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1. Introduction

This report presents a comparative analysis of the stock performance of Apple, Microsoft, and Tesla from 2018 to 2023. Using data extracted from the website of Yahoo finance, we examine the trends in their adjusted closing prices, providing insights into their market behaviour and performance. The analysis includes line charts and histograms to visualize these trends, accompanied by key descriptive statistics.

2. Comparative Analysis of Stock Performance (2018-2023): Apple, Microsoft, and Tesla

The analysis is based on the adjusted closing prices of the stocks. Descriptive statistics provide a summary of the data, while line charts illustrate the price trends over time, and histograms show the distribution of stock prices.

2.1. Descriptive Statistics

- **Apple:**

Mean (97.388) and Median (94.148) are close, suggesting a skewed (not normal distribution) distribution of prices over the period. A high standard deviation (46.567) indicates significant volatility and variability in Apple's stock price.

- **Microsoft:**

Mean (190.826) and Median (198.824) indicate a skewed distribution of stock prices. A lower standard deviation (75.188) compared to Tesla, but higher than Apple, indicates moderate price variability.

- **Tesla:**

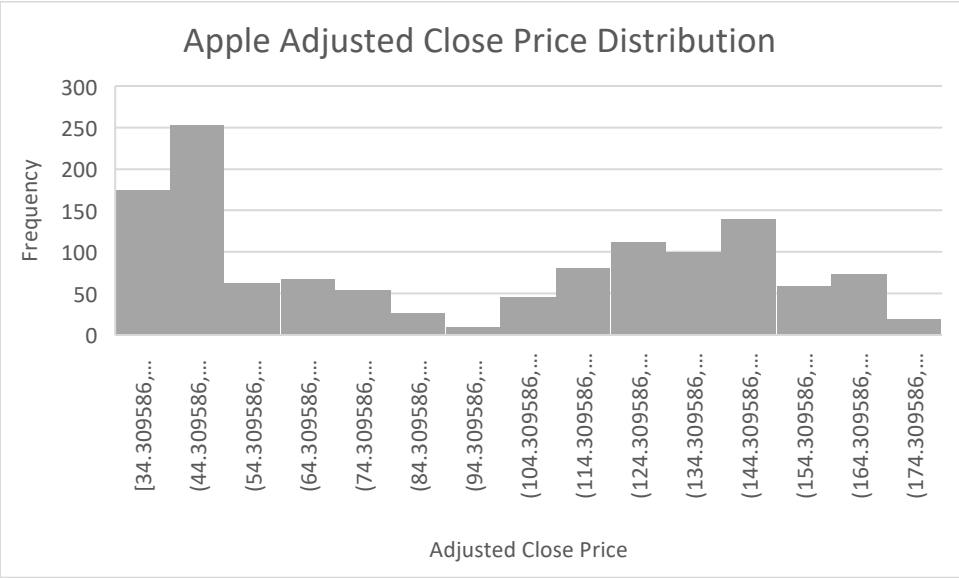
Mean (131.79) and Median (97.64) indicates a skewed distribution with more values in the lower range but also periods of extremely high prices. An extremely high standard deviation (116.98) reflects Tesla's highly volatile stock price.

- **S&P 500:**

Mean (3457.23) and Median (3298.03) indicate a skewed distribution of stock prices of the broader market. A standard deviation of 666.77 depicts market volatility, with a range from 2237.40 to 4796.56.

