STATISTICS PROJECT: STOCK PRICE ANALYSIS #2

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Inspiring generation

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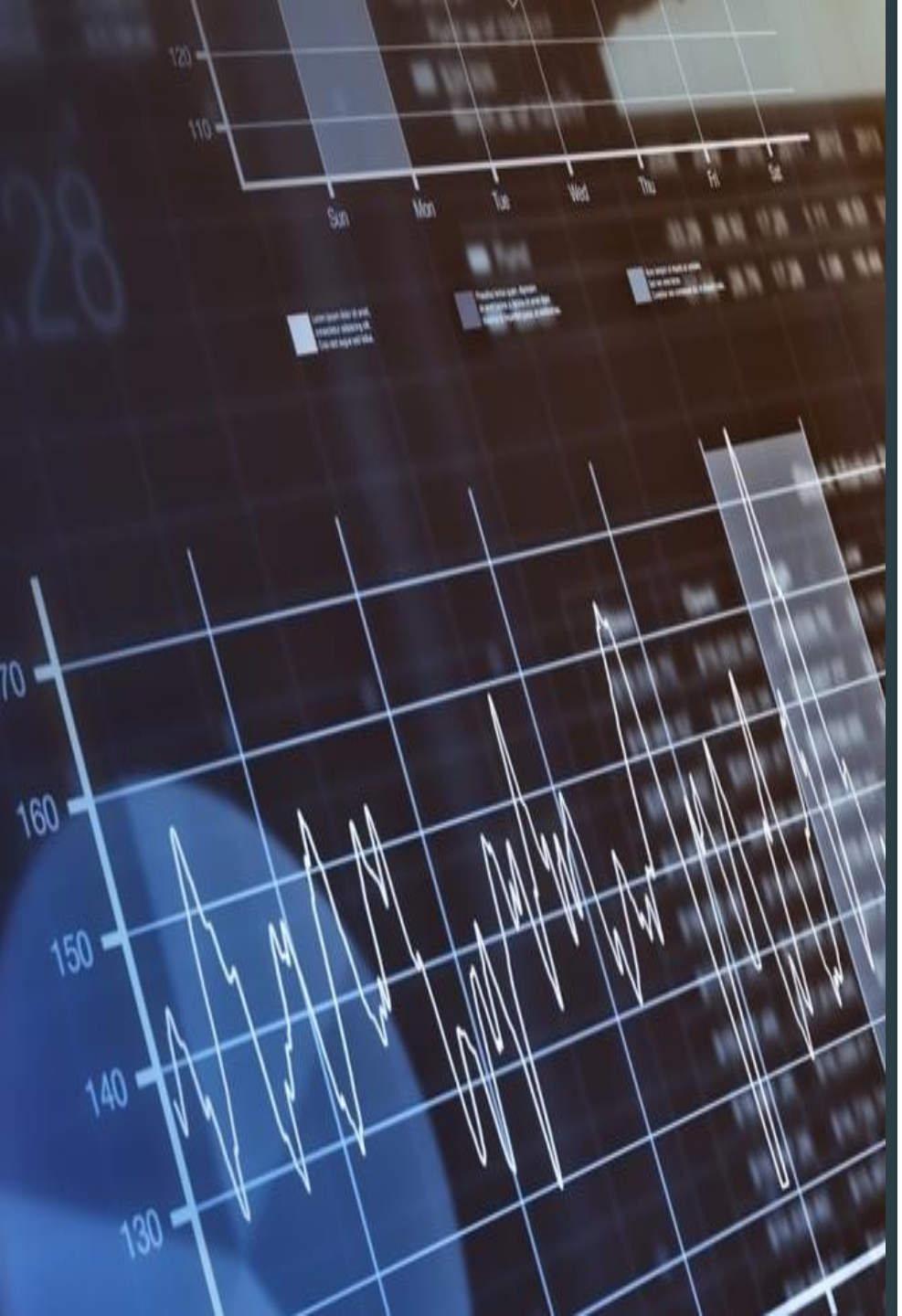
Introduction

- In this project I am going to conduct comparative analysis of the price values of four stocks spanning the period from 2018 to 2023: Microsoft (MSFT), Tesla (TSL), Apple (APL), and the S&P 500 Index (SP500).
- The main goal for this analysis is to understand market performance, investment strategy, investors and stockholders make wise choice in the future from risk factors and gain more benefits
- Make comparison by using descriptive statistics, some chats such as histograms, scatter plots and line graphs.

