



Portfolio Strategy Report

Strategy, Analysis, and Forecasting

By:
Ludmila Aboud

For:
David E. French

Course: Advanced Investment Strategies
Institution: University of California, Los Angeles (UCLA)
Date: April 16, 2025

Contents

1	Model & Strategy	3
1.1	MAST Model Overview	3
1.2	Market Conditions and Geopolitical Context	3
1.3	Market Sector Selected	3
1.3.1	Technology Sector	3
1.3.2	Commodities	3
1.3.3	Currencies	3
1.3.4	Bonds	4
1.3.5	Why the Majority of Assets Are US-Based	4
1.4	Strategic Rationale and Support	4
2	Data Analysis: Asset Performance	4
2.1	How I Analyzed Each Asset	4
2.2	Asset Performance: Analysis of Each Asset	5
2.2.1	Palo Alto Networks (PANW)	5
2.2.2	Crowd Strike (CRWD)	7
2.2.3	Nvidia (NVDA)	9
2.2.4	Lockheed Martin (LMT)	9
2.2.5	Palantir (PLTR)	9
2.2.6	EUR/USD Futures (EURUSD=X)	10
2.2.7	Swiss Franc (CHF=X)	10
2.2.8	Platinum (PL=F)	10
2.2.9	US Treasury Bond (5 years) (FVX)	10
2.3	Conclusion	11
3	Allocation and Optimization	12
3.1	Portfolio Allocation Strategy	12
3.2	Optimization Approach	12
3.3	Optimal Portfolio Weights and Expected Performance	14
3.4	Visualization of the Optimal Asset Allocation	14
3.5	Conclusion of Allocation and Optimization Strategy	15
4	Monte Carlo Simulation	15
4.1	Overview of Monte Carlo Simulation	15
4.2	Results of the Simulation	16
4.3	Portfolio Value Forecast Visualization	17
4.4	Conclusion of Monte Carlo Simulation	17
5	Conclusion of the Portfolio Evaluation	17

Abstract

This report is a deep dive into my investment portfolio strategy, shaped by the current twists and turns of the economic, financial, and geopolitical world. The portfolio is a carefully crafted mix of equities, commodities, currencies, and bonds, because why settle for just one asset class when you can have the whole buffet, right?

Using the Modern Asset Selection Theory (MAST) model, I've worked to balance maximizing returns with minimizing risk. It's all about finding that sweet spot between getting rich and sleeping at night without worrying about sudden market crashes. With \$10,000,000 allocated to a mix of assets, my strategy carefully considers each asset's risk-return profile, because who wants to gamble with their future?

To predict how my portfolio might behave, I've run Monte Carlo simulations, generating a wide range of possible future outcomes, think of it like predicting the weather, but for my investments. I've calculated expected returns and volatility for both annual and 60-day periods, because, let's face it, a year is a long time to wait for results.

Of course, I didn't just pick these assets out of thin air. I've carefully considered key economic events, from the Federal Reserve's ever-moving interest rates to global trade tariffs (thanks, Trump), to guide my asset allocation decisions. Finally, I'll evaluate whether my portfolio is doing what I expect and adjust it if it's misbehaving. After all, just like in life, not everything always goes according to plan, but that's why I have a strategy in the first place!

1 Model & Strategy

This section outlines the portfolio's structure and the underlying reasoning behind the asset selection. The portfolio is designed using the principles of the Modern Asset Selection Theory (MAST), a model that optimizes risk and return through diversification across multiple asset classes. The MAST model has been carefully applied to reflect my understanding of the current economic, financial, and geopolitical conditions as of March/April 2025.

1.1 MAST Model Overview

The Modern Asset Selection Theory (MAST) emphasizes maximizing returns while minimizing risk through diversification across a wide range of asset classes. The theory acknowledges that investors must balance the desire for high returns with the potential for high risk, ensuring that no single asset class dominates the portfolio. By selecting equities, commodities, currencies, and bonds, the model aims to leverage growth potential in volatile markets while stabilizing risk with safer assets.

1.2 Market Conditions and Geopolitical Context

In March/April 2025, the global economic and geopolitical landscape is influenced by several key factors:

- The Federal Reserve's interest rate policy has continued to tighten, with the central bank increasing rates to curb inflation. This has caused increased volatility in equity markets, particularly in sectors like technology. [1]
- US-China trade relations remain a central concern, with tariffs continuing to affect global supply chains. The technology sector is particularly impacted, as trade policies influence the global flow of semiconductors, defense systems, and tech services. [2]
- Geopolitical tensions in Europe and the Middle East, especially surrounding energy resources, have contributed to rising commodity prices, creating opportunities in safe-haven assets like precious metals (e.g., Platinum) and safe-haven currencies like the Swiss Franc.
- Additionally, cybersecurity threats are on the rise, as attacks on major corporations and governments become more sophisticated. This is especially relevant to cybersecurity companies like Palo Alto Networks and Crowd Strike. [3]

These factors play a significant role in the decision-making process, particularly in determining the asset classes to include in the portfolio and how to allocate capital in response to these trends.

1.3 Market Sector Selected

The portfolio is heavily weighted in the technology sector, with a particular focus on cybersecurity and defense, alongside a strategic investment in commodities and currencies. Let's break down the rationale behind each asset class selection:

1.3.1 Technology Sector

The technology sector, and more specifically cybersecurity and defense, was chosen due to the following reasons:

- Cybersecurity: As cyber threats escalate globally, companies like Palo Alto Networks (PANW) and Crowd Strike (CRWD) are positioned to see strong demand for their services. Governments and businesses alike are increasing spending on digital defenses, making this sector a high-growth area.
- Defense: The defense industry is benefitting from increased global military spending, particularly in Europe and the US. Companies like Lockheed Martin (LMT), which provide military technologies, are well-positioned to capitalize on growing defense budgets. As geopolitical tensions increase, the demand for defense contracts is expected to rise. [4]

1.3.2 Commodities

I have chosen Platinum as a commodity investment, with the rationale as follows:

- Platinum serves as a hedge against inflation and is also used in hydrogen fuel cell technology—a growing alternative energy market. The economic uncertainty surrounding global energy resources, especially with ongoing geopolitical tensions, has made Platinum an attractive asset.

1.3.3 Currencies

The currency market plays a significant role in my strategy:

- EUR/USD Futures: The decision to include EUR/USD futures is based on my view that the US Dollar may face downward pressure due to rising interest rates and the changing global trade landscape. With the European Union implementing more trade-friendly policies and economic recovery, the Euro is expected to strengthen relative to the US Dollar in the medium term.

- **Swiss Franc (CHF):** The Swiss Franc is included for its safe-haven status. During times of geopolitical instability (e.g., in Europe), investors flock to CHF as a store of value. This makes it an ideal risk-off asset to stabilize the portfolio during market turmoil.

1.3.4 Bonds

I have included US Treasury Bonds (FVX) for the following reasons:

- US Treasury Bonds (5 years) offer stability and relatively low risk. With interest rates rising, bond prices are under pressure, but Treasury Bonds still provide an essential hedge against high-risk assets. This allocation balances the higher-risk equities in the portfolio by offering a more secure return.

1.3.5 Why the Majority of Assets Are US-Based

A significant portion of the assets in the portfolio is US-based, reflecting the current US market dominance. The rationale behind this is:

- The US stock market, particularly the technology sector, has been one of the strongest performers globally, driven by innovation, particularly in cybersecurity and AI. This provides a strong foundation for growth.
- The US Dollar remains the world's reserve currency, and while trade relations have fluctuated, the USD continues to be a key player in the global economy, driving demand for USD-based assets.
- US Treasuries are considered one of the safest investments globally, and their inclusion ensures the portfolio's stability amidst market fluctuations.