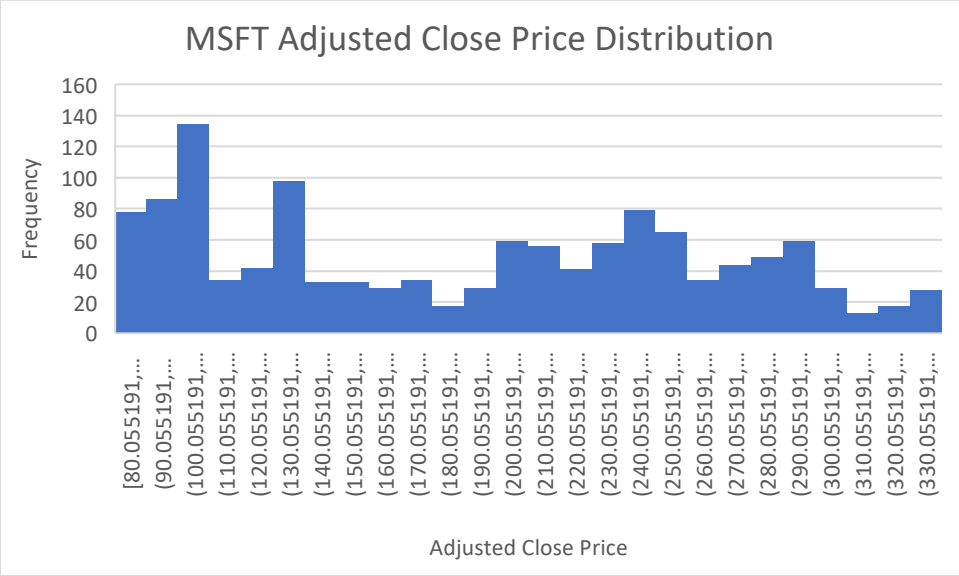
2.2. Histograms: Distribution of Adjusted Close Prices

- **Apple:**



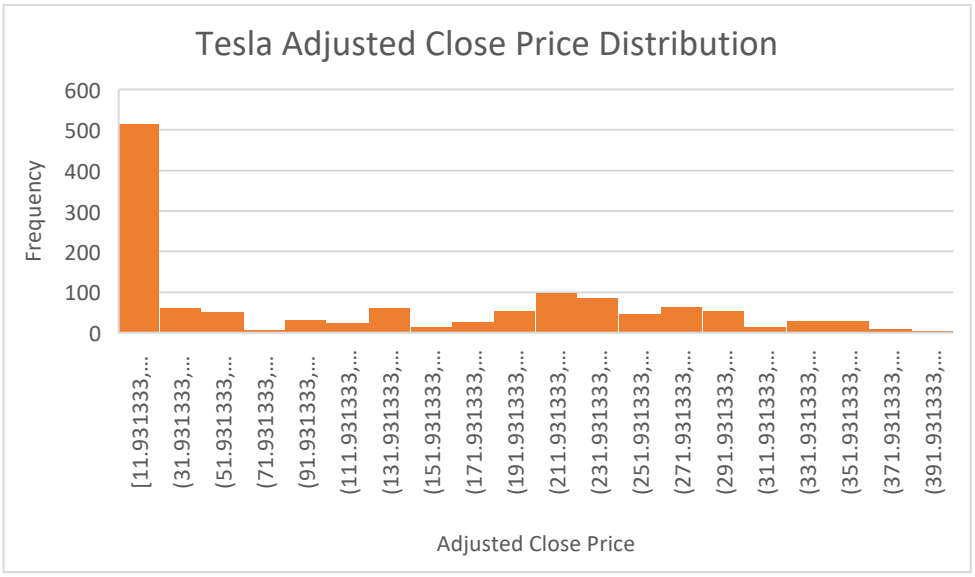
The histogram for Apple displays a bimodal distribution, with two local maxima's indicating periods of stability followed by rapid growth.

- **Microsoft:**



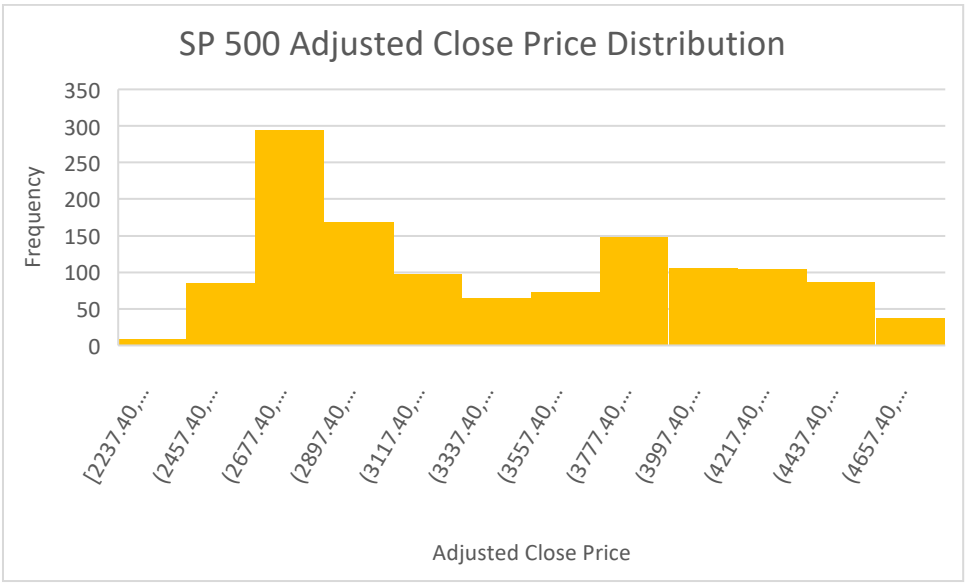
Microsoft's histogram shows a broader distribution of stock prices, reflecting a more gradual and consistent increase over time. The spread of the distribution indicates that Microsoft's stock price has been steadily climbing, with fewer periods of stagnation or decline.