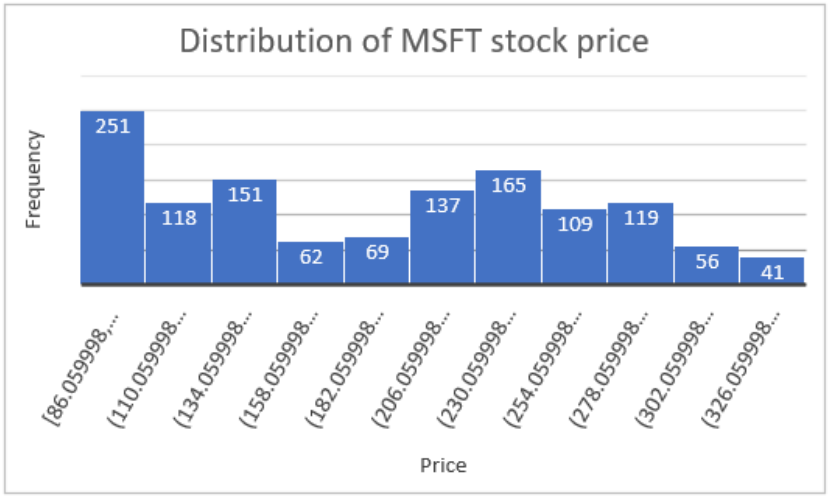


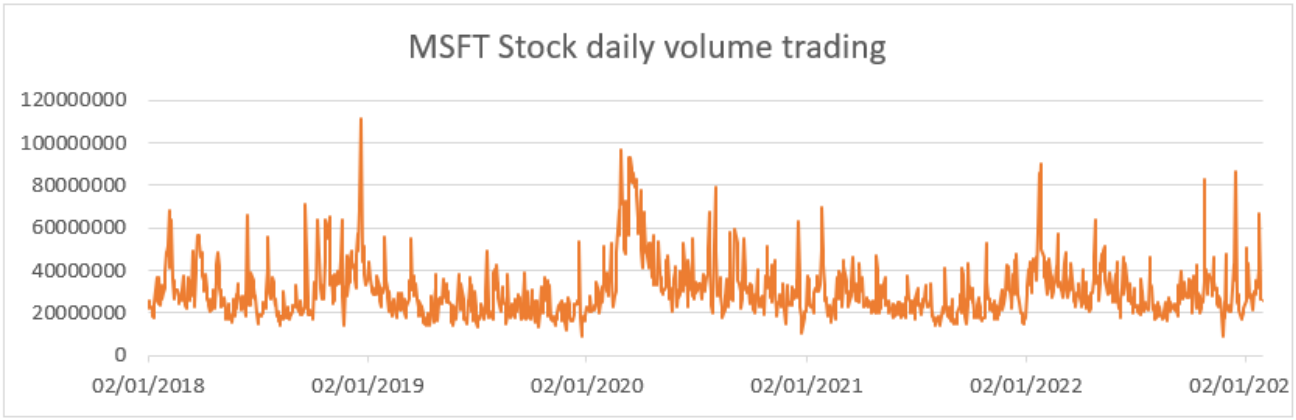
Data description

- The dataset contains live data stock values from the website of Yahoo Finance of 3 major companies: Microsoft, Apple and Tesla between 2018 and 2023 on daily basis, as well as S&P 500 values during the same period.
- The dataset contains following stock metrics:
  - Date: the day the stock data is recorded
  - High: the highest price on the day
  - Low: the lowest price on the day
  - Open: the price of the stock at the start of the day
  - Close: the price of the stock at the end of the day
  - Adjust close: closing price after adjustments being made, e.g. dividends, stock splits
  - Volume: the number of stock traded during the day
  - Percentage change (%chng): percentage change in open price from the previous day.