1.4 Strategic Rationale and Support

The strategic allocation was made after considering multiple economic events that have shaped market conditions in March/April 2025. These include:

- **Monetary policy:** Rising interest rates by the Federal Reserve have made traditional growth assets less attractive. The portfolio includes a mix of growth-focused assets (technology) alongside more stable, low-risk assets like US Treasuries and currencies.
- **Geopolitical tensions:** With increased global uncertainty, especially in Europe and the Middle East, safe-haven assets like the Swiss Franc and Platinum serve as vital stabilizers in the portfolio.
- **Inflation concerns:** The inclusion of Platinum serves as a hedge against rising inflation and market instability. Commodities are traditionally strong performers in such environments.

This portfolio aims to capitalize on the growth of the technology sector while protecting against market volatility with currencies and bonds. The allocation reflects a dynamic response to current economic challenges, with flexibility to adjust based on future developments in the financial landscape.

2 Data Analysis: Asset Performance

This section outlines how I analyzed each asset in my portfolio. For each asset, I calculated monthly and annual returns, as well as monthly and annual volatility using historical price data. I used Python, specifically the `pandas` library, to fetch and process the data, calculate the necessary metrics, and generate the required visualizations.

2.1 How I Analyzed Each Asset

To calculate the monthly and annual returns, as well as volatility, I followed these steps:

- **Data Retrieval:** I used the Yahoo Finance API (via `requests`) to fetch daily closing prices for each asset over the specified time period.
- **Price Series:** I created a price series from the retrieved data and computed the daily percentage change (returns) for each asset.
- **Monthly Returns and Volatility:** Using `resample("ME")`, I aggregated the daily returns into monthly returns. The monthly volatility was calculated as the standard deviation of the daily returns over each month.
- **Annual Returns and Volatility:** For annual metrics, I calculated the overall return over the full year by comparing the first and last closing prices. The annual volatility was computed by annualizing the standard deviation of daily returns.

For example, here's a snippet of the Python code I used to retrieve the data for Crowd Strike (CRWD) and calculate its returns and volatility:

```
1 import requests
2 import pandas as pd
3 import matplotlib.pyplot as plt
4
5 # Date range for data
6 start_date = "2024-01-01"
7 end_date = "2024-12-31"
8 start_timestamp = int(pd.Timestamp(start_date).timestamp())
9 end_timestamp = int(pd.Timestamp(end_date).timestamp())
10
11 CRWD_ticker = "CRWD"
12
13 def fetch_data(ticker, start_timestamp, end_timestamp):
14     url = f"https://query2.finance.yahoo.com/v8/finance/chart/{ticker}?period1={
15         start_timestamp}&period2={end_timestamp}&interval=1d"
16     response = requests.get(url, headers={"User-Agent": "Mozilla/5.0"})
17     data = response.json()
18
19     timestamps = data["chart"]["result"][0]["timestamp"]
20     prices = data["chart"]["result"][0]["indicators"]["quote"][0]["close"]
21     dates = pd.to_datetime(timestamps, unit="s")
22     price_series = pd.Series(prices, index=dates)
23
24     return price_series
25
26 # Fetch data
27 CRWD_prices = fetch_data(CRWD_ticker, start_timestamp, end_timestamp)
28 ...
```

Listing 1: Crowd Strike Stock Analysis Using Python

Once the data is retrieved, I calculated the following metrics for each asset:

- Daily Returns: Percentage change from one day to the next.
- Monthly Returns: The compounded monthly return was calculated using the daily returns.
- Monthly Volatility: The standard deviation of monthly returns.
- Annual Return: The percentage change from the first to the last day of the year.
- Annual Volatility: The standard deviation of daily returns annualized by multiplying by $\sqrt{252}$ (252 trading days).

2.2 Asset Performance: Analysis of Each Asset

For each asset, I've included the monthly return graph, the volatility graph, and the closing price chart for 2024. Below, I'll explain why I selected each asset for the portfolio and provide insights based on the performance of these assets.

2.2.1 Palo Alto Networks (PANW)

Palo Alto Networks (PANW) was selected due to its leading position in the cybersecurity market. As digital threats increase globally, the demand for cybersecurity solutions is expected to grow, making Palo Alto Networks a crucial asset in my portfolio. The company is forecasted to report an EPS (Earning Per Share) of \$0.77, showcasing a 16.67% upward movement from the corresponding quarter of the prior year. For the full year, the Zacks Consensus Estimates are projecting earnings of \$3.22 per share and revenue of \$9.17 billion, which would represent changes of +13.38% and +14.2%, respectively, from the prior year. [5]

- Annual Return: 27.51%
- Annual Volatility: 43.65%

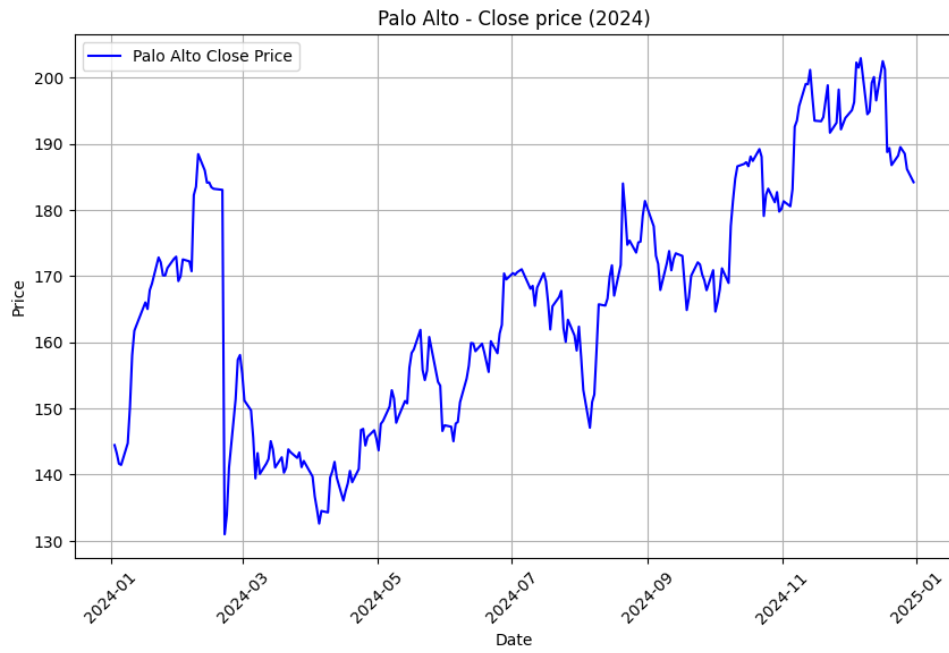


Figure 1: Palo Alto Networks - Closing Price (2024)

