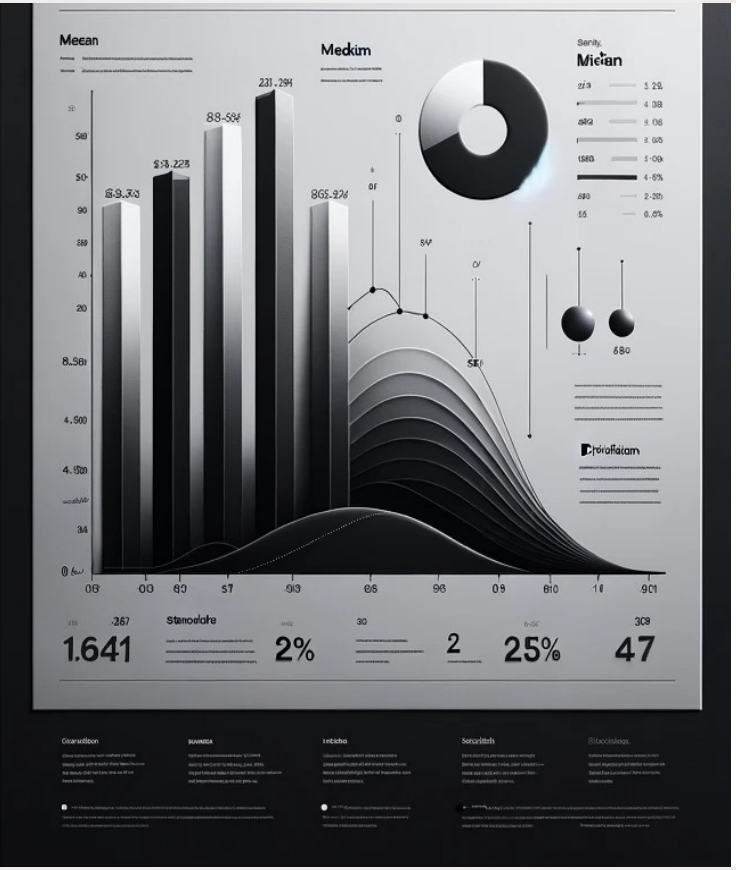
STOCK PRICE ANALYSIS

Microsoft , Apple, Tesla & S&P 500 Index

SOLOMON OKORO



OBJECTIVES

- Uncover trends in Adjusted Closing Stock Prices for Microsoft, Tesla, Apple and the S&P 500 Index from January 2018 to January 2023.
- Analyse the regression of the three (3) Company stock prices against the S&P 500 Index.
- Conclude and make recommendations following the analysis.

OVERVIEW

Brief Description of Stocks and Index Studied

MICROSOFT (MSFT)

- Wide product and service range.
- Cloud growth with significant Azure Expansion.
- Stable financials.

APPLE (AAPL)

- Continuous innovation and expansion.
- Loyal customer base and ecosystem.
- High value with strong balance sheet.

TESLA (TSLA)

- Innovative leader (electric vehicle innovation pioneer).
- Global production and product diversification.
- High stock price fluctuations.

S&P 500 Index

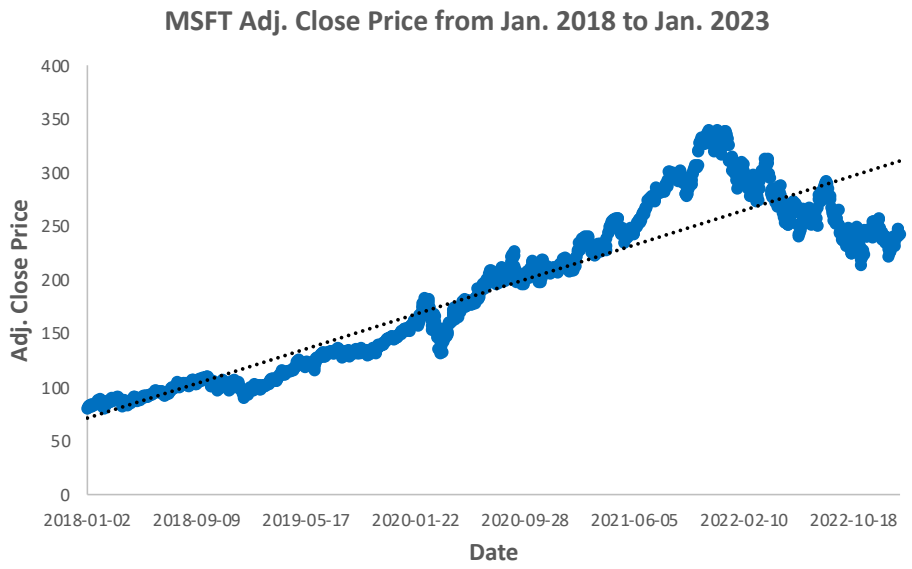
- U.S. stock market representation (top 500 companies).
- Covers all sectors in the U.S. economy.
- Investment benchmark.

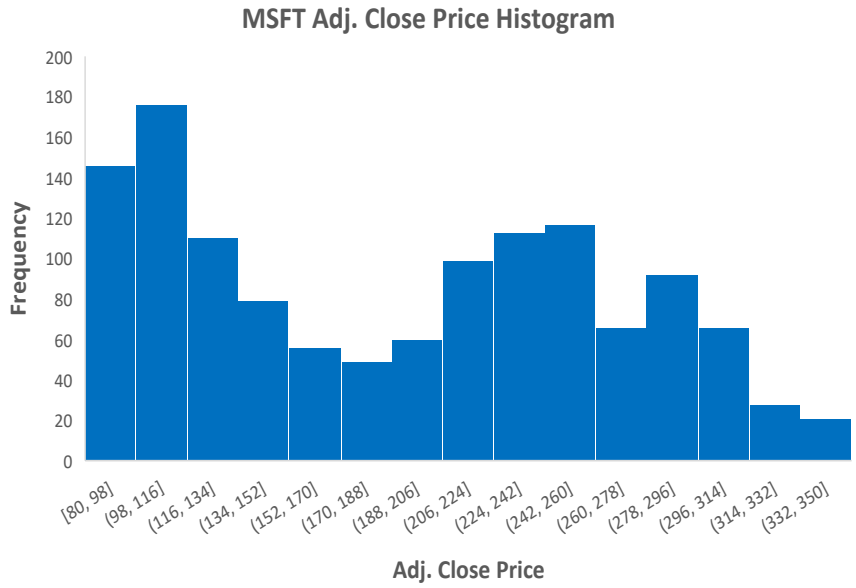
PRICE & TRADE VOLUME ANALYSIS

MSFT Adjusted Closing Price Analysis

MICROSOFT (MSFT)

MSFT Adj. Close Price Statistics	
Mean	190.83
Standard Error	2.10
Median	198.82
Mode	89.88
Standard Deviation	75.19
Sample Variance	5653.29
Kurtosis	-1.3106
Skewness	0.14
Range	259.87
Minimum	80.06
Maximum	339.92
Sum	243876.63
Count	1,278





Over the period studied, the Adjusted Closing Price per share for MSFT can be best described by its Median value of $198.82 (Mean not far off at $190.83). Standard deviation at 75.19.

