I. Introduction

Microsoft Corporation

CEO: Satya Nadella (Chairman & CEO since 2014)
Founded in 1975 by Bill Gates and Paul Allen, Microsoft Corporation is a global leader in software, cloud computing, and enterprise services (Microsoft, 2024). It operates in the software publishing industry, which has grown at a CAGR of 6.9%, driven by the increasing adoption of cloud computing and SaaS models (IBISWorld, 2015b). In fiscal year 2024, Microsoft reported $245.1 billion in revenue, a 16% increase, with the Intelligent Cloud segment growing by 20%, largely due to Azure's performance (Microsoft Corporation, 2024).
News: Microsoft has significantly invested in artificial intelligence (AI). The company's Azure cloud platform experienced a 22% revenue increase, with AI services projected to reach a $10 billion annual run-rate (Helmore, 2024).

The Coca-Cola Company

CEO: James Quincey (Chairman & CEO since 2017)
Founded in 1886, The Coca-Cola Company is a leading beverage company with over 200 brands, including Coca-Cola, Sprite, and Fanta (Coca-Cola, 2023). It operates in the global soft drink and bottled water industry, which has experienced a decline with a CAGR of -2.1% due to shifting consumer preferences for healthier beverages (IBISWorld, 2015a). Coca-Cola follows a franchise-based model, selling syrups and concentrates to bottling partners who distribute finished products (The Coca-Cola Company, 2021). In 2024, the company reported $47.1 billion in revenue, a 3% increase, with a 12% rise in organic revenues (The Coca-Cola Company, 2024).
News: Coca-Cola expanded into the dairy market by acquiring Fairlife in 2020. Fairlife specializes in ultrafiltered milk with enhanced nutritional benefits. By 2022, Fairlife's sales surpassed $1 billion, demonstrating the success of this diversification strategy (Izquierdo, 2025).

II. Valuation Methods

In this project, we assessed the fairness of stock prices for Microsoft (MSFT) and Coca-Cola (KO) using three valuation methods: **Stock Valuation by Comparables**, **Discounted Cash Flow (DCF) Valuation**, and **Bond Valuation**. (Appendix 1)

1. Stock Valuation by Comparables (P/E Analysis)

The valuation by comparables method involves assessing a firm's market price relative to similar companies within its industry, using ratios such as Price-to-Earnings (P/E). While the 5-year average EPS smooths out anomalies such as the pandemic, it may understate recent growth. The latest EPS, on the other hand, better captures current business dynamics and investor sentiment, especially as markets recover from irregular periods like COVID-19 (Goldstein, Koijen and Mueller, 2021).

For MSFT, we selected **Meta (META), Alphabet (GOOGL), and Apple (AAPL)** as comparable companies due to their significant presence in the tech sector, particularly in software, cloud computing, and digital platforms. These companies reflect similar business models focused on innovation, high scalability, and rapid earnings growth. We calculated a 5-year average EPS of MSFT to be $8.99, with a current stock price of $409.64. This results in a P/E ratio of 45.58. Using the most

recent EPS, the P/E ratio is 34.72. When compared to the average industry P/E of 42.78 (5-year basis), and 30.72 (1-year basis), we get an estimated price **$384.51** using 5-year average EPS and **$362.55** using the latest 1-year EPS. These estimates are **below the actual market price of $409.64**, suggesting that **MSFT may currently be overvalued**. However, a higher P/E ratio often reflects investor confidence in a company's future growth potential, not just its current earnings. Microsoft's elevated valuation could therefore signal strong expectations tied to its aggressive push into AI infrastructure (such as Azure OpenAI integration).

