Project Report: Finance Analytics (FIN 650)

Team Harry-Potter

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1. Executive Summary

This project undertakes a thorough analysis and optimization of a diverse investment portfolio, incorporating stocks from renowned companies such as NVIDIA, Uber, Micron, and Louis Vuitton. Through meticulous macroeconomic analysis, rigorous risk assessment, and the application of sophisticated optimization techniques, the project aims to deliver actionable insights designed to maximize returns while adeptly managing risks. The primary objective is to enhance portfolio performance by leveraging data-driven decision-making and strategic investment approaches, ensuring a robust and resilient investment strategy amidst dynamic market conditions.

Key Competencies:

- Portfolio Management
- Financial Analysis
- Macroeconomic Trends
- Investment Strategy
- Risk & Return Analysis
- Data-Driven Decision Making
- Optimization Techniques
- Stock Performance Metrics

2. Introduction

In the realm of financial analytics, understanding market dynamics and leveraging data-driven insights are critical for making informed investment decisions. This project delves into various aspects of portfolio management, focusing on economic indicators, sector-specific analyses, and the performance metrics of selected stocks. By integrating these elements, the project aims to provide a comprehensive approach to optimizing investment strategies and enhancing portfolio performance.

3. Responsibilities & Achievements

- Conducted a comprehensive analysis of a diverse portfolio comprising stocks such as NVIDIA, Uber, Micron, and Louis Vuitton.
- Evaluated macroeconomic trends, including economic growth, inflation, interest rates, and global supply chain dynamics.
- Provided insights into sector-specific performance drivers, particularly in technology and consumer discretionary sectors.
- Developed investment strategies aligned with market conditions and investor expectations.
- Achieved a total portfolio return of 13.01% over the holding period, significantly outperforming the S&P 500 index return of 3.01%.

4. Macro Economy and Investment Strategy

Detailed Analysis:

- **Economic Growth:**
  The project evaluates various economic growth trends to identify sectors with the potential for expansion. This involves analysing GDP growth rates, industrial production indices, and other macroeconomic indicators that can influence investment opportunities.
- **Inflation Trends:**
  An in-depth examination of inflationary pressures is conducted to understand their impact on asset pricing and investment strategies. This includes analysing historical inflation rates, CPI data, and projecting future trends.
- **Interest Rates and Monetary Policy:**
  The analysis covers the effects of interest rate fluctuations and monetary policy decisions on market conditions and investment outcomes. Key focus areas include central bank policies, interest rate forecasts, and their implications for different asset classes.

- **Global Supply Chain Dynamics:**
  The project assesses the impact of global supply chain disruptions on specific industries within the portfolio. This includes examining factors such as trade policies, logistical challenges, and geopolitical events affecting supply chains.

- **Sector-Specific Analyses:**
  Technology Sector:
  An in-depth review of the technology sector's performance drivers, including innovation trends, regulatory changes, and market sentiment, is conducted. The project specifically focuses on the performance of NVIDIA and Micron within this sector.

- **Consumer Discretionary and Luxury:**
  The project analyses consumer spending patterns in discretionary and luxury goods, influencing portfolio composition. Louis Vuitton is examined in detail to understand the factors driving its market performance.

- **Growth Potential:** Identified growth opportunities within portfolio stocks, aligning with market dynamics and investor expectations.

5. Portfolio Composition

Stock	Price ($)	Shares	Cost Base	Initial Weight (%)
Best Buy	76.79	250	19,197.5	19.762%
NVIDIA	84.53	500	42265	43.5%
Louis Vuitton	858.45	15	12876.75	13.25%
Uber	72.26	165	11922.9	12.227%
Micron	108.80	100	10880	11.20%
Total			97,142.15	100%

Stock Selection & Weighting:

- **Best Buy:** 250 shares at $76.79, Cost Base: $19,197.50, Initial Weight: 19.76%
- **NVIDIA:** 500 shares at $84.53, Cost Base: $42,265.00, Initial Weight: 43.50%
- **Louis Vuitton:** 15 shares at $858.45, Cost Base: $12,876.75, Initial Weight: 13.25%
- **Uber:** 165 shares at $72.26, Cost Base: $11,922.90, Initial Weight: 12.23%
- **Micron:** 100 shares at $108.80, Cost Base: $10,880.00, Initial Weight: 11.20%
- **Total Portfolio Value:** $97,142.15

