**Apollo Investments**

**Background**

You are a financial analyst for Apollo Investment Research, a company that develops investment reports and stock recommendations for clients, including pension funds, mutual funds, and university endowments. Apollo strives to use cutting-edge technology and data to provide the most profitable recommendations possible to its clients. In order to accomplish this, the company regularly assesses new datasets and technologies.

Over the past 10 years, you have followed the retail industry, focusing on Target, Walmart, Home Depot, and Lowes. For these retail chains, a key accounting metric is “same-store sales growth” (also referred to as “comparable store sales growth”). This metric focuses on store locations that have been operating for more than a year, and captures how much sales revenue has grown in those stores during the period (typically a quarter) compared to the same period last year. For example, in the first quarter of 2022 Target reported 3.3% same-store sales growth, meaning that sales revenue in the first quarter of 2022 increased by 3.3% relative to sales revenue in the first quarter of 2021 for Target store locations that have been operating for more than a year.

Same-store sales growth is the most widely reported and followed metric in the retail industry because it is closely linked to the value of retail companies. Companies with high same-store sales growth have demonstrated an ability to generate more revenue with its existing stores.

**Predicting Sales Revenue from Outer Space**

Recently, your boss Maria asked you to evaluate a new dataset to determine whether it can improve your investment research and recommendations. This dataset was produced by a company that launched a collection of nanosatellites into space. The nanosatellites produce daily, high-resolution images of thousands of store parking lots for several retail chains (see Figure 1 for an example), including the ones you follow—Target, Walmart, Home Depot, and Lowes. Automated counting software calculates the number of cars in each parking lot, as well as the number of spaces in each parking lot.



Figure : Nanosatellite Image of Retail Parking Lot

Your boss Maria has provided you with seven years of data (2012-2018) from the nanosatellite dataset, and has asked that you evaluate the usefulness of the dataset for your work.

**Your Task**

In order to evaluate the usefulness of the nanosatellite dataset, you have decided to try to answer three key questions:[[1]](#footnote-1)

* Does the nanosatellite data predict same-store sales growth?
* Is the nanosatellite data more or less useful for different companies you follow? For example, is the nanosatellite data more or less predictive of same-store sales growth for Target relative to Walmart?
* Is the nanosatellite data more or less useful during different seasons of the year? For example, is the nanosatellite data more or less predictive of same-store sales growth during the busy holiday months (November, December, January)?

You have decided that answering these questions will give you some insight on the broader question of whether the nanosatellite data can improve your financial forecasts, valuations, and investment recommendations.

In order to answer these questions, you have created dashboard visualizations that combines the nanosatellite data with accounting metrics reported by these companies during the same time period.

You have decided to focus your analyses on two key variables:

* Nanosatellite database
  + **Delta Parking Rate**: Growth in how full the company’s parking lots are (cars/spaces) this quarter relative to the same quarter last year. (i.e., “Growth in parking lot fill rate”)
* Accounting metrics
  + **Delta Comp Sales.** Growth in same-store sales revenue for the quarter relative to the same quarter last year. (i.e., “Same-store sales growth”)

For the nanosatellite data to be useful, it needs to predict a company’s same-store sales growth. Therefore, you want to use the dashboards you’ve created to see whether growth in a company’s parking lot fill rate predicts same-store sales growth.

**Dashboard 1**

Click this link to access the first dashboard: <https://public.tableau.com/views/ApolloInvestmentsMiniCase--Dashboard1/Dashboard1?:language=en-US&publish=yes&:display_count=n&:origin=viz_share_link>

This dashboard displays a scatterplot of the relationship between growth in parking lot fill rate and growth in same-store sales revenue for the companies you follow. Each blue circle represents a quarter for the time period 2012-2018. The dashboard includes a trend line, which shows the overall relationship from the data.

**Module quiz question.** Note your answer to this question, as it will be one of the questions included in the module 14 quiz.

Based on the data in Apollo Investment Dashboard 1, which of the following best describes the relationship between growth in parking lot fill rate (Delta Parking Rate) and growth in same-store sales revenue (Delta Comp Sales)?

a. There is no discernible relationship between growth in parking lot fill rate and growth in same-store sales revenue.

b. There is a **positive relationship** between growth in parking lot fill rate and growth in same-store sales revenue. As growth in parking lot fill rate **increases**, growth in same-store sales revenue also **increases**.

c. There is a **negative relationship** between growth in parking lot fill rate and growth in same-store sales revenue. As growth in parking lot fill rate **increases**, growth in same-store sales revenue also **decreases**.

**Dashboard 2**

Click on this link to access the second dashboard: <https://public.tableau.com/views/ApolloInvestmentsMiniCase--Dashboard2/Dashboard2?:language=en-US&:display_count=n&:origin=viz_share_link>

This dashboard displays a scatterplot similar to the one in Dashboard 1 (illustrating the relationship between growth in parking lot fill rate and growth in same-store sales), but is broken out by company. On the top right of the screen is a legend that specifies the color assigned to each company. The companies included are:

* Home Depot (Ticker=HD)—Blue
* Lowes (Ticker=LOW)—Orange
* Target (Ticker=TGT)—Red
* Walmart (Ticker=WMT)—Green

**Module quiz question.** Note your answer to this question, as it will be one of the questions included in the module 14 quiz.

Based on the data in Apollo Investment Dashboard 2, for which company is the relationship growth in parking lot fill rate (Delta Parking Rate) and growth in same-store sales revenue (Delta Comp Sales) **the strongest**?

a. Target (TGT)

b. Home Depot (HD)

c. Lowes (LOW)

d. Walmart (WMT)

**Dashboard 3**

Click on this link to access the third dashboard: <https://public.tableau.com/views/ApolloInvestmentsMiniCase--Dashboard3/Dashboard3?:language=en-US&:display_count=n&:origin=viz_share_link>

This dashboard displays a scatterplot similar to the one in Dashboard 1 (illustrating the relationship between growth in parking lot fill rate and growth in same-store sales), but is broken out by season of the year. On the top right of the screen is a legend that specifies the color assigned to each season of the year. The seasons included are:

* Holiday months (November, December, January)—Orange
* Non-holiday months (all other months)—Blue

**Module quiz questions.** Note your answers to these questions, as they will be included as questions in the module 14 quiz.

Based on the data in Apollo Investment Dashboard 3, for which season of the year is the relationship between growth in parking lot fill rate (Delta Parking Rate) and growth in same-store sales revenue (Delta Comp Sales) the strongest? In other words, is growth in parking lot fill rate most predictive of same-store sales growth during holiday months or non-holiday months?

a. Holiday months

b. Non-holiday months

Based on the data in all three Apollo Investment dashboards, which of the following is the most reasonable conclusion from the data?

a. Growth in parking lot fill rates cannot be used to predict growth in same-store sales revenue.

b. Growth in parking lot fill rates can be used to predict growth in same-store sales revenue. The relationship between these variables does not vary across companies or seasons of the year.

c. Growth in parking lot fill rates can be used to predict growth in same-store sales revenue. This is especially true for Lowes and non-holiday months.

1. Some of the key questions in this case were inspired by academic research on nanosatellite imagery: <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3222741> [↑](#footnote-ref-1)