

# Stock Market Performance Analysis

Stock Market Performance Analysis entails the computation of moving averages, assessment of volatility, correlation analysis, and exploration of diverse facets of the stock market. Its aim is to acquire comprehensive insights into the elements that influence stock prices and the interdependencies among stock prices of distinct companies. This analytical process assists in comprehending the dynamics of the stock market and aids in making informed investment decisions.

Let us import the necessary Python Libraries for the Analysis of the Stock Market Performance

```
In [1]: import pandas as pd
import yfinance as yf
from datetime import datetime

start_date = datetime.now() - pd.DateOffset(months=3)
end_date = datetime.now()
```

Now we will search and download for stock prices from few tech companies, I have taken stocks from Apple, Microsoft, Meta and Google from the last 3 months.

```
In [2]: tickers = ['AAPL', 'MSFT', 'META', 'GOOG']
df_list = []
for ticker in tickers:
    data = yf.download(ticker, start = start_date, end = end_date)
    df_list.append(data)

df = pd.concat(df_list, keys=tickers, names=['Ticker', 'Date'])
print(df.head())

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Ticker Date      Open      High      Low      Close  Adj Close \
AAPL  2023-03-13  147.809998  153.139999  147.699997  150.470001  150.262161
      2023-03-14  151.279999  153.399994  150.100006  152.589996  152.379227
      2023-03-15  151.190002  153.250000  149.919998  152.990005  152.778687
      2023-03-16  152.160004  156.460007  151.639999  155.850006  155.634735
      2023-03-17  156.080002  156.740005  154.279999  155.800000  154.785904

Volume
AAPL  2023-03-13  84457100
      2023-03-14  73695900
      2023-03-15  77167900
      2023-03-16  76161100
      2023-03-17  98944600
```

In the Dataset, we will set the Date Column as the Index Column

```
In [3]: df = df.reset_index()
print(df.head())

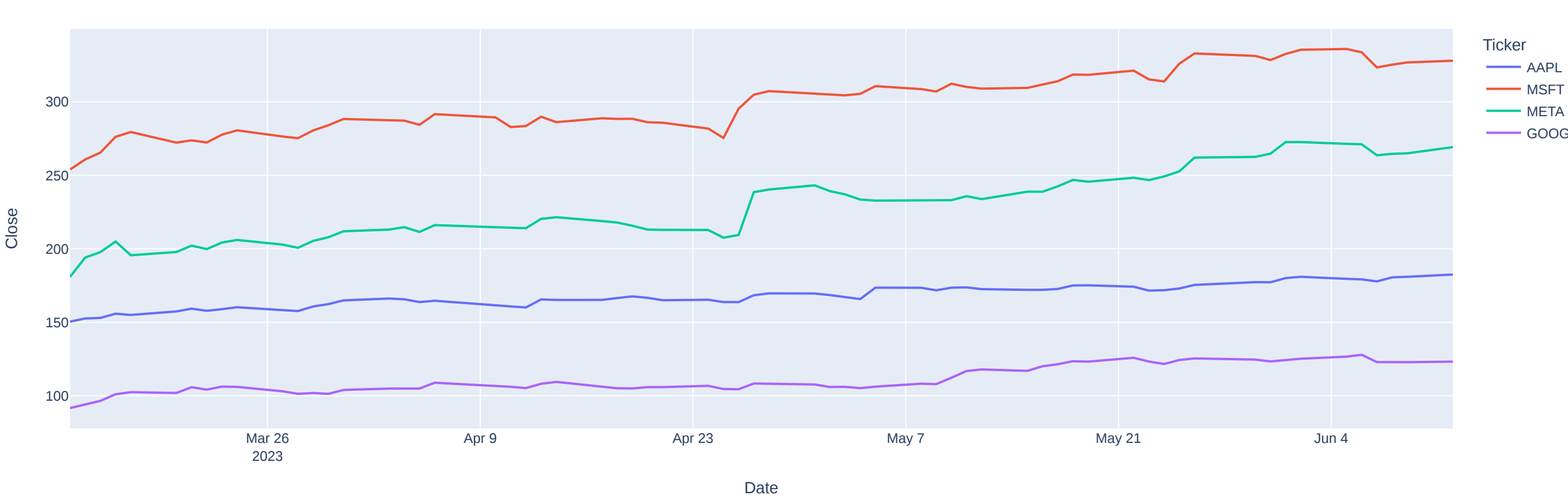
Ticker Date      Open      High      Low      Close \
0  AAPL 2023-03-13  147.809998  153.139999  147.699997  150.470001
1  AAPL 2023-03-14  151.279999  153.399994  150.100006  152.589996
2  AAPL 2023-03-15  151.190002  153.250000  149.919998  152.990005
3  AAPL 2023-03-16  152.160004  156.460007  151.639999  155.850006
4  AAPL 2023-03-17  156.080002  156.740005  154.279999  155.800000

Adj Close Volume
0  150.262161  84457100
1  152.379227  73695900
2  152.778687  77167900
3  155.634735  76161100
4  154.785904  98944600
```

