

# FINANCIAL RISK ASSESSMENT

OSEON LEARNING PROJECT 1

BY AMOABENG YEBOAH

# AGENDA

1. Data description
2. Statistical summary
3. Data trend patterns
4. Volatilities
5. Relationship between the changes in stock prices
6. Capital asset pricing model
7. Risk assessment
8. Model visualization



# Study Objective



The study objective appears to focus on analyzing the stock price movements of **Microsoft**, **Tesla**, and **Apple** in relation to the overall market index. Specifically, the goal is to understand the correlation and volatility of these individual stocks compared to the market, utilizing statistical measures such as mean, median, standard deviation. Also, particularly the beta coefficient from the Capital Asset Pricing Model (CAPM).

This analysis is aimed at assessing the risk and expected returns of the stocks, informing potential investment decisions based on historical price behaviors and market dynamics. The study would likely aid investors in portfolio diversification, risk management, and identifying the systematic risk associated with each stock as part of a broader financial strategy.

# DATA DESCRIPTION

**Source of Data** Extracted live data from Yahoo Finance.

**Time Period** 2018 - 2023 (Covers 5 years stock data)

**Frequency** Daily Stock values

**Companies Analyzed** Microsoft(MSFT), Apple (AAPL),  
Tesla (TSLA)

**Market Index** S&P 500 values are included as a market  
benchmark

**Percentage change variable** Calculated daily percentage change for individual stocks

**Represented as** MS%chng for Microsoft, APP%chng for Apple, TESL%chng for Tesla

**S&P 500 Index** Denoted as sp%chng, used to track the overall market performance

	MSFT	Tesla	Apple	SP500
Mean	194,4708998	131,8952112	98,5741	3457,034
Standard Error	2,076481441	3,27746698	1,291672	18,64546
Median	203,580002	96,573334	95,0875	3294,67
Mode	95,139999	24	127,82	2832,41
Standard Deviation	74,23239641	117,1665796	46,17614	666,559
Sample Variance	5510,448676	13728,00737	2132,236	444300,9
Kurtosis	-1,287957663	-1,257261138	-1,58204	-1,29724
Skewness	0,149832436	0,470592085	0,121834	0,33324
Range	258,559997	399,396668	146,635	2513,8
Minimum	86,059998	12,073333	35,995	2290,71
Maximum	344,619995	411,470001	182,63	4804,51
Sum	248533,81	168562,0799	125977,7	4418090
Count	1278	1278	1278	1278

# STATISTICAL SUMMARY

➢ Tesla shows the highest volatility with the largest standard deviation, followed by MSFT, Apple, and the S&P 500.

➢ MSFT has the highest average stock price, followed by Tesla and then Apple.

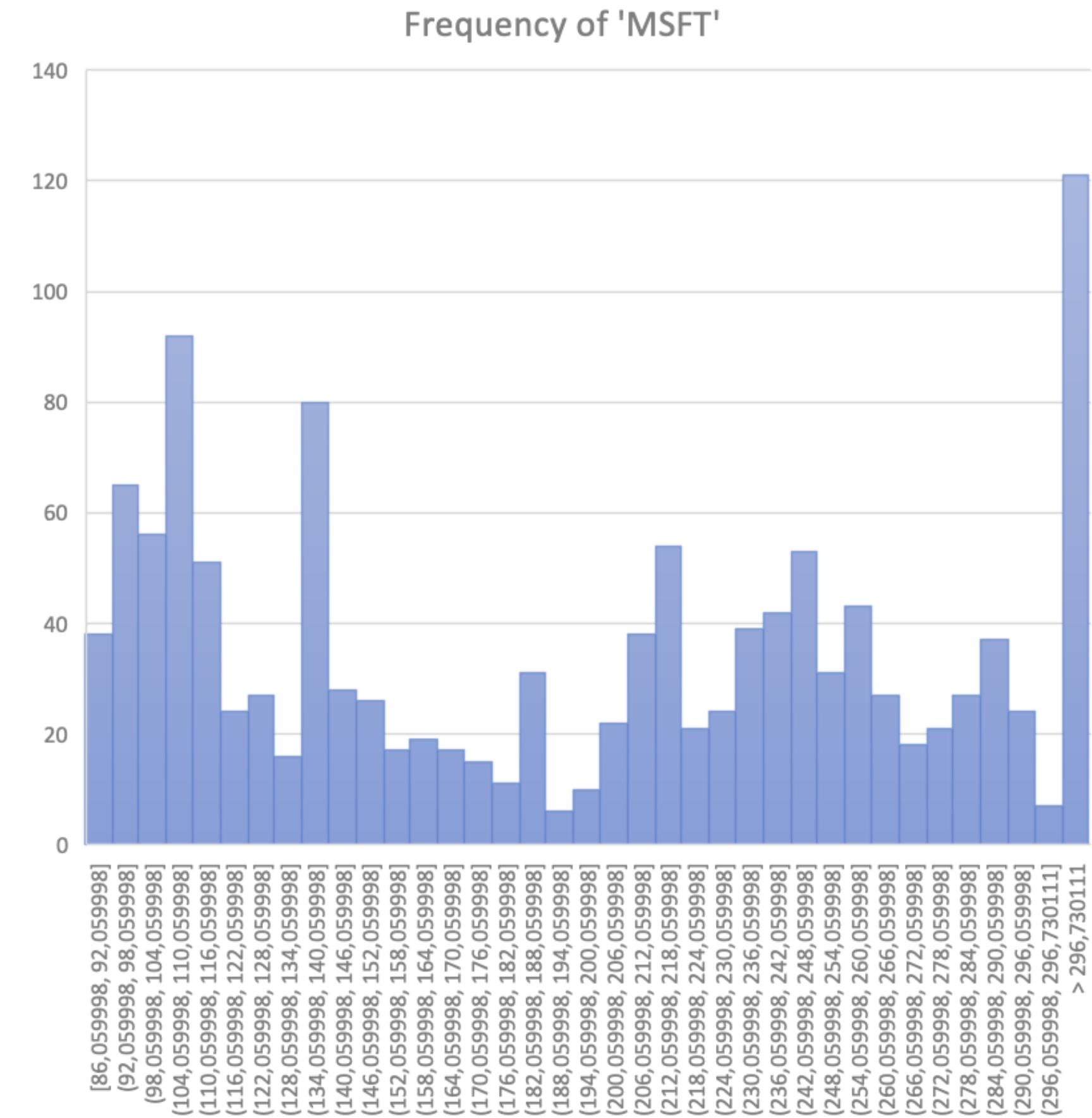
## Based on skewness and kurtosis:

➢ MSFT and Apple show a more stable price range with fewer extreme values

➢ While Tesla exhibits more variability and potential for extreme values.

