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# The Analysis of Starbucks's Market over Political Trends

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25/5/2024



## Introduction

Global markets are increasingly influenced by political and social trends, impacting companies like Starbucks. Ongoing boycotts, social movements, and the effects of the COVID-19 pandemic present both challenges and opportunities for the company.

Whether you're an investor, market analyst, or curious about the business landscape, this analysis provides insights into key trends shaping Starbucks' market performance, aiding strategic decision-making.

## Research Question

- 1- Research Question 1: Did the boycott have a significant impact on Starbucks' closing stock prices?
- 2- Research Question 2: Did the boycott have a significant impact on Starbucks' trading volume?

## Hypothesis

### Null Hypothesis 1:

There is no difference between the means of close prices of October 2022 to May 2023 and October 2023 to May 2024

### Alternative Hypothesis 1:

The average close price in the former period is less than the latter

### Null Hypothesis 2:

There is no difference between the means of volume of October 2022 to May 2023 and October 2023 to May 2024

### Alternative Hypothesis 2:

The average volume in the former period is less than the latter

## Population of Interest:

Daily stock prices of Starbucks from October 2022 – May 2024

## Dataset:

The dataset contains Starbucks's historical data in the stock market from 26 June 1992 till present day (23/5/2024)

Here is a brief of each column in the dataset:

**Date:** The date of the trading day.

**Open:** The opening price of the stock on that day.

**High:** The highest price the stock reached on that day.

**Low:** The lowest price the stock reached on that day.

**Close:** The closing price of the stock on that day.

**Adj Close:** The adjusted closing price of the stock, accounting for any corporate actions like stock splits and dividends.

**Volume:** The number of shares traded on that day.

## Analysis:

### Descriptive Statistics Analysis

**Period: October 2022 - May 2023**

- **Date:** The data covers a period from October 2022 to May 2023 with a total of 166 observations.
- **Open Prices:**
  - Mean: 100.75
  - Standard Deviation: 7.03
  - Minimum: 84.07
  - Maximum: 114.49
- **High Prices:**
  - Mean: 101.79
  - Standard Deviation: 6.92
  - Minimum: 85.47
  - Maximum: 115.48
- **Low Prices:**
  - Mean: 99.85

- Standard Deviation: 7.16
  - Minimum: 82.43
  - Maximum: 114.25
- **Close Prices:**
  - Mean: 100.88
  - Standard Deviation: 7.13
  - Minimum: 83.76
  - Maximum: 114.56
- **Adjusted Close Prices:**
  - Mean: 97.67
  - Standard Deviation: 7.17
  - Minimum: 80.47
  - Maximum: 111.25
- **Volume:**
  - Mean: 6,557,510
  - Standard Deviation: 2,819,347
  - Minimum: 2,320,000
  - Maximum: 24,388,600
- **Daily Return:**
  - Mean: 0.001
  - Standard Deviation: 0.017
  - Minimum: -0.092
  - Maximum: 0.085
- **Volatility:**
  - Mean: 0.272
  - Standard Deviation: 0.086
  - Minimum: 0.144
  - Maximum: 0.437
- **Year:**
  - Mean: 2022.62
  - Standard Deviation: 0.49

**Period: October 2023 - May 2024**

- **Date:** The data covers a period from October 2023 to May 2024 with 163 observations.
- **Open Prices:**
  - Mean: 92.23
  - Standard Deviation: 7.29
  - Minimum: 72.29
  - Maximum: 107.18
- **High Prices:**

- Mean: 92.95
- Standard Deviation: 7.23
- Minimum: 72.85
- Maximum: 107.66
- **Low Prices:**
  - Mean: 91.42
  - Standard Deviation: 7.25
  - Minimum: 71.80
  - Maximum: 106.20
- **Close Prices:**
  - Mean: 92.14
  - Standard Deviation: 7.20
  - Minimum: 72.50
  - Maximum: 107.21
- **Adjusted Close Prices:**
  - Mean: 91.07
  - Standard Deviation: 6.90
  - Minimum: 71.95
  - Maximum: 105.77
- **Volume:**
  - Mean: 9,182,346
  - Standard Deviation: 6,251,854
  - Minimum: 3,206,400
  - Maximum: 66,610,700
- **Daily Return:**
  - Mean: -0.001
  - Standard Deviation: 0.019
  - Minimum: -0.159
  - Maximum: 0.095
- **Volatility:**
  - Mean: 0.234
  - Standard Deviation: 0.108
  - Minimum: 0.140
  - Maximum: 0.516
- **Year:**
  - Mean: 2023.61
  - Standard Deviation: 0.49