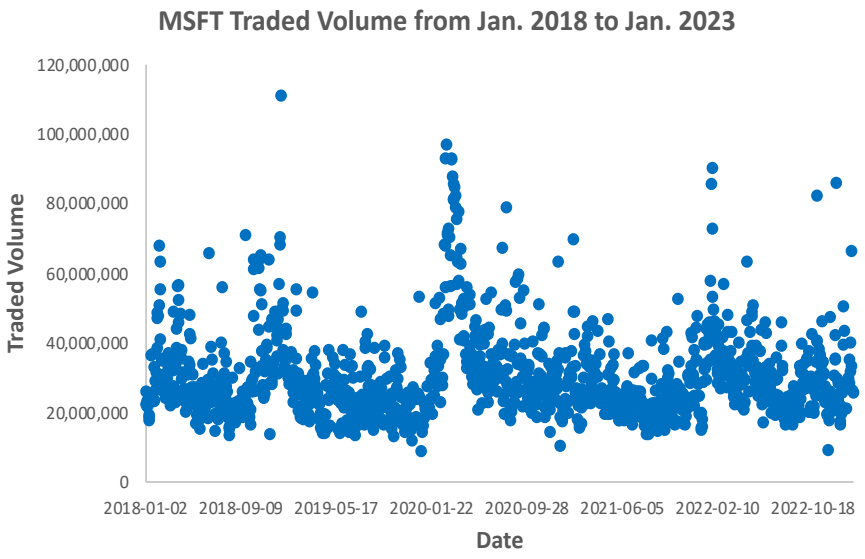
Time series chart shows a general upward trajectory from 2018, however with an observed decline since the peak price of $339.92 in December 2021 (post COVID-19 Pandemic).

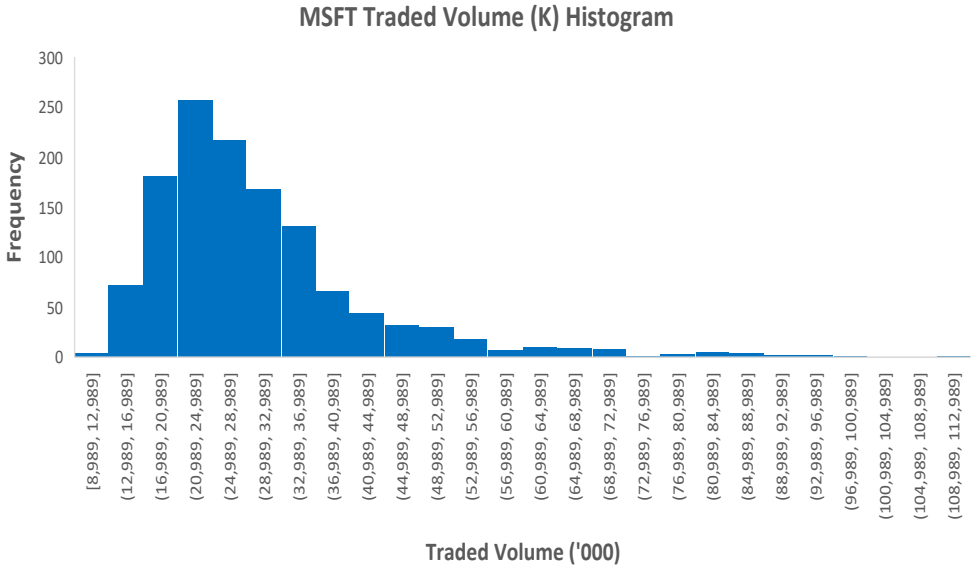
PRICE & TRADE VOLUME ANALYSIS

MSFT Traded Volume Analysis

MICROSOFT (MSFT)

MSFT Traded Volume Statistics	
Mean	30,267,789.44
Standard Error	359,366.01
Median	27,062,700
Mode	22,860,700
Standard Deviation	12,847,020.80
Sample Variance	1.65046E+14
Kurtosis	5.75
Skewness	2.02
Range	102,252,900
Minimum	8,989,200
Maximum	111,242,100
Sum	38,682,234,900
Count	1,278





Over the period studied, the Traded Volume for MSFT can be best described by its Median value of 27.062M (Mean not far off at 30.27M).

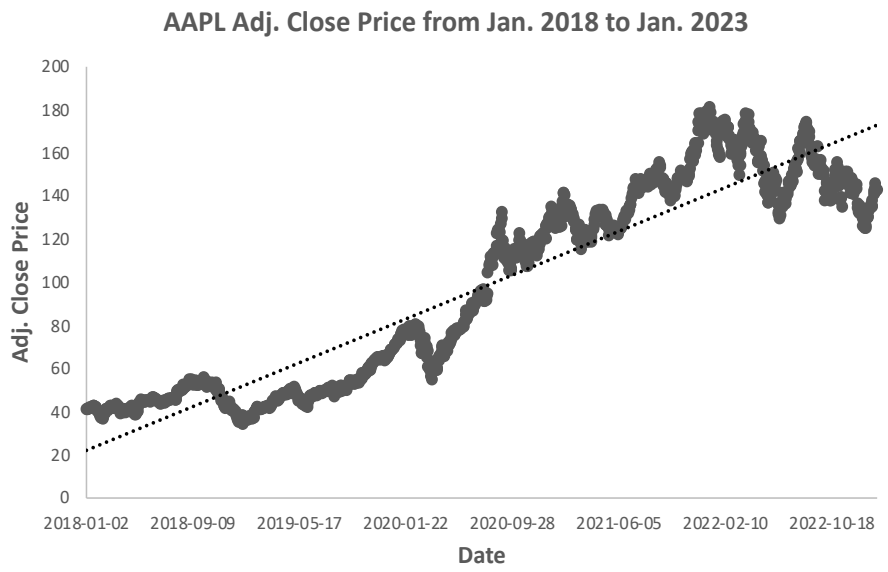
Scatter Plot of Traded Volume shows a consistent trend with most daily trades lying between 20M to 40M shares.