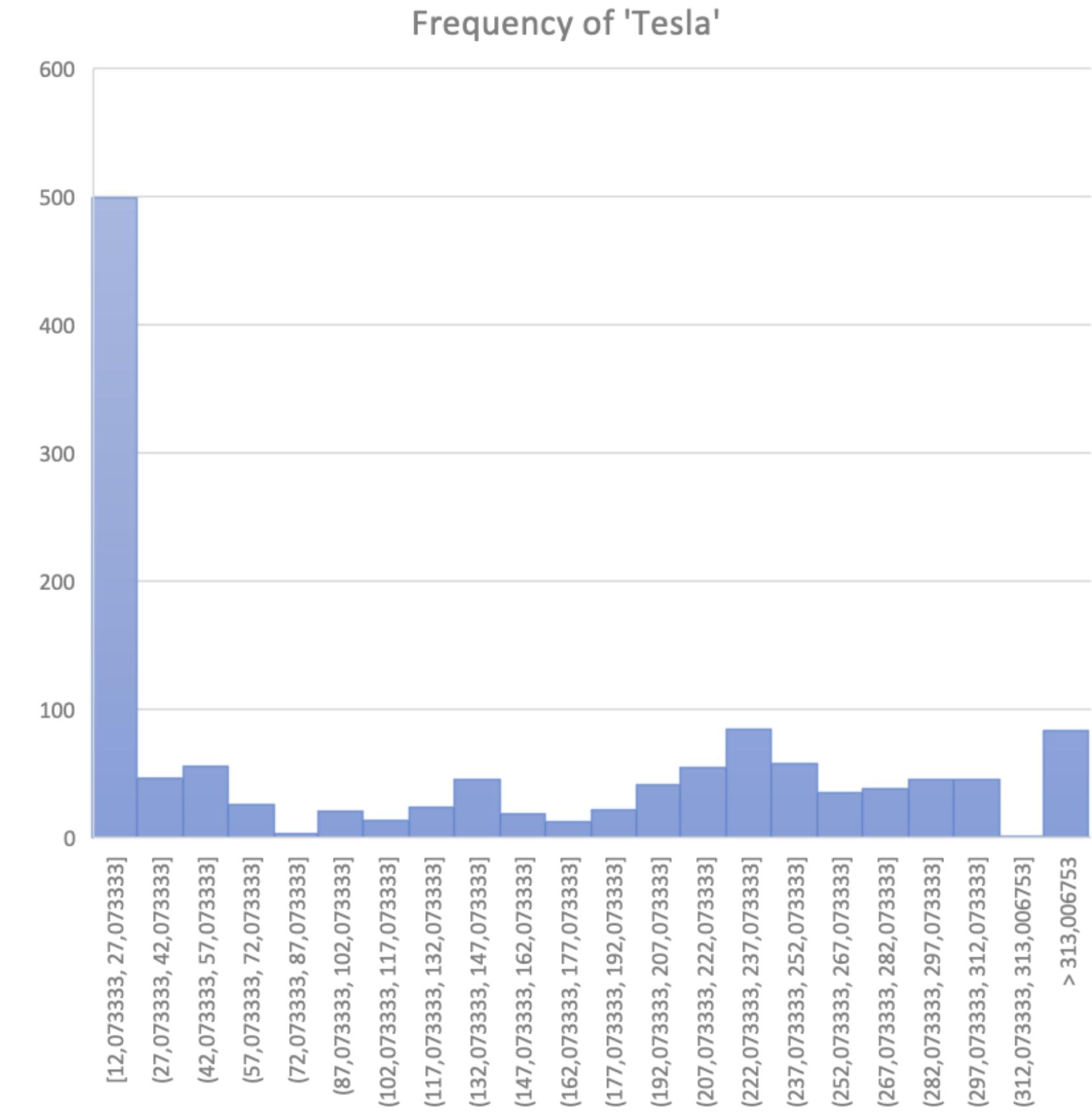
# MSFT (Microsoft Corporation)

- Positive skewness (0.14) suggests the distribution tails off to the right. There are a number of unusually high values.
- Negative kurtosis (-1.28) suggests fewer extreme outliers than a normal distribution.
- Platykurtic curve - no clear peaks in the data & frequency not too far from the mean



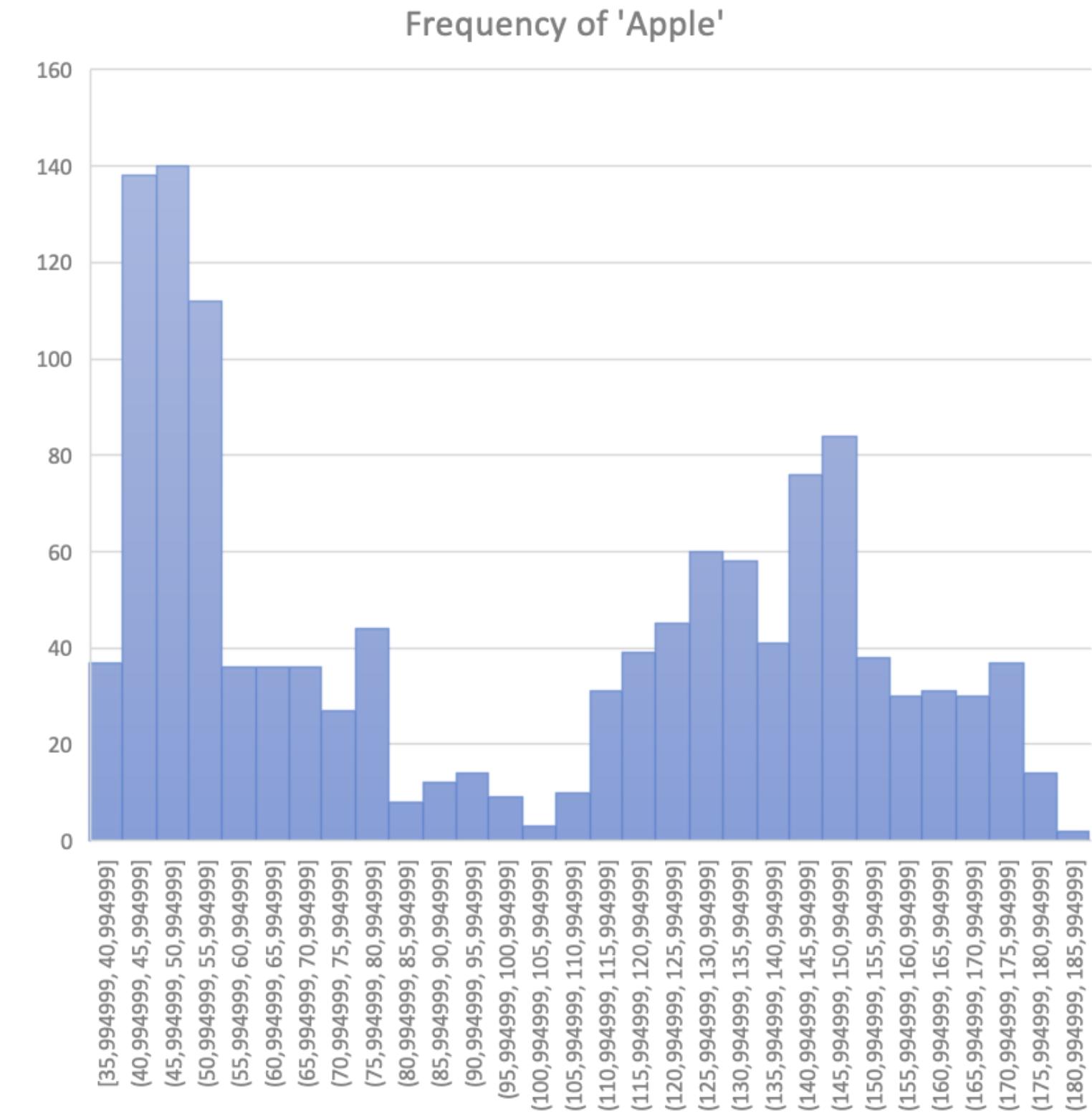
# Tesla

- Skewness: Positive (0.47) shows a right tail, similar to MSFT but more pronounced.
- Kurtosis: Negative (-1.25) implies less likelihood of extreme outliers.
- Platykurtic curve