Microsoft (MFST) – descriptive statistics

MSFT Stock price statistics	
Mean	190.8267835
Standard Error	2.103222362
Median	198.8247145
Mode	89.883148
Standard Deviation	75.18836093
Sample Variance	5653.28962
Kurtosis	-1.310573841
Skewness	0.140260764
Range	259.869614
Minimum	80.055191
Maximum	339.924805
Sum	243876.6293
Count	1278

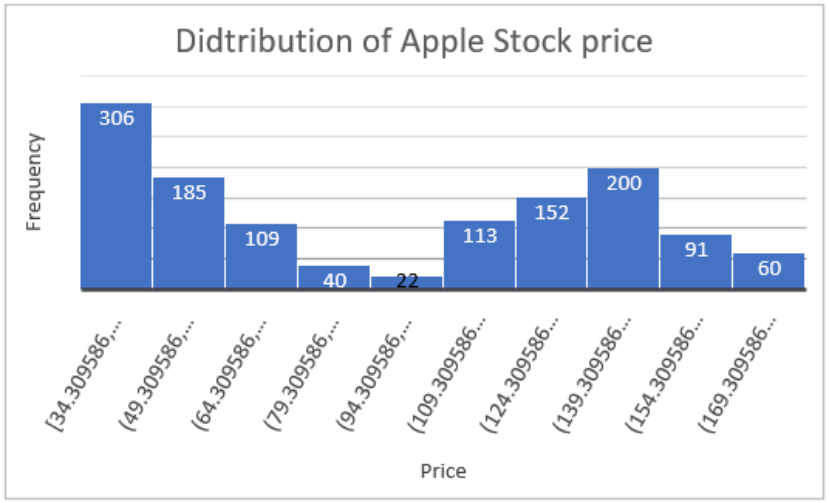


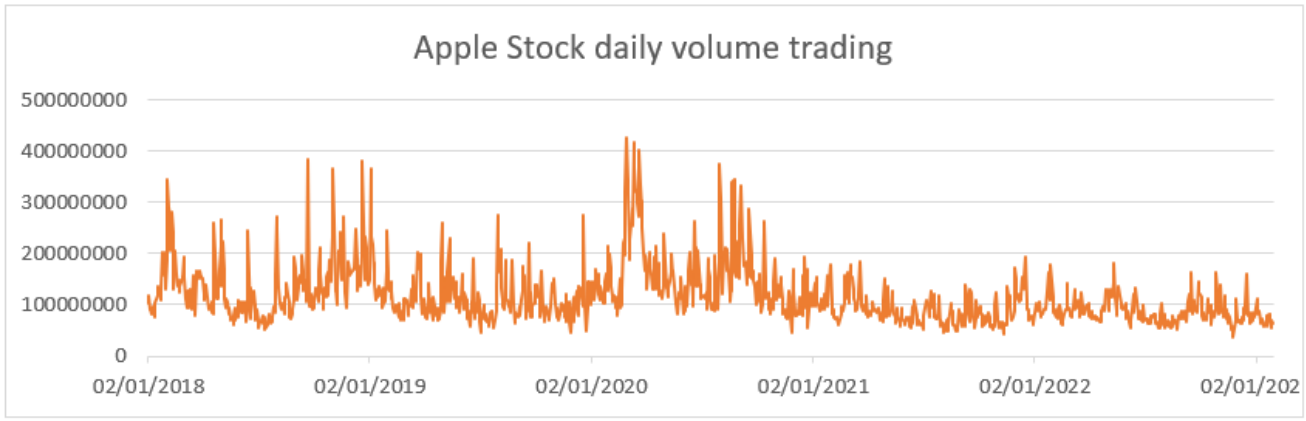


- The average stock price is of $190.8 and a low standard deviation of 75.19 indicate that the Microsoft stock's price fluctuations are relatively predictable and not excessively volatile, making it an attractive option for those seeking dependable returns.
- A skewness of 0.14 suggests there is a negative skewness, indicating that the stock price value is lower than the mean.
- The kurtosis of -1.31 shows a low distribution of the stock price, suggesting there are extreme values than normal.
- The range of $260 shows the spread between the adjusted stock prices.