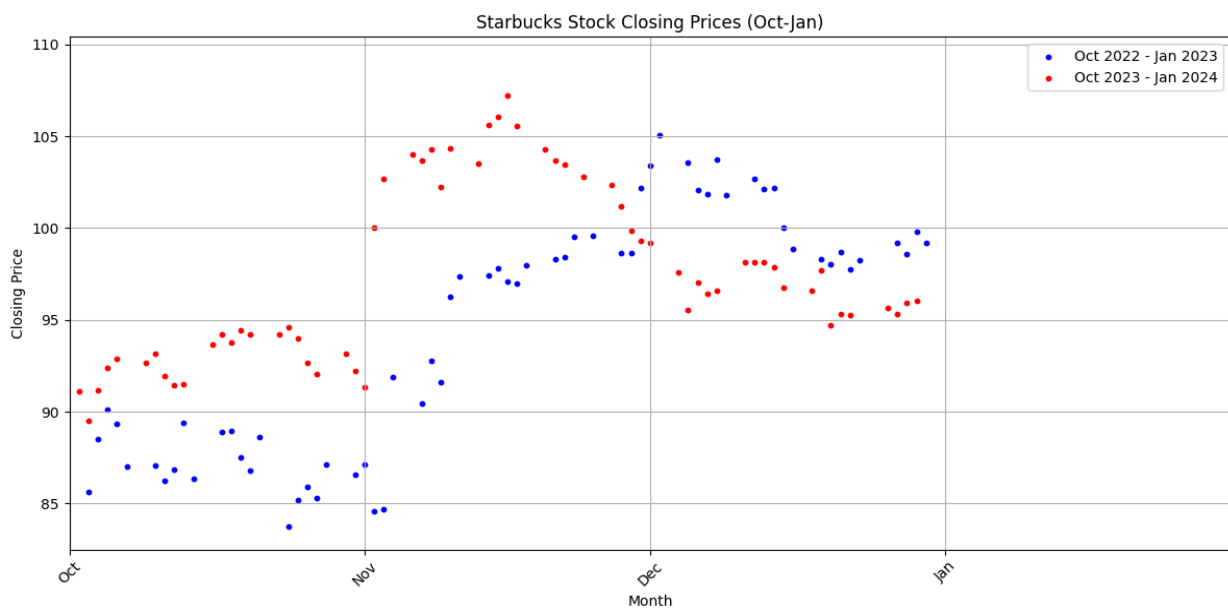
### Comparison of Descriptive Statistics

- **Mean Open Prices:** The mean open prices decreased from 100.75 (Oct 2022 - May 2023) to 92.23 (Oct 2023 - May 2024).

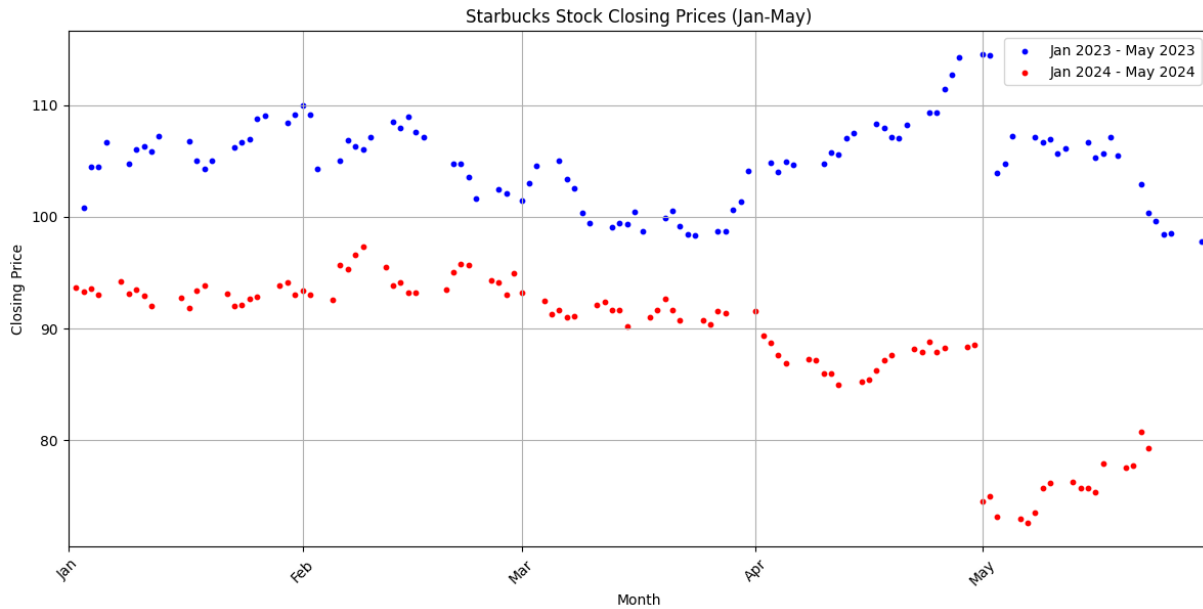
- **Mean High Prices:** The mean high prices decreased from 101.79 to 92.95.
- **Mean Low Prices:** The mean low prices decreased from 99.85 to 91.42.
- **Mean Close Prices:** The mean closing prices decreased from 100.88 to 92.14.
- **Mean Adjusted Close Prices:** The mean adjusted close prices decreased from 97.67 to 91.07.
- **Mean Volume:** The mean volume increased significantly from 6,557,510 to 9,182,346.
- **Daily Return:** The mean daily return decreased from 0.001 to -0.001.
- **Volatility:** The mean volatility decreased from 0.272 to 0.234.