For KO, we selected **PepsiCo (PEP), Monster Beverage (MNST), and National Beverage Corp. (FIZZ)** as peer companies. These firms operate in the non-alcoholic beverage industry, offering a relevant benchmark for Coca-Cola due to their similar product portfolios and focus on consumer staples. While PepsiCo is a direct competitor, Monster and National Beverage are prominent in soft drink markets. We calculated KO's P/E ratio of 30.94 based on 5-year average EPS and 28.07 based on the latest EPS. When compared to the industry average P/E of 28.10 (5-year) and 24.76 (1-year), we derived an estimated price of **$62.71** using 5-year average EPS and an estimated price of **$60.91** using latest EPS. These estimates are both **below the current market price of $69.05**, suggesting a **modest overvaluation**. KO's premium can also be attributed to its status as a globally recognized brand and a historically defensive stock, which investors often turn to during periods of economic uncertainty. Moreover, a slightly elevated P/E in the **consumer staples** sector often reflects the value investors place on stability, especially during times of market uncertainty.

In summary, while MSFT's valuation reflects high growth expectations, KO's modest premium reflects its perceived stability in a volatile economic environment.

2. Discounted Cash Flow (DCF) Valuation

The Discounted Cash Flow (DCF) model was used to assess the intrinsic stock values of MSFT and KO. We assessed the intrinsic value of both MSFT and KO by projecting their future Free Cash Flows (FCFs) from 2025 to 2028 were directly sourced from Refinitiv. This approach allows the model to reflect realistic expectations based on analyst forecasts and company strategy, rather than relying on potentially misleading historical averages (14% MSFT, -9.16% KO with extreme changes in *g*!)

Then, the terminal value was calculated based on the final year's FCF (2028), the (assumed) perpetual growth rate of 3% (for MSFT) and 2.5% (for Coca-Cola) and the discount factor estimated with Weighted Average Cost of Capital (WACC) of 9.4% for MSFT and 7.7% for Coca-Cola. Both the projected FCFs and the terminal value were discounted to present value using the respective WACC. To determine each company's equity value, we adjusted for net debt by subtracting total debt and adding cash and cash equivalents. Finally, the equity value was divided by the number of outstanding shares to estimate the intrinsic share price. The resulting price per share for MSFT ($190.28) and KO ($45.08) appears **significantly lower** than their actual market prices. One reason for this is the limited forecasting as we only use explicit Free Cash Flow (FCF) projections up to 2028, and although terminal value captures the perpetuity of future cash flows, it uses a static growth assumption (3% for MSFT and 2.5% for KO). This simplified perpetuity approach may undervalue long-term strategic shifts (e.g., MSFT's AI expansion, KO's global distribution, etc.).

Nonetheless, this **aligns well with the results from the Stock Valuation by Comparables** (P/E Analysis), reinforcing the conclusion that **both MSFT and KO** appear to be **overvalued in the current market.**

3. Bond Valuation

For the Bond Valuation, we analyzed a selected bond issued by each company, MSFT and KO. **For MSFT**, we selected a semi-annual bond with a 10-year maturity and used the company's Aaa credit rating to obtain a corresponding spread of 0.10%. This spread was added to the current 10-year Treasury yield of 4.31% to derive a Yield to Maturity (YTM) of 4.41%. Using this YTM, we estimated the price of the bond to be **$950.68** through the DCF model. **For KO**, we chose a 5-year semi-annual bond with a Baa1 credit rating, which corresponded to a spread of 0.70%. This spread was added to the 5-year Treasury yield (assumed the same at 4.31%), resulting in a YTM of 5.01%. Based on this, the estimated price of the bond is **$1010.50**. MSFT's bond appears to be **undervalued**, as it trades **below par** despite the company's strong credit rating (Aaa). This may be influenced by macroeconomic conditions such as rising interest rates or investor demand for higher yields. The discount suggests an opportunity for investors seeking a relatively safe, long-term investment with potential price appreciation. In contrast, KO's bond is priced **above par**, indicating that investors are willing to pay a premium for the bond's higher coupon payments and consistent income stream This suggests that KO's bond valuation is more **in line with market expectations**, as the premium compensates for its lower credit standing while still offering an attractive return profile. It is important to note that while current pricing reflects market expectations, these valuations remain sensitive to external economic and firm-specific developments. Any changes in the creditworthiness of MSFT/KO (although highly unlikely for such large, well-established firms) or macroeconomic conditions, such as inflation trends or monetary policy shifts, could significantly impact bond yields and valuations.