6. Holding Period Performance

Portfolio Performance Overview (4/12 - 5/31)

Key Metrics:

- Initial Portfolio Market Value (4/12): $100,000
- Final Portfolio Market Value (5/31): $113,005.80
- S&P 500 Initial Level (4/12): 5,123.41
- S&P 500 Final Level (5/31): 5,277.51

Weekly Performance Breakdown

Week	Dates	Return	Market value	Return	Level	Summary
1	4/12 - 4/19	-5.58%	$94,420.60	-3.05%	4,967.23	Significant drop reflecting broader market trends.
2	4/19 - 4/26	6.19%	$100,263.56	2.67%	5,099.96	Strong rebound, outperforming the S&P 500.
3	4/26 - 5/3	0.11%	$100,376.30	0.55%	5,127.79	Slight increase, S&P 500 performed better.
4	5/3 - 5/10	0.89%	$101,265.20	1.85%	5,222.68	Steady growth, lagged behind the S&P 500.
5	5/10 - 5/17	1.33%	$102,609.85	1.54%	5,303.27	Continued positive performance with healthy gains.
6	5/17 - 5/24	7.06%	$109,856.65	0.03%	5,304.72	Standout week, significantly outperforming the S&P 500.
7	5/24 - 5/31	2.87%	$113,005.80	-0.51%	5,277.51	Strong gains contrasted with a slight S&P 500 decline.

Summary: Portfolio Outperformance: 13.01% vs. S&P 500's 3.01%

Total Holding Period Return

Period	Portfolio Return	S&P 500 Return
4/12 - 5/31	13.01%	3.01%
Summary	Substantial outperformance of S&P 500 by portfolio	

7. Risk & Return Analysis

Stocks	Mean Return	Standard Deviation	Sharpe Ratio	Safety First Ratio	Beta (CAPM)	Adj R Square	Risk Assessment
Micron	0.00015129	0.02661663	0.00655	0.00157	1.43687	0.5677	More Risky (beta > 1)
NVIDIA	0.0016214	0.0356571	0.04611	0.04611	1.59204	0.3945	More Risky (beta > 1)
Uber	0.0002530	0.0212358	0.0129	0.00676	2.17626	0.6941	More Risky (beta > 1)
Louis Vuitton	0.0000723	0.0234089	-0.00211	-0.00777	0.99345	0.3986	Less Risky (beta < 1)

NVIDIA leads with the highest Sharpe ratio (0.0461), indicating superior risk-adjusted returns despite higher volatility (beta > 1), appealing to investors seeking potentially higher returns. Uber follows closely with a positive Sharpe ratio (0.0130) and a significant beta (2.17626), suggesting competitive risk-adjusted returns amid volatility. Micron shows lower risk-adjusted returns (Sharpe ratio 0.0065) and higher volatility (beta > 1). Louis Vuitton has a negative Sharpe ratio (-0.0021) and a beta less than 1, indicating lower risk and poorer risk-adjusted returns.

Conclusion: NVIDIA and Uber are recommended for higher returns relative to risk. Micron offers a moderate risk-return profile, while Louis Vuitton may appeal to conservative investors prioritizing lower risk. Investors should consider their risk tolerance and objectives when choosing investments.

8. Individual Stock Performance Analysis

Stocks	Mean Return	Standard Deviation	Sharpe Ratio	Beta (CAPM)
NVIDIA	0.0016214	0.0356571	0.0461	1.59204
Uber	0.0002530	0.0212358	0.0130	2.17626
Micron	0.00015129	0.02661663	0.0065	1.43687
Louis Vuitton	0.0000723	0.0234089	-0.0021	0.99345

Analysis:

- **NVIDIA**: Strong risk-adjusted returns with higher volatility (beta = 1.59204).
- **Uber**: Competitive risk-adjusted returns with the highest volatility (beta = 2.17626).
- **Micron**: Moderate risk-return profile with higher volatility (beta = 1.43687).
- **Louis Vuitton**: Lower risk with poorer risk-adjusted returns (beta = 0.99345).