This comprehensive comparison indicates a general decline in stock prices and daily returns, while the trading volume has increased during the period following the boycotting event. This suggests that the boycott might have influenced investor behavior, leading to more trading activity but lower stock prices.

### Data Visualization:



**fig. 1.** Starbucks Stock Closing Prices (Oct-Jan) showing the two periods



**fig. 1.1** Starbucks Stock Closing Prices (Jan-May) showing the two periods

## Figures 1.0, 1.1:

The provided scatter plots offer a comparative analysis of Starbucks stock closing prices over two periods: October to January, and January to May. Each plot contrasts the data from two consecutive years—2022-2023 and 2023-2024—highlighting the variations in stock performance across these timeframes.

October to January (Fig. 1):

Plot Overview: The first scatter plot illustrates the closing prices from October to January for the periods of 2022-2023 (blue) and 2023-2024 (red).

Key Observations:

Initial Levels: In October, the closing prices for 2022-2023 start slightly lower compared to 2023-2024, around 85 to 90.

Trends and Peaks: During the 2023-2024 period, the stock prices show a significant upward trend, peaking in December at over 105, then facing a decline. Conversely, the prices during 2022-2023 exhibit a more stable pattern with minor fluctuations and steady upward trend.

Conclusion of the Period: By January, the 2022-2023 prices remain high, around 95 to 100, while the 2023-2024 prices stabilize around 90 to 95.

January to May (Fig. 2):

Plot Overview: The second scatter plot continues from January to May for the same two periods.

Key Observations:

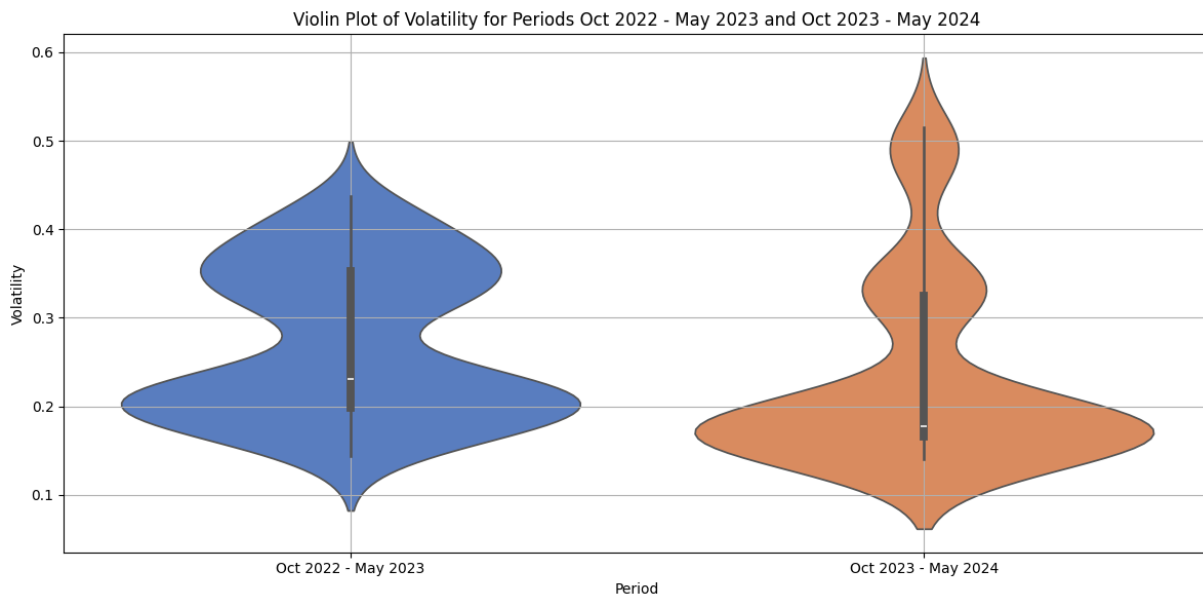
Continuation and Divergence: The 2022-2023 period shows continued growth with a steady rise, peaking at around 110 in February and maintaining high levels throughout



