STAVROULA
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BANK OF AMERICA (BAC) STOCK PERFORMANCE ANALYSIS

2025

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Stock Performance Analysis of Bank of America (BAC)

Overview

This project analyses the historical stock performance of Bank of America (BAC) from 2020 to 2024. Using Python, Pandas, Matplotlib, Seaborn, and Power BI, I conducted a detailed analysis of BAC’s stock price movements, risk factors, and trading strategy performance. The goal was to extract insights into stock trends, implement and backtest a trading strategy, and compare BAC's performance against major competitors in the banking sector.

Objectives

- Evaluate BAC's historical price trends and trading volume.
- Implement and backtest a moving average crossover trading strategy.
- Assess stock volatility and risk through drawdowns and return analysis.
- Use ARIMA time-series forecasting to predict stock movements.
- Create interactive Power BI visualizations to enhance data storytelling.
- Compare BAC's performance with Goldman Sachs (GS), JPMorgan Chase (JPM), and Wells Fargo (WFC).

1. Data Collection & Preprocessing

Data Source

- Stock price data was obtained from Yahoo Finance (yFinance) for the period 2020 to 2024.
- Data included adjusted closing prices, high/low values, opening prices, and trading volume.

Steps Taken

1. Downloaded BAC stock data using the yfinance API.
2. Stored the dataset as a CSV file for analysis and Power BI integration.
3. Checked for missing values, data types, and inconsistencies.
4. Converted the Date column to datetime format and set it as the index.
5. Ensured the dataset was chronologically sorted for time-series analysis.

2. Exploratory Data Analysis (EDA)

To understand BAC's stock behaviour, I examined key financial indicators and market trends.

Adjusted Closing Price Trend

- Plotted BAC’s adjusted closing price over time to observe long-term trends.
- BAC’s stock price showed an overall upward trend from 2020 to 2024.
- Periods of high volatility were observed in 2020 and 2022, coinciding with broader market fluctuations.

Trading Volume Analysis

- Analysed BAC’s daily trading volume trends.
- The highest trading activity was recorded in 2020, likely due to market uncertainty during the pandemic.
- Trading volume declined post-2022, indicating reduced investor activity.

3. Technical Indicators & Strategy Development

To develop a systematic trading approach, I implemented moving averages, Bollinger Bands, and RSI.

Moving Averages (MA10 & MA50)

- Computed a 10-day (MA10) and 50-day (MA50) moving average.
- Trading rule:
    - Buy when MA10 crosses above MA50 (bullish signal).
    - Sell when MA10 crosses below MA50 (bearish signal).

Bollinger Bands

- Constructed a 20-day moving average with upper and lower bands.
- Used to identify overbought (> upper band) and oversold (< lower band) conditions.

Relative Strength Index (RSI)

- Calculated RSI to measure stock momentum.
- RSI > 70 suggests an overbought market.
- RSI < 30 suggests an oversold market.

4. Backtesting the Trading Strategy

To evaluate the effectiveness of the moving average crossover strategy, I simulated a trading strategy using historical BAC data.

Backtesting Approach

- Bought 1 share when MA10 > MA50.
- Sold the share when MA10 < MA50.
- Recorded daily profit and cumulative wealth to assess strategy performance.

Strategy Performance

- Cumulative wealth analysis showed early losses in 2020-2021, likely due to volatile market conditions.
- Gradual recovery from 2021-2023, aligning with broader stock market gains.
- Fluctuations in 2024, indicating sensitivity to market conditions.

Risk & Performance Metrics

- Sharpe Ratio: 0.0266, indicating low risk-adjusted returns.
- Maximum Drawdown: -2.21, reflecting significant portfolio declines.
- Volatility: 2.14%, suggesting moderate daily price fluctuations.

5. Stock Price Forecasting with ARIMA

To project BAC's future stock prices, I implemented an AutoRegressive Integrated Moving Average (ARIMA) model.

Forecasting Results

- Predicted 30-day stock prices using ARIMA.
- The model suggested stable prices with no major upward or downward trends.
- Forecasting performance indicated that BAC's price movements were relatively stable, with minimal short-term fluctuations.

6. Comparison with Other Bank Stocks

To contextualize BAC's performance, I analysed Goldman Sachs (GS), JPMorgan Chase (JPM), and Wells Fargo (WFC) alongside BAC.

Stock Price Trends

- Goldman Sachs (GS) had the highest overall price growth, exceeding $600 by 2024.
- JPM and WFC exhibited similar trends to BAC, but with lower long-term growth.
- BAC remained relatively stable compared to GS, indicating a lower-risk investment.