Now Let's look at the performance of the companies in the stock market:

```
In [4]: import plotly.express as px
fig = px.line(df, x='Date',
              y='Close',
              color='Ticker',
              labels={'Date': 'Date', 'Close': 'Closing Price', 'Ticker': 'Company'},
              title='Stock Market Performance from the last 3 Months')
fig.show()
```

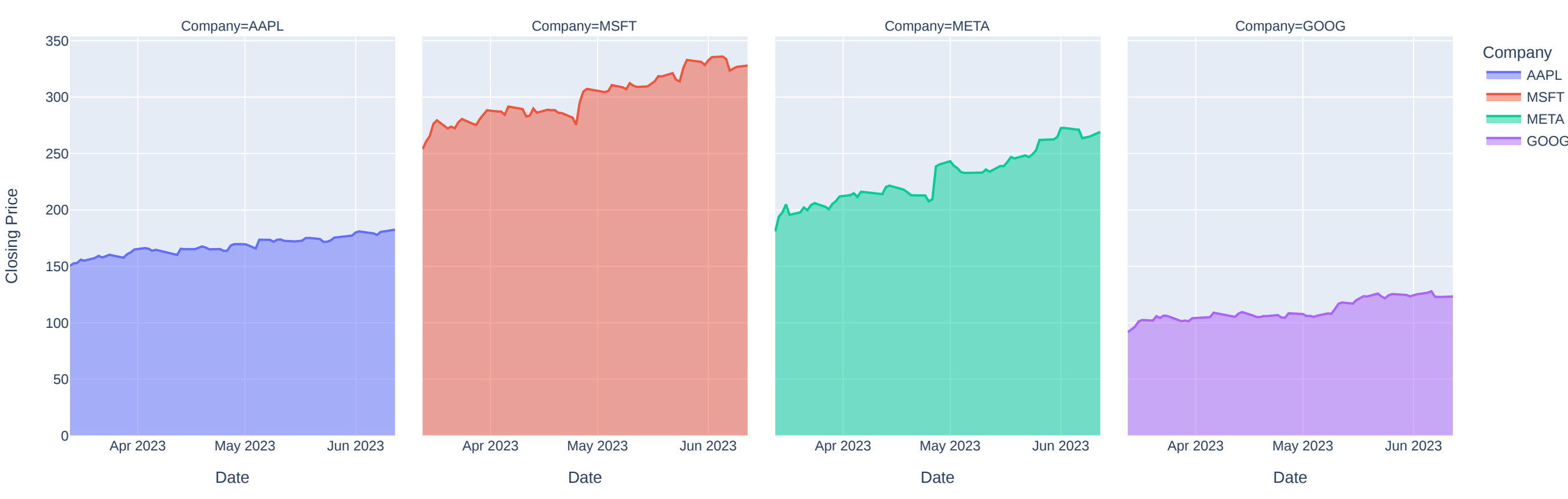
Stock Market Performance from the last 3 Months



Now Lets use the Area Chart and compare the performances of different Companies and Identify similarities or differences in their stock price movements

```
In [5]: fig = px.area(df, x='Date', y='Close', color='Ticker', facet_col='Ticker',
                    labels={'Date': 'Date', 'Close': 'Closing Price', 'Ticker': 'Company'},
                    title='Stock Prices of Apple, Micorsoft, Meta and Google')
fig.show()
```