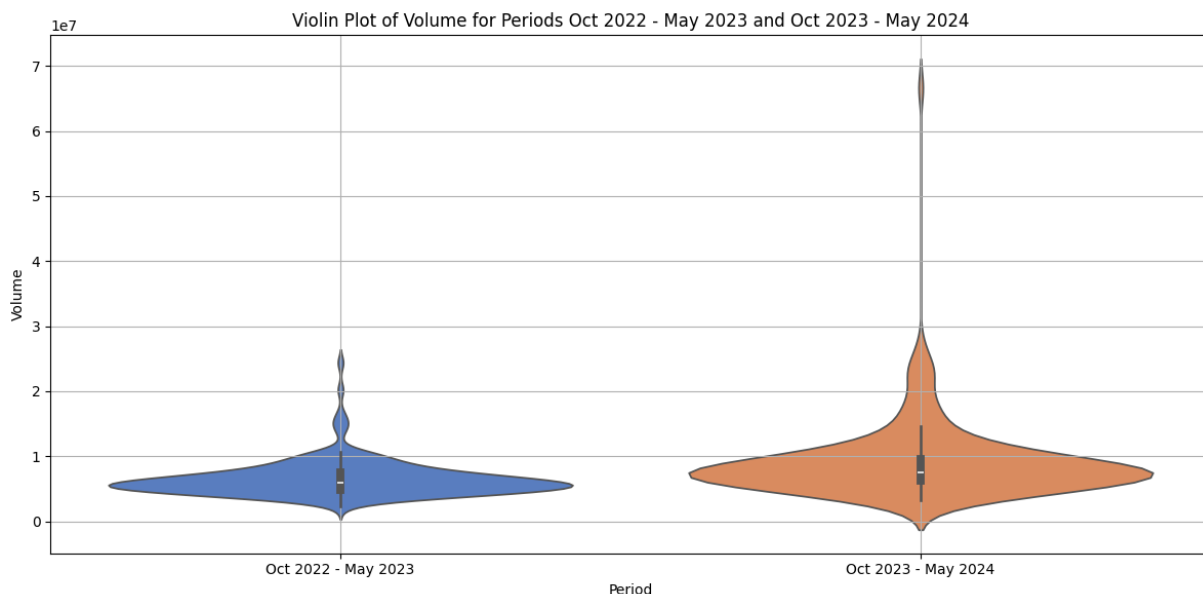
the period. In contrast, the 2023-2024 prices display a more stable trend, with continuous decline, remaining around 85 to 95. Then a very sharp decline in May. Final Comparison: By the end of May, the stock prices for the 2022-2023 period are significantly higher compared to the same period in 2023-2024, indicating a stronger performance in the former period.

**Conclusion:**

The comparison between the two periods (October to January and January to May) for the years 2022-2023 and 2023-2024 reveals noticeable differences in the stock price trends. The 2022-2023 period exhibits an overall upward trend, while the 2023-2024 period shows stability but lower overall prices until the sharp decline in May. These observations suggest that external factors, such as the boycotting event starting in October 2023, may have negatively impacted the stock performance in the latter period.



**fig 1.2** Violin Plot of Total Volume comparing the periods Oct 2022 – May 2023 and Oct 2023 – May 2024



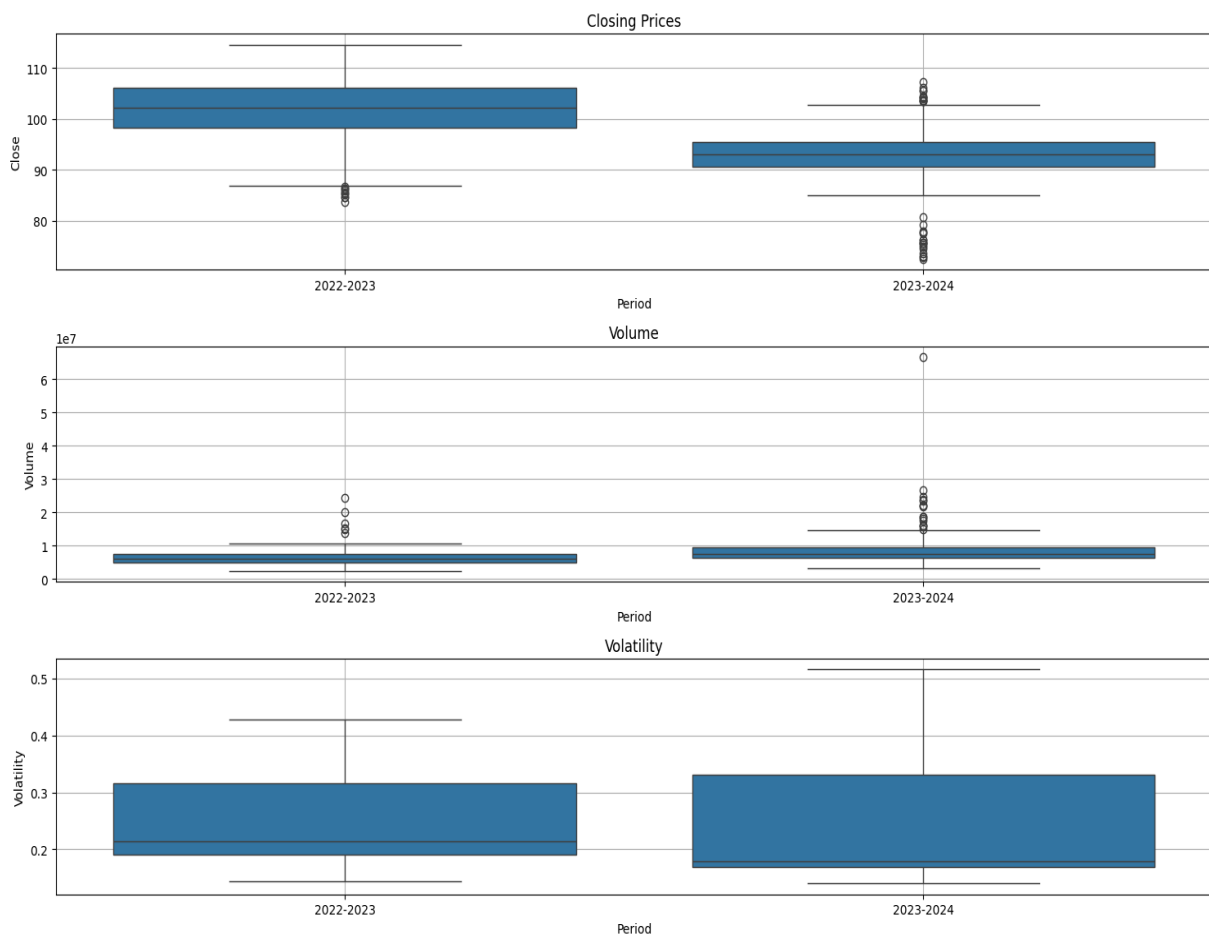
**fig 1.3** Violin Plot of Total Volume comparing the periods Oct 2022 – May 2023 and Oct 2023 – May 2024

