

Uncertainties on the current stock market



Duc Huy Nguyen, Prabhav Dasari, Arjav Dhorajia, Josh Kim

Apr 16th, 2025

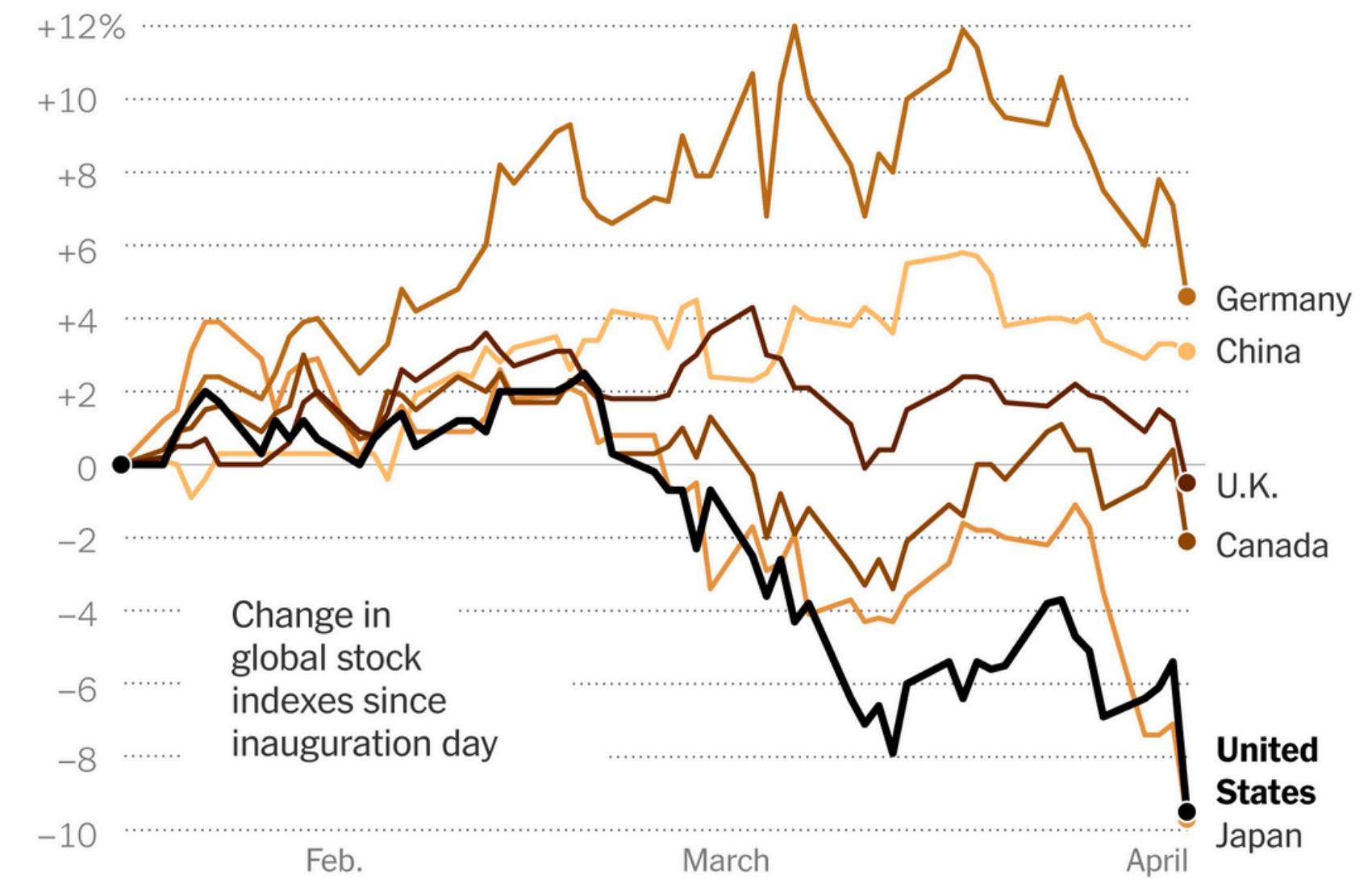
Motivation

An interesting time in the market where there are huge shocks both negatively and positively to the stock market

Challenges: The current market is volatile and hard to unstable so we aim to provide a more methodical insights

Opportunity: Support investors to make informed investing decisions within this situation

Return on investment on Jan 20th



Analysis and hypothesis

Objective:

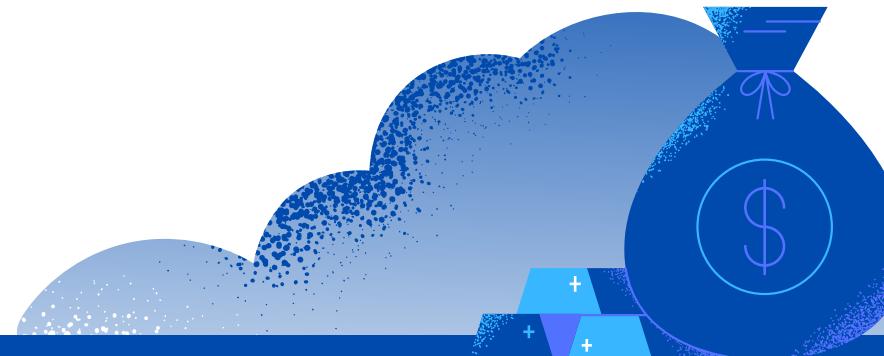
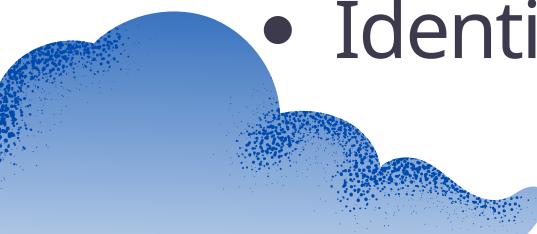
Provide a thorough analysis of large company within the technology services, financial services and healthcare to assess the impact of political movement

Key Questions:

- Did companies in those sectors are being affected by election result and inauguration? And did all the sectors tell the same story?
- How did the stocks change during the Mr. President's last election and inauguration in 2016 ?
- Did the change happen because of changes in company performance ?