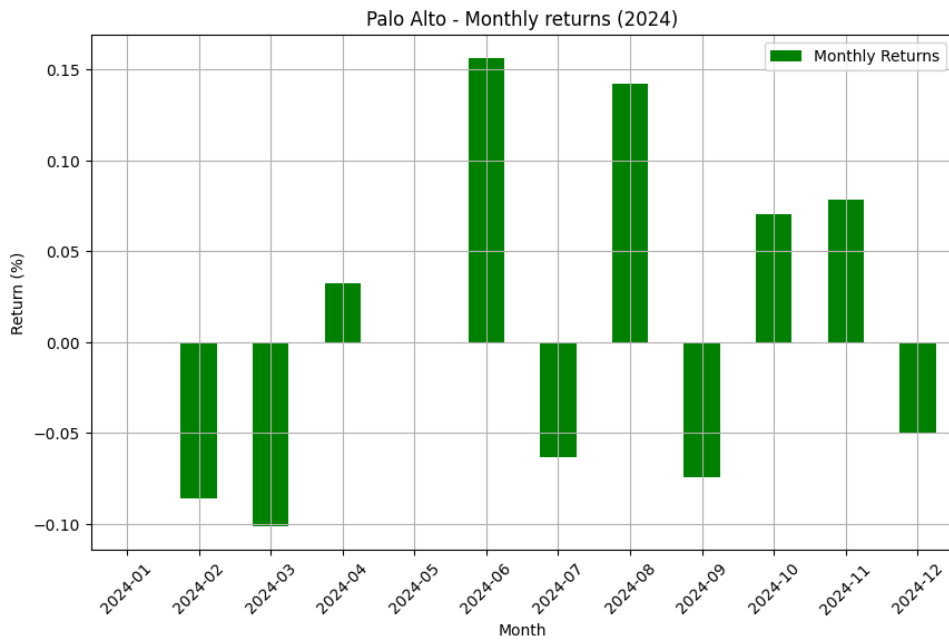


Figure 2: Palo Alto Networks - Monthly Returns (2024)

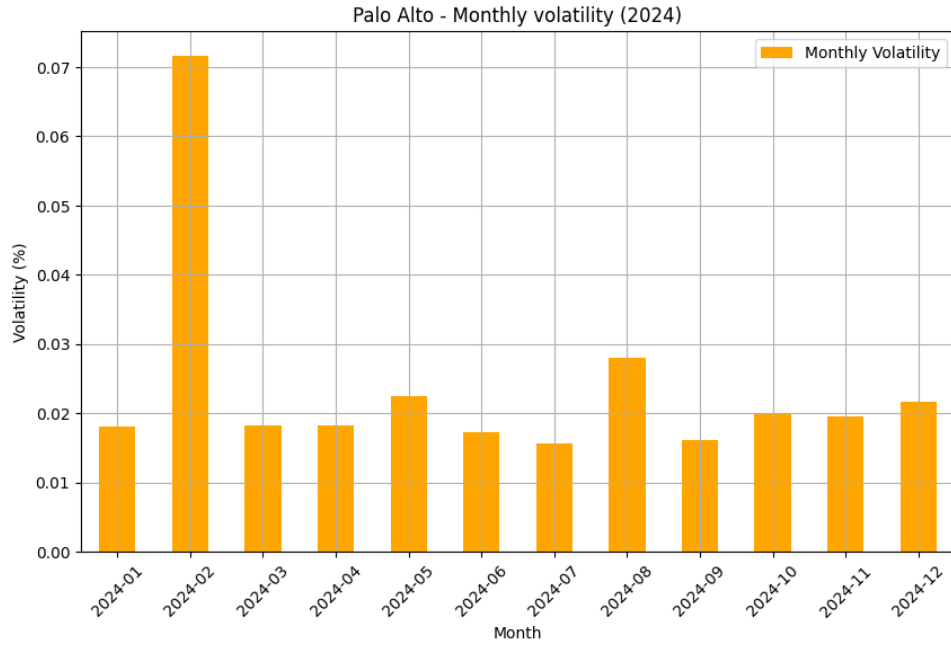


Figure 3: Palo Alto Networks - Monthly Volatility (2024)

2.2.2 Crowd Strike (CRWD)

Crowd Strike (CRWD) is another leader in cybersecurity. The company's cloud-native security platform has seen increasing demand, particularly as enterprises continue to migrate to the cloud. The company's strong growth is expected to continue. However, it is worth noting that CrowdStrike was involved in a significant IT failure in July 2024, which led to a global IT meltdown affecting companies like Microsoft. Despite this setback, the company's role in global cybersecurity has remained strong, as it was later revealed that CrowdStrike's involvement in the incident was due to external vulnerabilities, not its software. This event underscored the vulnerabilities that even the most advanced security platforms face in a highly interconnected global IT environment, yet it also highlighted the growing reliance on cybersecurity companies like CrowdStrike to mitigate such risks in the future. [6]

The increasing frequency and sophistication of cyber threats, paired with the growing reliance on cloud services, positions Crowd Strike to continue benefiting from the rise in demand for advanced security solutions.

- Annual Return: 41.48%
- Annual Volatility: 47.20%

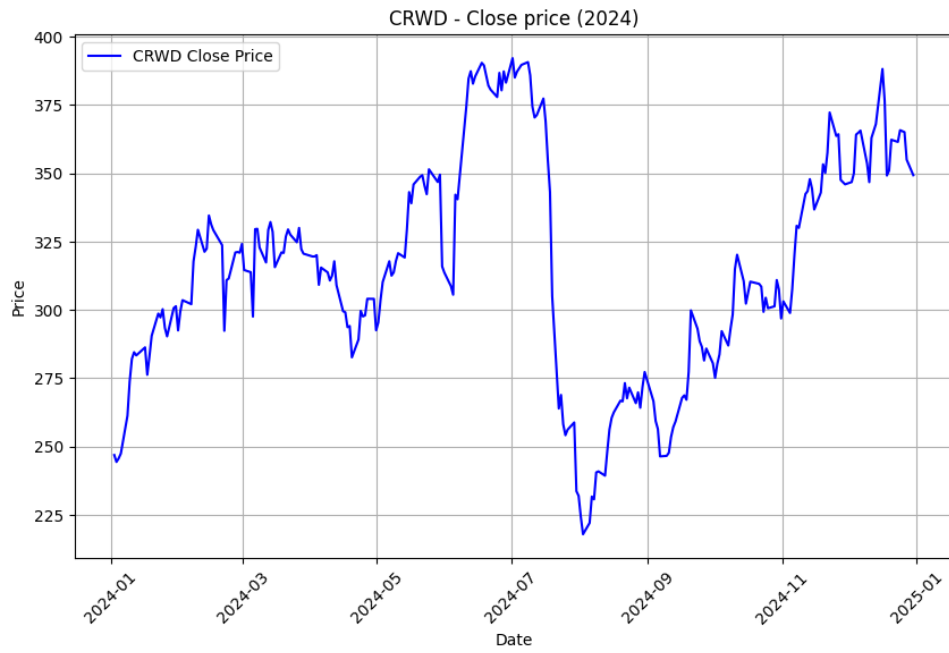


Figure 4: Crowd Strike - Closing Price (2024)