#### Figures 1.2,1.3:

**Volume:** The violin plot for volume shows that during the period from October 2022 to May 2023, the trading volume had a narrower distribution centered around lower values, indicating more consistent and moderate trading activity. Conversely, in the period from October 2023 to May 2024, the distribution of trading volume is broader with a significant peak towards higher volumes. This suggests that trading activity was more volatile with periods of unusually high volume, possibly reflecting heightened market interest or significant events influencing trading behavior during this period.

**Volatility:** The violin plot for volatility reveals that the period from October 2022 to May 2023 exhibited a relatively narrower and more consistent range of volatility, suggesting more stable stock price movements. In contrast, the period from October 2023 to May 2024 shows a broader distribution with higher median volatility, indicating increased fluctuations in stock prices. This period seems to have experienced more pronounced volatility, possibly due to market reactions to external factors such as the boycott mentioned.

Analysis: The data indicates a clear difference in trading behavior and stock price stability between the two periods. The period from October 2023 to May 2024 shows both higher trading volumes and greater volatility. This could be due to significant market events or external factors affecting investor sentiment and behavior. The increased volatility and volume during the latter period suggest a more reactive market, potentially influenced by the boycott mentioned and other economic factors. These patterns highlight the importance of considering external market conditions and events when analyzing stock performance and investor behavior.



**fig 1.4** Box plots comparing the two periods (2022-2023 and 2023-2024 from Oct to May) in terms of closing prices, volume, and volatility

**Figure 1.4:**

**1. Closing Prices:**

- 2022-2023: - The median closing price is around 100. - The interquartile range (IQR) is between approximately 90 and 110. There are several outliers below 90, indicating occasional lower closing prices.

- 2023-2024: - The median closing price is slightly lower, around 95. - The IQR is between approximately 85 and 105. - There are more outliers below 85, indicating increased instances of lower closing prices.

- Comparison: - The median closing price has decreased from 2022-2023 to 2023-2024. - The IQR has shifted downward, indicating a general decline in closing prices. - The number of outliers has increased, suggesting more frequent low closing prices in 2023-2024.

**2. Volume:** - 2022-2023: - The median trading volume is relatively low. - The IQR is very tight around the median, indicating low variability in volume. - There are several significant outliers, indicating occasional high trading volumes. - 2023-2024: - The median trading volume remains low and similar to 2022-2023. - The IQR is slightly wider but still indicates low variability. - There are fewer significant outliers compared to 2022-2023.

- Comparison: - The trading volume in both periods shows low median values with occasional spikes. - The 2022-2023 period has more significant outliers, suggesting occasional high trading activity. - The 2023-2024 period has fewer outliers, indicating steadier trading behavior.

**3. Volatility:** - 2022-2023: - The median volatility is around 0.3. - The IQR is between approximately 0.2 and 0.4, indicating moderate variability in volatility. - There are few outliers, indicating consistent volatility levels. - 2023-2024: - The median volatility is similar, around 0.3. - The IQR is slightly narrower, indicating more consistent volatility. - There are no significant outliers, suggesting stable volatility levels. - Comparison: - The volatility levels are similar in both periods, with a slight reduction in variability in 2023-2024. - The absence of significant outliers in 2023-2024 indicates more stable volatility compared to 2022-2023.

**Summary:** - Closing Prices: The stock prices have decreased in 2023-2024 compared to 2022-2023, with a shift in the median and IQR downward. - Volume: There is low variability in trading volume for both periods, with occasional spikes. The 2023-2024 period shows fewer significant outliers. - Volatility: The volatility levels are consistent between the two periods, with a slight reduction in variability in 2023-2024.