III. Beta Analysis

We computed the betas of the firms and this helps us to assess the **systematic risk** of MSFT and KO, which measures a stock's sensitivity to market movements. We extracted 5 years of historical daily adjusted closing prices for MSFT, KO, and the market benchmark (S&P 500) using the **Yahoo Finance API** with Python. We computed daily returns for each stock price and then calculated **beta** using the standard formula:

$$\beta = \frac{\mathrm{Cov}(R_{\text{stock}},\ R_{\text{market}})}{\mathrm{Var}(R_{\text{market}})}$$

MSFT has a beta of ~1.19, indicating it is **more volatile than the market**. This higher beta reflects greater systematic risk, which is typical for technology firms that are heavily influenced by market cycles, innovation trends, and investor sentiment. The COVID-19 pandemic acted as a catalyst for digital transformation across industries, accelerating demand for Microsoft's cloud services, remote work tools (e.g., Teams, Azure), and enterprise software. As a result, MSFT is better suited for investors with a higher risk tolerance who are seeking growth opportunities and can withstand greater price fluctuations. **KO has a beta of ~0.60**, reflecting **it is less volatile than the market**. Despite shifts in consumer behavior, demand for Coca-Cola's products remained relatively consistent, especially through home consumption pre-, post- and during the pandemic, a key characteristic of consumer staples. This lower beta makes KO a defensive stock, preferred by risk-averse investors who prioritize stability and consistent returns, especially during economic downturns. Such a risk profile is characteristic of the consumer staples sector, where demand is stable regardless of economic cycles. We visualized the relationship using a linear regression plot reflecting the same results of higher volatility of MSFT expected returns and lower volatility of KO expected returns (Appendix 2).

IV. Portfolio Analysis

To evaluate the performance of a portfolio consisting of Microsoft (MSFT) and Coca-Cola (KO), we simulated 10,000 random long-only portfolios using historical daily excess returns over the past five years. All portfolio weights were constrained to be non-negative and summed to one, ensuring full capital allocation without short selling. Portfolio returns were calculated as the weighted average of the individual stock returns, while risk was measured as portfolio standard deviation using the covariance matrix. A daily risk-free rate of 0.01/252 (approximating 1% annualized) was applied to compute the Sharpe Ratio, which provides a measure of risk-adjusted performance.

The efficient frontier based on five-year data appears relatively flat and less curved, with daily Sharpe Ratios reaching a maximum of approximately 0.05 (5-year), and 0.09 (1-year) and volatility extending beyond 1.9%. The minimum variance portfolio, tailored for risk-averse investors, **allocates 78% to Coca-Cola and 22% to Microsoft, achieving the lowest overall risk**. In contrast, the portfolio maximizing the Sharpe Ratio distributes **65% to Microsoft and 35% to Coca-Cola, enhancing expected returns by 2 percentage points** compared to the minimum variance portfolio, while increasing volatility only marginally by 0.24 percentage points. These results highlight the modest improvement in risk-adjusted returns when combining both assets (Appendix 3. a).

To examine recent trends, we repeat the analysis using one year of return data. The resulting efficient frontier has a more regular shape, and Coca-Cola outperforms Microsoft in both return and volatility. The minimum variance portfolio allocates **66% to Coca-Cola and 34% to Microsoft, achieving the lowest portfolio risk**. Meanwhile, the maximum Sharpe Ratio portfolio leans even more **heavily toward Coca-Cola, with a 93% allocation**, yielding an expected return 2 percentage points higher than the minimum variance configuration and an increase in volatility of just 0.14 percentage points. Microsoft, which yielded close to zero return during this period with comparatively higher volatility, lies on the inefficient portion of the frontier. Coca-Cola, on the other hand, dominates the risk-return landscape, offering both higher returns and lower volatility. These results are consistent with recent market dynamics that favored KO's short-term performance (Appendix 3. b).