Conclusion: NVIDIA and Uber appeal to higher-risk investors seeking competitive returns. Micron offers moderate risk in the tech sector. Louis Vuitton suits conservative investors prioritizing stability.

9. Three-Factor Model Analysis

Applied the three-factor model to rank stocks based on aggressiveness, moderation, and conservatism, guiding portfolio allocation strategies.

	Micron	Uber	NVIDIA	BestBuy	Louis vuitton	Spy
Intercept	-0.00049324	0.00067248	0.00114	0.00043056	0.00090172	0.00003359
p value of Intercept	0.6637	0.7059	0.3816	0.7253	0.4136	0.5538
(try: is the intercept significant at 10%, yes or no?)	No	No	No	No	No	No
Coefficient of X1(RM-RF)	1.43687	1.59204	2.17626	1.14688	0.99345	0.94589
p value of X 1	< .0001	< .0001	< .0001	< .0001	< .0001	<.0001
(try: is the X1 coefficient significant at 10%, yes or no?)	yes	Yes	Yes	Yes	Yes	Yes
No of Observations	289	289	289	289	289	715
Adj R Square	0.5677	0.3945	0.6941	0.4170	0.3986	0.9844
More (or less) risky than the market average portfolio? (beta is larger or smaller than 1)	More Risky	More Risky	More Risky	More Risky	Less Risky	Less Risky

10. Stock Ranking & Recommendations

Stock	Aggressive	Moderate	Conservative
NVIDIA	1	2	5
Uber	2	3	5
Micron	3	3	2
Louis Vuitton	5	4	1

NVIDIA: Recommended as the most preferable stock due to its strong performance metrics and growth potential.
Uber: Deemed less preferable due to its higher volatility.

