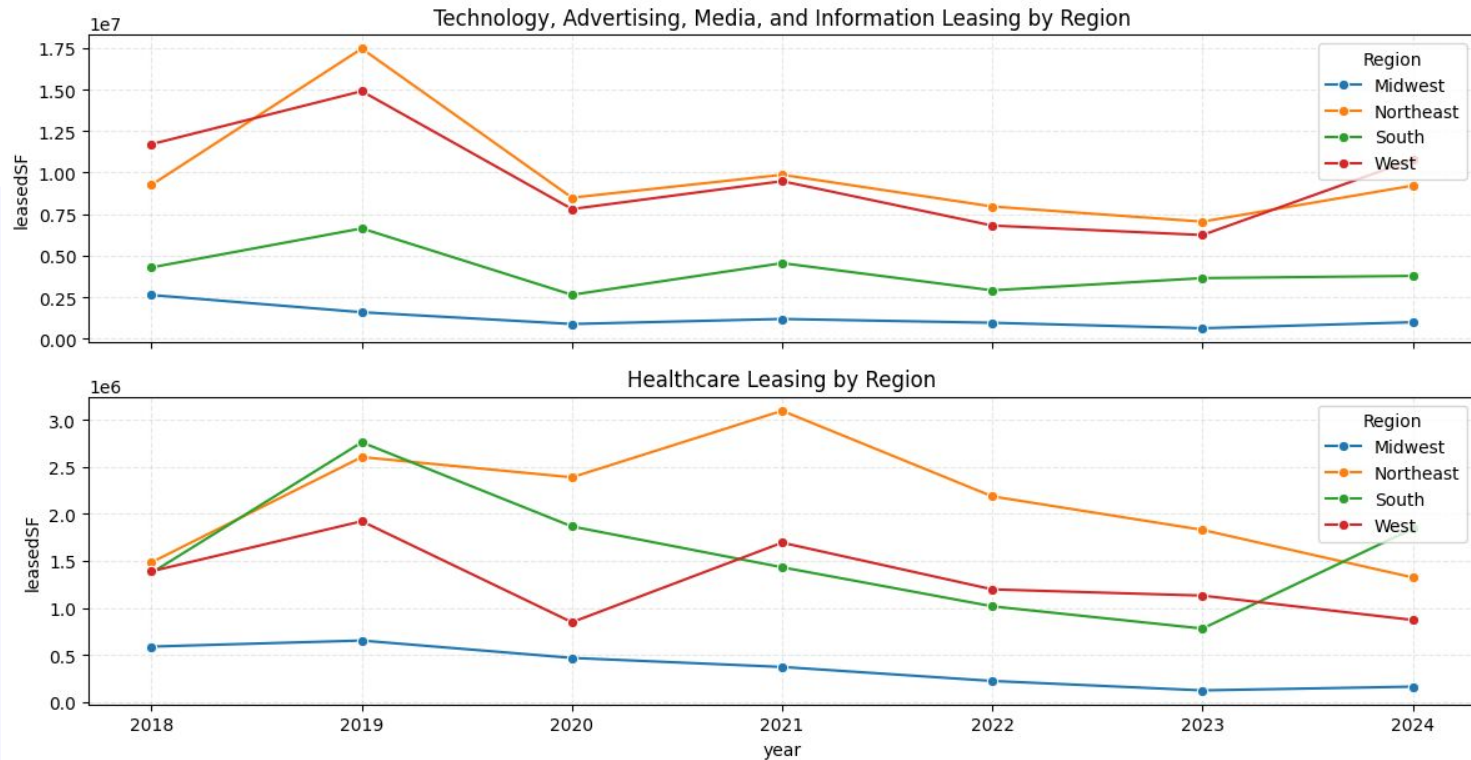
Where are markets moving?

How do regions compare between markets?