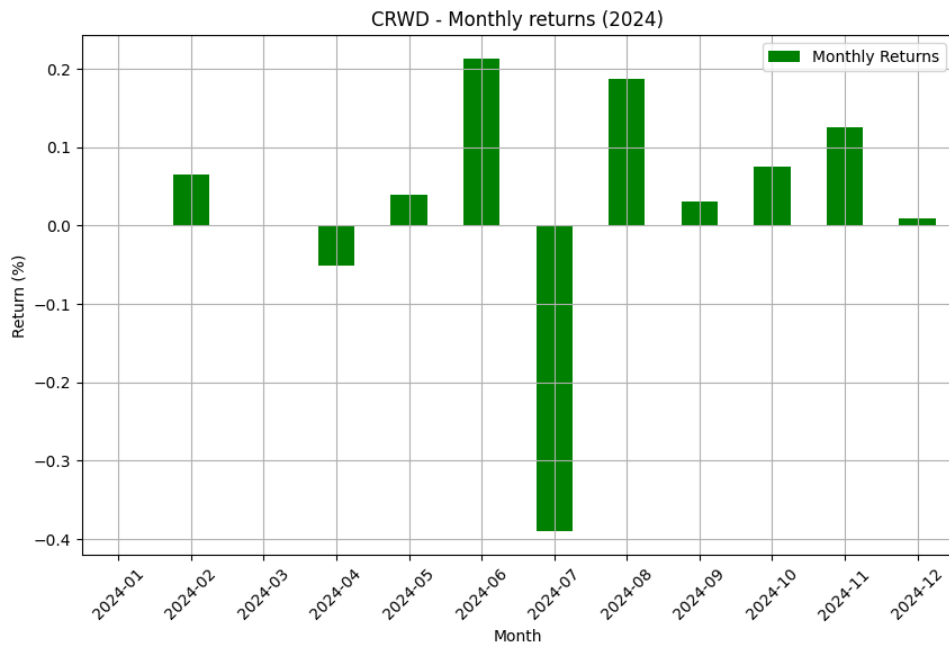


Figure 5: Crowd Strike - Monthly Returns (2024)

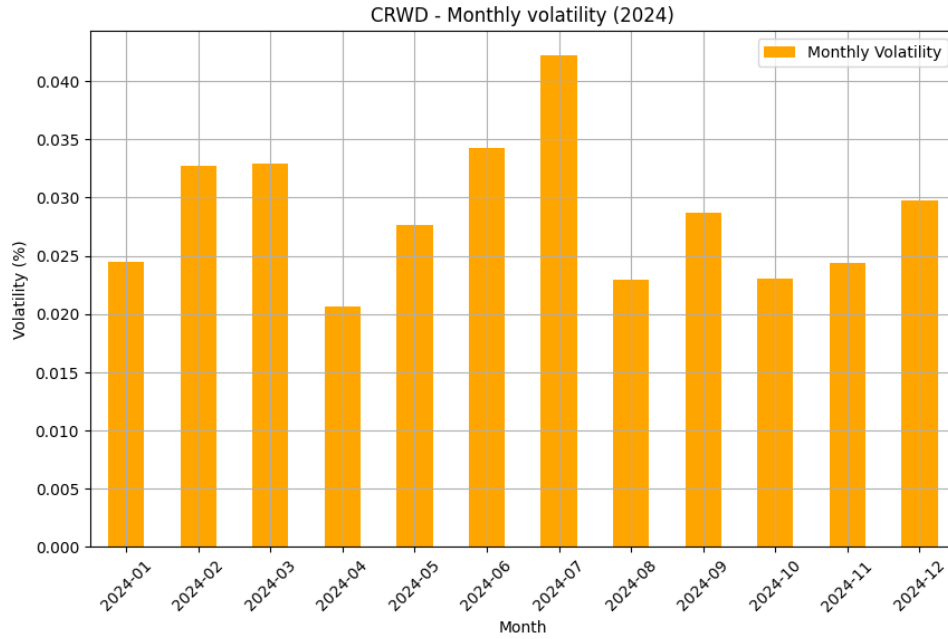


Figure 6: Crowd Strike - Monthly Volatility (2024)

2.2.3 Nvidia (NVDA)

Nvidia (NVDA) is a leader in graphics processing units (GPUs), essential for industries like gaming, AI, and data centers. As the world continues to invest in artificial intelligence, Nvidia is expected to benefit from the increased demand for processing power. However, Nvidia faced a significant setback on January 27, 2025, when the company was involved in a crash related to its collaboration with DeepSeek, an AI platform. The incident caused a brief but sharp drop in Nvidia's stock price, as it raised concerns about the stability of some AI partnerships. In addition, Nvidia's stock faced a significant decline following the announcement of US tariffs on Chinese tech products. As China retaliated, there was a temporary downturn in Nvidia's stock price, reflecting market concerns about the US-China trade war.

Despite this, in early April 2025, President Trump paused tariffs on tech products for 90 days, offering a temporary relief to companies like Nvidia. As a result, Nvidia's stock began to recover, as investors regained confidence in the company's long-term growth prospects within the AI and semiconductor markets.

- Annual Return: 185.44%
- Annual Volatility: 52.54%

2.2.4 Lockheed Martin (LMT)

Lockheed Martin (LMT) was selected for its stability and strong position in the defense sector. As geopolitical tensions rise, defense spending is expected to increase, benefiting companies like Lockheed Martin that are heavily involved in government contracts. In recent months, the Trump administration has indicated massive increases in defense spending. In April 2025, it was announced that President Trump proposed a \$1 trillion defense budget for the upcoming year. This budget would represent a nearly 12% increase in defense spending and underscores the government's ongoing commitment to enhancing military capabilities. As the US government looks to strengthen its military, companies like Lockheed Martin, which supply advanced defense systems, are well-positioned to benefit. [7]

Despite President Trump's often divisive rhetoric, his actions have led to an increase in military budgets, which directly impacts Lockheed Martin's growth. This focus on defense spending, alongside global geopolitical instability, ensures strong future demand for defense contractors like Lockheed Martin.

- Annual Return: 5.97%
- Annual Volatility: 17.12%

2.2.5 Palantir (PLTR)

Palantir Technologies (PLTR) has made a name for itself as a leader in big data analytics and artificial intelligence solutions, primarily for government and large corporations. With its growing importance in sectors like defense, intelligence, and healthcare, Palantir is poised for continued growth. Palantir stock

rose 4.6% on Monday, April 14 after NATO announced it had finalized the acquisition of an AI military system from the Denver-based defense tech firm. [8]

In 2025, the company's role in AI-driven data analysis has become even more prominent, especially with governments and multinationals [9] seeking better surveillance tools and predictive analytics to combat cyber threats and enhance national security. The company's stock saw a massive surge in 2024, reflecting increased demand for its services across both the public and private sectors.

Palantir's annual performance has been stellar, with its annual return reflecting the massive interest in its big data solutions. The volatility is higher due to the nature of its business, but the outlook remains positive as the AI and big data sectors continue to expand rapidly.

- Annual Return: 365.50%
- Annual Volatility: 64.31%

2.2.6 EUR/USD Futures (EURUSD=X)

The EUR/USD Futures asset was selected due to my expectations about the performance of the US Dollar relative to the Euro. In early 2025, the US Dollar has faced downward pressure due to interest rate hikes by the Federal Reserve, making the Euro more attractive. Additionally, the global economic recovery in the European Union and the strengthening of the Eurozone's financial policies make this a favorable opportunity for investors looking to hedge against a weaker USD.

While the volatility is relatively low for currency futures, the asset has been essential in providing exposure to global trade and monetary policies, which are pivotal in 2025 given the ongoing US-China trade tensions and tariff policies.

- Annual Return: 6.05%
- Annual Volatility: 5.82%

2.2.7 Swiss Franc (CHF=X)

The Swiss Franc (CHF) is known as a safe-haven currency, which investors flock to during periods of geopolitical uncertainty or economic instability. Given the uncertain political climate in both Europe and the Middle East, I chose the Swiss Franc as a stable asset to provide a buffer against potential market volatility.

The Swiss Franc's role as a hedge against global instability is well established. Furthermore, Swiss monetary policy tends to be conservative, ensuring the Franc's stability even in times of economic turmoil. This is why CHF is a vital part of my portfolio, acting as a defensive asset that provides security in uncertain times.