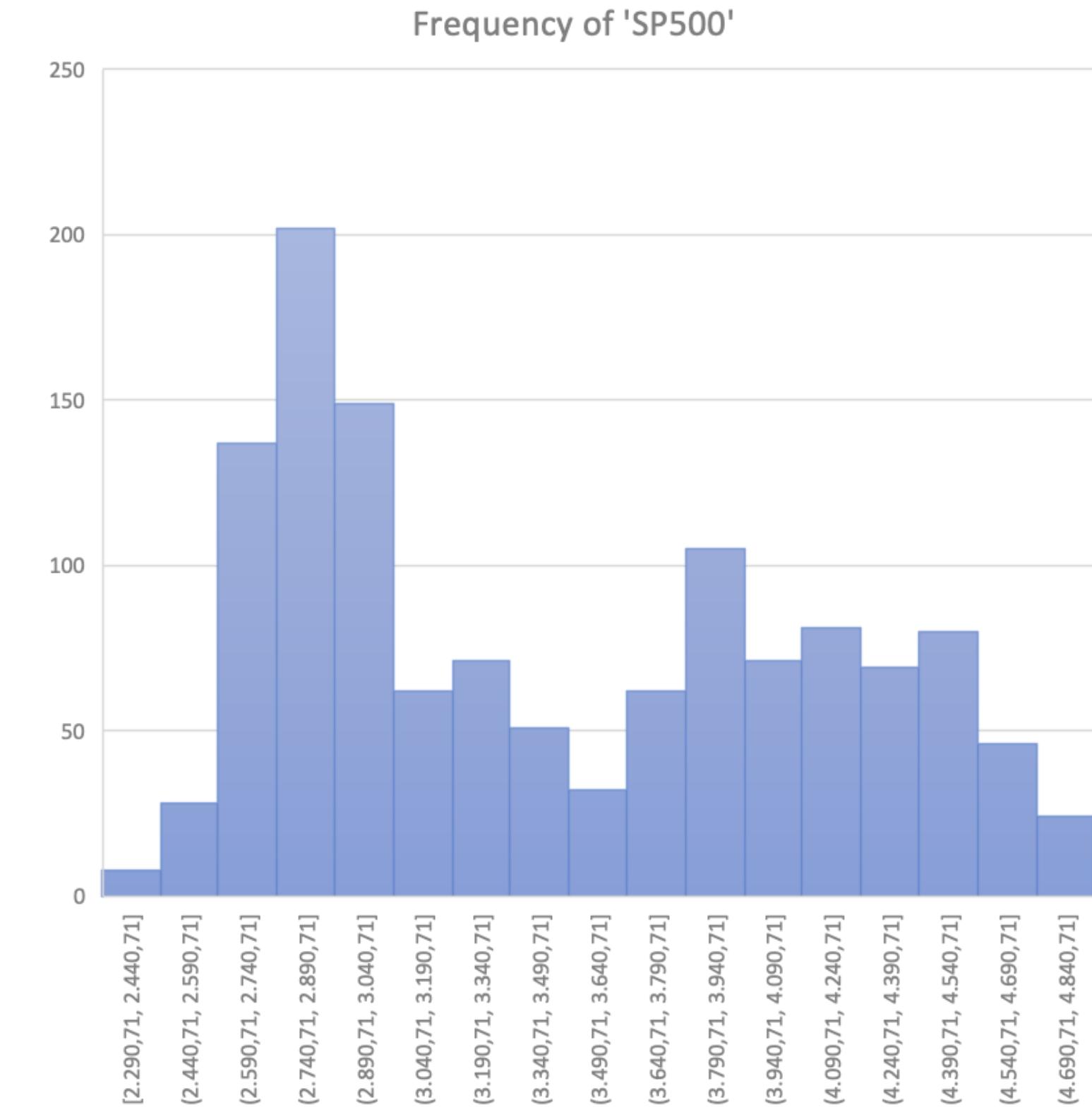
# Apple

- Skewness: Slightly positive (0.12), showing a gentle right tail.
- Kurtosis: Negative (-1.58), implying a flatter distribution with fewer outliers.
- Platykurtic curve



# S&P 500 (SP500)

- Skewness:  
Positive (0.33), indicating a longer right tail.
- Kurtosis:  
Negative (-1.29), suggesting the index has a flatter peak compared to the normal distribution.
- Platykurtic curve