Thus, compared to the individual stocks, the combined portfolios consistently outperform both MSFT and KO on a risk-adjusted basis, emphasizing the **benefits of diversification (Appendix 4)**. Over the five-year horizon, Microsoft delivered higher returns but with greater risk, while Coca-Cola offered lower returns with more stability. The optimized portfolios provided a more balanced trade-off, particularly the one maximizing the Sharpe Ratio. In the one-year period, the performance dynamic reversed, with Coca-Cola outperforming Microsoft across both metrics. The maximum Sharpe Ratio portfolio accordingly concentrated heavily on Coca-Cola, offering improved expected returns with only a modest increase in risk, underscoring the importance of adaptive portfolio strategies based on evolving market conditions.

V. Capital Structure, Cost of Capital (WACC) & Dividend Policy

MSFT has a total asset base of $512.16 billion, indicating the company's massive scale. With total equity of $268.48 billion, MSFT demonstrates a strong balance sheet, supported predominantly by shareholder equity. Its total debt of $51.63 billion results in a **Debt-to-Equity ratio of 0.19**, reflecting a conservative capital structure with limited reliance on debt financing. The **Debt-to-Asset ratio of 0.10** shows that only 10% of the company's assets are financed through debt, while the **Equity Ratio of 0.52** highlights MSFT's strong equity position. A **cost of debt at 5.68%, combined with a cost of equity of 9.42% and a beta of 0.89**, indicates that while Microsoft faces moderate borrowing costs, its equity investors perceive relatively low stock volatility. This aligns with its Aaa credit rating and strong balance sheet. These factors contribute to MSFT's Aaa credit rating, underscoring its high creditworthiness and financial flexibility. On the other hand, KO has total assets of $100.55 billion, significantly smaller than MSFT, consistent with the nature of its industry. KO's equity stands at $26.37 billion, while its total debt is $44.52 billion, indicating a more leveraged capital structure. Its **Debt-to-Equity ratio of 1.69** suggests a greater dependence on debt financing, typical of mature firms with stable and predictable cash flows. The **Debt-to-Asset ratio of 0.44** shows that nearly half of KO's assets are financed by debt, and the **Equity Ratio of 0.26** reveals a lower equity contribution compared to MSFT. Despite a relatively low **cost of debt at 2.2%**, KO's reliance on debt financing introduces interest rate sensitivity. While **its beta of 0.45 and cost of equity of 7.85%** indicate lower equity market volatility, its Baa1 credit rating reflects elevated credit risk stemming from its high leverage. *The betas used here is the reported or adjusted beta which differs from the statistical beta calculated via historical regression*. Overall, while MSFT maintains a conservative and equity-heavy capital structure with excellent credit standing, KO adopts a more leveraged approach that enhances financial efficiency through lower borrowing costs. However, this comes at the expense of elevated credit risk and greater sensitivity to interest rate fluctuations.

Microsoft's **WACC of 9.41%** is primarily driven by its cost of equity, reflecting the company's limited use of debt financing. This equity-heavy structure aligns with investor expectations for sustained growth in the technology sector. Despite Microsoft's strong credit rating and low default risk, factors that contribute to a low cost of debt, the minimal use of leverage limits its effect on reducing overall WACC. In contrast, Coca-Cola's **WACC is lower at 7.81%**, driven by a capital structure that relies more heavily on low-cost debt. The company's stable and predictable cash flows reduce the risk perceived by creditors, while its lower beta contributes to a more modest cost of equity. Together, these factors result in a more cost-efficient financing structure. Overall, **Microsoft's conservative use of debt supports financial flexibility and long-term credit stability, making it attractive to risk-averse investors. Coca-Cola's greater use of debt enhances capital efficiency, which may appeal to investors seeking steady returns at a moderate risk level.**

MSFT's dividend policy is **conservative**, with a **dividend payout ratio of around 25%** and a **dividend yield typically below 1%**. By retaining the majority of its earnings, MSFT signals that it sees better internal investment opportunities, such as R&D and acquisitions, to generate long-term shareholder value. This makes MSFT a **mature growth company,** not a risky startup, but still reinvesting heavily to expand, innovate, and dominate new tech sectors like AI. It's a company investors choose for long-term capital appreciation, not for steady dividends. In contrast, KO's dividend policy reflects its role as a **value company**. It maintains a **high payout ratio of approximately 75–80%** and offers a dividend yield of around 3–3.5%, making it attractive to income-seeking investors. The reliable, growing dividend signals stability, maturity, and a focus on shareholder income over rapid growth (Yahoo Finance, 2025).