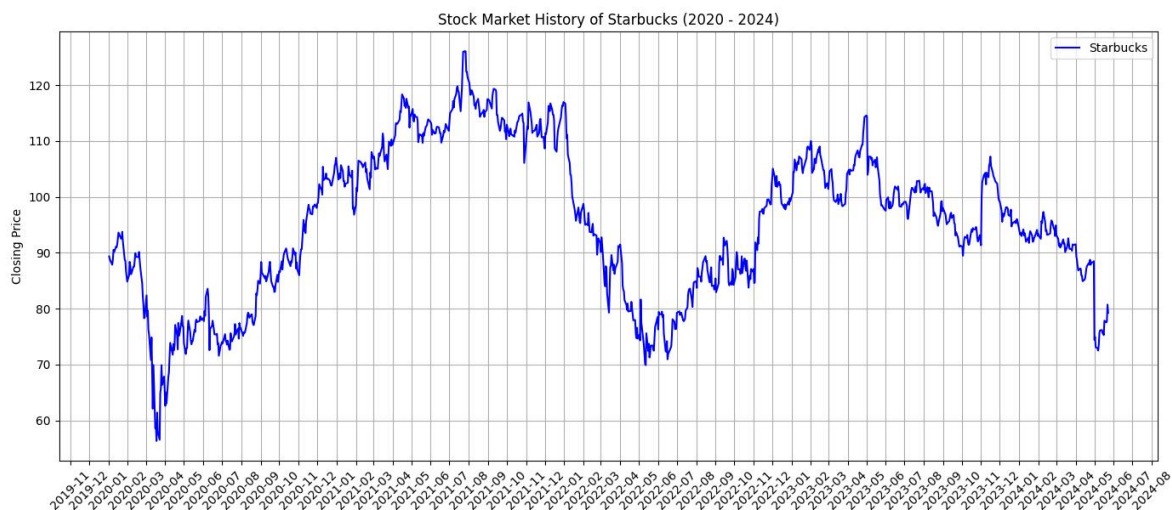
**Interpretation:** - The downward shift in closing prices and the decrease in the number of outliers suggest a less favorable market sentiment or performance for Starbucks in the 2023-2024 period compared to 2022-2023. - The low variability in trading volume and the absence of significant outliers in 2023-2024 indicate steadier trading behavior. - The consistent volatility levels with

reduced variability in 2023-2024 suggest a stable market environment with fewer extreme price movements.

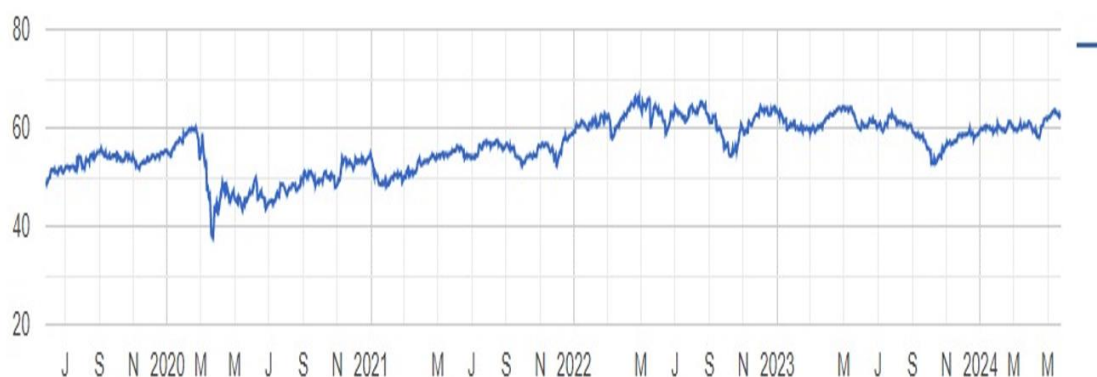
These observations provide valuable insights into the changes in stock performance and market behavior for Starbucks over the two periods.

## Competitor analysis:

In this section, we compare the closing stock prices of Starbucks with one of their biggest competitors, Costa Coffee. The goal is to identify and eliminate potential confounding variables, providing a clearer understanding of whether any economic trends have impacted the entire coffee industry or if the observed changes are specific to Starbucks. This comparison aims to discern broader economic influences from factors that may be unique to Starbucks, such as the boycotting event starting in October 2023. By analyzing both companies' stock performances over the same period, we can better isolate the effects of industry-wide economic trends from company-specific events.



Stock market history THE COCA-COLA COMPANY (COSTA COFFEE)



*fig 1.5 Computing the Stock prices of Costa Coffee to the Starbucks*

**Figure 1.5:**

The boycott of Starbucks starting in October 2023 could indeed be a contributing factor to the observed trends in the stock prices, particularly the sharp decline and subsequent volatility seen in the Starbucks stock graph.

