StockComparisonAnalysis

September 23, 2024

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'''
How do stock price trends for major companies (e.g., Johnson & Johnson, Hewlett␣
 ↪Packard Enterprise, Amazon, and Tesla)
vary across different time periods, and can we identify patterns of volatility␣
 ↪or stability that could inform investment strategies?

Practice in generating different kinds of plots, reading different kinds of␣
 ↪plots, drawing data froom yfinance.
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[1]:
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# Import necessary libraries
import yfinance as yf
import matplotlib.pyplot as plt

# Function to download and return stock data for a given ticker and date range
def get_stock_data(ticker, start_date, end_date):
    return yf.download(ticker, start_date, end_date)

# Function to create a plot for given stock data and plot attributes
def plot_stock_data(data, title, ylabel, xlabel, color, subplot_pos,␣
 ↪grid_style):
    plt.subplot(subplot_pos)
    plt.plot(data, color=color)
    plt.title(title)
    plt.ylabel(ylabel)
    plt.xlabel(xlabel)
    plt.grid(which="major", linestyle=grid_style, linewidth=0.5)

# Set common start and end dates
start_dates = ['2021-01-01', '2021-07-01', '2022-01-01', '2022-07-01']
end_dates = ['2021-06-30', '2021-12-30', '2022-06-30', '2022-12-30']

# Set stock ticker
ticker = 'JNJ'
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[2]:
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# Start figure for multiple subplots
plt.figure(1, figsize=(12, 12))
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plt.suptitle("Johnson & Johnson Stock Prices Across Various Periods")

# Loop through the date ranges and create subplots
for i in range(4):
    data = get_stock_data(ticker, start_dates[i], end_dates[i])
    plot_stock_data(data['Close'], f"{start_dates[i]} to {end_dates[i]}",
                    'Price', 'Month', 'purple', 221+i, ':' if i % 2 == 0 else␣
 ↪'--')

# Show all subplots
plt.show()
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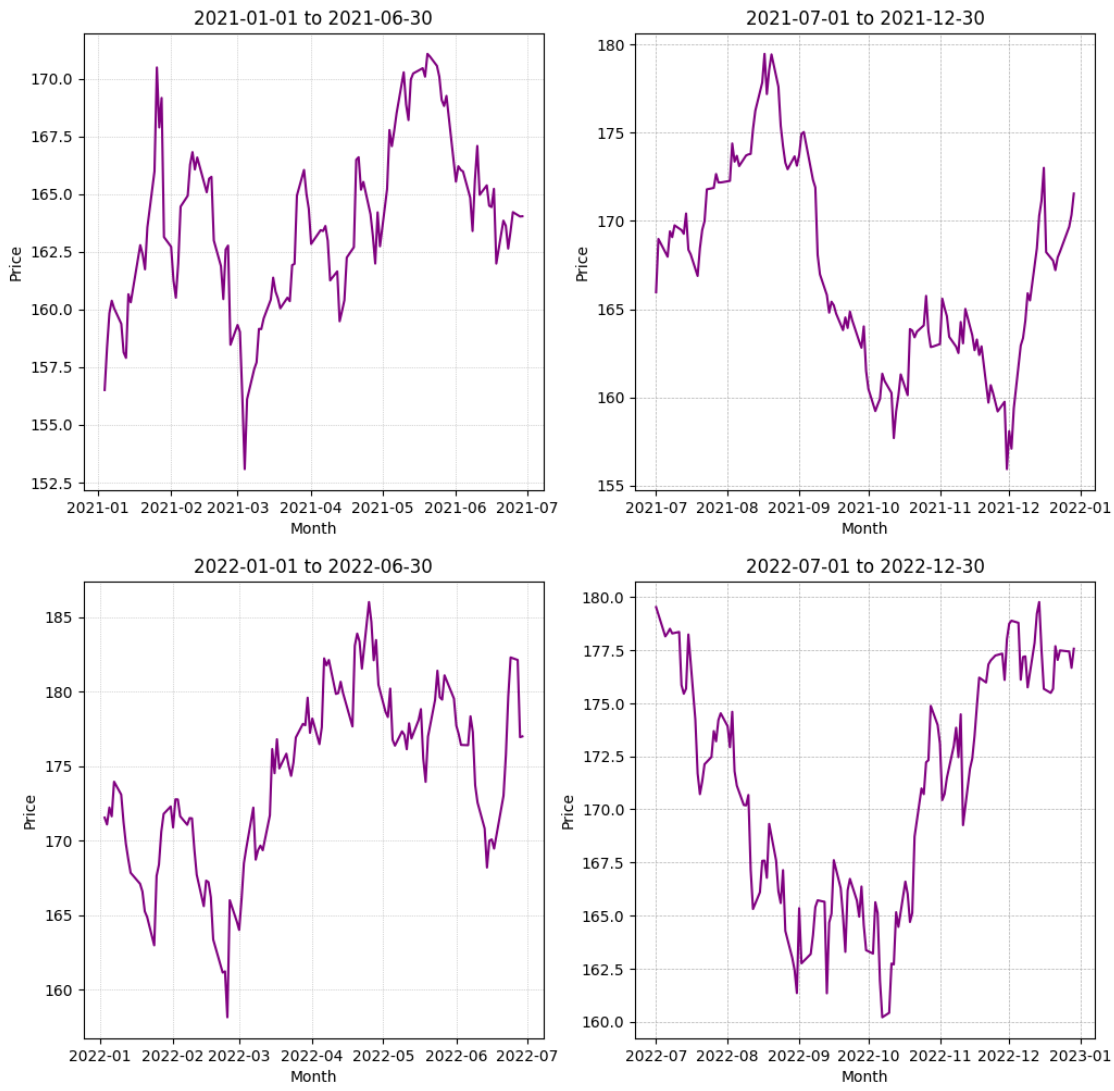