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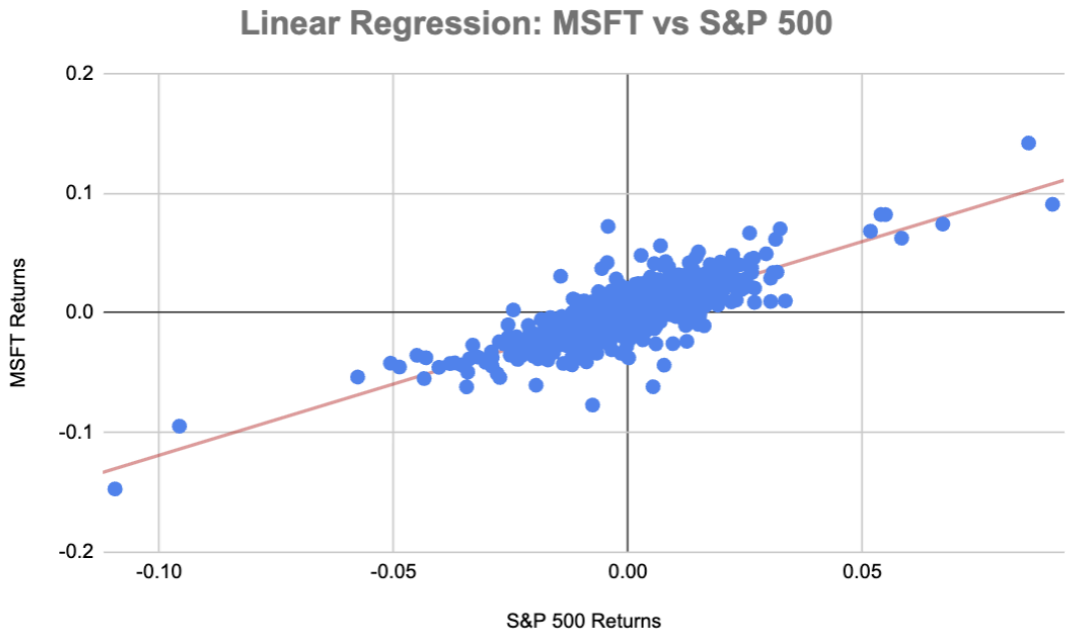
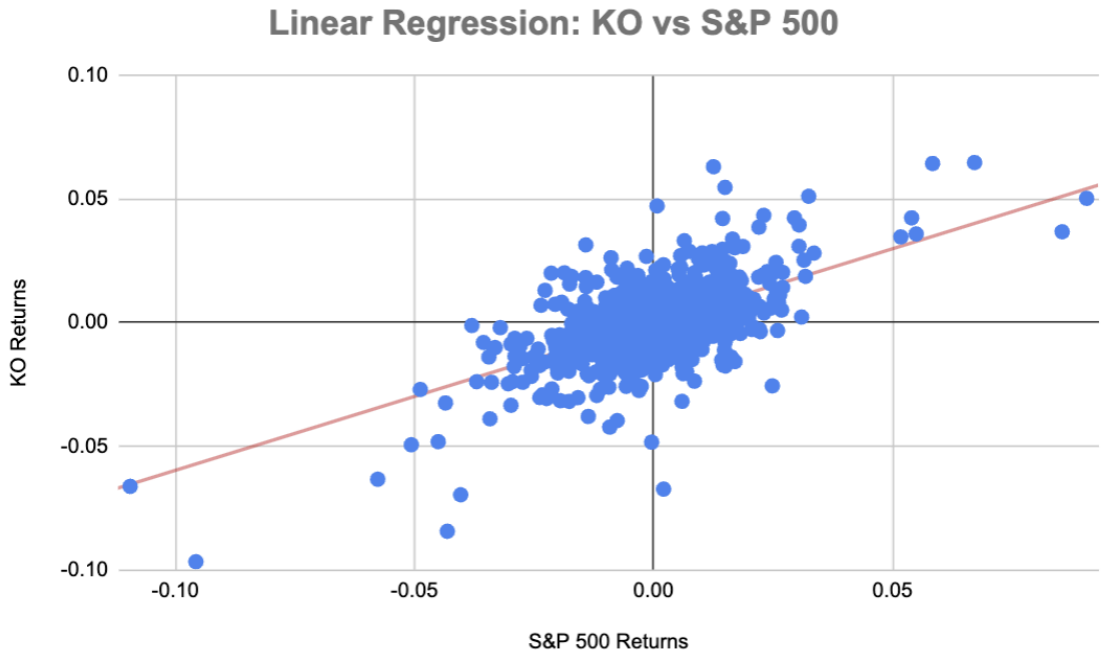
Appendix