Apple – descriptive statistics

Apple Stock price statistics	
Mean	97.38823308
Standard Error	1.302620443
Median	94.1483495
Mode	41.246353
Standard Deviation	46.56754217
Sample Variance	2168.535984
Kurtosis	-1.580637888
Skewness	0.123055369
Range	146.650146
Minimum	34.309586
Maximum	180.959732
Sum	124462.1619
Count	1278

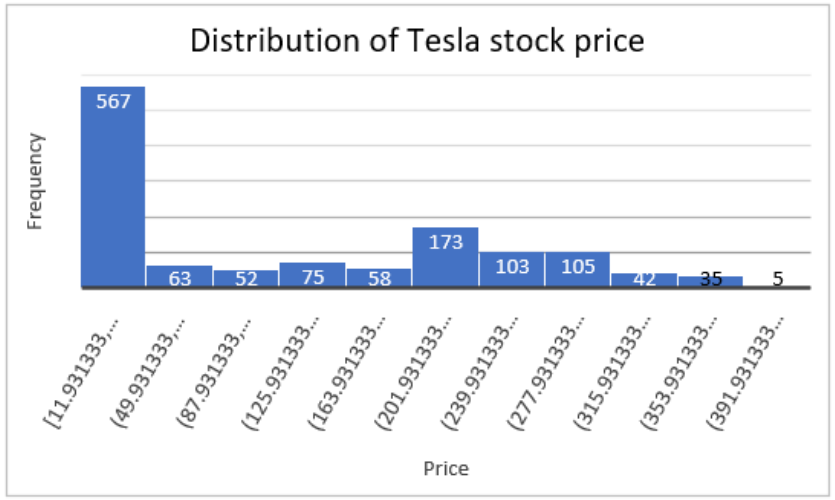


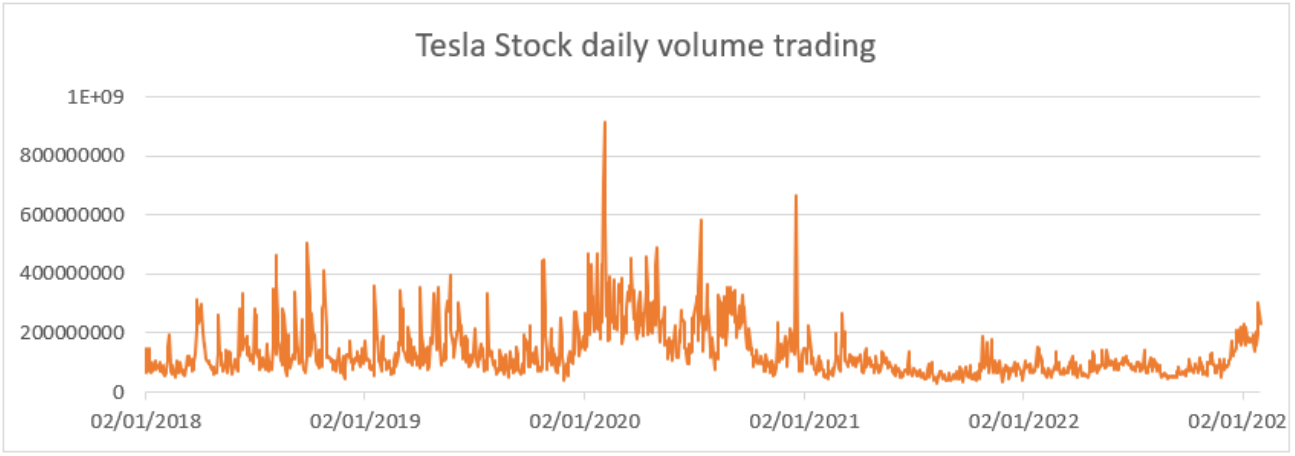


- The average stock price is of 97.39$ shows variability with a high standard deviation of $46.57
- A skewness of 0.12 shows a positive skewness in the stock price value, indicating that stock prices are higher than average
- The kurtosis of -1.58 shows a low distribution of the stock price, suggesting there are extreme values than normal.
- The range of $147 shows the spread between the adjusted stock prices.