Here's a detailed analysis:

**Sharp Decline Post-October 2023:** The Starbucks stock graph shows a noticeable drop starting in late 2023. This decline aligns with the timing of the boycott, suggesting that negative public sentiment and reduced consumer demand may have significantly impacted the stock price. Investors likely reacted to the potential loss in revenue and market share due to the boycott, leading to a sell-off in the stock.

**Increased Volatility:** After the initial decline, the stock shows increased volatility. This can be attributed to the market's uncertainty about the long-term impact of the boycott. Fluctuations in stock prices might reflect changing investor sentiment as new

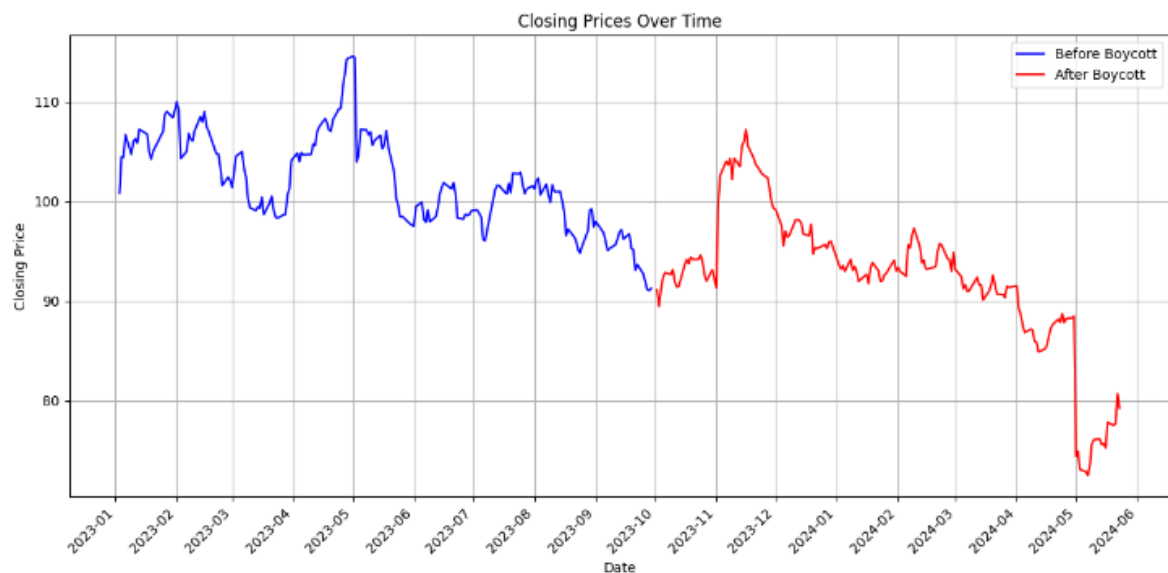
information about the boycott's impact becomes available, including any measures Starbucks took to mitigate the effects or changes in consumer behavior.

Comparison with Costa Coffee: Comparing with Costa Coffee's steadier performance, it is clear that Costa Coffee did not face the same level of public backlash or market disruption. This relative stability further supports the idea that Starbucks' unique challenges, like the boycott, played a significant role in its stock performance.

Market Reaction: Boycotts can lead to immediate negative market reactions as investors anticipate lower earnings and potential long-term damage to the brand. The impact on Starbucks' stock price is a reflection of these market dynamics, with the sharp decline and subsequent volatility highlighting the investors' concerns.

In conclusion, while there could be multiple factors influencing Starbucks' stock prices, the timing and nature of the decline and increased volatility strongly suggest that the boycott starting in October 2023 had a significant impact. This aligns with typical market behavior in response to boycotts, where investor sentiment quickly adjusts to perceived threats to the company's financial performance and brand reputation.

Explaining the reason of the immediate sharp incline after the boycotting:



*fig 1.6 Computing the Stock prices of Costa Coffee to the Starbucks*

**Fig 1.6:**

The short, sharp incline in Starbucks' stock prices immediately following the onset of the boycott in October 2023 is an interesting anomaly (appeared in fig 1.6 and fig 1.0). Typically, one might expect a boycott to exert downward pressure on a company's stock due to anticipated declines in

sales and revenue. However, the observed initial increase could be attributed to opportunistic investor behavior.

When a company faces a significant, but potentially temporary, challenge such as a boycott, some investors might view the resultant dip in stock prices as a buying opportunity. These investors likely believe that the company's fundamentals remain strong and that the boycott's effects will be short-lived. Consequently, they purchase shares at reduced prices, anticipating a rebound once the boycott ends or its impact diminishes. This surge in buying activity can temporarily drive up the stock price, creating a short-term upward trend.

The rationale behind this behavior is grounded in market psychology and the principles of value investing. Investors who trust in Starbucks' long-term prospects might see the boycott as an overreaction by the market, leading to undervalued stock prices. By capitalizing on this perceived undervaluation, they aim to benefit from the stock's eventual recovery.