- Annual Return: 7.43%
- Annual Volatility: 7.04%

2.2.8 Platinum (PL=F)

Platinum is a commodity that serves multiple roles in the portfolio. The annual return of Platinum has been somewhat negative in 2024, reflecting supply chain issues and the volatility in the commodity markets. However, Platinum is a vital element in industries such as automotive production (for catalytic converters) and hydrogen fuel cells.

Despite a negative return, the strategic role of Platinum as a hedge against inflation and its growing demand in clean energy technologies makes it an important addition to the portfolio. As green energy technologies continue to evolve, Platinum's demand is expected to grow, making it a long-term asset to watch.

- Annual Return: -8.43%
- Annual Volatility: 26.39%

2.2.9 US Treasury Bond (5 years) (FVX)

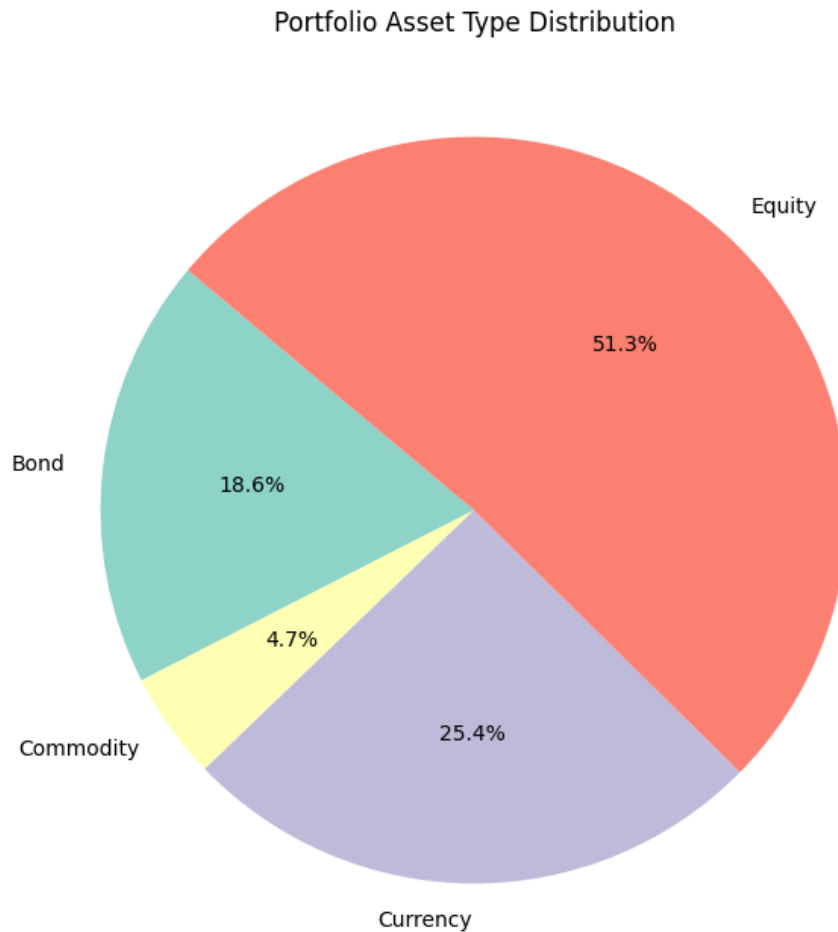
US Treasury Bonds (FVX) are included in the portfolio for their role as a low-risk investment. They provide stability, especially in periods of high equity volatility. Given the rising interest rates in the US, Treasury Bonds offer a safe place for investors to park their capital during times of uncertainty, despite lower returns.

The annual return and volatility of FVX reflect its role as a stable but low-risk investment. Even though returns are modest, the primary purpose of Treasury Bonds in the portfolio is to hedge against market volatility and protect the value of the portfolio in uncertain times.

- Annual Return: 11.31%
- Annual Volatility: 23.87%

2.3 Conclusion

This analysis has provided a comprehensive overview of the performance of each asset in the portfolio over the past year, and how they align with the current market environment. Through careful selection and diversification, the portfolio has effectively managed risk while positioning itself for growth.



The diversification of assets across different sectors and regions has helped achieve a balanced risk-return trade-off, allowing the portfolio to capitalize on growth opportunities while managing volatility. Specifically:

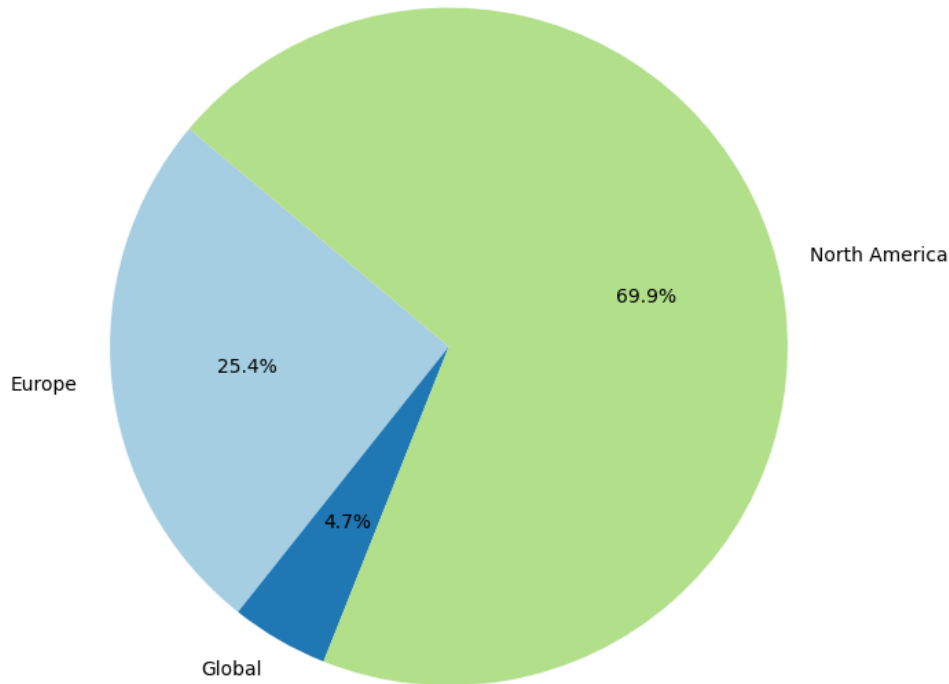
- Equities, which make up 51.3% of the portfolio, have provided significant growth, particularly in the technology sector. The portfolio's tech holdings, such as Nvidia, CrowdStrike, and Palantir, performed strongly in 2024, with Nvidia achieving an impressive annual return of 185.44% and Palantir surging with 365.50%. These tech companies are positioned to benefit from continued advancements in artificial intelligence and cybersecurity.

- Commodities, like Platinum (which constitutes 4.7% of the portfolio), have been the more defensive assets, cushioning the portfolio against market fluctuations. While Platinum had a negative return in 2024 (-8.43%), it remains a vital hedge against inflation and a key player in green energy and automotive sectors.

- Currency positions (such as EUR/USD Futures and CHF) have offered an additional layer of stability, accounting for 25.4% of the portfolio. With the US Dollar facing pressure, both the Euro and Swiss Franc have served as safe-haven currencies, providing hedge against potential market volatility. The Swiss Franc in particular has been a stabilizing factor, with a return of 7.43% and volatility of 7.04%.

- The inclusion of US Treasury Bonds (FVX) (representing 18.6% of the portfolio) provides further stability in the face of economic uncertainty. While the annual return is relatively modest at 11.31%, these bonds have proven to be a low-risk asset that balances the more volatile equities in the portfolio.