Tesla – descriptive statistics

Tesla Stock price statistics	
Mean	131.7902812
Standard Error	3.272219195
Median	97.6400035
Mode	23.620667
Standard Deviation	116.9789759
Sample Variance	13684.08079
Kurtosis	-1.260371058
Skewness	0.468792298
Range	398.038668
Minimum	11.931333
Maximum	409.970001
Sum	168427.9793
Count	1278

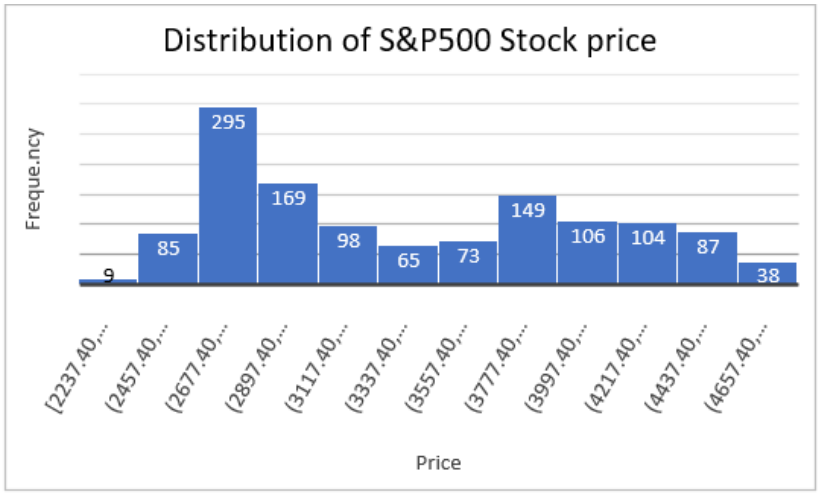


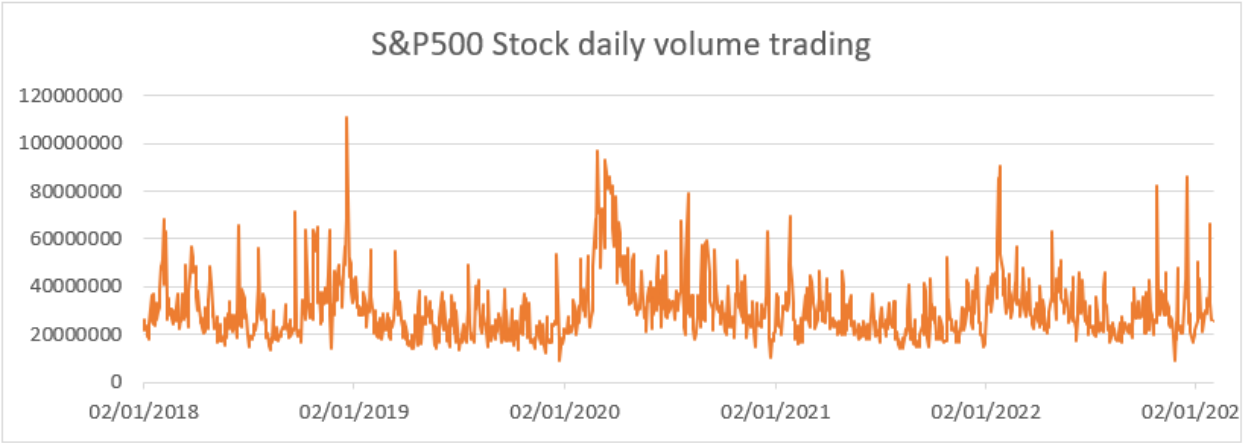


- The average stock price is $131.80, which is a good level of stock value over the time period
- The standard deviation of $117 shows a high risk and high stock price value of trading
- A skewness of 0.46 shows a positive skewness in the stock price value, indicating that stock prices are higher than average
- The kurtosis of -1.26 shows a low distribution of the stock price, suggesting there are extreme values than normal.
- The range of $399 shows the spread between the adjusted stock prices.