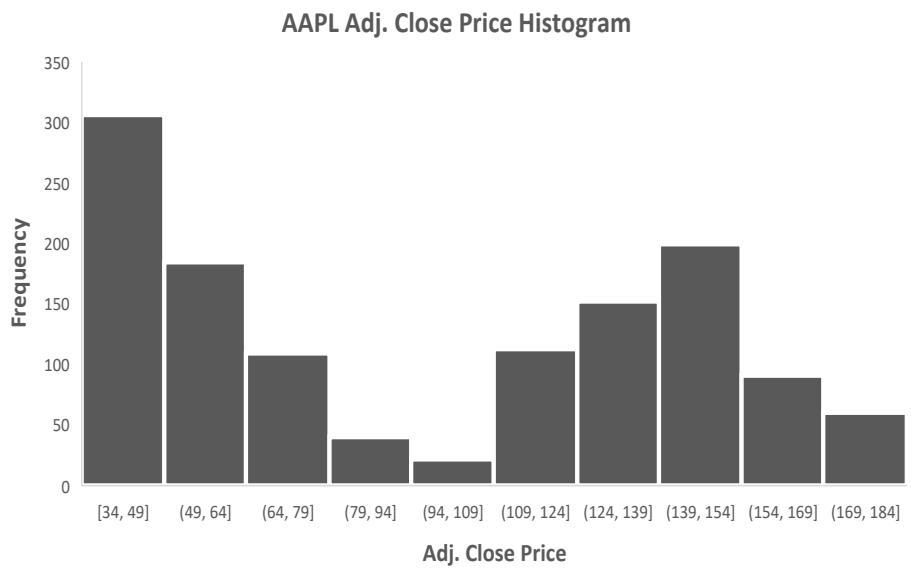
PRICE & TRADE VOLUME ANALYSIS

AAPL Adjusted Closing Price Analysis

APPLE (AAPL)

AAPL Adj. Close Price Statistics	
Mean	97.39
Standard Error	1.30
Median	94.15
Mode	41.25
Standard Deviation	46.57
Sample Variance	2,168.54
Kurtosis	-1.58
Skewness	0.12
Range	146.65
Minimum	34.31
Maximum	180.96
Sum	124,462.16
Count	1,278





Over the period (Jan. 2018 to Jan. 2023), the Adjusted Closing Price per share for AAPL can be best described by its Median value of $94.15 (Mean not far off at $97.39). Lower Standard deviation at 46.57.

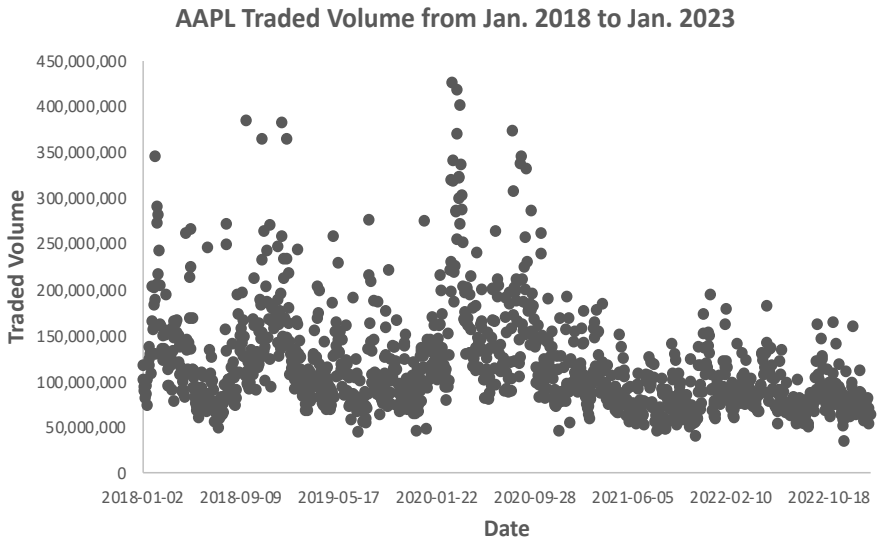
Time series chart shows a general upward trajectory from 2018, however with an observed decline since the peak price of $180.96 in January 2022 (post COVID-19 Pandemic).

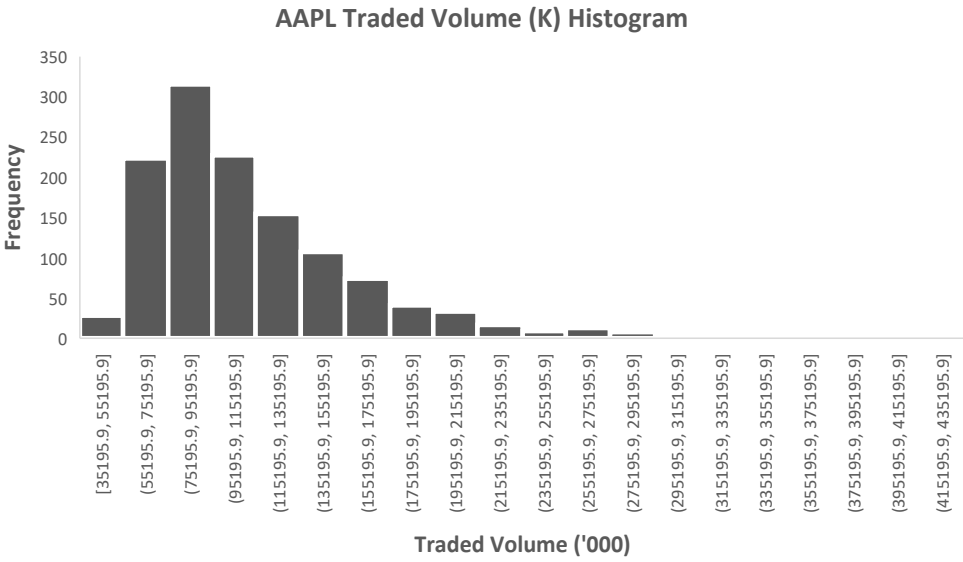
PRICE & TRADE VOLUME ANALYSIS

AAPL Traded Volume Analysis

APPLE (AAPL)

AAPL Traded Volume Statistics	
Mean	116,220,544.84
Standard Error	1,536,301.59
Median	101,699,200
Mode	118,655,600
Standard Deviation	54,921,438.84
Sample Variance	3.01636E+15
Kurtosis	5.66
Skewness	2.03
Range	391,314,100
Minimum	35,195,900
Maximum	426,510,000
Sum	1.4853E+11
Count	1,278





Over the period studied, the Traded Volume for AAPL can be best described by its Median value of 101.67M (Mean not far off at 116.22M).