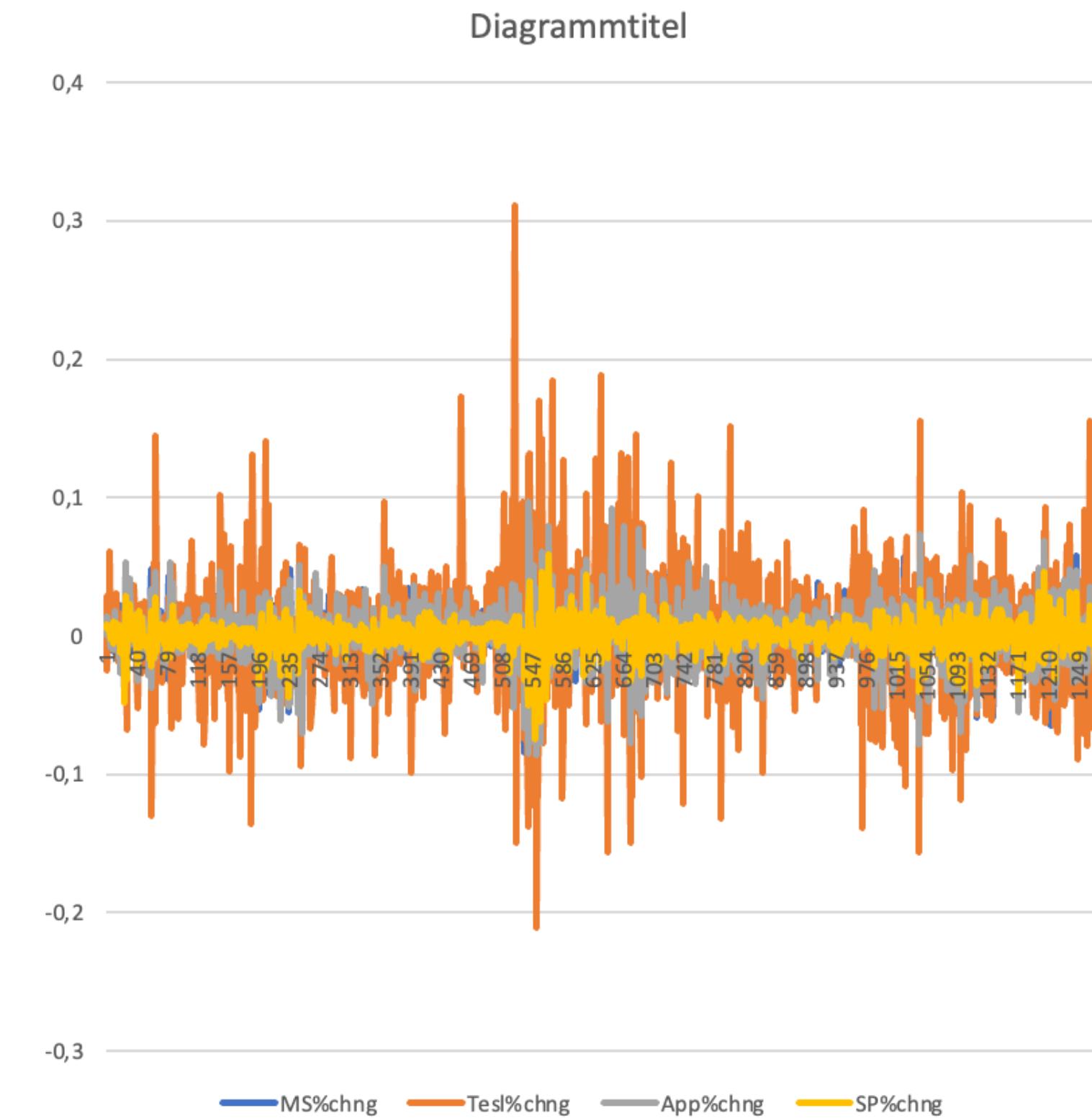


# VOLATILITIES

Tesla's line shows the highest peaks and troughs,

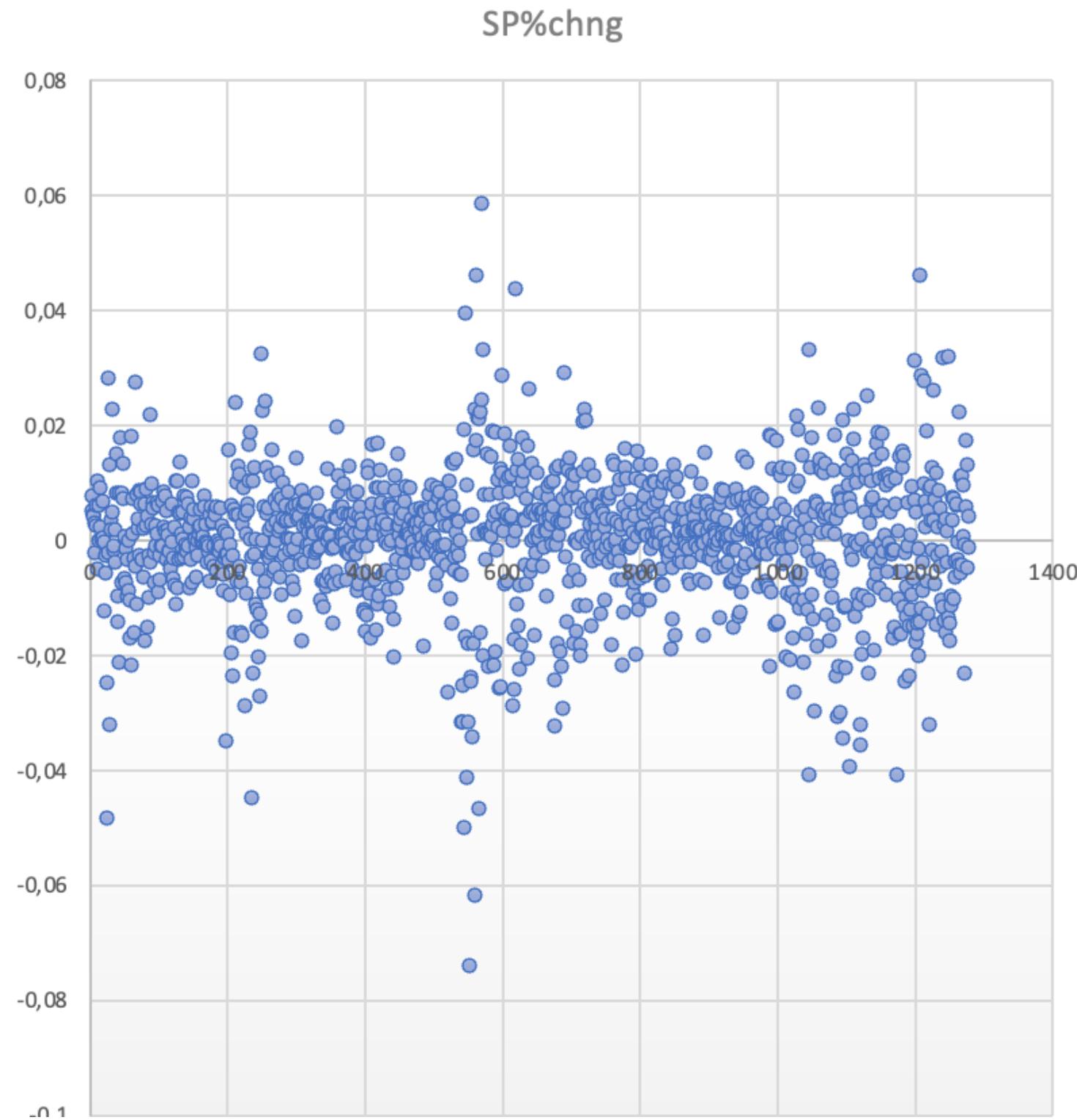
Indicating that it has the most significant daily percentage changes,

Reflective of high volatility.



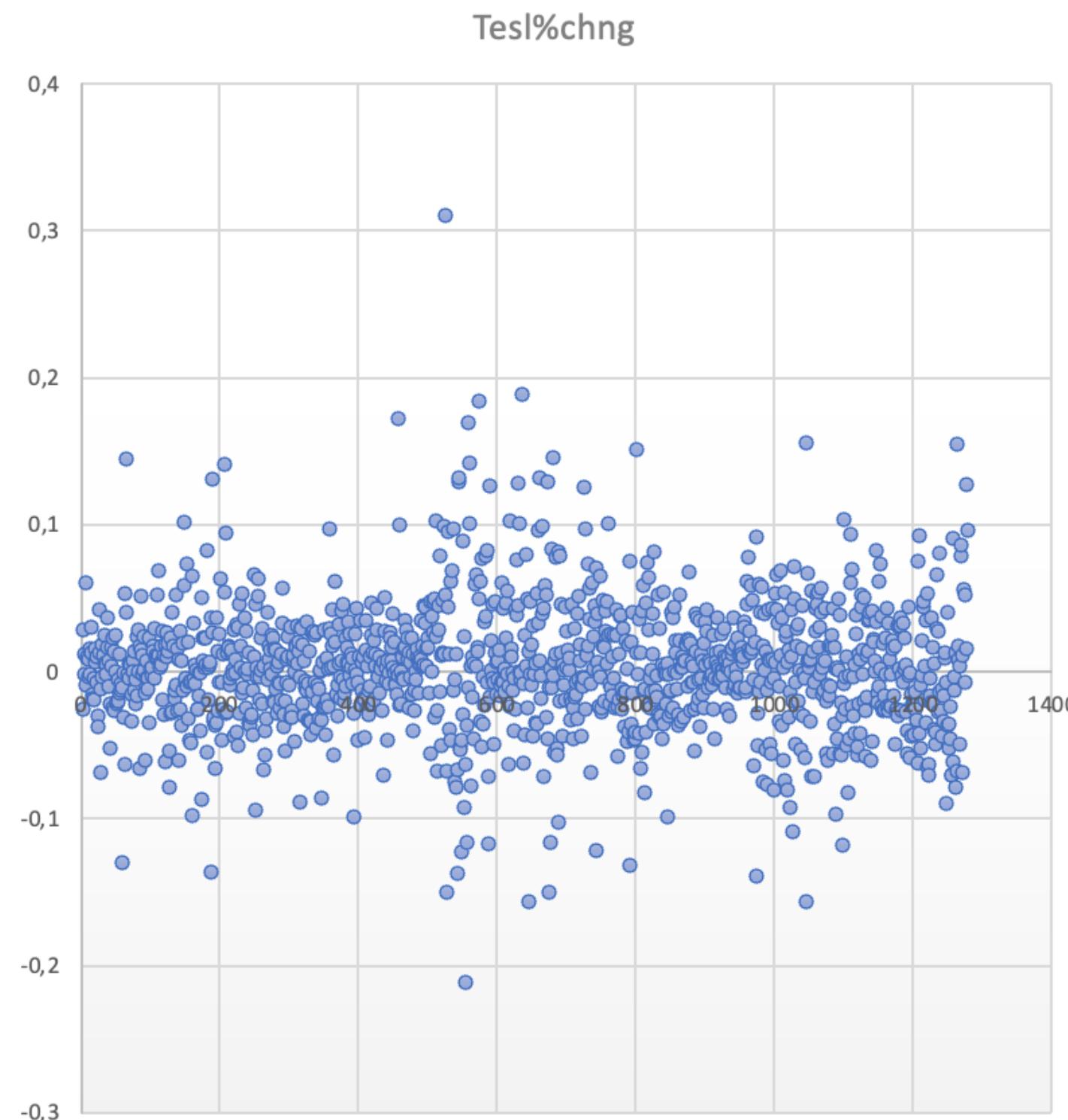
# S&P 500 (%chg)

- Stationary
- on most days, the percentage change is minimal
- There are no extreme outliers
- Which indicates a stable market index without extreme volatility.