S&P 500 – descriptive statistics

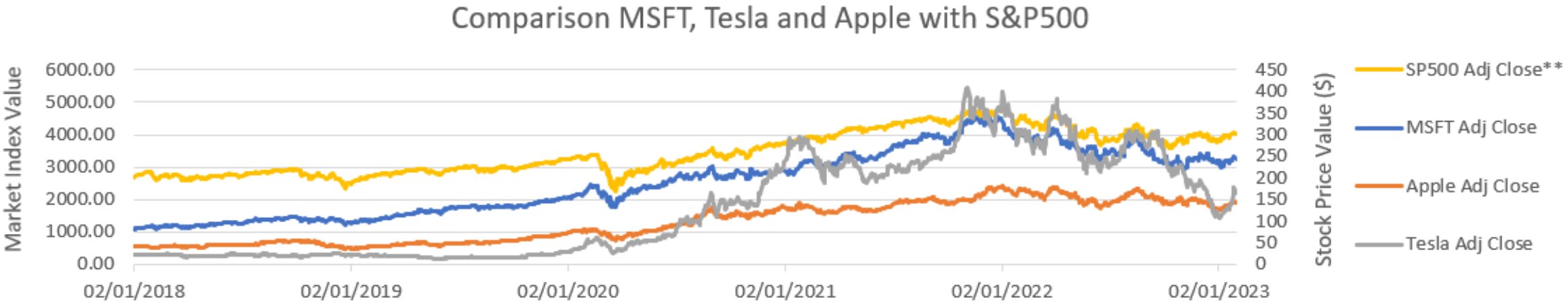
S&P500 Stock price statistics	
Mean	3457.2301
Standard Error	18.651608
Median	3298.025
Mode	2783.02
Standard Deviation	666.77867
Sample Variance	444593.79
Kurtosis	-1.29891
Skewness	0.3311858
Range	2559.16
Minimum	2237.4
Maximum	4796.56
Sum	4418340
Count	1278





- The average index value is $3457, which is at a stable level of performance over the time period
- The standard deviation of 666.78 shows an opportunity of massive and stable growth
- A skewness of 0.33 shows a positive skewness in the stock price value, indicating that stock prices are higher than average
- The kurtosis of -1.30 shows a low distribution of index value, suggesting there are extreme values than normal.
- The range of $2559.16 shows the spread between the highest and lowest index value

Microsoft, Apple and Tesla - stocks price comparison



Microsoft

- Had a steady growth until 2018
- Growth had dropped in early 2020
- Their stock price value was around $337 million by the end of 2021