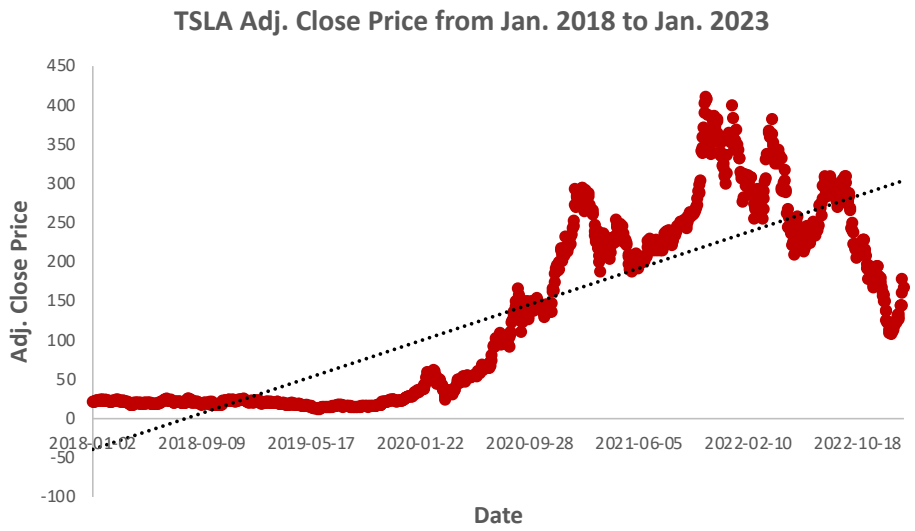
Scatter Plot of Traded Volume shows a consistent trend with most daily trades lying between 60M to 130M shares.

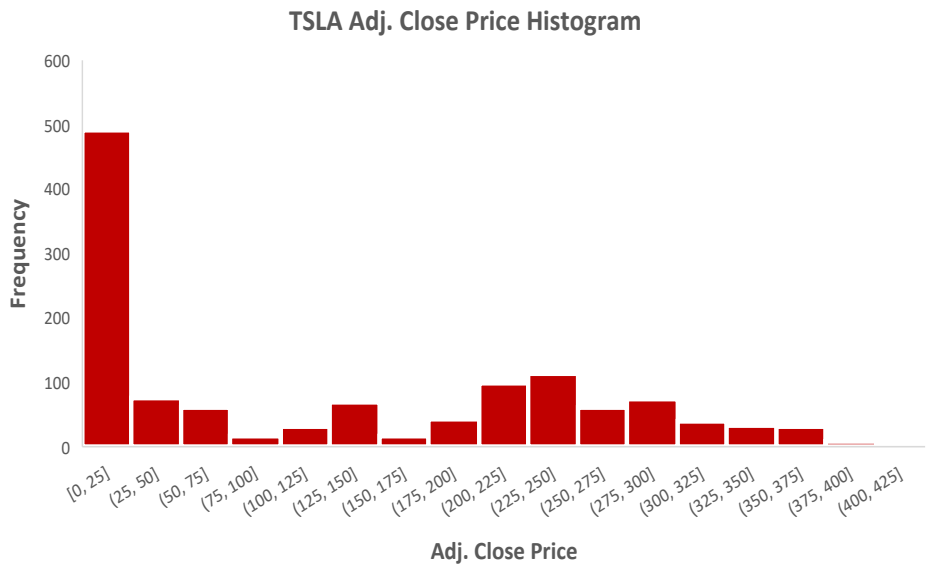
PRICE & TRADE VOLUME ANALYSIS

TSLA Adjusted Closing Price Analysis

TESLA (TSLA)

TSLA Adj. Close Price Statistics	
Mean	131.79
Standard Error	3.27
Median	97.64
Mode	23.62
Standard Deviation	116.98
Sample Variance	13,684.08
Kurtosis	-1.26
Skewness	0.47
Range	398.04
Minimum	11.93
Maximum	409.97
Sum	168,427.98
Count	1,278





Over the period studied, the Adjusted Closing Price per share for TSLA can be best described by its Median value of $97.64 (with the Mean further right at $131.79). Comparatively larger Standard deviation at 116.98.

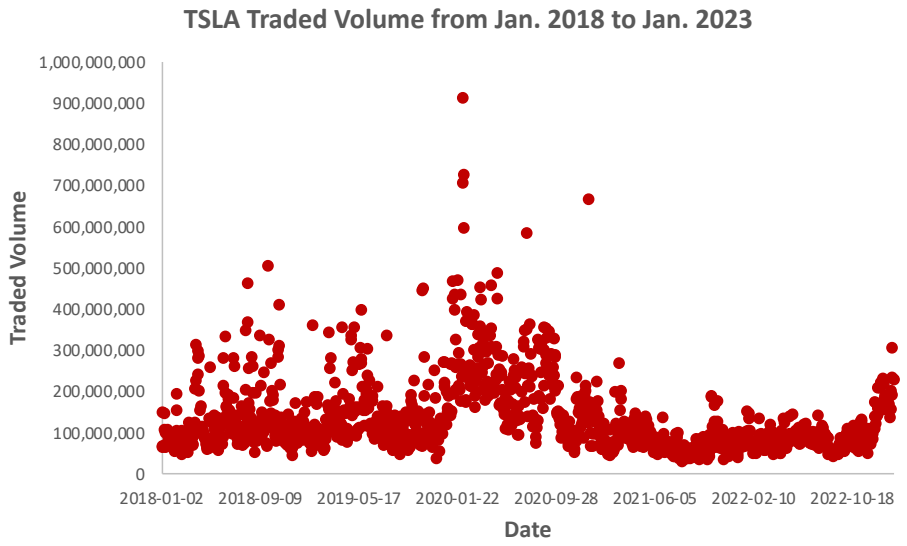
Time series chart shows an upward steep trajectory from 2020 (which was fuelled by the announcement of a 5-for-1 stock split), however with a significant decline since the peak price of $409.97 in November 2021 (post COVID-19 Pandemic).