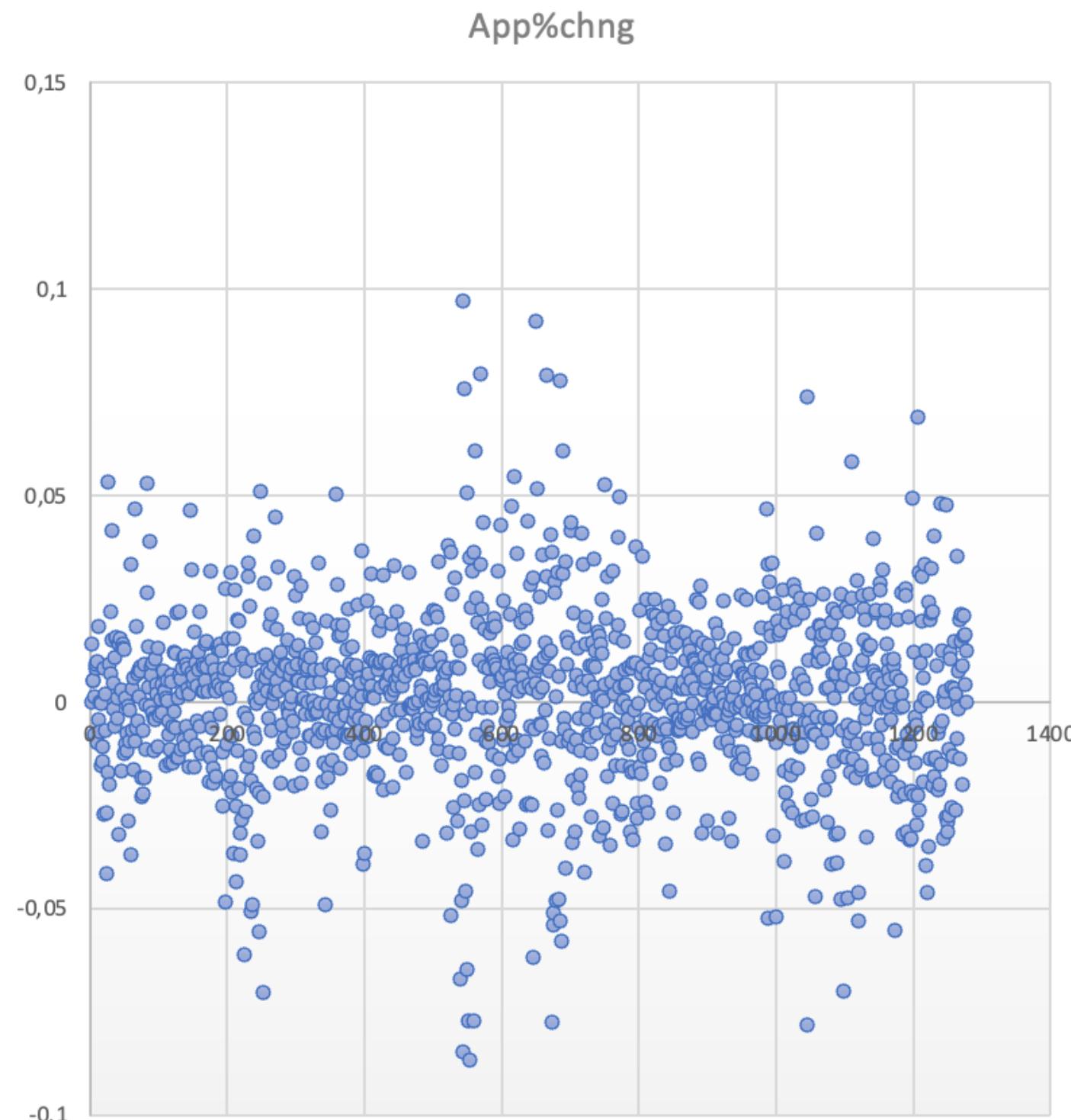
# Tesla (%chg)

- Stationary
- More spread along the y-axis compared to the S&P 500.
- This indicates that Tesla's daily percentage changes are more volatile
- Consistent with the nature of individual stocks as opposed to market indices.



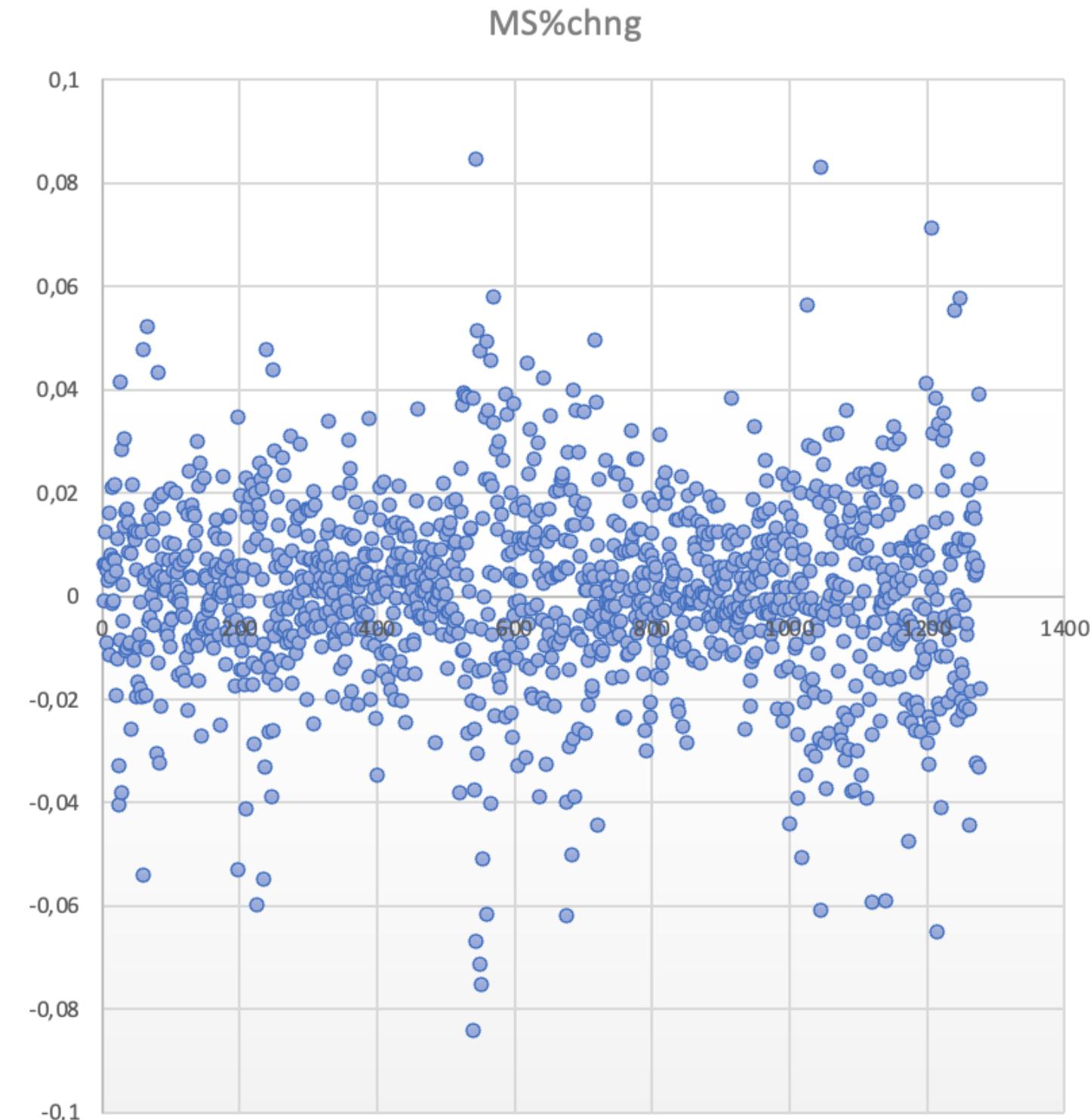
# Apple (%chg)