Methodology:

- Analyze the company's financial performance through financial statement
- Identify the trends and return of the stock on the market



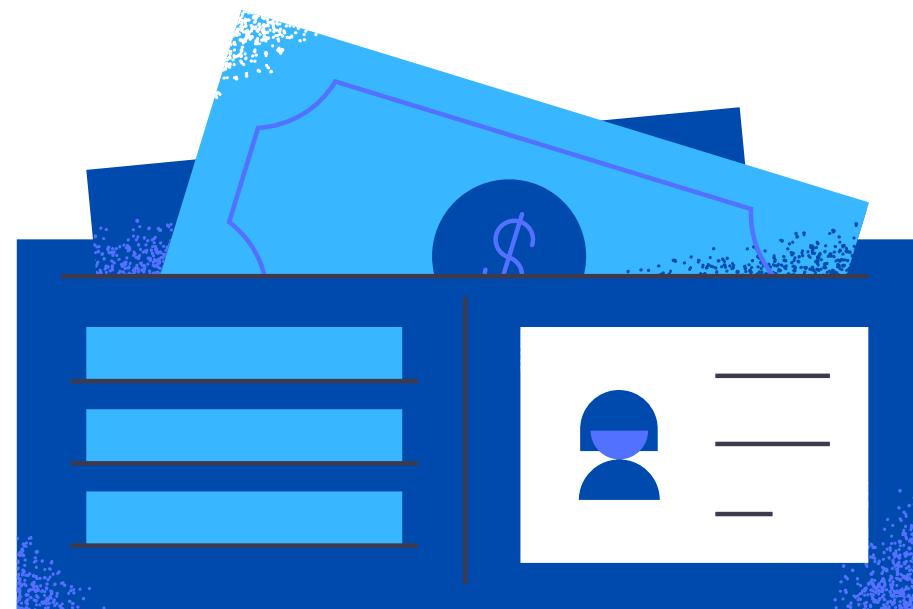
Data Source & Collection

Data Source: U.S Securities and Exchange Commission for financial's data and yahoo finance for the stock prices

Data Includes: assets, equity, revenue, dividends, prices

ETL Process:

- Export relevant labels for financial ratio and within range for stock data
- Clean and fill empty data to adjust for the taxonomy notation



Key Financial Analysis

Fundamental: How the company is actually performing financially

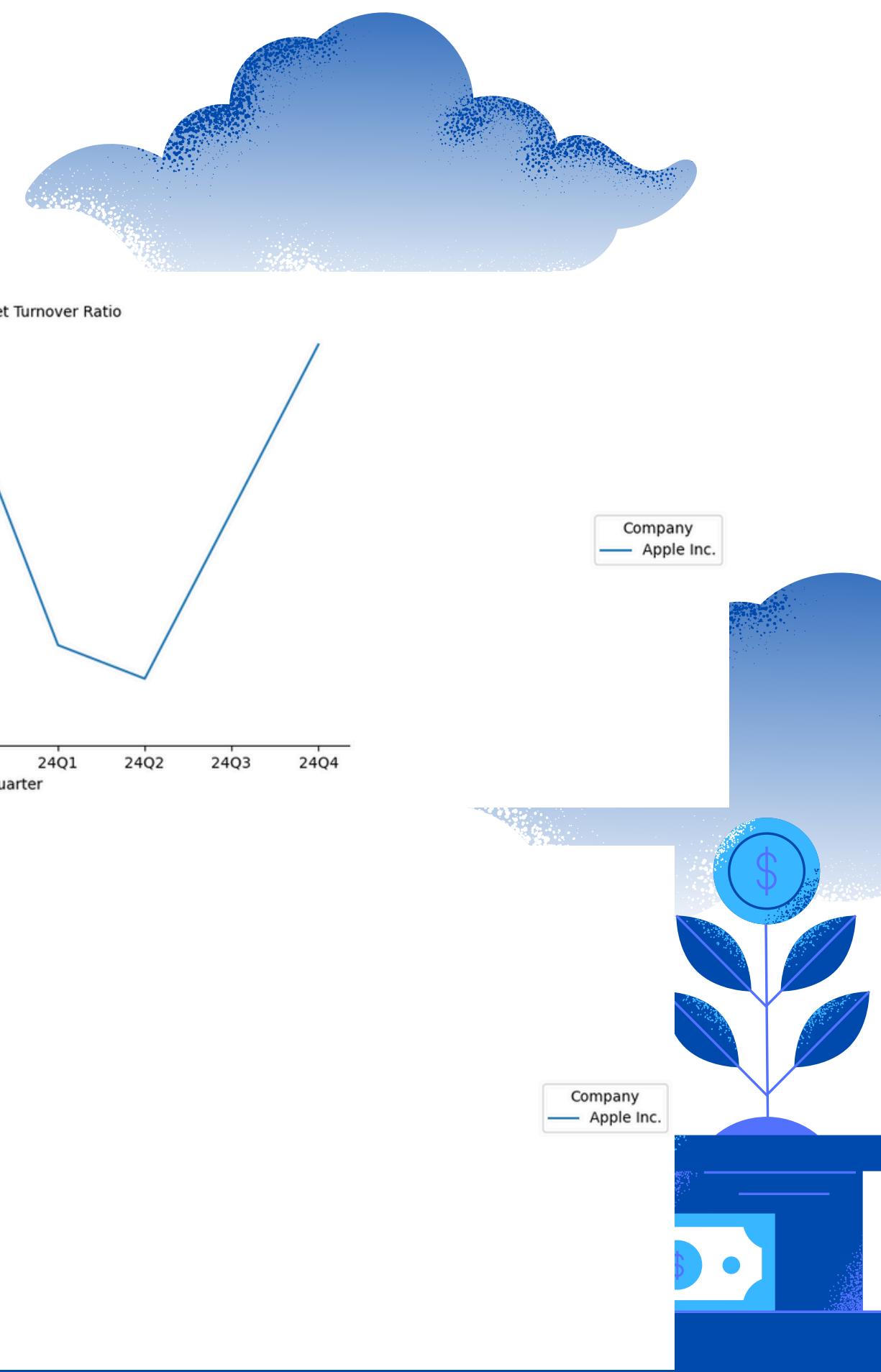
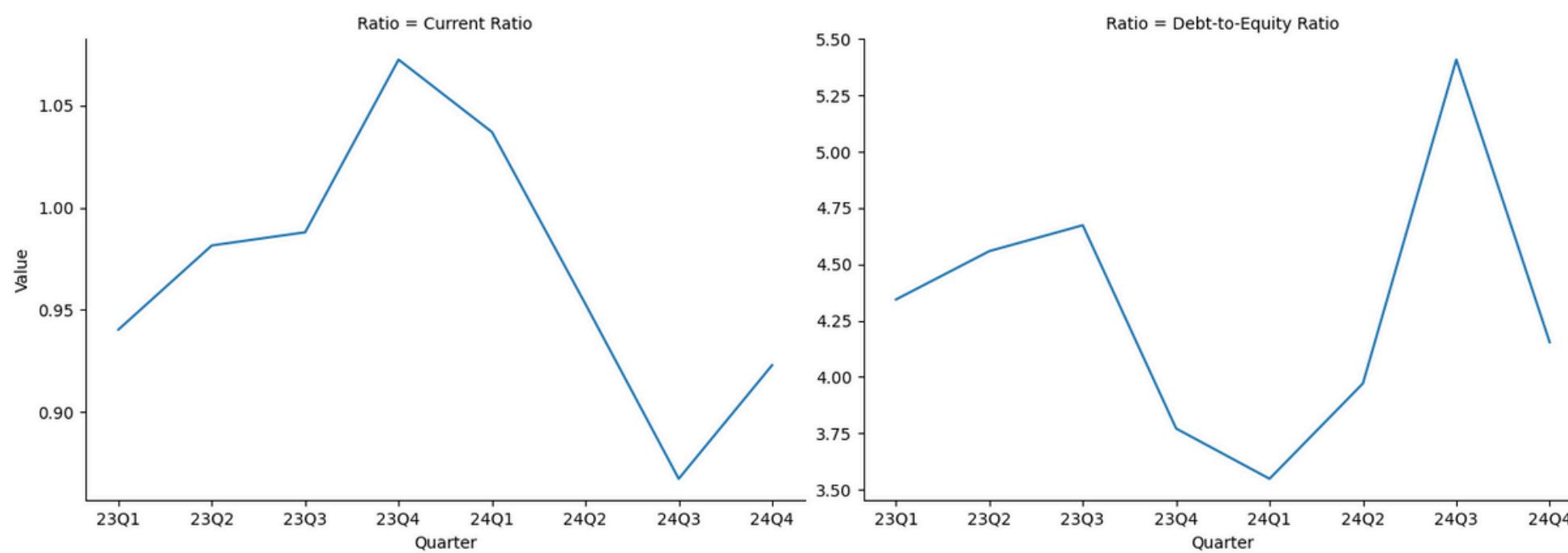
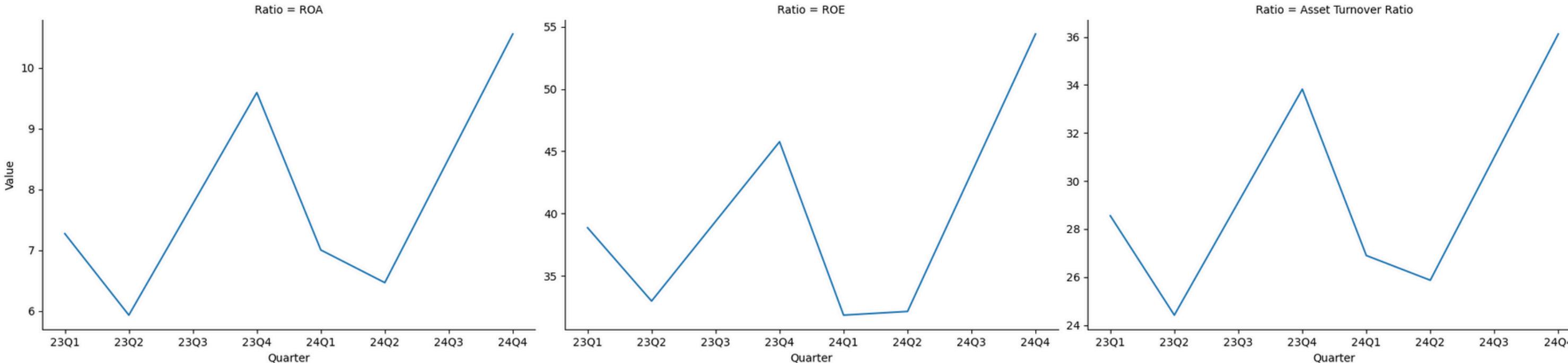
- Profitability: ROA, ROE
- Liquidity (cash in hand): Current Ratio
- Solvency (ability to pay debt): Debt - to - equity ratio
- Efficiency: Asset Turnover Ratio