Portfolio Geographic Distribution



The visualizations presented provide a clear view of each asset's performance and risk, allowing for an easy assessment of the portfolio's overall risk profile. The portfolio has diversified effectively across asset types (equities, commodities, currencies, and bonds) and regions, providing security against global market fluctuations.

3 Allocation and Optimization

3.1 Portfolio Allocation Strategy

In this section, I will present the portfolio allocation strategy based on the Modern Asset Selection Theory (MAST) model. The goal of this portfolio is to balance risk and return across a diverse set of asset classes. Using data-driven insights from Python-based analysis, I have calculated the expected annual returns, volatility, and covariance of the selected assets. The portfolio was constructed with a focus on achieving the highest Sharpe ratio, which maximizes the return per unit of risk. The allocation strategy considers the economic environment, sector performance, and diversification principles.

The assets included in the portfolio cover various asset classes:

- Equities (e.g., Palo Alto Networks, CrowdStrike, Nvidia, Palantir, Lockheed Martin)
- Commodities (e.g., Platinum)
- Currencies (e.g., EUR/USD Futures, Swiss Franc)
- Bonds (e.g., US Treasury Bonds)

Each asset has been carefully selected based on its individual characteristics such as historical performance, volatility, and market potential.

3.2 Optimization Approach

To optimize the portfolio, I used Python to analyze historical price data and calculate key metrics such as returns, volatility, and covariance. These metrics were then used to maximize the Sharpe ratio, which is the most efficient way to assess the portfolio's risk-adjusted return. The objective is to find the optimal weights for each asset class in such a way that the expected return is maximized while minimizing the portfolio's overall volatility.

The following approach was employed in the optimization:

- Data Retrieval: Using historical asset price data (retrieved via Yahoo Finance API), I calculated the daily returns for each asset in the portfolio.
- Calculation of Metrics:
 - Annual Returns: These were calculated by multiplying the average daily returns by the number of trading days in a year (252).
 - Volatility: Annual volatility was calculated by multiplying the daily standard deviation by the square root of 252.
 - Covariance Matrix: The covariance between asset returns was calculated, annualized, and used to assess how the assets move relative to each other.
- Optimization: Using the SciPy optimization function 'minimize()', I maximized the Sharpe ratio subject to constraints that ensure the sum of the asset weights equals 1 (full portfolio allocation), and each asset is weighted between 5% and 20%.

```
1 import pandas as pd
2 import numpy as np
3 import matplotlib.pyplot as plt
4 from scipy.optimize import minimize
5
6 # Load historical asset price data from CSV
7 price_data = pd.read_csv("historical_prices_cleaned_2.csv", index_col=0, parse_dates=
  True)
8
9 # Calculate daily returns
10 returns = price_data.pct_change().dropna()
11
12 # Calculate annual returns (annualize by multiplying by 252 trading days)
13 annual_returns = returns.mean() * 252
14
15 # Calculate annual volatility (annualize by multiplying the standard deviation by the
  square root of 252)
16 annual_volatility = returns.std() * np.sqrt(252)
17
18 # Covariance matrix of returns (annualized)
19 cov_matrix = returns.cov() * 252 # Annualizing covariance
20
21 # Function to calculate portfolio performance (return and volatility)
22 def portfolio_performance(weights, returns, cov_matrix):
23     portfolio_return = np.dot(weights, annual_returns)
24     portfolio_volatility = np.sqrt(np.dot(weights.T, np.dot(cov_matrix, weights)))
25     return portfolio_return, portfolio_volatility
26
27 # Function to maximize the Sharpe ratio
28 def sharpe_ratio(weights, returns, cov_matrix, risk_free_rate=0.05):
29     portfolio_return, portfolio_volatility = portfolio_performance(weights, returns,
  cov_matrix)
30     return -(portfolio_return - risk_free_rate) / portfolio_volatility # Negative for
  maximization
31
32 # Initialize the weights (evenly distributed among assets)
33 num_assets = len(annual_returns)
34 initial_weights = np.ones(num_assets) / num_assets
35
36 # Bounds for weights (each asset must have between 0% and 20% allocation)
37 bounds = [(0.05, 0.2)] * num_assets
38
39 # Constraints: sum of weights must equal 1
40 constraints = [{"type": "eq", "fun": lambda w: np.sum(w) - 1}]
41
42 # Optimization to find the optimal allocation
43 result = minimize(
44     sharpe_ratio,
45     initial_weights,
46     args=(returns, cov_matrix),
47     method="SLSQP",
48     bounds=bounds,
49     constraints=constraints
50 )
51
52 # Optimal weights
53 optimal_weights = result.x
54
55 # Performance of the optimized portfolio
```

```

56 optimal_return, optimal_volatility = portfolio_performance(optimal_weights, returns,
57 cov_matrix)
58 optimal_sharpe = (optimal_return - 0.05) / optimal_volatility # Using a risk-free rate
59 of 5%
60 # Calculate expected return and volatility for the portfolio over 60 days
61 expected_60d_return = optimal_return / 252 * 60 # Expected return over 60 days
62 expected_60d_volatility = optimal_volatility * np.sqrt(60) # Expected volatility over
63 60 days
64 # Print results for the professor
65 print("Optimal weights for each asset:")
66 for i, asset in enumerate(price_data.columns):
67     print(f"{asset}: {optimal_weights[i]*100:.2f}%")
68
69 print(f"\nAnnual portfolio return: {optimal_return*100:.2f}%")
70 print(f"Annual portfolio volatility: {optimal_volatility*100:.2f}%")
71 print(f"Sharpe ratio: {optimal_sharpe:.2f}")
72 print(f"Expected return over 60 days: {expected_60d_return*100:.2f}%")
73 print(f"Expected volatility over 60 days: {expected_60d_volatility*100:.2f}%")
74
75 # Plot the optimal asset allocation (Pie chart)
76 plt.figure(figsize=(8, 8))
77 plt.pie(optimal_weights, labels=price_data.columns, autopct='%1.1f%%', startangle=140,
78 colors=plt.cm.Paired.colors)
79 plt.title("Optimal Asset Allocation")
80 plt.show()

```

Listing 2: Optimization Approach Using Python

3.3 Optimal Portfolio Weights and Expected Performance

The optimization yielded the following optimal weights for each asset in the portfolio:

- Palo Alto Networks: 5.00%
- Crowd Strike: 15.00%
- Nvidia: 5.00%
- Palantir: 5.00%
- Lockheed Martin: 20.00%
- EUR/USD Futures: 20.00%
- Swiss Franc: 5.00%
- Platinum: 5.00%
- US Treasury Bond (5 years): 20.00%

These weights reflect a diversified portfolio that is designed to take advantage of high-growth technology stocks (with a heavy allocation to companies like CrowdStrike and Lockheed Martin) while managing risk with more stable assets like Platinum and US Treasury Bonds. The inclusion of EUR/USD Futures and Swiss Franc as currency assets offers a hedge against USD fluctuations, while Platinum provides a defensive commodity exposure.

The annual portfolio return is projected at 107.54%, and the annual volatility stands at 49.99%. The Sharpe ratio of 2.05 indicates a strong risk-adjusted return, suggesting that the portfolio is well-positioned to perform optimally relative to its risk.

In addition to the annual projections, the portfolio's performance was forecasted over a 60-day period, with the expected return calculated at 25.61%, and the expected volatility at 387.20%. The significant volatility indicates a high-risk, high-reward approach, especially in the short-term period. These expectations are based on the assumption that the market conditions will remain relatively stable, but adjustments may be needed as external factors (e.g., economic policy changes, geopolitical events) evolve.