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Analysis:

1. First Period: January 1, 2021 - June 30, 2021
    - The stock opened around $155 and experienced significant fluctuations␣
 ↪during the first half of 2021.
    - A  peak occurred in February, where the price reached above $170,␣
 ↪followed by a gradual decline through March and April.
    - The stock recovered to a smaller peak in May before tapering off in June.
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2. Second Period: July 1, 2021 - December 30, 2021
    - The stock began this period around $170, reached a high point close to␣
 ↪$180 by September, but then declined steadily to around $160 in November.
    - By the end of December, the stock showed signs of recovery, reaching␣
 ↪close to $175.
    - This period was marked by a steep drop in prices in October and November.

3. Third Period: January 1, 2022 - June 30, 2022
    - During the first half of 2022, the stock price showed a steady upward␣
 ↪trend from about $160 in January to over $185 in March, which is the highest␣
 ↪price observed across all periods.
    - After peaking in March, the stock declined in April and May before␣
 ↪stabilizing around $175 in June.
    - This suggests higher volatility in early 2022 compared to the second half␣
 ↪of 2021.

4. Fourth Period: July 1, 2022 - December 30, 2022
    - This period starts around $170 and follows a sharp decline in August,␣
 ↪dropping to around $160.
    - After hitting this low, the stock price rebounds, climbing back above␣
 ↪$175 and showing an upward trend towards the end of December.
    - This recovery towards the end of 2022 suggests potential market␣
 ↪corrections or positive news affecting the stock.


Conclusion:

The stock price movements for Johnson & Johnson from 2021 to 2022 reflect␣
 ↪significant volatility, with clear periods of decline followed by recovery.
Investors may use this pattern to time their buy and sell decisions, especially␣
 ↪anticipating a possible mid-year decline followed by year-end recoveries.
Over the two-year period, Johnson & Johnson's stock price generally increased,␣
 ↪showing resilience in bouncing back after each downturn.
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[3]:
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# Set ticker for Hewlett Packard Enterprise
ticker = 'HPE'
start_date = '2021-12-01'
end_date = '2023-02-28'

# Fetch stock data
data = get_stock_data(ticker, start_date, end_date)

# Plot 4 price types: High, Low, Close, Adjusted Close
plt.figure(2, figsize=(30, 6))
plt.suptitle("Hewlett Packard Enterprise Stock Prices")
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# High Price Plot
plot_stock_data(data['High'], 'HPE High Price', 'Price', 'Month', 'purple',␣
 ↪141, ':')
# Low Price Plot
plot_stock_data(data['Low'], 'HPE Low Price', 'Price', 'Month', 'violet', 142,␣
 ↪'dotted')
# Close Price Plot
plot_stock_data(data['Close'], 'HPE Close Price', 'Price', 'Month', 'brown',␣
 ↪143, '--')
# Adjusted Close Price Plot
plot_stock_data(data['Adj Close'], 'HPE Adjusted Close Price', 'Price',␣
 ↪'Month', 'pink', 144, '-.')