Technical: trends within the stock market related to the company

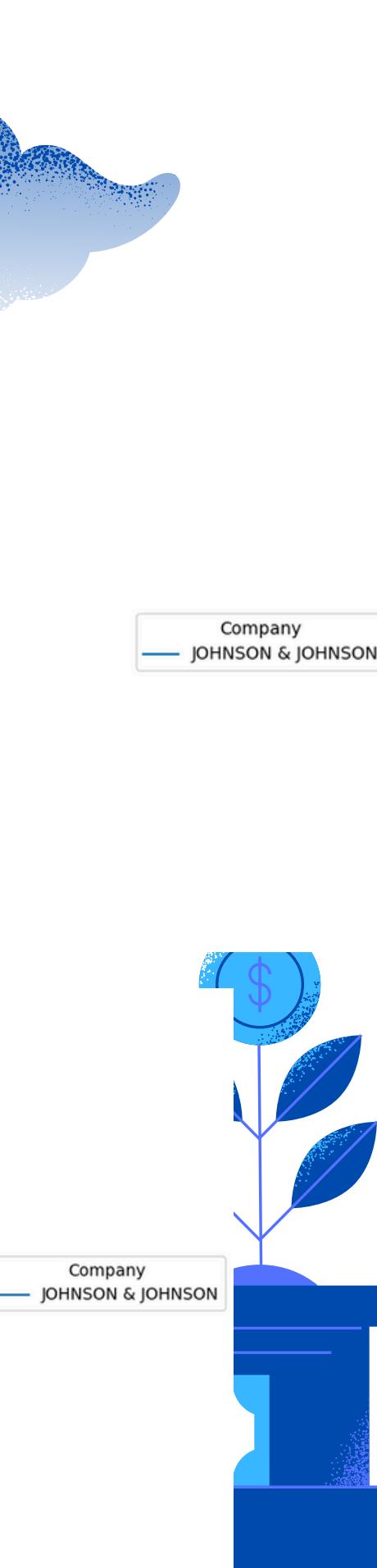
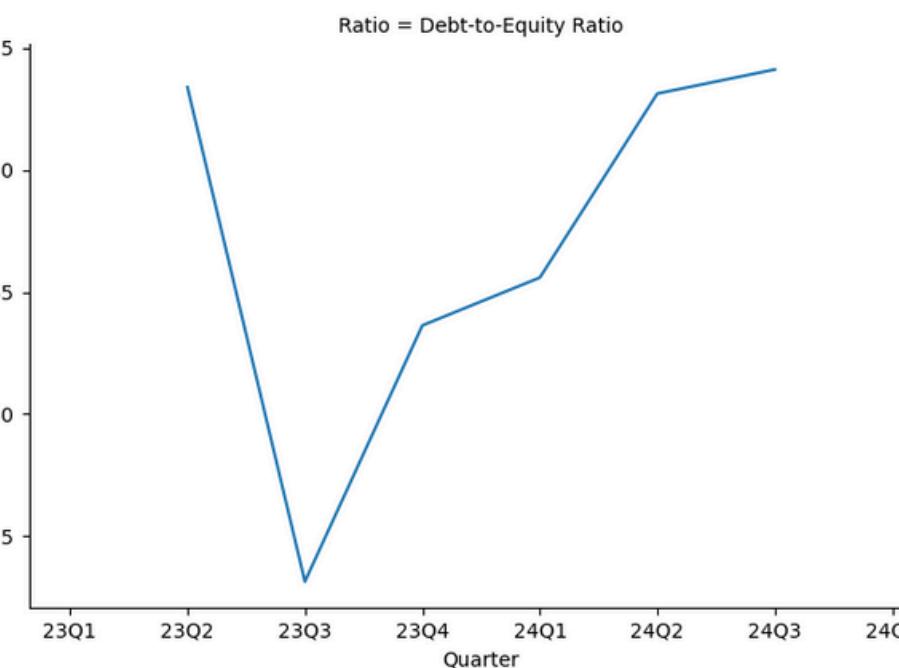
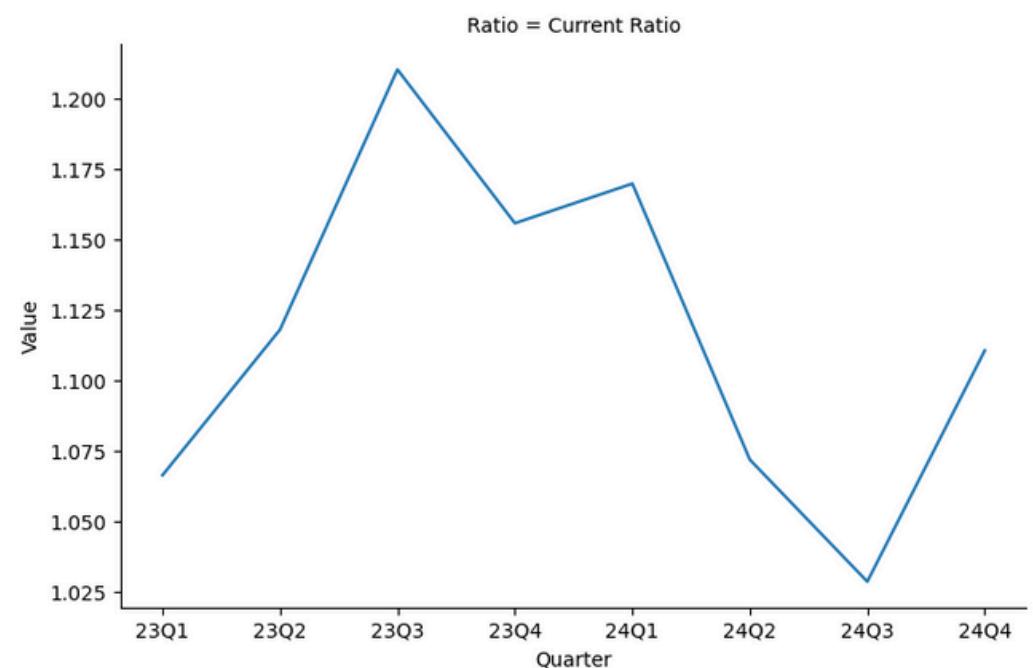
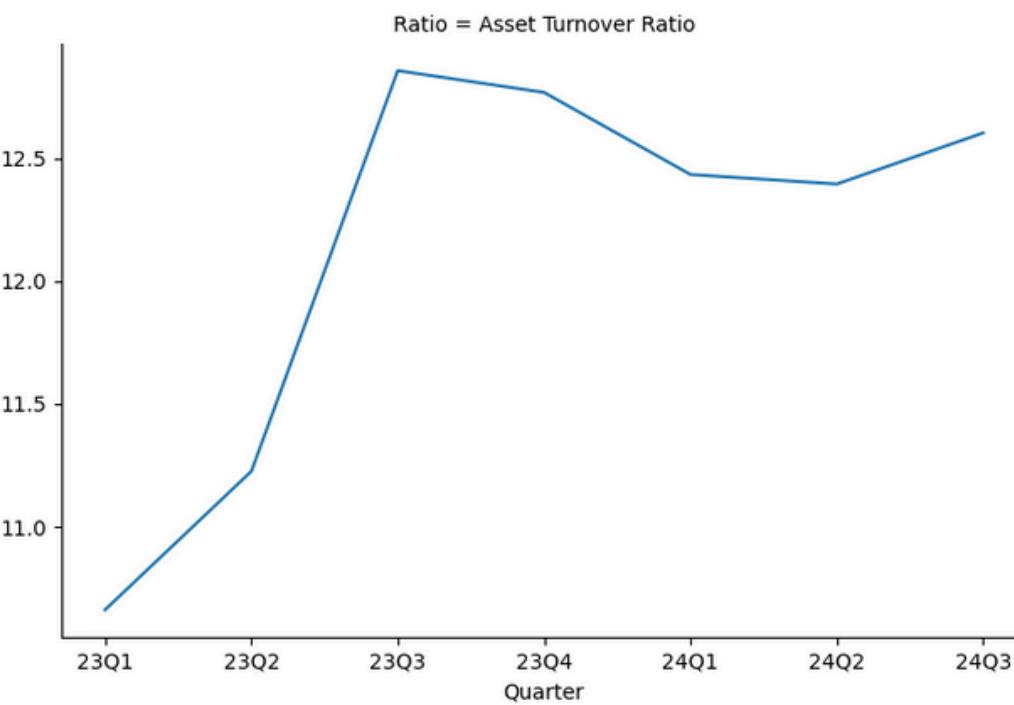