- Similarly, plot points are concentrated around the zero line.
- The spread is slightly more than the S&P 500
- Suggesting mild volatility, but less than Tesla
- Indicating a relatively stable performance for a large-cap stock.



# Microsoft (%chg)

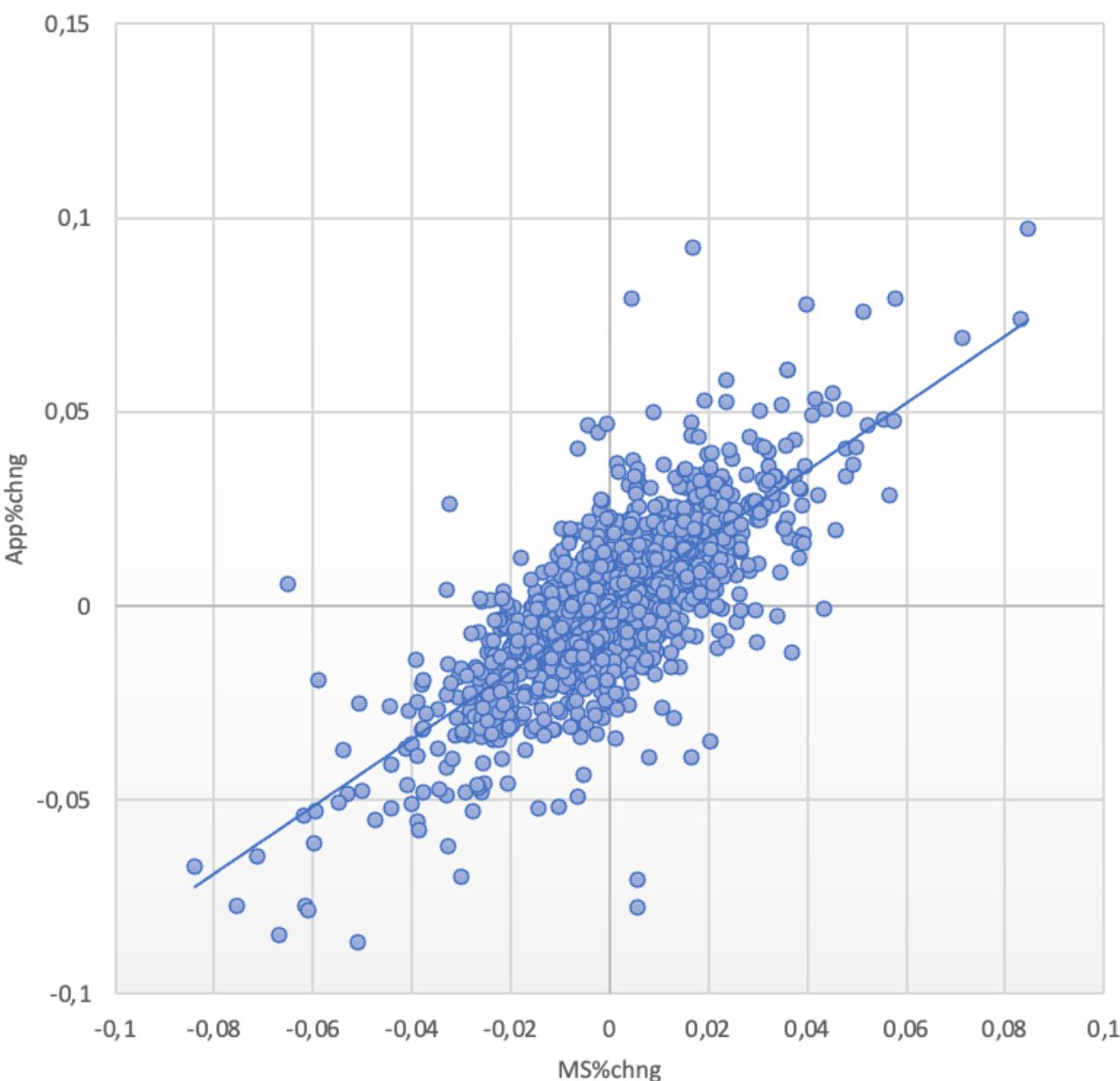
- The points for Microsoft show a distribution pattern similar to Apple
- With most of the data clustered close to the zero line.
- It indicates stability
- But with some days of notable percentage changes.