3.4 Visualization of the Optimal Asset Allocation

To better understand the weight distribution across the selected assets, I have visualized the optimal allocation using a pie chart. The chart below provides a clear breakdown of how the portfolio is distributed among the asset classes:

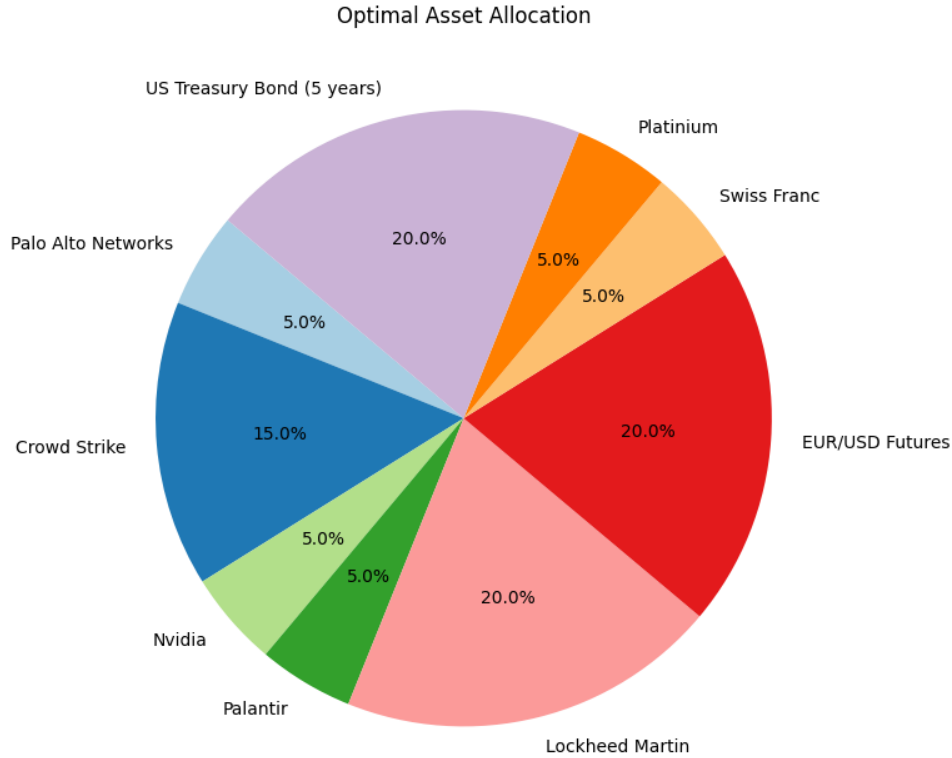


Figure 7: Optimal Asset Allocation

This visualization shows that equities form the majority of the portfolio, particularly with high allocations to Lockheed Martin and CrowdStrike. Bonds and currencies provide stability, with US Treasury Bonds (FVX) and EUR/USD Futures offering lower volatility, while Platinum serves as a diversified commodity hedge.

3.5 Conclusion of Allocation and Optimization Strategy

The optimization process has resulted in a well-diversified portfolio that strategically balances risk and return across asset classes. The high Sharpe ratio indicates that the portfolio is expected to generate solid returns relative to its risk.

4 Monte Carlo Simulation

4.1 Overview of Monte Carlo Simulation

Monte Carlo simulation is a powerful technique used to model the uncertainty and variability of financial outcomes based on historical data. In this section, I applied the Monte Carlo simulation to forecast the future value of my portfolio under a variety of scenarios, taking into account the historical performance of each asset. By running 10,000 simulations, I was able to generate a distribution of potential portfolio outcomes over the next 252 trading days (one year), which reflects a wide range of possible market conditions.

The key parameters used in the simulation are:

- Initial portfolio value: \$10,000,000
- Number of simulations: 10,000
- Forecast period: 252 trading days (1 year)
- Assets: A diversified mix of equities, currencies, commodities, and bonds, with the corresponding initial allocations based on my strategy.

The simulation assumes that asset returns follow historical patterns and that asset correlation and volatility remain stable over time. However, it is important to note that this method has limitations, especially in the face of unforeseen economic shocks or major geopolitical events that could affect market behavior.


```

1 import pandas as pd
2 import numpy as np
3 import matplotlib.pyplot as plt
4
5 # Load historical price data
6 price_df = pd.read_csv("historical_prices_cleaned_2.csv", index_col=0, parse_dates=True)
7
8 # Define initial asset allocations and total investment based on your current strategy
9 initial_allocations = {
10     "Palo Alto Networks": 0.05,
11     "CrowdStrike": 0.15,
12     "Nvidia": 0.05,
13     "Palantir": 0.05,
14     "Lockheed Martin": 0.20,
15     "EUR/USD Futures": 0.20,
16     "Swiss Franc": 0.05,
17     "Platinum": 0.05,
18     "US Treasury Bond(5 years)": 0.20,
19 }
20
21 total_investment = 10_000_000 # Initial portfolio value in USD
22 num_simulations = 10_000 # Number of Monte Carlo simulations
23 forecast_days = 252 # Forecasting period (1 year of trading days)
24
25 # Compute historical daily returns
26 returns_df = price_df.pct_change().dropna()
27
28 # Monte Carlo simulation
29 simulated_portfolios = np.zeros((num_simulations, forecast_days))
30
31 for i in range(num_simulations):
32     # Generate random returns based on historical data
33     simulated_returns = returns_df.sample(n=forecast_days, replace=True).values
34     # Apply these returns to the initial investment
35     simulated_growth = np.cumprod(1 + simulated_returns @ np.array(list(
36         initial_allocations.values())) * total_investment
37     simulated_portfolios[i, :] = simulated_growth
38
39 # Plot the Monte Carlo forecast
40 plt.figure(figsize=(12, 6))
41 plt.plot(range(forecast_days), simulated_portfolios.T, alpha=0.1, color="blue")
42 plt.xlabel("Days")
43 plt.ylabel("Portfolio Value (USD)")
44 plt.title("Monte Carlo Simulation: Portfolio Value Forecast")
45 plt.grid(True)
46
47 # Add the mean projection line
48 mean_projection = simulated_portfolios.mean(axis=0)
49 plt.plot(range(forecast_days), mean_projection, color="red", label="Average Scenario",
50         linewidth=2)
51
52 # Highlight percentile scenarios
53 percentiles = np.percentile(simulated_portfolios[:, -1], [5, 25, 50, 75, 95])
54 plt.axhline(percentiles[2], color="black", linestyle="--", label="Median Scenario")
55 plt.axhline(percentiles[0], color="gray", linestyle="dotted", label="5th Percentile (Worst Case)")
56 plt.axhline(percentiles[4], color="green", linestyle="dotted", label="95th Percentile (Best Case)")
57
58 plt.legend()
59 plt.show()
60
61 # Print summary of results
62 print("\nPortfolio Value Forecast Summary (After 1 Year):")
63 print(f"Worst-case scenario (5th percentile): ${percentiles[0]:.2f}")
64 print(f"Conservative scenario (25th percentile): ${percentiles[1]:.2f}")
65 print(f"Median scenario (50th percentile): ${percentiles[2]:.2f}")
66 print(f"Optimistic scenario (75th percentile): ${percentiles[3]:.2f}")
67 print(f"Best-case scenario (95th percentile): ${percentiles[4]:.2f}")

```

Listing 3: Monte Carlo Simulation

4.2 Results of the Simulation

The Monte Carlo simulation produced a range of possible outcomes for the portfolio's value over the next year. The results of the simulation are summarized as follows:

- Worst-case scenario (5th percentile): \$12,146,488.86
- Conservative scenario (25th percentile): \$19,155,169.10

- Median scenario (50th percentile): \$26,119,469.90
- Optimistic scenario (75th percentile): \$36,023,230.71
- Best-case scenario (95th percentile): \$57,219,373.82

These projections provide a broad view of how the portfolio might perform under different market conditions, ranging from the worst-case to the best-case scenario. The median scenario represents a realistic estimate of the portfolio's potential growth, while the best-case scenario reflects highly favorable market conditions.