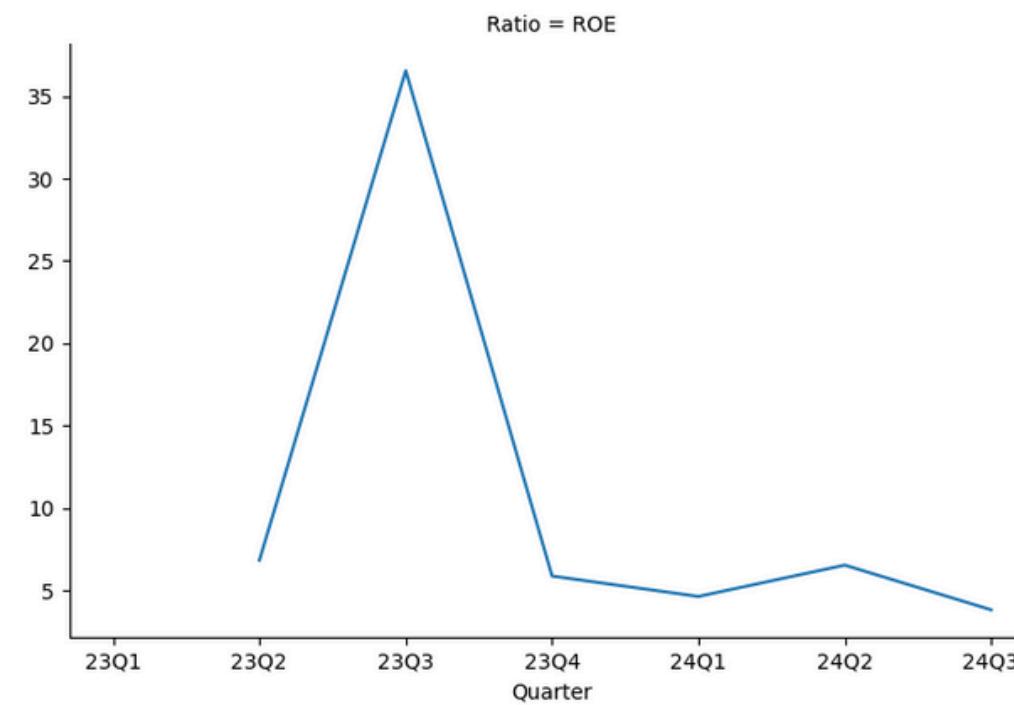
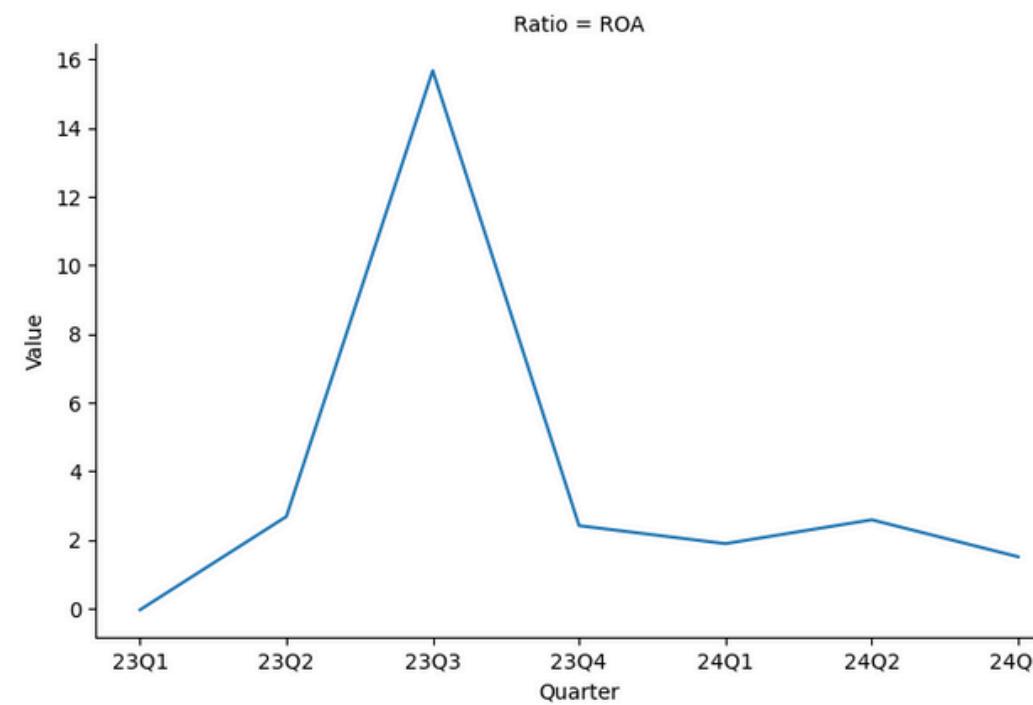
- Moving Averages, Exponential Moving Averages (prices over time)
- Relative Strength Index: speed and magnitude of a security's recent price changes