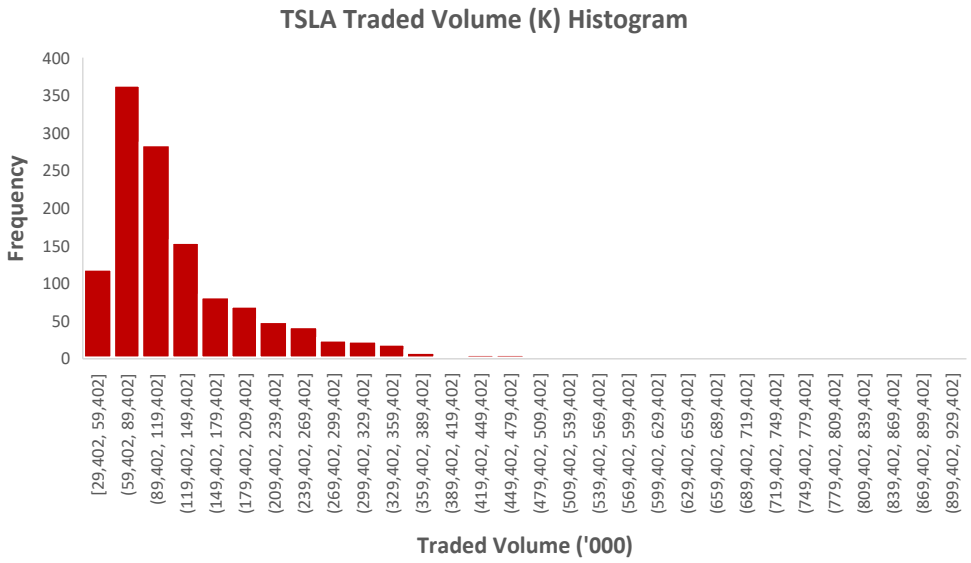
PRICE & TRADE VOLUME ANALYSIS

TSLA Traded Volume Analysis

TESLA (TSLA)

TSLA Traded Volume Statistics	
Mean	133,357,337.32
Standard Error	2,515,609.41
Median	103,169,550
Mode	130,173,000
Standard Deviation	89,930,837.32
Sample Variance	8.08756E+15
Kurtosis	9.96
Skewness	2.46
Range	884,680,200
Minimum	29,401,800
Maximum	914,082,000
Sum	1.70431E+11
Count	1,278





Over the period studied, the Traded Volume for TSLA can be best described by its Median value of 103.17M (with the Mean further right at 133.36M).

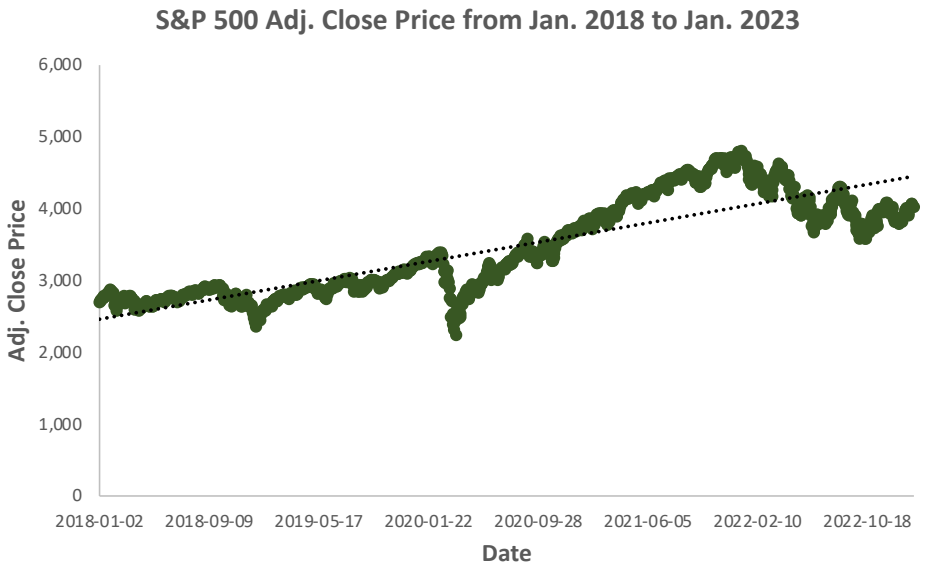
Scatter Plot of Traded Volume shows a consistent trend with most daily trades lying between 50M to 150M shares.

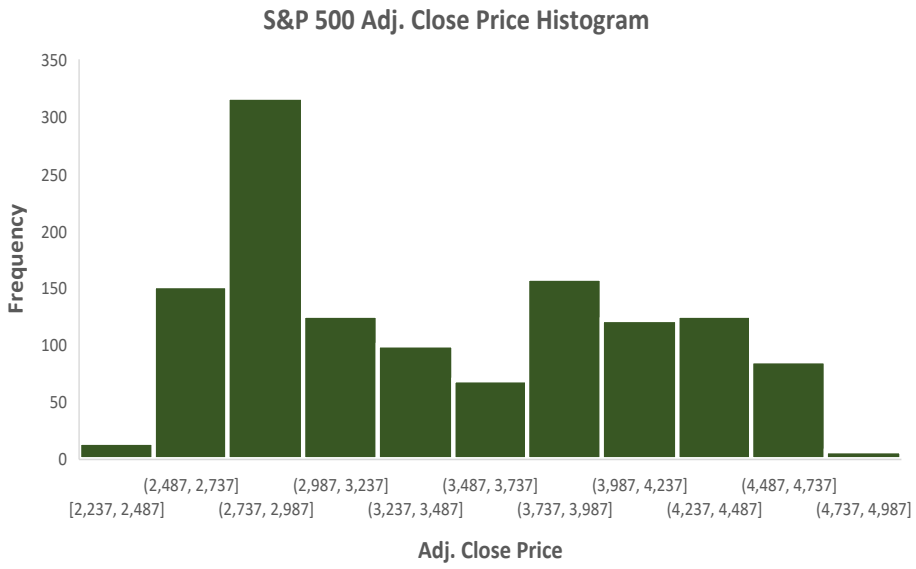
PRICE & TRADE VOLUME ANALYSIS

S&P 500 Index Adjusted Closing Price Analysis

S&P 500 Index

S&P 500 Adj. Close Price Statistics	
Mean	3,457.23
Standard Error	18.65
Median	3,298.03
Mode	2,783.02
Standard Deviation	666.78
Sample Variance	444,593.79
Kurtosis	-1.30
Skewness	0.33
Range	2,559.16
Minimum	2,237.40
Maximum	4,796.56
Sum	4,418,340.01
Count	1,278





Over the period studied, the Adjusted Closing Price per share for the S&P 500 Index can be best described by its Median value of $3,298.03 (Mean not far off at $3457.23). SD at 666.78.