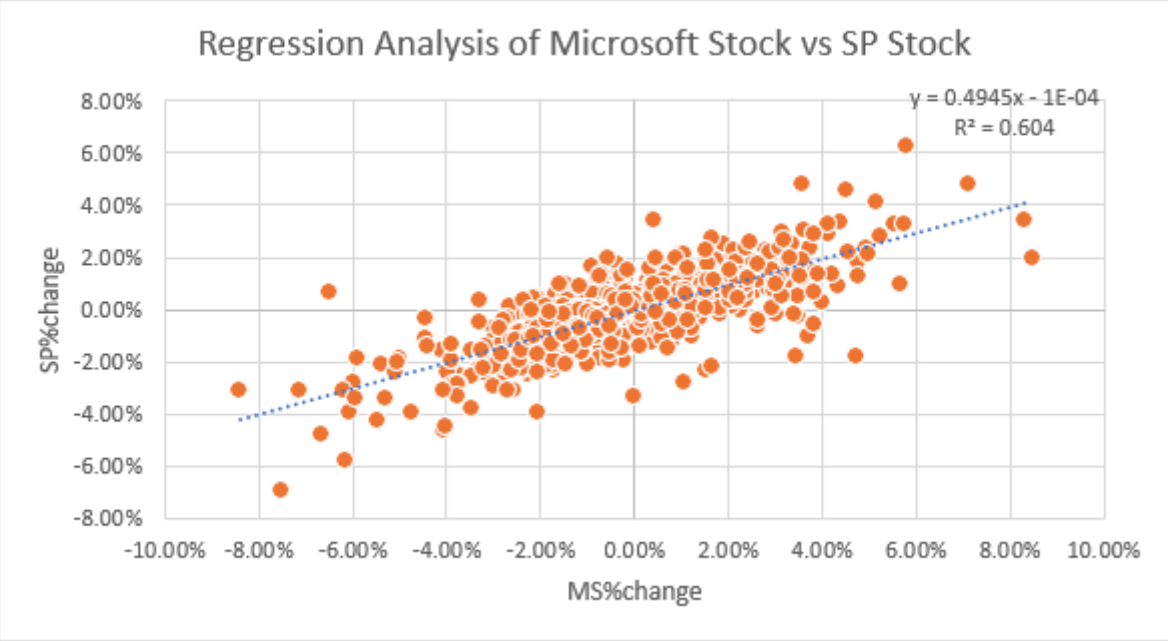
Apple

- Had a fluctuating growth till early 2020
- Increased growth occurred at end of 2020
- Their stock price value of around $174 million by middle of 2022

Tesla

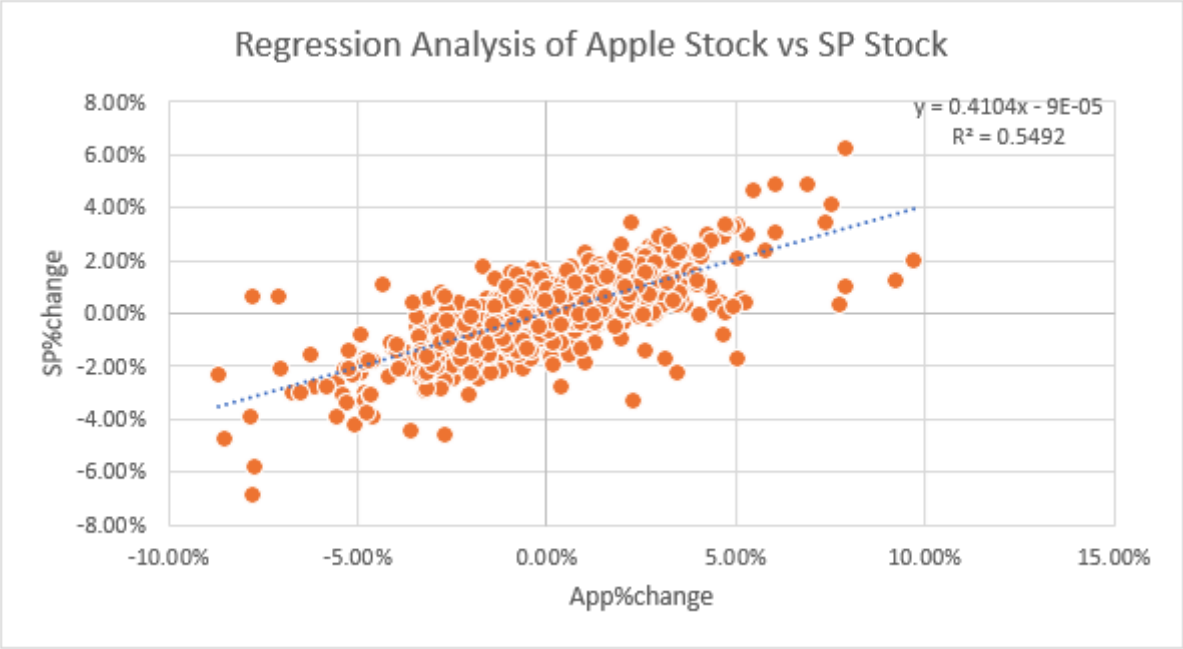
- Had consistent growth until early 2020
- Fluctuated a bit consistently after early 2020
- Their highest stock price value was around $402 million by 2021