Fundamental Analysis: Technology Services



Fundamental Analysis: Healthcare



Fundamental Analysis: Financial Services (in progress)



Technical Analysis: EMA vs. SMA

SMA: for long-term investing: The Simple Moving Averages may depend too much on the old data so it is not too sensitive to changes (20 day period)

EMA: for shorter-term investing: more responsive to change over time

where smoothing is the determination of how much weight is given to a recent data points compared to older one, smoothing = 2

The formula for SMA is:

$$\text{SMA} = \frac{A_1 + A_2 + \dots + A_n}{n}$$

where:

A_n = the price of an asset at period n

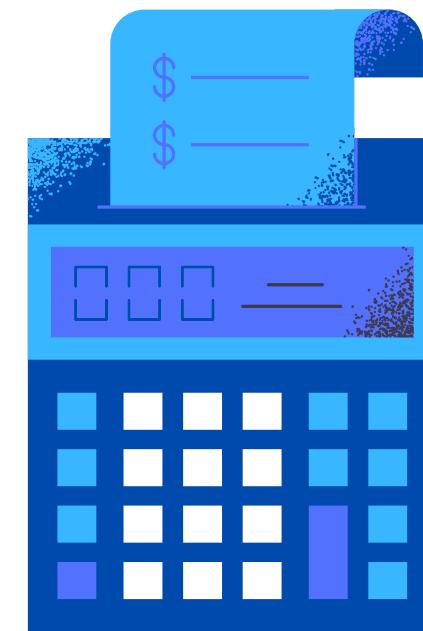
n = the number of total periods

Formula for Exponential Moving Average (EMA)

$$\begin{aligned} EMA_{\text{Today}} &= \left(\text{Value}_{\text{Today}} * \left(\frac{\text{Smoothing}}{1 + \text{Days}} \right) \right) \\ &\quad + EMA_{\text{Yesterday}} * \left(1 - \left(\frac{\text{Smoothing}}{1 + \text{Days}} \right) \right) \end{aligned}$$

where:

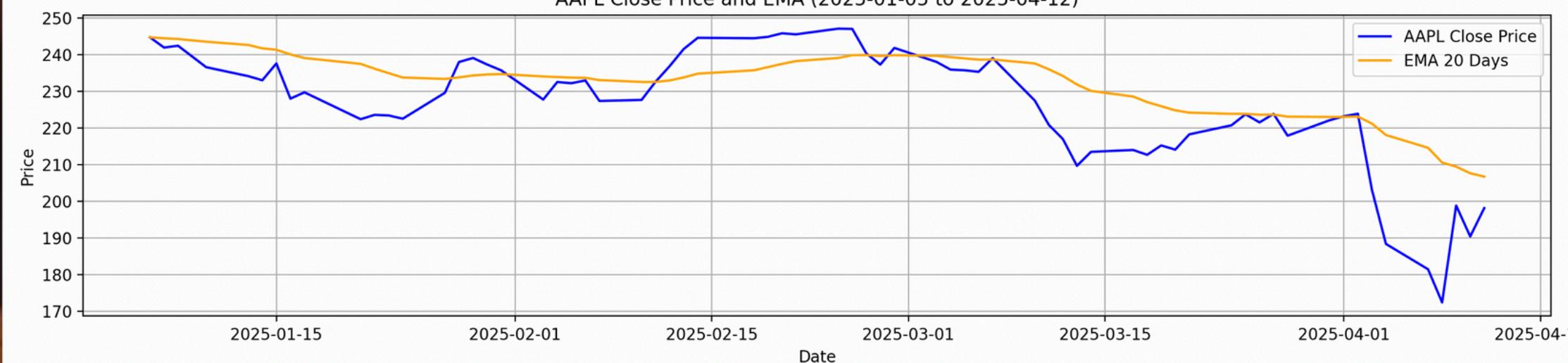
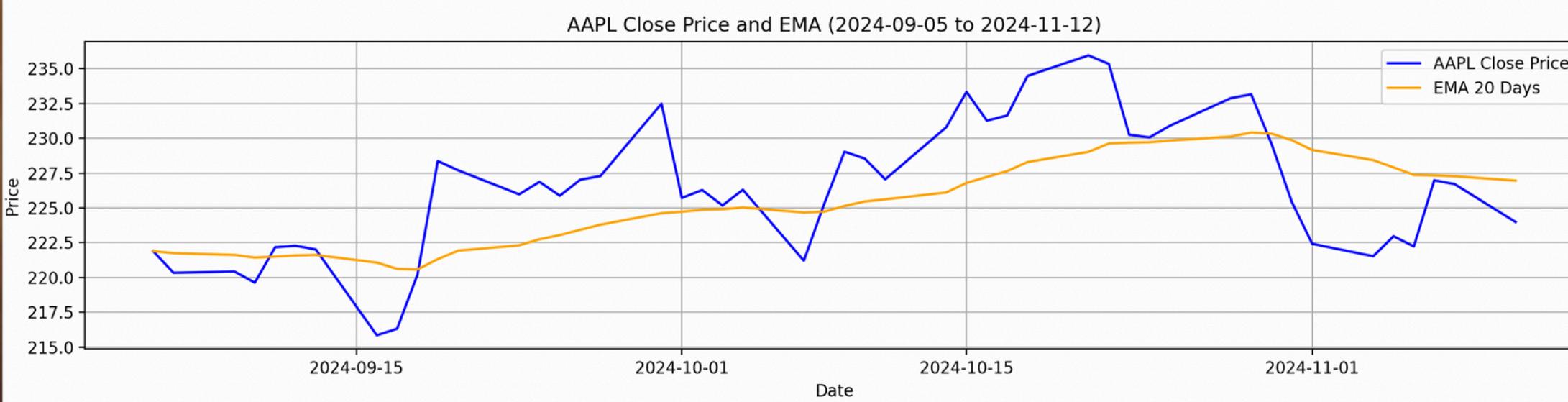
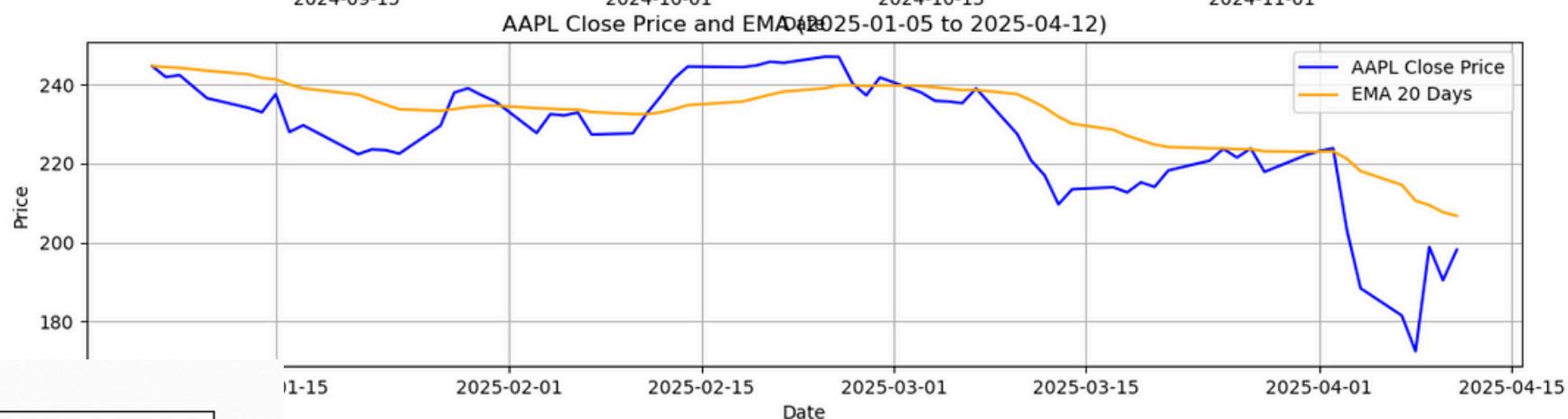
EMA = Exponential moving average