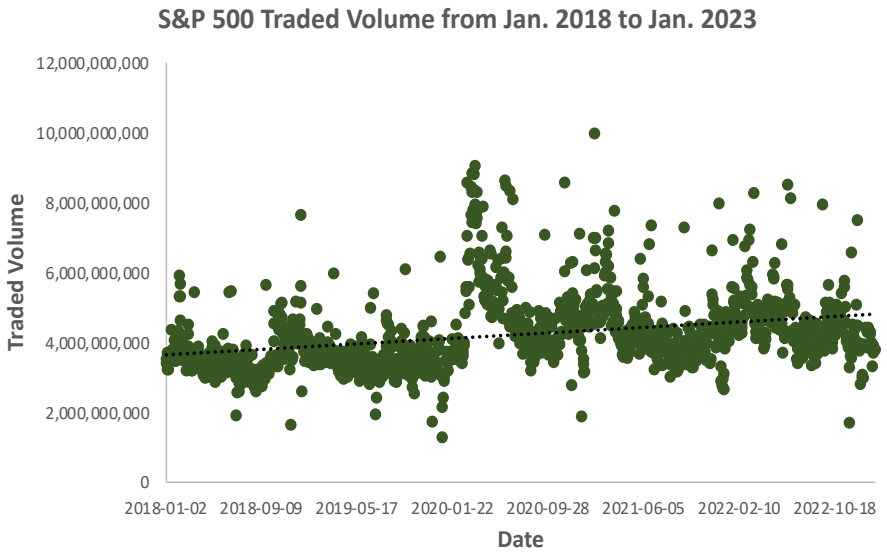
Time series chart shows a general upward trajectory from 2018, however with an observed decline since the peak price of $4,795.56 in January 2022 (post COVID-19 Pandemic).

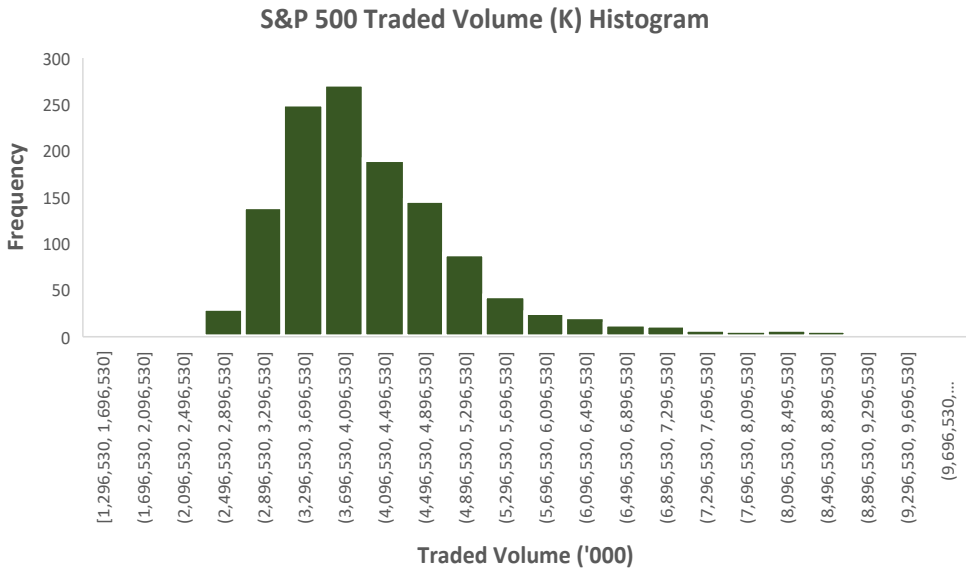
PRICE & TRADE VOLUME ANALYSIS

S&P 500 Index Traded Volume Analysis

S&P 500 Index

S&P 500 Traded Volume Statistics	
Mean	4,227,470,023.47
Standard Error	30,055,826.45
Median	3,988,600,000
Mode	3,646,920,000
Standard Deviation	1,074,469,522.72
Sample Variance	1.15448E+18
Kurtosis	3.74
Skewness	1.57
Range	8,679,990,000
Minimum	1,296,530,000
Maximum	9,976,520,000
Sum	5.40271E+12
Count	1,278