Stock Prices of Apple, Micorsoft, Meta and Google



## Moving Averages

Now we'll analyze the moving averages, it'll provide a useful way to identify trends and patterns in each company's stock price movements over a certain period of time:

```
In [6]: df['MA10'] = df.groupby('Ticker')['Close'].rolling(window=10).mean().reset_index(0, drop=True)
df['MA20'] = df.groupby('Ticker')['Close'].rolling(window=20).mean().reset_index(0, drop=True)

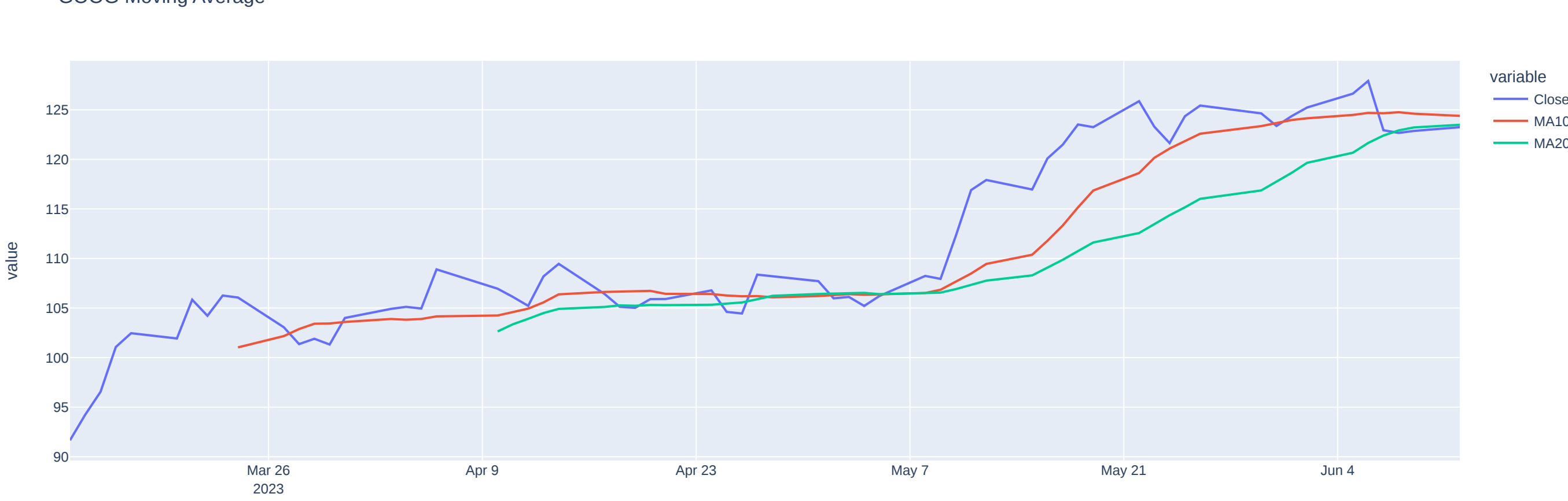
# Table View
#for ticker, group in df.groupby('Ticker'):
#    print(f'Moving Averages for {ticker}')
#    print(group[['MA10', 'MA20']])

#Visualization of the Moving Average
for ticker, group in df.groupby('Ticker'):
    fig = px.line(group, x='Date',
                  y=['Close', 'MA10', 'MA20'],
                  color='Ticker',
                  title=f'{ticker} Moving Average')
    fig.show()
```