There is a sharp decrease in March and April, mainly due to fears of the tariffs introduced. Since China is a major power player and a key facility for Apple, the introduction of strict duties resulted in a dip in stock prices.

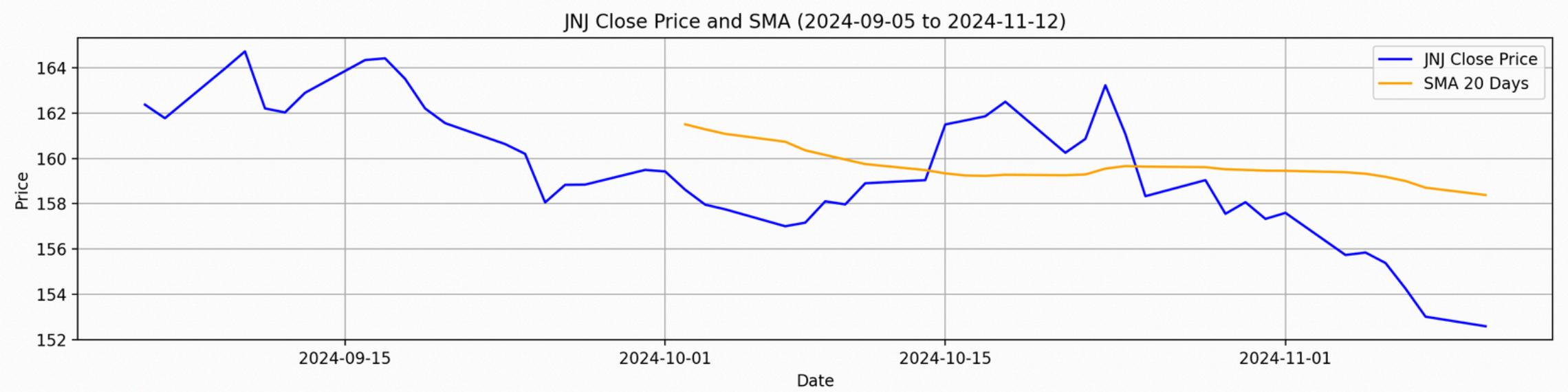
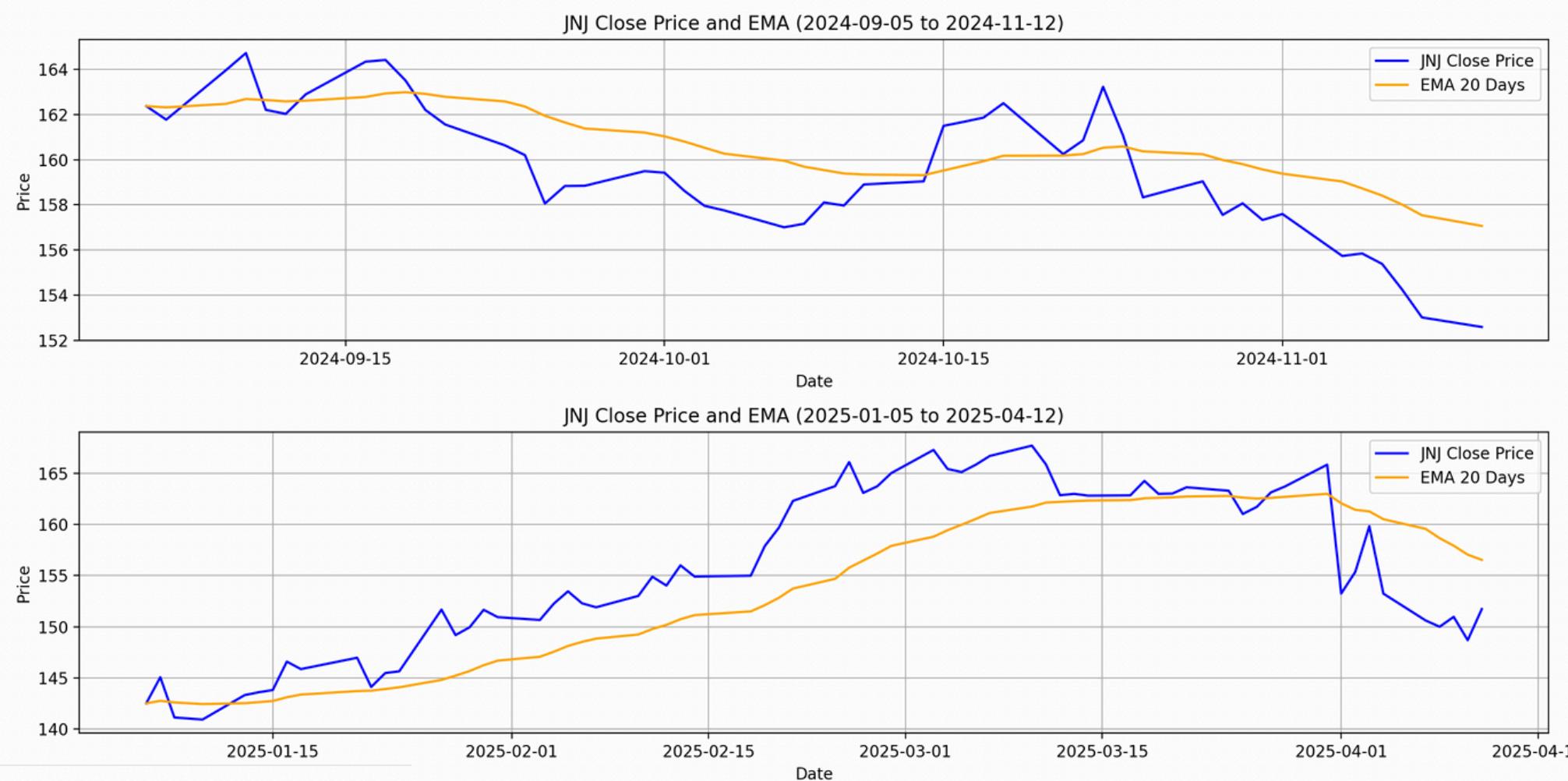
Technical Analysis: Technology Services