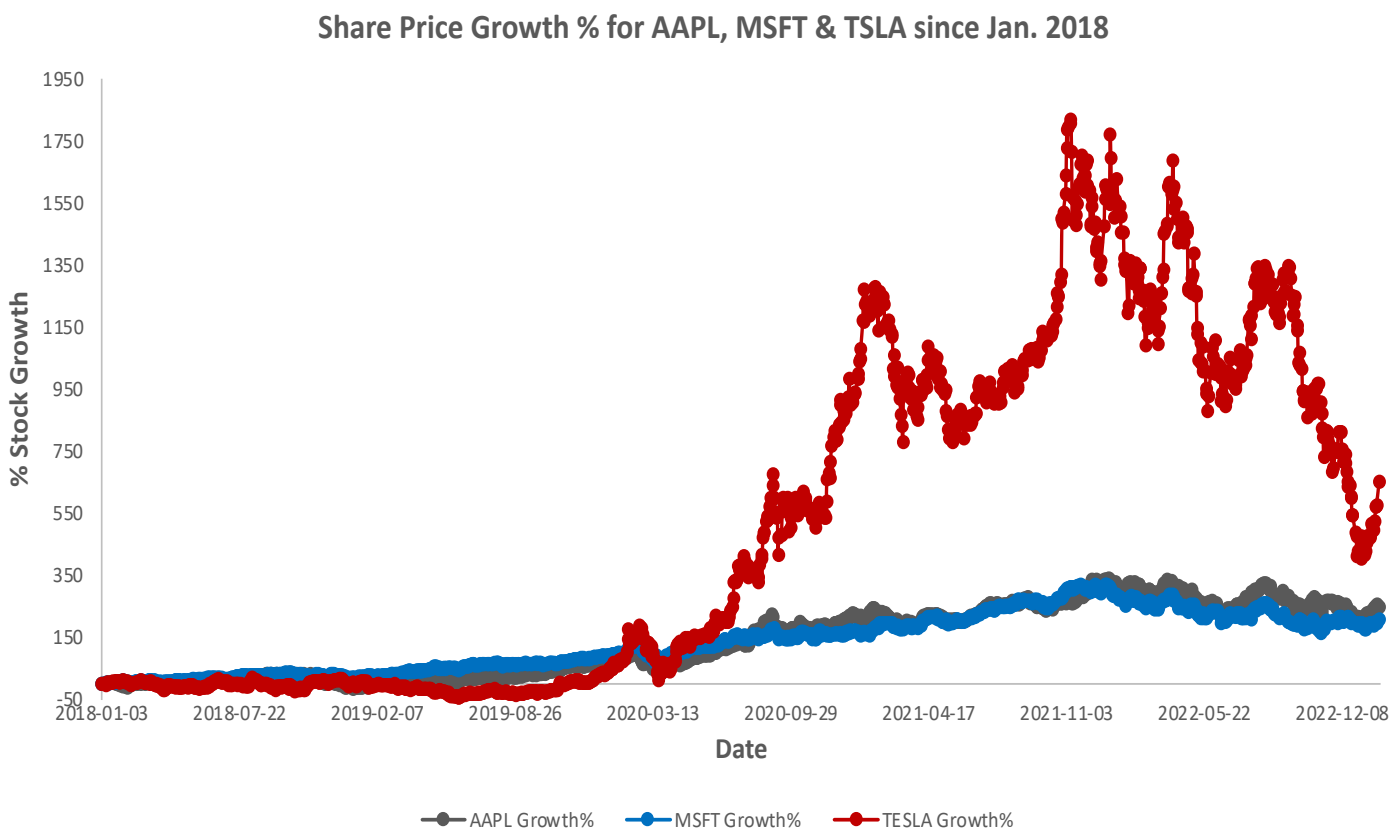


Over the period studied, the Traded Volume for the S&P 500 Index can be best described by its Median value of 3.99B (with the Mean further right at 4.23B).

Scatter Plot of Traded Volume shows a subtle but steady increase with most daily trades lying between 3B to 5B shares.

STOCK GROWTH COMPARISON

MSFT, AAPL & TSLA



Share Price Growths for MSFT, AAPL and TSLA have been computed with the opening price in Jan. 2018 as the reference.

Share prices for MSFT and AAPL have shown similar growth trajectories since 2018, with maximum percentage growths of 320% and 342% respectively.

TSLA share prices have shown a more volatile growth trajectory with up to 1,819% compared to the Jan. 2018 price.

All three stocks have recorded some decline post the COVID-19 Pandemic, however with the TSLA stock having a far steeper decline.

REGRESSION ANALYSIS

MSFT%Change VS S&P 500%Change

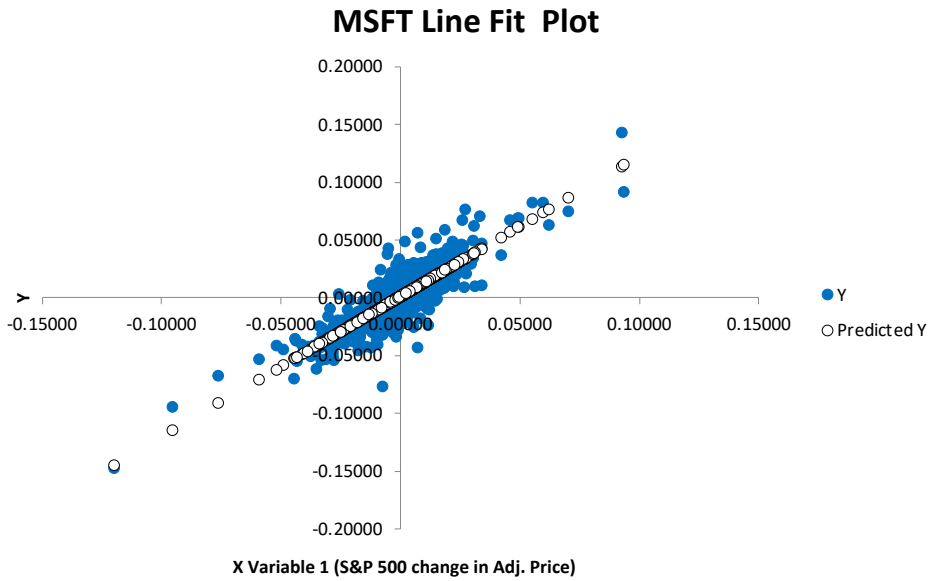
MSFT

SUMMARY OUTPUT - MSFT

Regression Statistics	
Multiple R	0.85263921
R Square	0.72699363
Adjusted R Square	0.7267795
Standard Error	0.01022219
Observations	1277

Significance F
0

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.00055705	0.00028618	1.94648401	0.05181603
X Variable 1	1.21435709	0.020840705	58.268522	0



The Beta coefficient for the regression of MSFT % Change in Daily Adjusted Closing Price against the S&P 500 % Change in Daily Adjusted Closing Price shows that for every 1 unit movement in the Index, the MSFT Price responds by 1.21 units.

Adjusted R Square shows an average correlation between the two variables (~0.73). The zero (0) Significance F and P-value of the Beta coefficient alludes to the presence of a relationship between the variables.