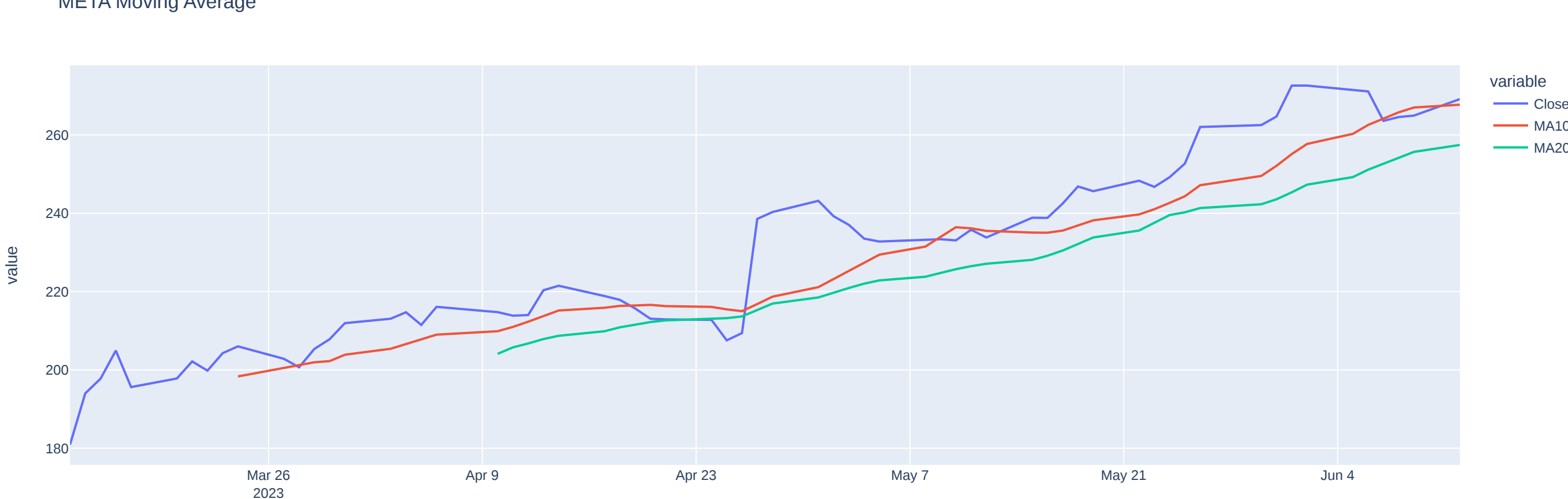
AAPL Moving Average



GOOG Moving Average



META Moving Average



MSFT Moving Average



The Above output we can observe that, When the MA10 crosses above MA20, it is considered a bullish signal indicating that the stock price will continue to rise. Conversely, when the MA10 crosses below the MA20, it is a bearish signal that the stock price will continue to fall.

## Volatility

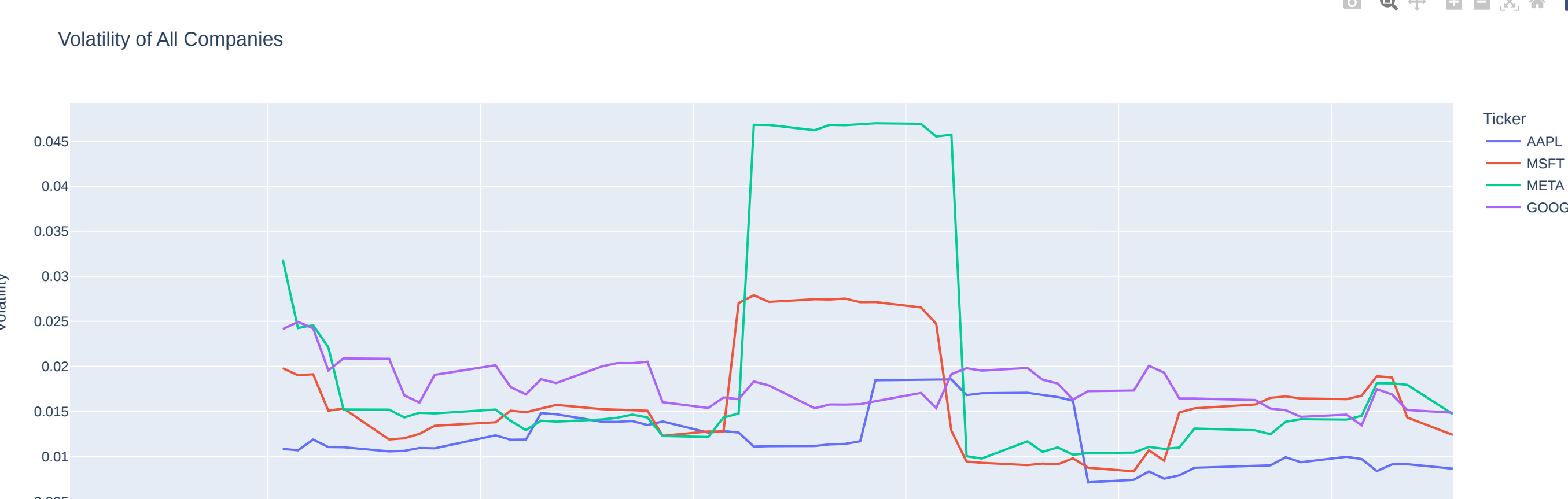
It measures how much and how often the stock price or market fluctuates over a given period of time.