The peak in Jan/Feb is due to the term 'transition euphoria'. This marks an optimistic period after a new election. This is sort of like a 'testing period' before the policy changes take effect.



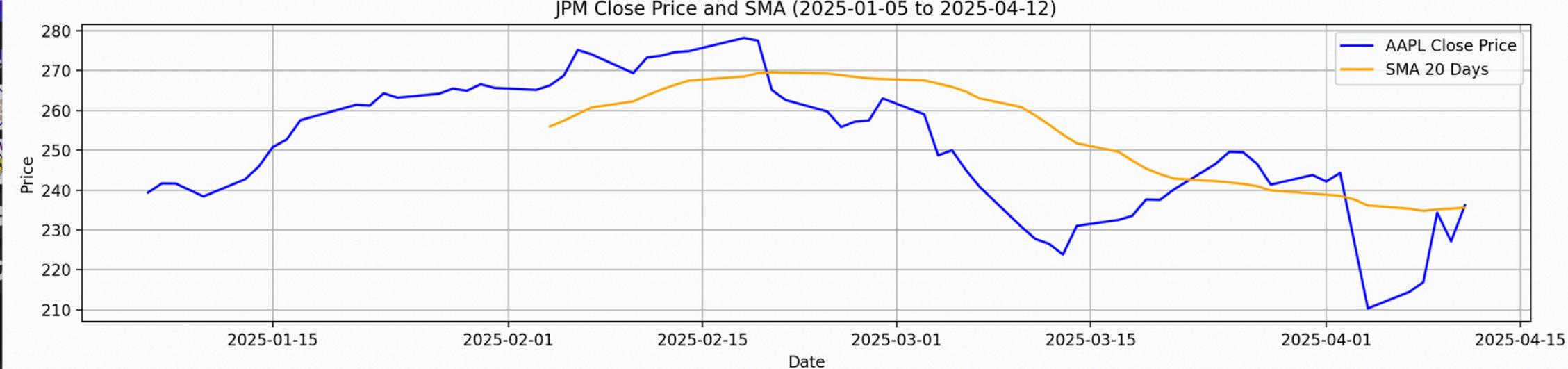
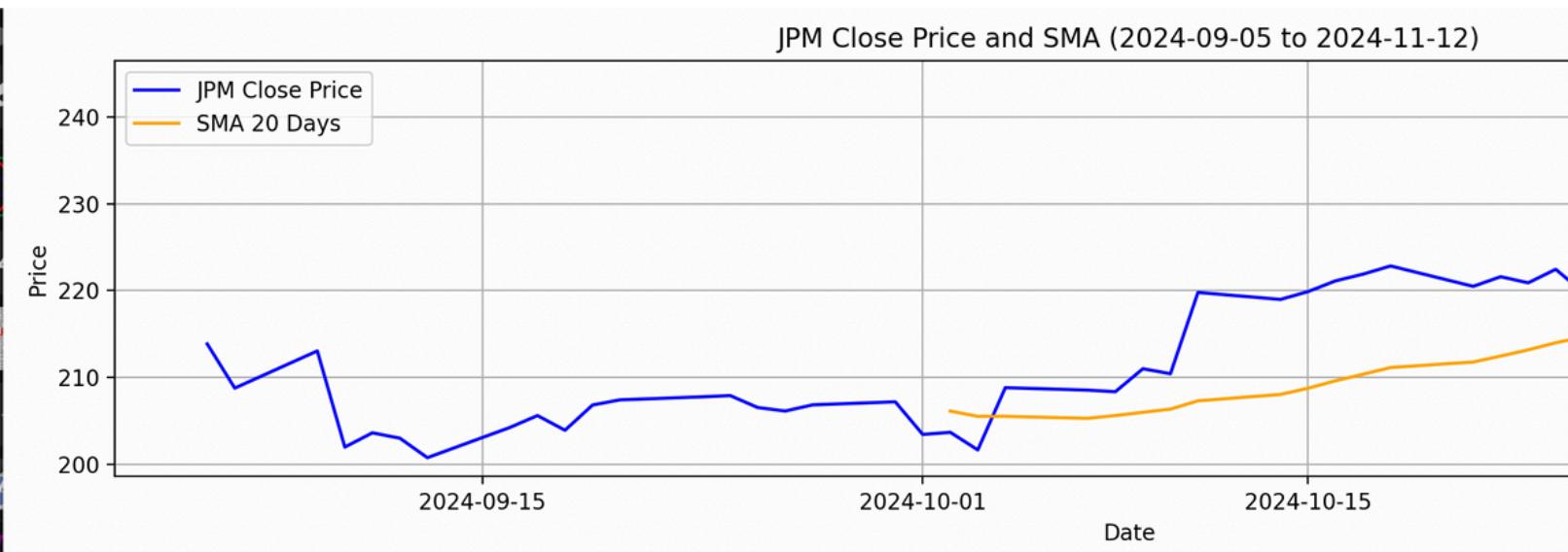
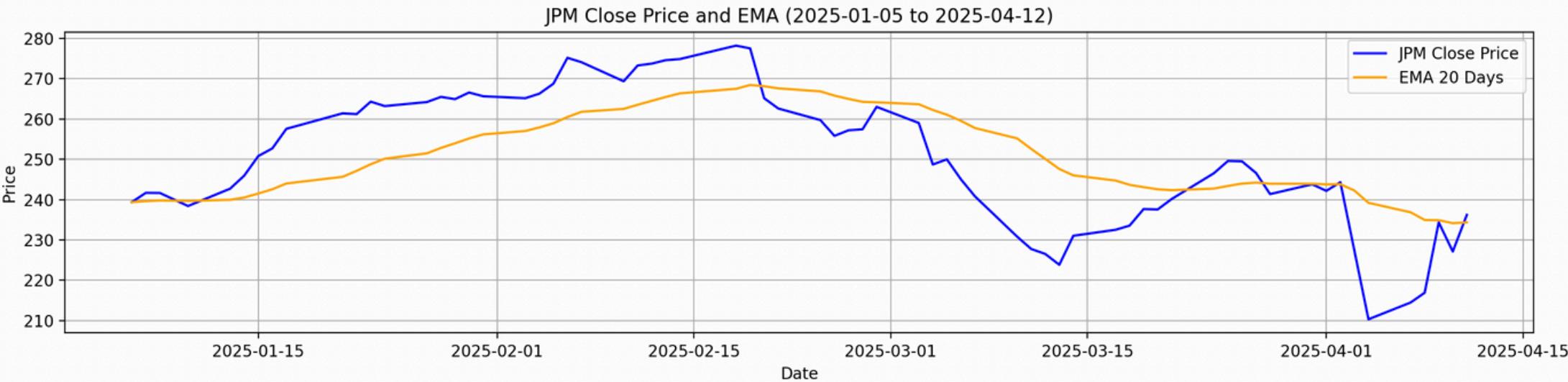
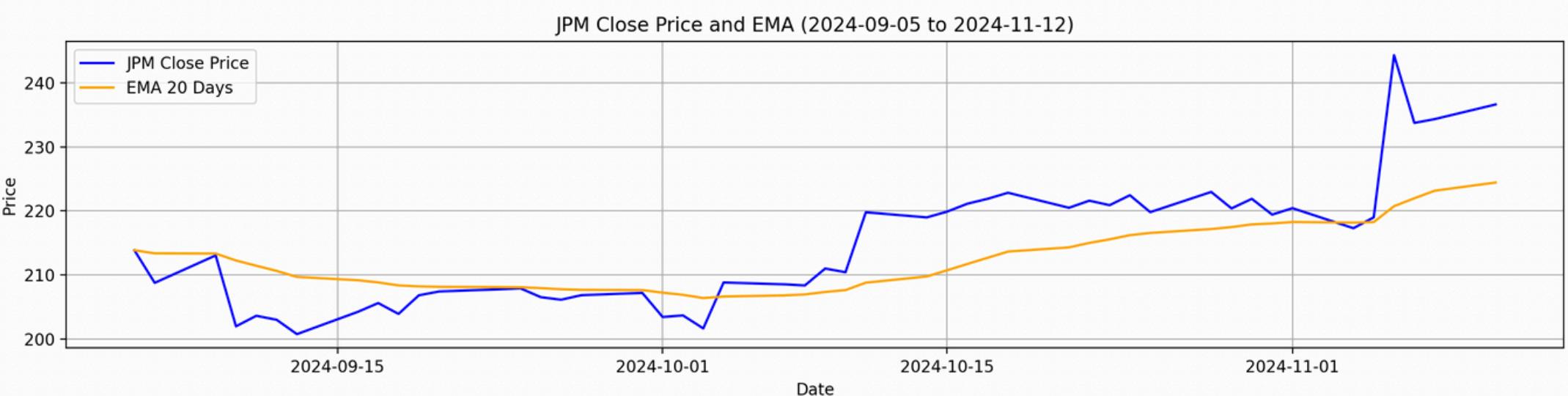
2025 - 04 - 02: Tariff announcement
2025 - 04 - 09: Tariff rollback