REGRESSION ANALYSIS

AAPL%Change VS S&P 500%Change

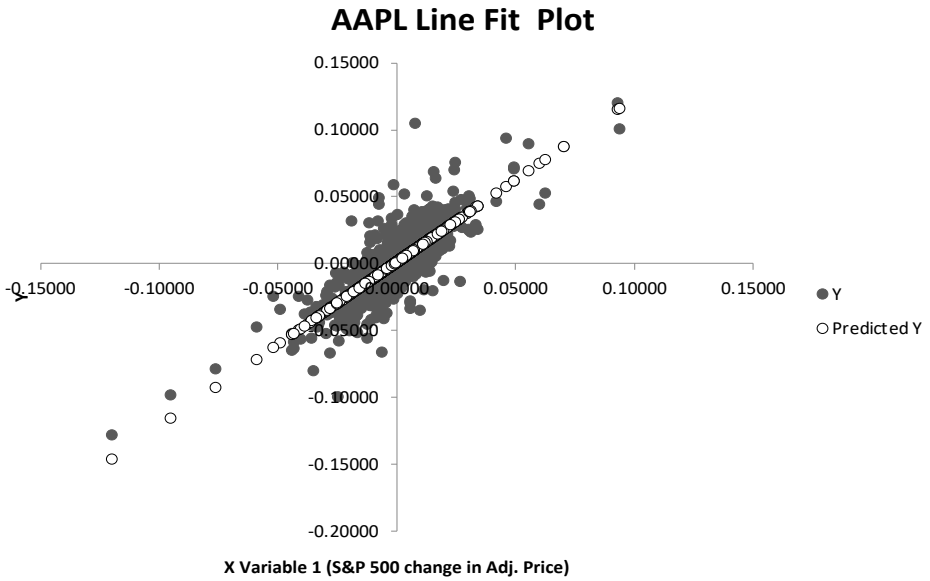
AAPL

SUMMARY OUTPUT - AAPL

Regression Statistics	
Multiple R	0.80185612
R Square	0.64297323
Adjusted R Square	0.64269321
Standard Error	0.0125738
Observations	1277

Significance F
1.957E-287

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.0007007	0.00035202	1.99054977	0.0467436
X Variable 1	1.22838877	0.02563508	47.9182724	1.957E-287



The Beta coefficient for the regression of AAPL % Change in Daily Adjusted Closing Price against the S&P 500 % Change in Daily Adjusted Closing Price shows that for every 1 unit movement in the Index, the AAPL Price responds by 1.22 units.

Adjusted R Square shows an average correlation between the two variables (~0.64). The near zero (0) Significance F and P-value of the Beta coefficient alludes to the presence of a relationship between the variables.

REGRESSION ANALYSIS

TSLA%Change VS S&P 500%Change

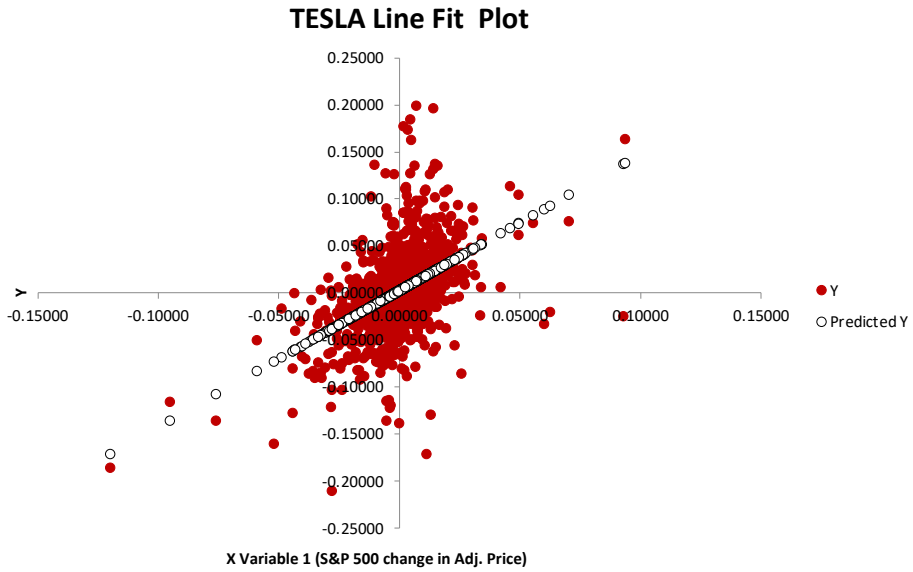
TSLA

SUMMARY OUTPUT - TSLA

Regression Statistics	
Multiple R	0.47819119
R Square	0.22866681
Adjusted R Square	0.22806184
Standard Error	0.03654781
Observations	1277

Significance F
6.09742E-74

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.00188212	0.001023192	1.83945563	0.06608058
X Variable 1	1.44865599	0.074512583	19.4417632	6.0974E-74

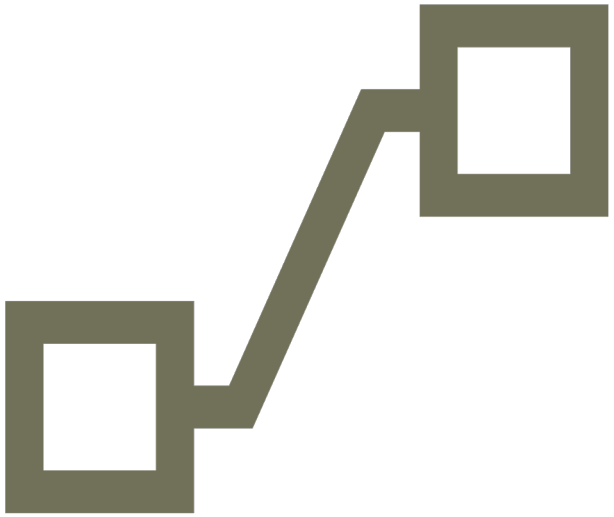


The Beta coefficient for the regression of TSLA % Change in Daily Adjusted Closing Price against the S&P 500 % Change in Daily Adjusted Closing Price shows that for every 1 unit movement in the Index, the TSLA Price responds by 1.45 units showing comparatively higher swings.

Adjusted R Square shows a poor correlation between the two variables (~0.23). The near zero (0) Significance F and P-value of the Beta coefficient however supports the presence of a relationship between the variables.

CONCLUSION

- Trends for the three stocks prices and the S&P Index have been presented with all four showing similar trajectories from Jan. 2018 to Jan. 2023.
- Of the three (3) stock prices analysed, the TSLA stock was the most volatile. The MSFT and AAPL stocks can be seen as having a more stable return on investment.
- Despite the general upward trajectory, all three (3) stocks plus the Index showed a decline in value from around December 2021 after the effect from the COVID-19 disruption and Fiscal Stimulus had worn out.
- The regression analysis on the change in daily stock prices against the changes in the daily S&P Index reveals the Beta Coefficient indicating the return and risk level of each stock.
- MSFT and AAPL had better correlation with the changes in the S&P Index. They also had similar and comparatively smaller Beta coefficients of ~1.22 indicating a more stable stock for risk averse investors.
- The TSLA stock showed a poor correlation with the changes in the S&P Index. The stock also had a higher Beta coefficient of ~1.45 indicating a more volatile stock with higher returns for investors with higher risk trolerance.



Resources: Bing.com, Yahoo Finance.