- **Tesla:**



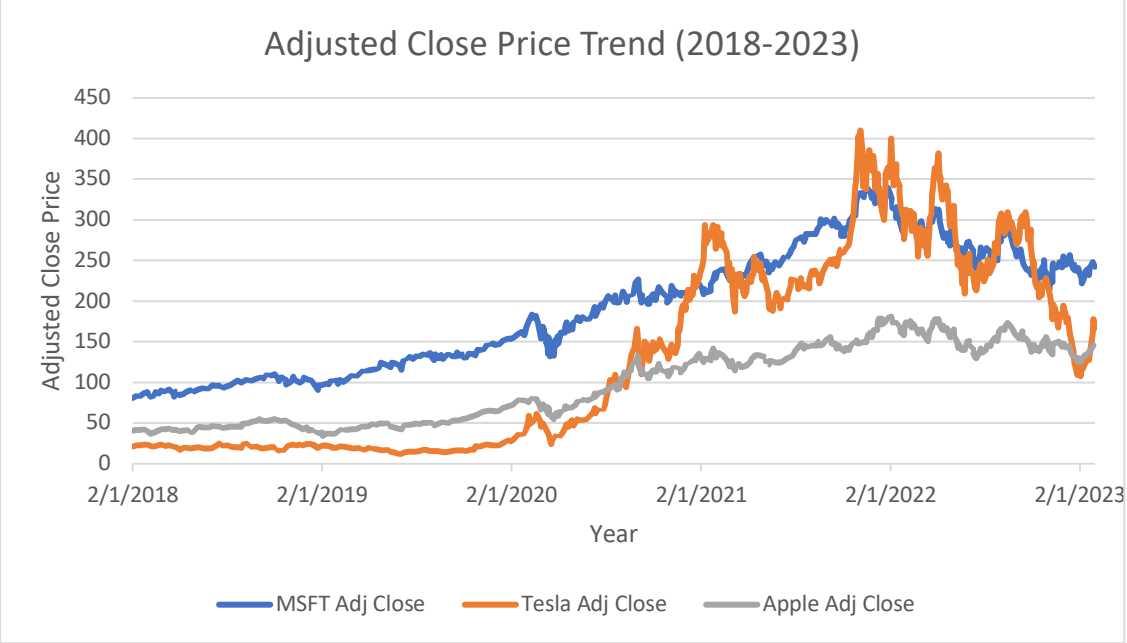
Tesla's histogram exhibits a wide range with a positively skewed distribution concentrated in the lower price range.

- **S&P 500 Index:**



The histogram indicates a skewed distribution with a concentration in the lower range, suggesting more time spent in lower price ranges for the overall market.