Technical Analysis: Healthcare

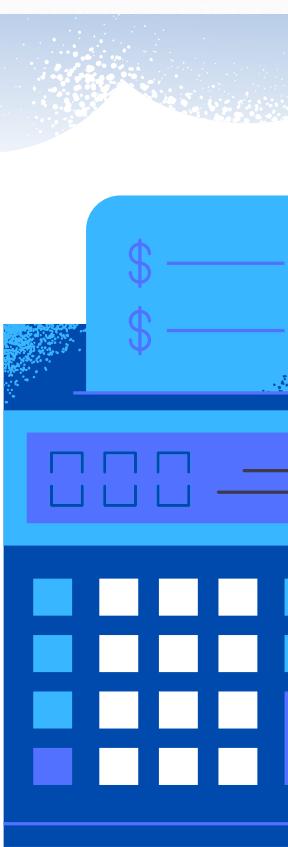


2025 - 04 - 02: Tariff announcement
2025 - 04 - 09: Tariff rollback

Technical Analysis: Financial Services



2025 - 04 - 02: Tariff announcement
2025 - 04 - 09: Tariff rollback



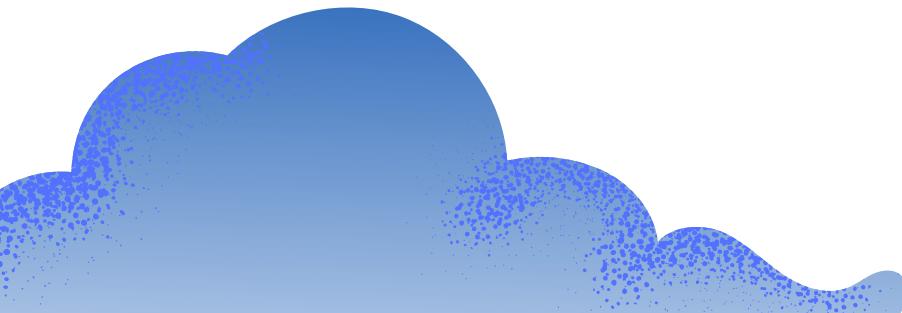
Difficulties



Could not get great data source on the financial statements of companies and still have to process the taxonomy label
(have to look for all financial labels associated with the company)

```
if label == 'Revenues' and comp == 'MICROSOFT CORP':  
    data = pd.DataFrame.from_dict(company_fact_requests.json()['facts']['us-gaap']['RevenueFromContractWithCustomerExcludingAssessedTax'])
```

Old method for extracting data from csv file
(much more complicated and make the data unreliable for computing ratios)



```
...  
Flatten the dictionary before converting it to pandas dataframe  
...  
  
def flatten_dict(self, nested_dict) -> {}: 2 usages new *  
    res = {}  
    # Flatten recursively through the dictionary to flatten it  
    if isinstance(nested_dict, dict):  
        for k in nested_dict:  
            flattened_dict = self.flatten_dict(nested_dict[k])  
            for key, val in flattened_dict.items():  
                key = list(key)  
                key.insert(0, k)  
                res[tuple(key)] = val  
    else:  
        res[()] = nested_dict  
    return res
```



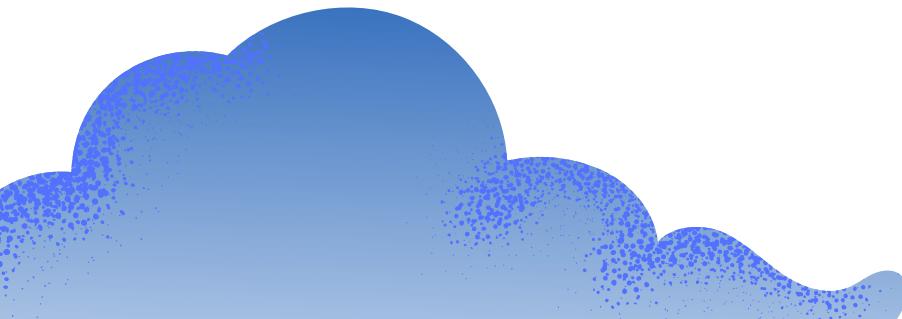
What's next



Adapt the code so that we can produce reproducible results for different companies over different period of time (probably use R for Time Series)

Fixing our graph through adjusting the data to account for the reporting period

Apply statistical models (Time Series) to the stock prices to determine whether the stock prices are dependent on time



THANK YOU

Apr 16th, 2025