# Correlation Between Stocks

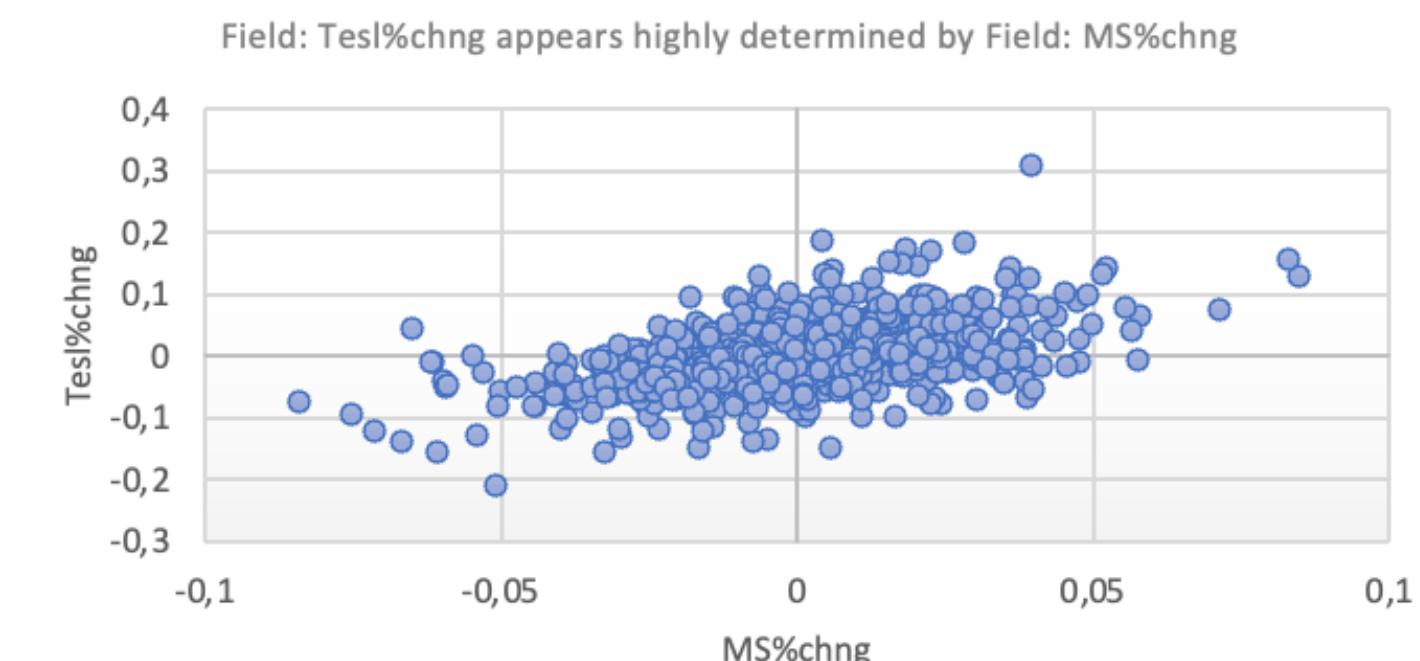
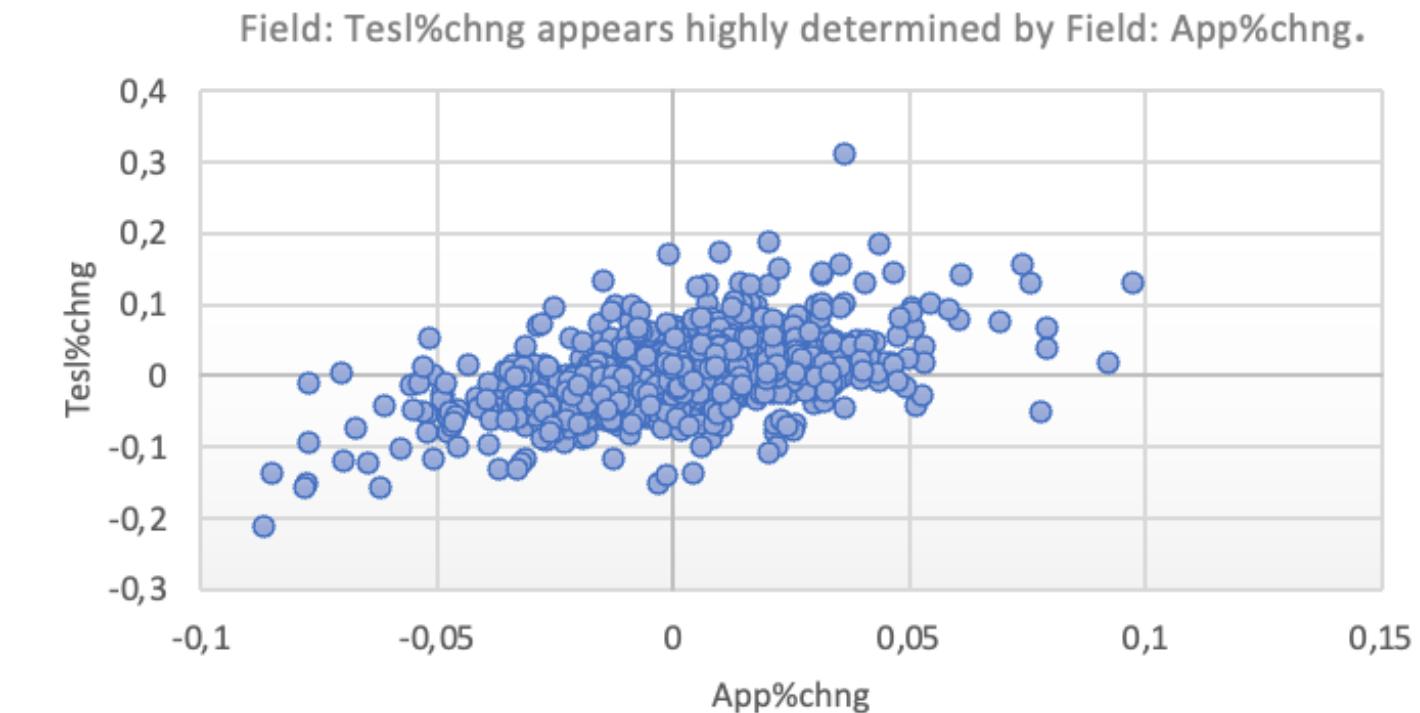
- Microsoft and Apple share a strong positive correlation.
- Tesla's stock changes show a relationship with Apple's, indicating possible shared market influences.
- Microsoft and Tesla also exhibit a positive correlation, though less tightly clustered than Microsoft and Apple.

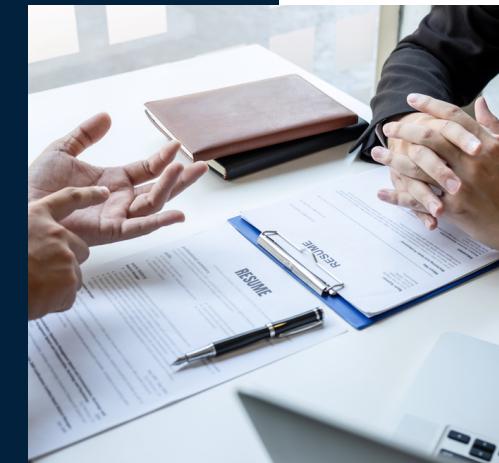
Field: MS%chng and Field: App%chng appear highly correlated.



# Implications for Investors

- Correlated movements suggest sector-specific or market-wide influences.
- Potential for portfolio diversification based on the different degrees of correlation.
- Understanding these relationships can aid in risk management strategies.





# CAPITAL ASSET PRICING MODEL

- Utilizes the slope coefficient Beta from regression analysis
- Higher beta values indicate higher risk and expected higher returns.
- Regression Model:
  - Analyzes the relationship between stock returns (%chng) and market return (SP%chng).
  - A separate model for each company to determine individual stock behaviors.