# Show the combined plot
plt.subplots_adjust(wspace=0.3)
plt.show()
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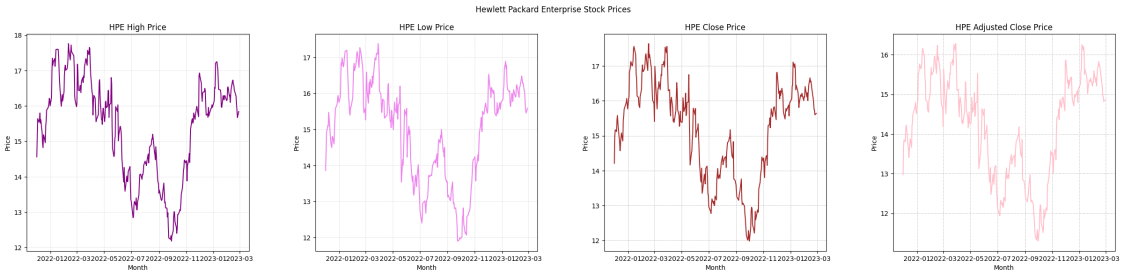

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'''
1. HPE High Price (First Plot):
    - The High Price shows the maximum trading price for each day.
    - In early 2022, the stock had several peaks above $17 but experienced a␣
 ↪significant dip to $12 by mid-2022.
    - After hitting a low, the stock price steadily recovered towards the end␣
 ↪of 2022, reaching close to $17 again
       before slightly declining in early 2023.
    - This indicates volatility in the stock price, with periods of sharp␣
 ↪increases and declines throughout 2022.

2. HPE Low Price (Second Plot):
    - The Low Price follows a similar pattern to the high price, with␣
 ↪fluctuations between $17 and $12.
    - The price fell below $13 in mid-2022, showing that the stock faced␣
 ↪significant downward pressure during that time.
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    - A steady recovery is observed from the mid-2022 low, rising to $16 by␣
 ↪early 2023.

3. HPE Close Price (Third Plot):
    - The Closing Price (the final price at which the stock was traded each␣
 ↪day) shows similar trends to the high and low prices.
    - After beginning 2022 with prices around $16-$17, the stock faced a steep␣
 ↪decline to below $13 around mid-2022, followed by a recovery.
    - By the end of 2022, the closing price climbed back to $16, but it␣
 ↪slightly declined in early 2023.

4. HPE Adjusted Close Price (Fourth Plot):
    - The Adjusted Close Price accounts for corporate actions such as dividends␣
 ↪and stock splits.
    - The adjusted close price largely mirrors the trends seen in the closing␣
 ↪price
    - The similarity between the closing and adjusted close prices suggests␣
 ↪that any corporate actions during this
       period had a minimal impact on the overall stock performance.

Conclusion:

The Hewlett Packard Enterprise stock price had significant volatility between␣
 ↪December 2021 and February 2023,
with a major dip in mid-2022 followed by a recovery towards the end of the year.
 ↪ Investors looking at HPE might
observe this pattern of recovery as an opportunity to invest during downturns.
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[4]:
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# Set tickers and date range for Amazon and Tesla
ticker1 = 'AMZN'
ticker2 = 'TSLA'
start_date = '2022-10-01'
end_date = '2023-08-30'

# Fetch stock data for Amazon and Tesla
data_amzn = get_stock_data(ticker1, start_date, end_date)
data_tsla = get_stock_data(ticker2, start_date, end_date)

# Create a 6-chart visualization
plt.figure(3, figsize=(35, 5))
plt.suptitle("Amazon and Tesla Stock Prices Comparison")

# Amazon High, Low, Close
plot_stock_data(data_amzn['High'], 'AMZN High Price', 'Price', 'Month',␣
 ↪'purple', 231, ':')
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plot_stock_data(data_amzn['Low'], 'AMZN Low Price', 'Price', 'Month', 'violet',␣
 ↪232, 'dotted')
plot_stock_data(data_amzn['Close'], 'AMZN Close Price', 'Price', 'Month',␣
 ↪'brown', 233, '--')