## Are the economic conditions the reason?

To determine whether the decline in Starbucks' stock prices after October 2023 is primarily due to the boycott or influenced by broader economic factors, we need to examine key economic indicators such as inflation rates, GDP growth, and unemployment rates during this period.

**Inflation Rates** In 2023, the inflation rate in the U.S. saw significant fluctuations, peaking at around 9.1% in June 2022 and then gradually decreasing to 3.2% by October 2023. Throughout 2024, the inflation rate remained relatively stable, fluctuating between 3.1% and 3.5% (US Inflation Calc) (Bureau of Labor Statistics).

**GDP Growth** the GDP growth rate in the U.S. during this period showed signs of recovery from the pandemic-induced recession. In 2023, the GDP growth rate was around 2.1%, indicating moderate economic expansion. This trend continued into 2024, with the GDP growth rate expected to stabilize around 2% (Bureau of Labor Statistics).

**Unemployment Rates** Unemployment rates also provide insight into economic health. In 2023, the unemployment rate was around 3.9%, reflecting a tight labor market. This rate remained consistent into early 2024, indicating that employment levels were stable and not significantly affecting consumer spending power (Bureau of Labor Statistics).

**Analysis** Given these economic indicators, the decline in Starbucks' stock prices post-October 2023 is less likely to be solely attributed to broader economic conditions such as high inflation, GDP growth fluctuations, or unemployment rates. Instead, the immediate drop following the boycott suggests that the boycott had an impact on investor sentiment and stock performance.



While it's possible that some investors might have seen the lower stock prices as a buying opportunity, the overall trend indicates that the boycott's influence on consumer behavior and market perceptions likely played a major role in the stock price decline.

In conclusion, while economic factors provide a backdrop to market conditions, the timing and magnitude of the stock price changes suggest that the boycott might be a driver of the observed decline.

## Hypothesis Testing Steps

- Step 1: Define null and alternative hypothesis
- Step 2: Choose the appropriate test
- Step 3: Calculate the p-value
- Step 4: Determine the statistical significance

### 1. Hypothesis testing for the close prices

- Step 1:

Null Hypothesis: There is no difference between the means of close prices in from October 2022 to May 2023 and from October 2023 to May 2024

Alternative Hypothesis: The average close prices in the first period is less than the latest

- Step 2:  
Since we're comparing numerical data over periods of time, the ANOVA test is the best test
- Step 3:  
 $p\text{-value} = 1.5862346891804615e-24$
- Step 4:  
With significance level of 0.05, the null hypothesis is rejected. It is statistically significant that the means of the 2 groups are different, and that the average close price from October 2022 to May 2023 is greater than the average from October 2023 to May 2024

### 2. Hypothesis testing for the volume

- Step 1:

Null Hypothesis: There is no difference between the means of volume in from October 2022 to May 2023 and from October 2023 to May 2024

Alternative Hypothesis: The average volume in the first period is less than the latest

- Step 2:  
Since we're comparing numerical data over periods of time, the ANOVA test is the best test
- Step 3:  
$$p\text{-value} = 1.524511637171421e-06$$
- Step 4:  
With significance level of 0.05, the null hypothesis is rejected. It is statistically significant that the means of the 2 groups are different.

## Conclusion

For Hypothesis 1, where the Null Hypothesis is that there is no difference between the means of close prices for the two periods, and the Alternative Hypothesis is that the average close price in the former period is less than the latter, the p-value obtained was less than 0.05. Therefore, the Null Hypothesis is rejected.

Similarly for Hypothesis 2, where the Null Hypothesis is that there is no difference between the means of volumes for the two periods, the p-value obtained was again less than 0.05, so the Null Hypothesis was rejected again.

In conclusion, at the 5% significance level, there is evidence that is sufficient to support the claim that there is a difference between the means of close prices and volumes for the periods from October 2022 to May 2023 and October 2023 to May 2024.

Despite the general expectation for close prices to increase annually, there has been an unusual decrease in the average close price. By eliminating some confounding variables, this is most likely influenced by the recent boycott and had a substantial impact. However, it is important to note that while the boycott is a plausible explanation, there is no definitive answer as other factors may also contribute to this unexpected trend.

## Any potential issues

One potential issue in our research is the limited availability of datasets for the stock prices of Starbucks' competitors. Many competitors are privately held and do not disclose their stock prices, which restricts our ability to include a comprehensive analysis of market

trends within the industry. Access to these datasets would have allowed for a more thorough elimination of confounding variables, providing a clearer understanding of the specific impacts of boycotting on Starbucks' stock prices. This data limitation highlights the challenges faced in market analysis when critical information is unavailable.

## References:

- [Understanding Market Psychology](#)
- [How Investor Sentiment Affects Stock Prices](#)
- [Inflation rates 1960-2024](#)
- [CPI over time](#)
- [Average increase of stock prices](#)
- [COSTA COFFEE - price - share - stock-market \(allbrands.markets\)](#)