# RISK ASSESSMENT

Coefficients	MS%chng	Tesl%chng	App%chng
SP%chng	1.2138	1.8183	1.3293

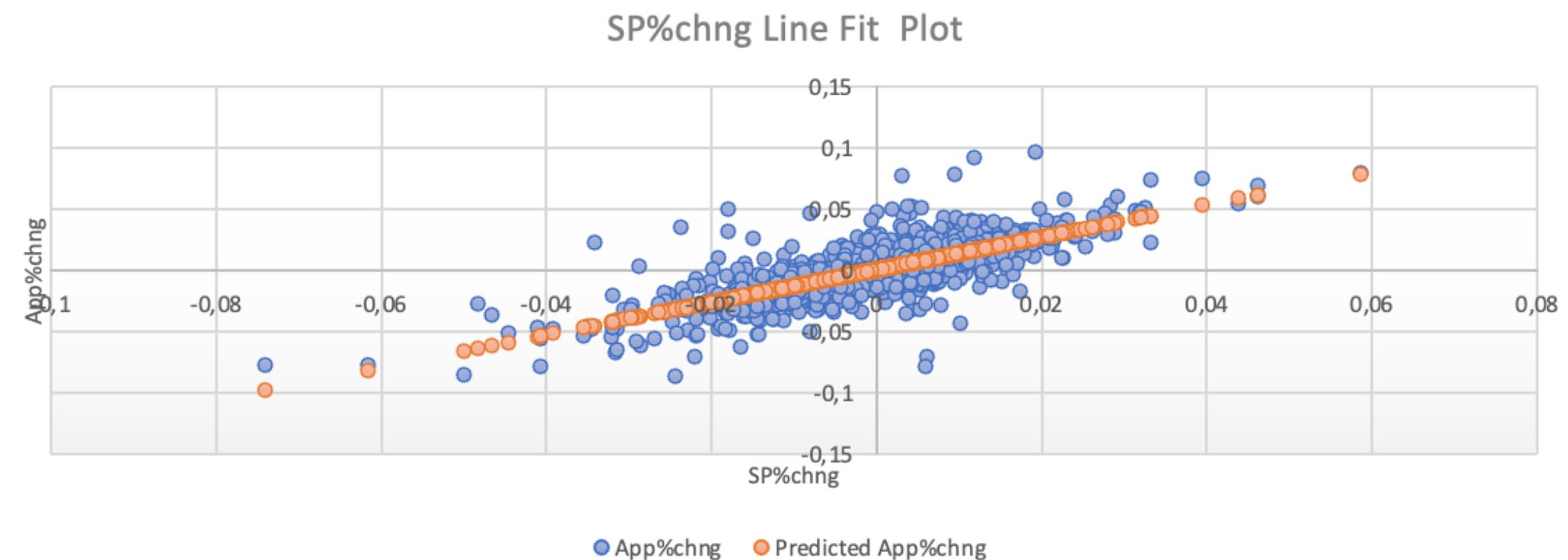
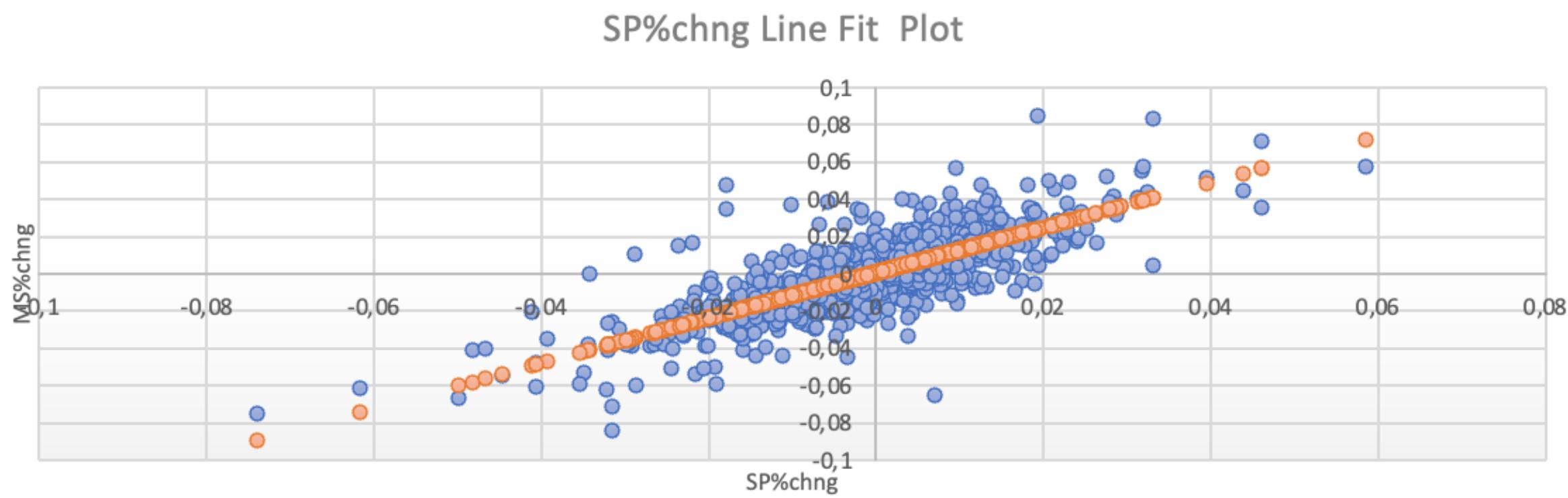
- Beta Values: All three stocks have a beta greater than 1
- Suggesting they are all more volatile than the market.

## Assessment:

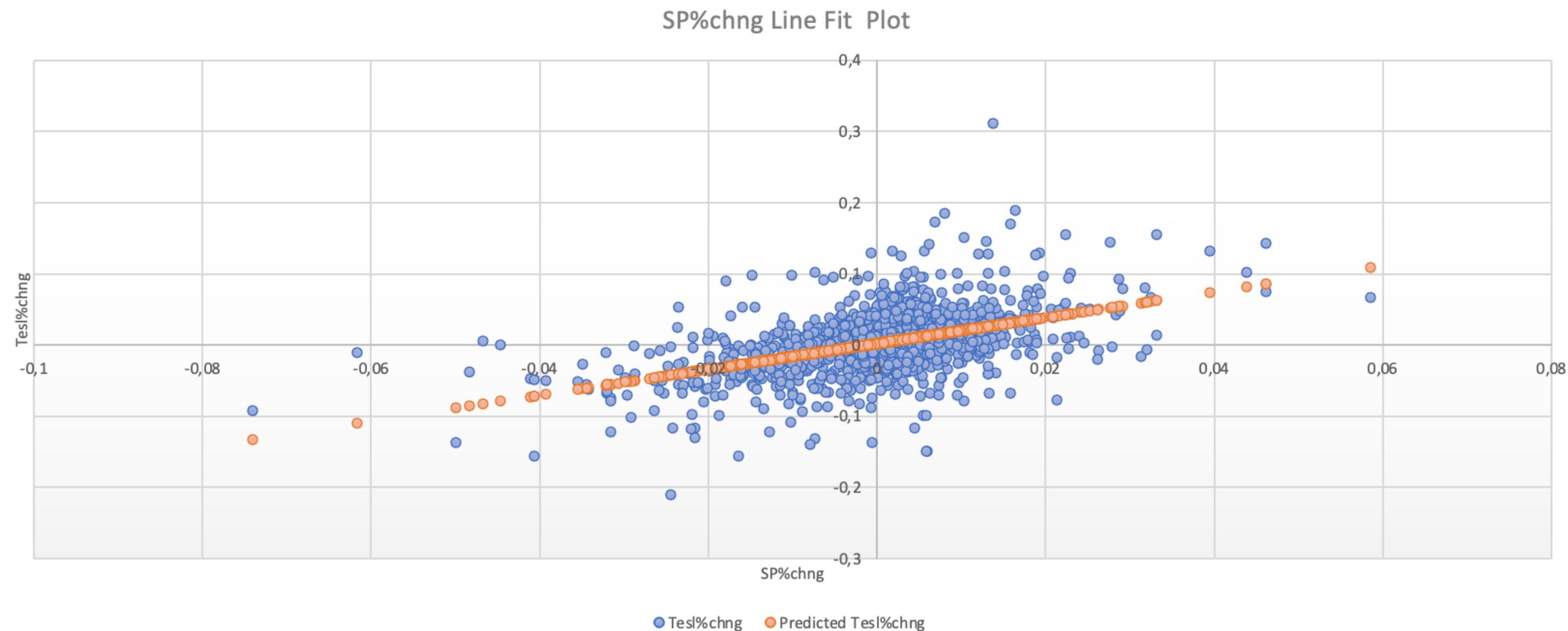
- Microsoft exhibits lower risk with a beta of 1.2138.
- Apple shows moderate risk correlating with its beta of 1.3293.
- Tesla stands out with the highest risk, as indicated by its beta of 1.8183.

# MODEL VISUALIZATION

- All models are positively and highly correlated



# MODEL VISUALIZATION



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THANK'S  
FOR WATCHING