2.3. Line Charts: Stock Price Trends Over Time (2018-2023)



- **Apple (Grey Line):**

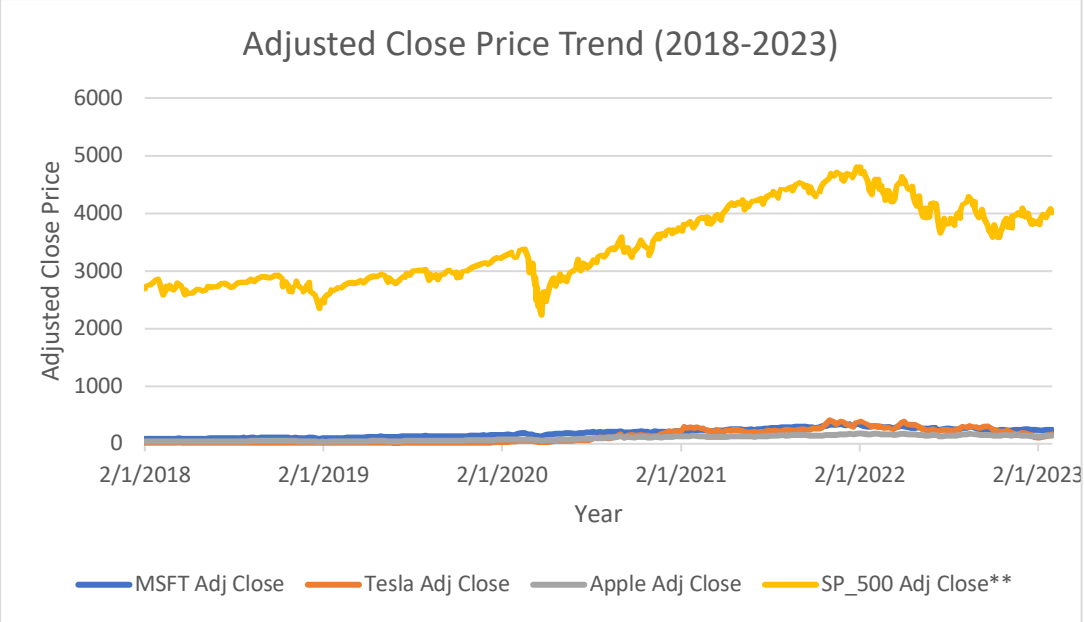
1) The line chart for Apple shows a significant upward trend in stock prices over the five-year period.
2) There's a marked increase in stock prices post-2020, possibly reflecting Apple's strong financial performance during the pandemic.
3) Periods of volatility are observable, with noticeable declines and recoveries.

- **Microsoft (Blue Line):**

1) Microsoft's stock price exhibits a steady and consistent upward trajectory.
2) The growth appears more linear compared to Apple, indicating a relatively stable increase in stock value.

- **Tesla (Orange Line):**

1) Tesla's stock price shows a highly volatile trajectory with a sharp increase after 2020.



- **S&P 500 Index (yellow line):**

Shows a general upward trend with periods of volatility. Reflects the cumulative performance of 500 large companies. Therefore, trend mirrors the broader market dynamics.

3. Regression Analysis of Stock Performance (2018-2023): Apple, Microsoft, and Tesla

This report presents a regression analysis of the daily percentage changes in stock prices for Microsoft, Apple, and Tesla (ex. app%chng) against the daily percentage change in the S&P 500 index (S&P%chng). The analysis period spans from 2018 to 2023, using data extracted from Yahoo Finance.

3.1 Beta Values

According to Capital Asset Pricing Model, the slope coefficient Beta in a simple regression of the excess return on the stock(ex. app%chng) vs. the stock return on the market (S&P%chng) is a measure of relative risk of the stock. Stocks with higher Betas are riskier and therefore should have higher returns in the market. Stocks with betas higher than 1 can be interpreted as more volatile than the S&P 500. While beta less than 1 suggests it is less volatile.

The regression analysis conducted in this report calculates the beta for each of the three companies.

The calculated beta values for each stock are as follows:

1. Microsoft: Beta = 1.2215
2. Tesla: Beta = 1.8315
3. Apple: Beta = 1.3381

3.2 Observation

Tesla has the highest beta at 1.8315, suggesting it's the riskiest among the three, with stock price trends that are significantly more volatile than the overall market. Apple follows with a beta of 1.3381, indicating higher volatility than the market but less than Tesla. Microsoft has the lowest beta of the three at 1.2215, yet it's still more volatile than the market, but less so compared to Apple and Tesla.

3.3 Conclusion

In conclusion, based on the beta values, investors looking for the stock with the highest potential return (but also the highest risk) should favour Tesla, while those seeking relatively more stability should go towards Microsoft or Apple, acknowledging that all three exhibit more volatility than the market.