# Tesla High, Low, Close
plot_stock_data(data_tsla['High'], 'TSLA High Price', 'Price', 'Month',␣
 ↪'purple', 234, ':')
plot_stock_data(data_tsla['Low'], 'TSLA Low Price', 'Price', 'Month', 'violet',␣
 ↪235, 'dotted')
plot_stock_data(data_tsla['Close'], 'TSLA Close Price', 'Price', 'Month',␣
 ↪'brown', 236, '--')

# Show the combined plot
plt.subplots_adjust(wspace=0.2, hspace=0.7)
plt.show()
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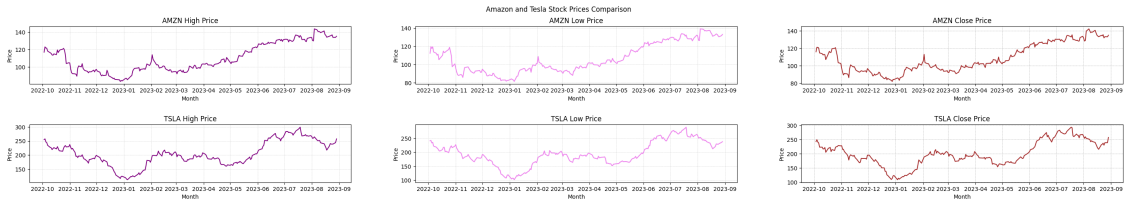

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Amazon (AMZN):

1. AMZN High Price (Top-Left):
    - In early October 2022, the High Price of Amazon was around $140, which␣
 ↪then dropped to below $100 by December 2022.
    - After this decline, the stock had a gradual recovery starting in early␣
 ↪2023, rising  to around $130 by mid-2023.
    - The high price then stabilized and remained in the $130-$140 range␣
 ↪through the end of August 2023.
2. AMZN Low Price (Top-Middle):
    - The Low Price follows a similar pattern, starting at around $130 in␣
 ↪October 2022 and going below $90 by the end of the year.
    - After this low in late 2022, the stock began recovering in early 2023 and␣
 ↪steadily rose to around $130 by the middle of 2023.
    - This  recovery indicates positive market sentiment and investor␣
 ↪confidence in Amazon's rebound throughout 2023.
3. AMZN Close Price (Top-Right):
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    - The Close Price shows similar trends to the high and low prices
    - After the decline, the stock price increased steadily throughout 2023
    - This reflects steady recovery after a sharp decline, with Amazon stock␣
 ↪showing resilience throughout 2023.

Tesla (TSLA):

1. TSLA High Price (Bottom-Left):
    - Tesla's High Price in October 2022 was around $300, but dropped to $150␣
 ↪by December 2022.
    - Around January 2023 and later, Tesla's stock began to recover, reaching␣
 ↪close to $275 by mid-2023.
    - The high price then declined slightly but remained above $250 in the␣
 ↪second half of 2023.
2. TSLA Low Price (Bottom-Middle):
    - The Low Price also dropped significantly in late 2022, from around $280␣
 ↪to $100 by December 2022.
    - Starting in early 2023, Tesla's stock recovered, with the low price␣
 ↪reaching $250 by mid-2023.
    - This indicates strong investor confidence in Tesla after the sharp␣
 ↪decline in 2022, with the stock price doubling
        within the span of a few months.
3. TSLA Close Price (Bottom-Right):
    - The Close Price of Tesla mirrored its high and low prices, dropping from␣
 ↪around $280 to below $150 by December 2022.
    - After this sharp decline, Tesla's closing price steadily increased␣
 ↪throughout 2023, reaching close to $275 by mid-year.
    - The closing price stabilized above $250

Conclusion:

Both Amazon and Tesla experienced significant stock price drops in late 2022,␣
 ↪followed by a steady recovery throughout
2023. Tesla's recovery was more pronounced, with its stock price nearly␣
 ↪doubling after the December 2022 lows.
Amazon's recovery was more gradual and consistent. The data suggest that while␣
 ↪both companies experienced
similar market pressures, their recovery trajectories differed in magnitude and␣
 ↪volatility. Investors could view
Amazon as a relatively stable long-term hold, while Tesla may present higher␣
 ↪risk but potentially greater returns
for short-term traders.

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