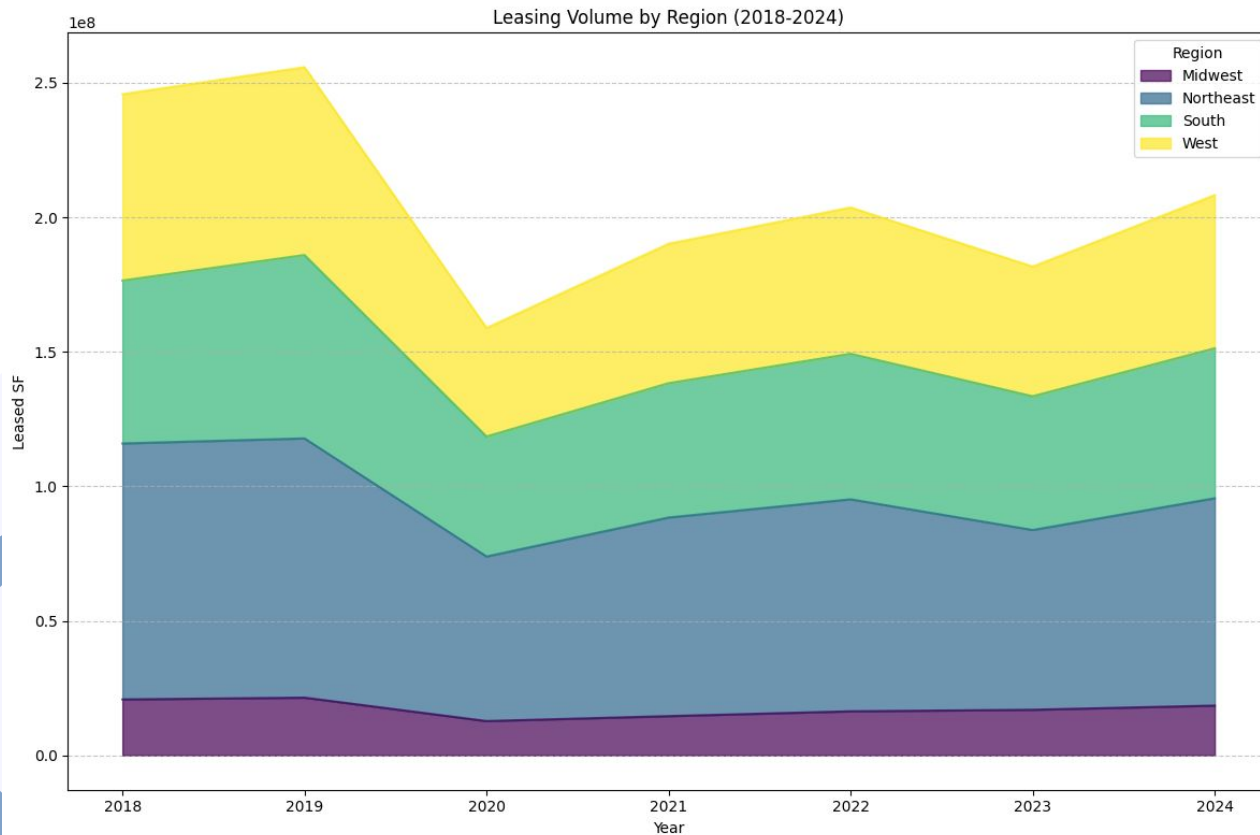
Regional Leasing Trends



Regional Leasing Trends



Comparing Regions





Economy:

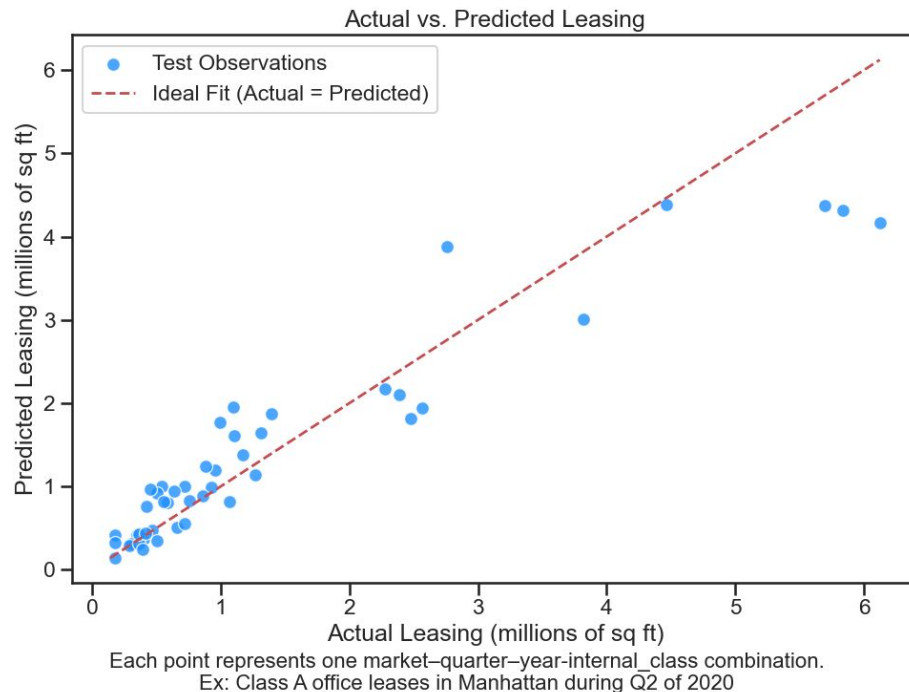
**What is the forecast for overall
leasing demand in 2025?**

Leasing Projection Model

Aggregated data by **year**, **quarter**, **market**, and **internal_class** to get one observation per market-quarter-class combination.

Applied bidirectional **stepwise selection** over ~20 predictors with a ton of **cross-validation** to get reliable **R²**.

Ended up with **R² = 0.86**, graph shows predicted leasing vs. historical leasing,



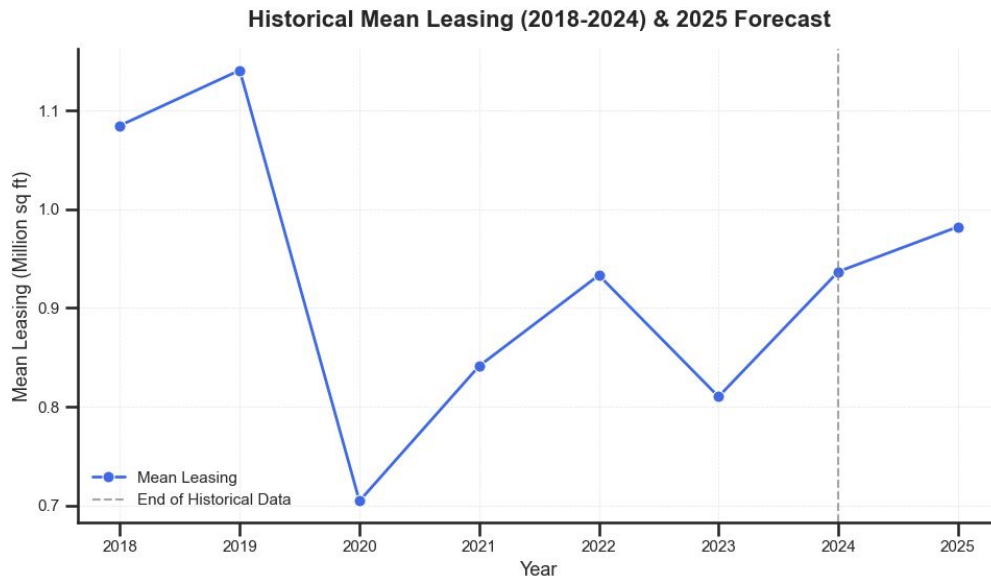
Model predictions closely align with actual leasing

Leasing Projection Model

Used our trained linear regression model ($R^2 = 0.86$) for forecasting.

Predictor Projection:

- Computed yearly averages for each predictor
- Fit (**predictor ~ year**) to forecast 2025 values.
- Compiled projected predictor values into our trained model to predict 2025 leasing.



Forecast shows continued growth in average leasing into 2025