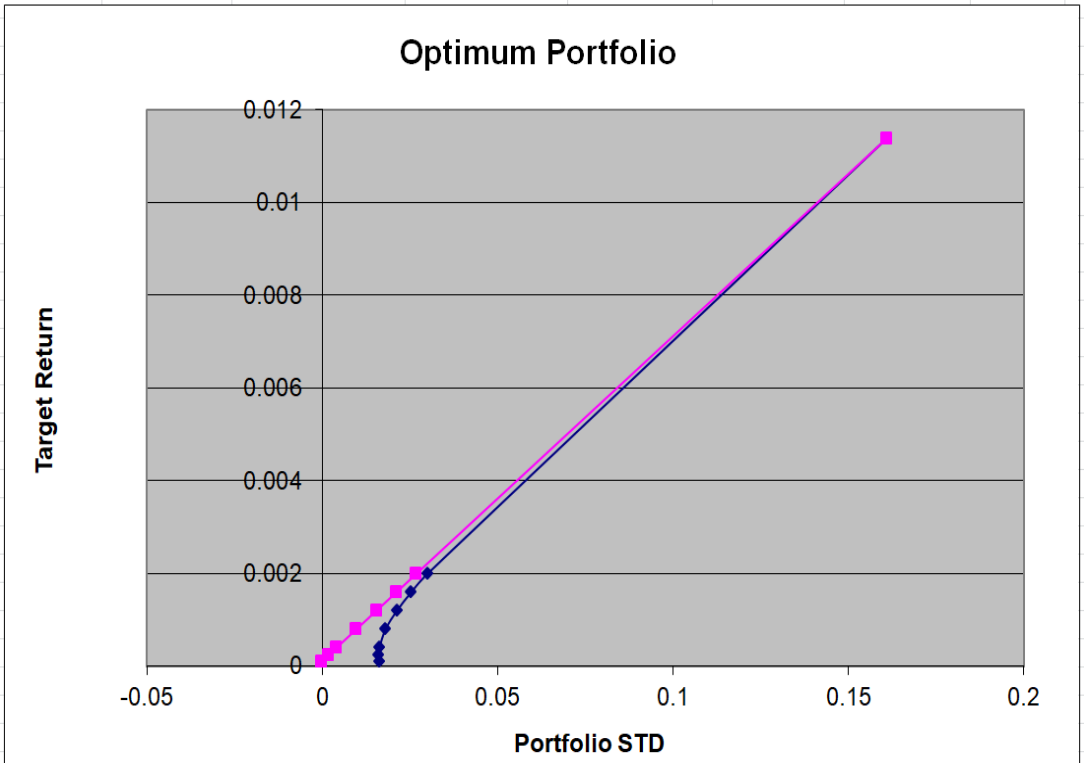
11. Portfolio Optimization

The global minimum variance portfolio achieves the lowest possible variance among all portfolios, prioritizing risk minimization over expected returns. It aims to provide the most efficient asset allocation for minimizing portfolio volatility.

Minimal variance		
Uber	w1	0.3808294
Micron	w2	-0.05080908
Nvidia	w3	0.054123958
Louis Vuitton	w4	0.615855718
Constraint 2		0
Min. Var. Portfolio STD		0.013647177
Min. Var. Portfolio Return		0.001620424

12. Efficient Frontier & Tangent Portfolio

The efficient frontier represents the set of optimal portfolios that offer the highest expected return for a given level of risk. The tangent (or market) portfolio is the point where the pink line touches the blue curve, achieving the highest Sharpe ratio and representing the best risk-adjusted return. Based on this tangent point, the optimal portfolio's composition can be determined, offering the best return for the specified level of risk.



13. Strategies to Improve Future Investment

- **Diversification Strategies:**

- Global Minimum Variance Portfolio: Aim to minimize risk by optimizing the asset mix to achieve the least volatility. For instance, in the given portfolio, significant weight is given to Louis Vuitton (0.6159) and Uber (0.3808), with a small negative weight for Micron (-0.0508) and a moderate weight for NVIDIA (0.0541).

- Tangency Portfolio: Blend a risk-free asset with a market portfolio to maximize the Sharpe ratio. This portfolio optimizes returns for a given level of risk, as illustrated by the efficient frontier and tangent portfolio analysis.

- **Risk Management Techniques:**

- Monitor and Adjust Portfolio Weights: Regularly rebalance the portfolio to maintain desired risk levels and take advantage of changing market conditions.

- Minimize Portfolio Standard Deviation: Focus on achieving the lowest possible variance among all potential portfolios. For example, the given portfolio has a standard deviation of 0.0136, reflecting its minimized risk.

- **Leveraging Market Insights**

  Analyse Market Trends: Utilize market data to identify opportunities and adjust investments accordingly. For example, target returns and optimal portfolio standard deviations indicate the most efficient portfolios.

  Optimize Risk-Adjusted Returns: Focus on portfolios that offer the highest Sharpe ratios, like NVIDIA and Uber, to achieve the best risk-adjusted returns.

  By implementing these strategies, investors can enhance their future investment outcomes through improved diversification, effective risk management, and informed decision-making based on market insights.

14. Conclusion

In conclusion, the Finance Analytics project underscored the importance of data-driven decision-making in portfolio management. NVIDIA and Uber were recommended for investors seeking growth with varying risk tolerances, while Micron and Louis Vuitton catered to more conservative preferences. The findings provide valuable insights for optimizing investment strategies amidst dynamic market conditions.

The Finance Analytics project underscored the importance of data-driven decision-making in portfolio management. Recommendations included:

- **NVIDIA:** For growth-seeking investors with higher risk tolerance.
- **Uber:** For growth-seeking investors willing to tolerate higher volatility.
- **Micron and Louis Vuitton:** For conservative investors prioritizing stability.

15. References

- Yahoo Finance: NVIDIA Corporation (NVDA) Stock Price, News, Quote & History." - https://finance.yahoo.com/quote/NVDA
- Macro Trends: Micron Technology Revenue 2010-2024 - https://www.macrotrends.net/stocks/charts/MU/micron-technology/revenue
- Morningstar. Uber Technologies Inc (UBER) Stock Analysis & News- https://www.morningstar.com/stocks/xnys/uber/quote