Regression Analysis of Microsoft Stock vs SP Stock



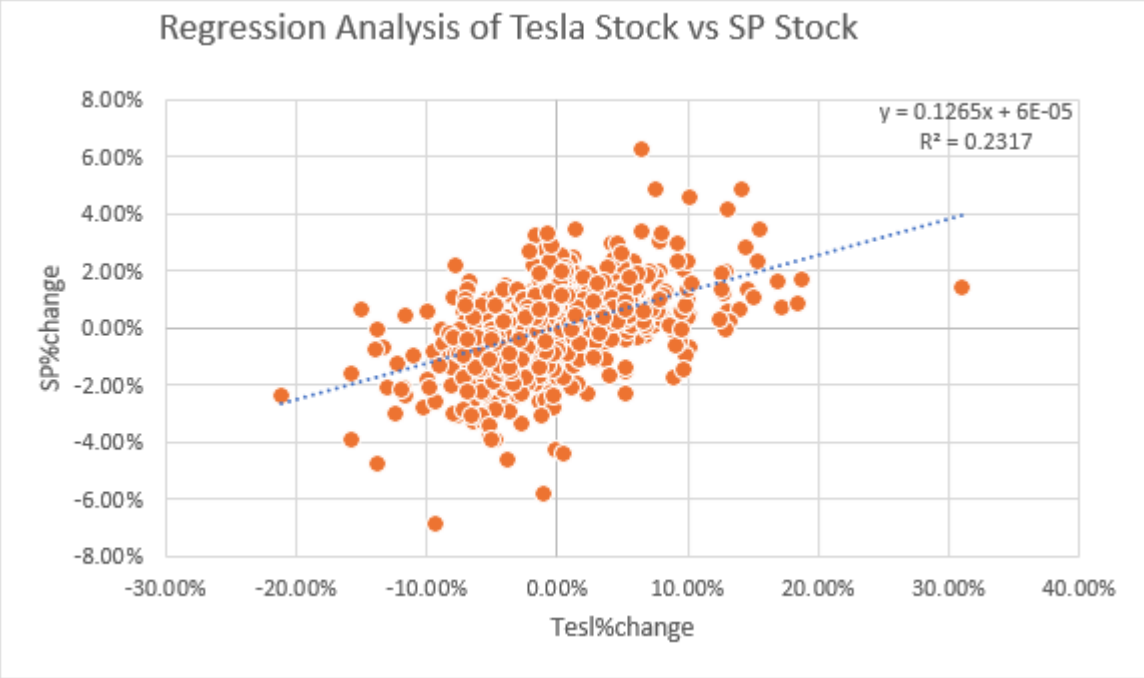
- Regression model: y = y = 0.49x + (-1E+05).
- Beta value (slope): 0.49, indicating lower risk compared to the market. A beta value less than 1 suggests lower risk compared to the market.
- Adjusted R-squared value: 0.60, indicating a 60% good relationship between variables. Higher R-squared implies the stock's price is less volatile than the overall market.
- The model would have returned 49% of the market's returns in each period.
- This indicates a relatively stable and reliable investment compared to more volatile options.

Regression Analysis of Apple Stock vs SP Stock



- Regression model: y = y = 0.41x + (-9E+05)
- Beta value (slope): 0.41, indicating lower risk compared to the market. Beta value less than 1 suggests lower risk compared to the market.
- The stock is less risky than Microsoft and more risky than Tesla.
- Adjusted R-squared value: 0.54, indicating a 54% good relationship between variables. This suggests a moderate correlation between the stock and the market.
- The model would have returned 41% of the market's returns in each period.
- This indicates a relatively stable and reliable investment with moderate risk compared to other options.

Regression Analysis of Tesla Stock vs SP Stock



- Regression model: y = y = 0.12x + 6E-05
- Beta value (slope): 0.12, indicating lower risk compared to the market. Beta value less than 1 suggests lower risk compared to the market.
- The stock (Tesla) is the least volatile among Apple and Microsoft.
- Adjusted R-squared value: 0.23, indicating a 23% good relationship between variables. This implies that there's a limited correlation between the stock and the market.
- The model would have returned 12% of the market's returns in each period.
- This indicates a relatively stable and reliable investment compared to more volatile options.

Summary

- Between 2018 and 2023, Microsoft demonstrated remarkable stability compared to Apple and Tesla.
- With a median stock price of $198.98 and a standard deviation of $75.18, Microsoft appeals to long-term traders due to its consistent performance. Its lower beta value indicates a favorable risk profile for both long and short-term traders.
- In contrast, Tesla shows higher price fluctuations and a high beta value, making it attractive for short-term traders but with increased risk.
- Ultimately, Microsoft offers stability for long-term investors, while Tesla may suit those comfortable with higher volatility.
- Assessing beta values remains crucial for managing risks effectively in investment decisions.

THANK YOU