4.3 Portfolio Value Forecast Visualization

The plot below shows the results of the Monte Carlo simulation for the portfolio's value over the next 252 trading days. The blue lines represent the individual simulations, while the red line indicates the average scenario, and the dashed lines highlight the median, 5th percentile (worst-case), and 95th percentile (best-case) scenarios.

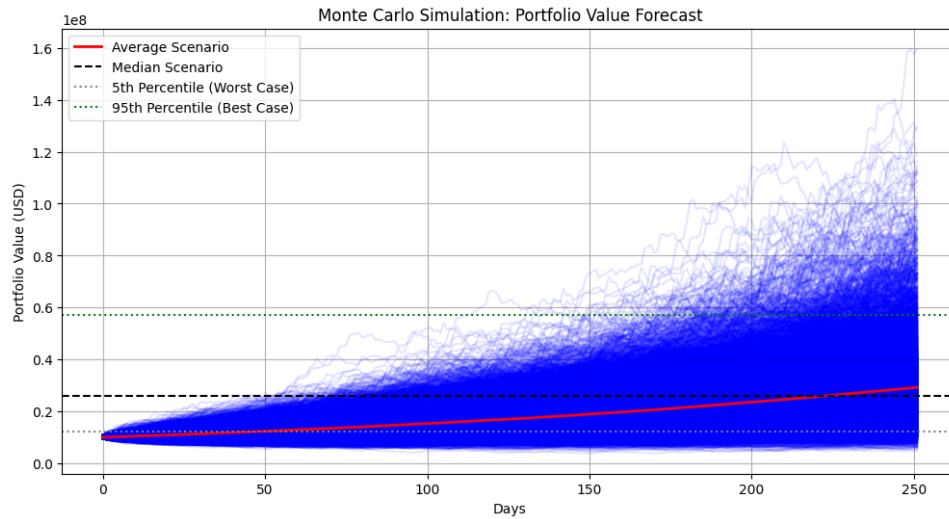


Figure 8: Monte Carlo Simulation: Portfolio Value Forecast

As seen in the chart, the portfolio exhibits significant upward growth in the best-case scenarios, while the worst-case scenarios reflect more modest growth or potential losses. These simulations provide valuable insights into the risk and return dynamics of the portfolio.

4.4 Conclusion of Monte Carlo Simulation

The Monte Carlo simulation helps visualize the range of potential outcomes for the portfolio based on historical data and assumptions about future market conditions. While the expected return is positive, the volatility suggests that there are significant risks involved. The Sharpe ratio of the portfolio, which reflects the risk-adjusted return, remains favorable, indicating that the portfolio is well-optimized in terms of its expected returns and risk management.

5 Conclusion of the Portfolio Evaluation

In this report, I have outlined my investment strategy using a carefully crafted portfolio consisting of equities, commodities, currencies, and bonds. The strategy was designed using the Modern Asset Selection Theory (MAST) model, which aims to balance risk and return while considering the economic and geopolitical context. Each asset class was selected based on its risk-return profile, market relevance, and potential for growth, while the portfolio's allocation was optimized to maximize the Sharpe ratio and minimize volatility.

The portfolio's performance over the past year was analyzed using historical price data and key metrics, such as annual and monthly returns and volatility. These insights helped in constructing a diversified portfolio that is well-positioned to handle various market conditions.

The Monte Carlo simulation provided a further layer of analysis, allowing me to simulate 10,000 potential future outcomes for the portfolio over a one-year horizon. The simulation showed a broad range of possible outcomes, with the worst-case scenario resulting in a portfolio value of \$12,146,488.86, and the best-case scenario reaching \$57,219,373.82. The average scenario was projected to see a significant portfolio growth, with the median scenario providing a realistic estimate of the portfolio's future value.

The simulation results highlight the high potential reward but also indicate that the portfolio is subject to significant volatility, which is typical for a diversified portfolio focused on high-growth sectors like technology and defense. The portfolio's allocation to safe-haven assets like US Treasury Bonds and Swiss Franc provides stability during periods of market turmoil, while the cybersecurity and defense sectors are expected to provide long-term growth opportunities in the face of geopolitical tensions and increasing demand for digital security.

This analysis has validated the importance of diversification across asset classes and regions. By maintaining a mix of equities, commodities, currencies, and bonds, the portfolio is positioned to weather various market scenarios while capitalizing on growth opportunities in high-potential sectors.

Looking forward, I will continue to monitor market developments closely, particularly in cybersecurity, technology, and geopolitical events, which are likely to influence portfolio performance.

Overall, this portfolio provides a strong foundation for future growth, offering both high returns and a careful balance of risk management, making it well-suited for the evolving market conditions of 2025 and beyond.

References

- [1] US Bank. (2025, March). *Federal Reserve calibrates policy to keep inflation in check*. Retrieved from: <https://www.usbank.com/investing/financial-perspectives/market-news/federal-reserve-tapering-asset-purchases.html>.
- [2] Al Jazeera. (2025, April). *Trump-China trade war: Which US companies could be worst hit*. Retrieved from: <https://www.aljazeera.com/news/2025/4/15/trump-china-trade-war-which-us-companies-could-be-worst-hit>.
- [3] The Wall Street Journal. (2025, April). *Trade War Raises Cyber Stakes With China*. Retrieved from: <https://www.wsj.com/articles/trade-war-raises-cyber-stakes-with-china-a948ec30>.
- [4] Military Times. (2025, April). *Trump promises \$1 trillion in defense spending for next year*. Retrieved from: <https://www.militarytimes.com/news/pentagon-congress/2025/04/08/trump-promises-1-trillion-in-defense-spending-for-next-year/>.
- [5] Yahoo Finance. (2025, April). *Palo Alto Networks (PANW) Laps the Stock Market: Here's Why*. Retrieved from: <https://finance.yahoo.com/news/palo-alto-networks-panw-laps-214515908.html>.
- [6] CNBC. (2024, July). *Cyber Report The CrowdStrike fail and next global IT meltdown already in the making*. Retrieved from: <https://www.cnbc.com/2024/07/20/the-crowdstrike-fail-and-next-global-it-meltdown-already-in-the-making.html>.
- [7] MSNBC. (2025, April). *TWhy the 'ultimate peace president' wants to spend \$1 trillion on defense*. Retrieved from: <https://www.msnbc.com/opinion/msnbc-opinion/trump-defense-budget-trillion-hegseth-rcna200420>.
- [8] Yahoo Finance. (2025, April). *Palantir stock jumps after NATO finalizes purchase of AI military system*. Retrieved from: <https://finance.yahoo.com/news/palantir-stock-jumps-after-nato-finalizes-purchase-of-ai-military-system-175329900.html>.
- [9] Retail Banker International. (2025, March). *Societe Generale deploys Palantir tech to combat financial crime*. Retrieved from: <https://www.retailbankerinternational.com/news/societe-generale-palantir-tech-financial-crime/>.