High Volatility indicates that the stock or market experience are large and have frequent price movements, While low volatility indicates that the market experiences smaller or less frequent price movements.

Below we have visualization of volatility of all companies:

```
In [7]: df['Volatility'] = df.groupby('Ticker')['Close'].pct_change().rolling(window=10).std().reset_index(0, drop=True)
fig = px.line(df, x='Date',
              y='Volatility',
              color='Ticker',
              title='Volatility of All Companies')
fig.show()
```

Volatility of All Companies



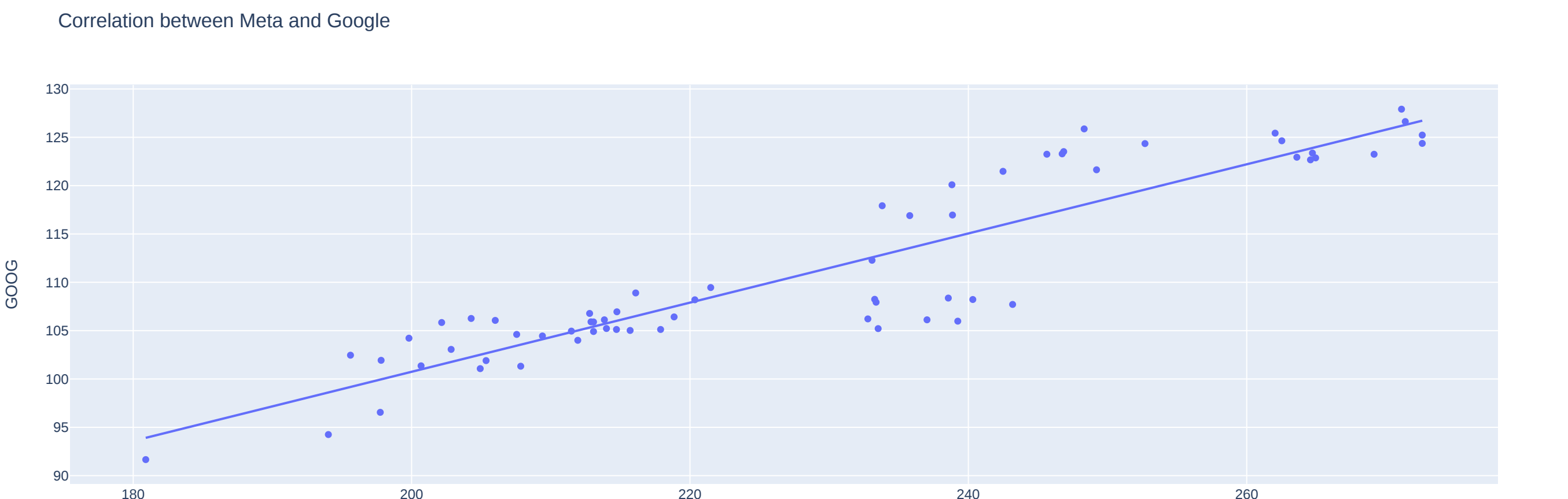
## Correlation

Let's Analyze the correlation between the stock prices of Meta and Google

```
In [8]: #Create DataFrame with the Stock Prices of the compnies correlation you want to check
#For this Example, I took Meta and Google
meta = df.loc[df['Ticker'] == 'META', ['Date', 'Close']].rename(columns={'Close': 'META'})
google = df.loc[df['Ticker'] == 'GOOG', ['Date', 'Close']].rename(columns={'Close': 'GOOG'})
df_corr = pd.merge(meta, google, on='Date')

#Visualization
fig = px.scatter(df_corr, x='META',
                y='GOOG',
                trendline='ols',
                title='Correlation between Meta and Google')
fig.show()
```

Correlation between Meta and Google



The stock prices of Meta and Google exhibit a significant positive linear relationship, implying that when Meta's stock price rises, Google's stock price tends to rise as well.

This correlation suggests similarities between the companies, possibly influenced by industry trends, market conditions, or shared business associations.

Investors can consider this correlation as an opportunity to diversify their portfolio, as both stocks offer comparable potential returns and risks.