Cumulative Wealth Comparison

- GS outperformed all stocks in cumulative wealth calculations.
- BAC had steady but slower growth, reflecting a moderate investment approach.
- JPM and WFC followed similar trends but with slightly higher volatility.

Trading Volume Comparison

- WFC had the highest trading volume, indicating higher market participation.
- GS had the lowest trading volume, reflecting its premium stock nature.
- BAC maintained consistent trading volumes, suggesting stable investor confidence.

Drawdown Analysis

- 2020 saw the highest drawdowns across all stocks due to market downturns.
- BAC and WFC had the most significant losses, while JPM remained relatively resilient.
- GS exhibited the lowest drawdowns, indicating strong price support.

Risk & Return Analysis

- GS had the highest return potential, but with increased risk.
- BAC provided balanced returns with moderate risk.
- JPM and WFC were more volatile, presenting higher investment risks.

7. Power BI Dashboard

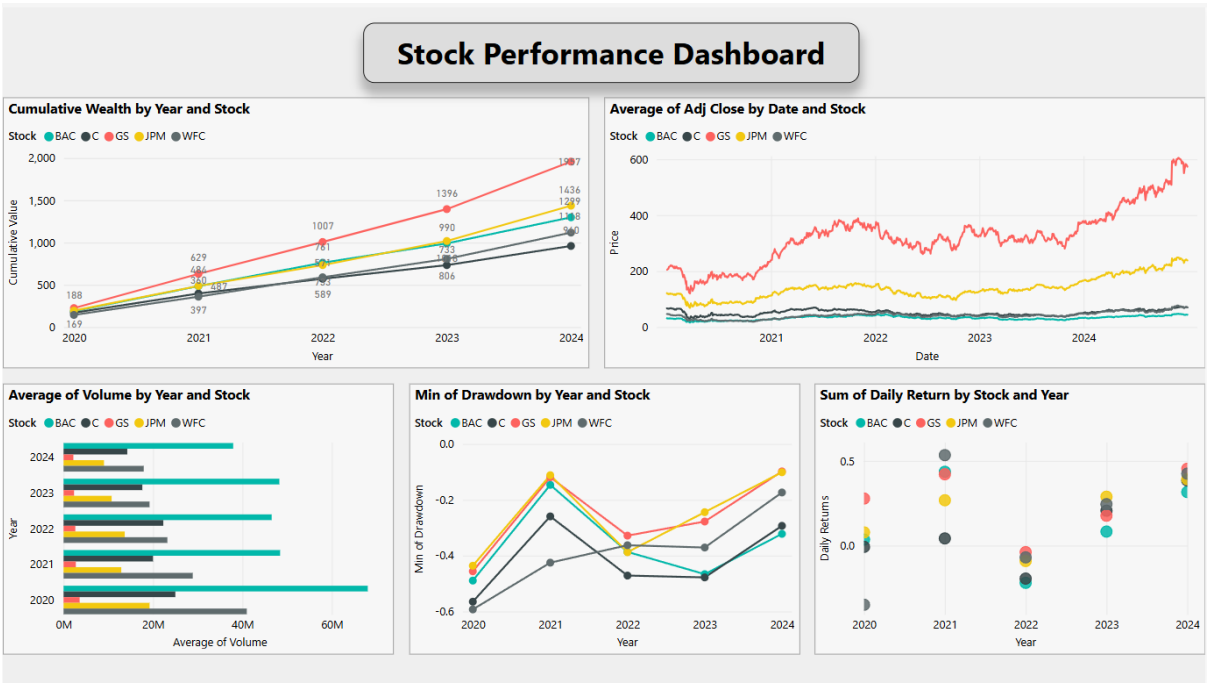
To enhance financial storytelling, I developed an interactive Power BI dashboard, presenting key insights:

- Cumulative Wealth Analysis: Tracks stock performance trends.

- Stock Price Movements: Visualizes adjusted closing prices.
- Trading Volume Trends: Highlights market activity.
- Drawdown Analysis: Identifies risk factors.
- Return Analysis: Evaluates overall profitability.

Dashboard Insights

- BAC's long-term stability makes it suitable for conservative investors.
- GS showed the highest growth, ideal for growth-focused portfolios.
- JPM and WFC displayed higher fluctuations, making them riskier investments.



Conclusion

This analysis showcases a comprehensive approach to stock performance evaluation, integrating:

- Python for data processing, technical indicators, and backtesting.
- Power BI for interactive visualizations.

- Statistical modelling (ARIMA) for forecasting.
- Comparison with peer banks for a holistic view.

BAC’s stock demonstrated moderate growth, stability, and lower risk compared to GS, JPM, and WFC, making it a viable long-term investment option.