1. Github Link: [Excel Calculations & Portfolio Optimization Python Notebook]

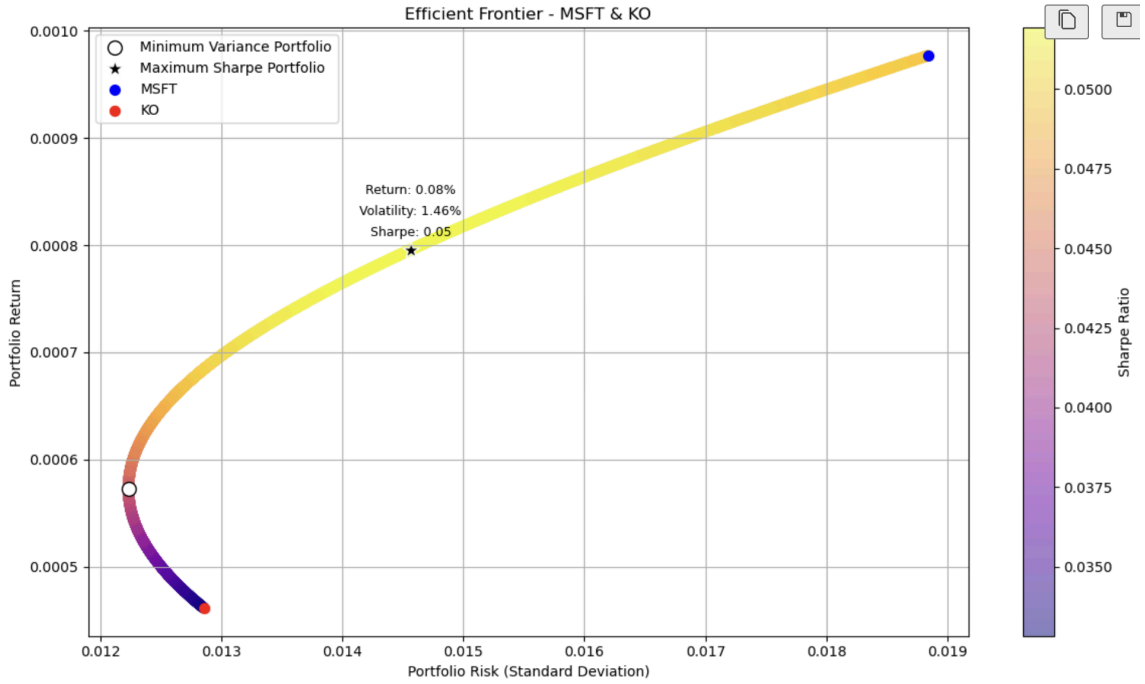
2. Linear Regression on Expected Returns (MSFT & KO)



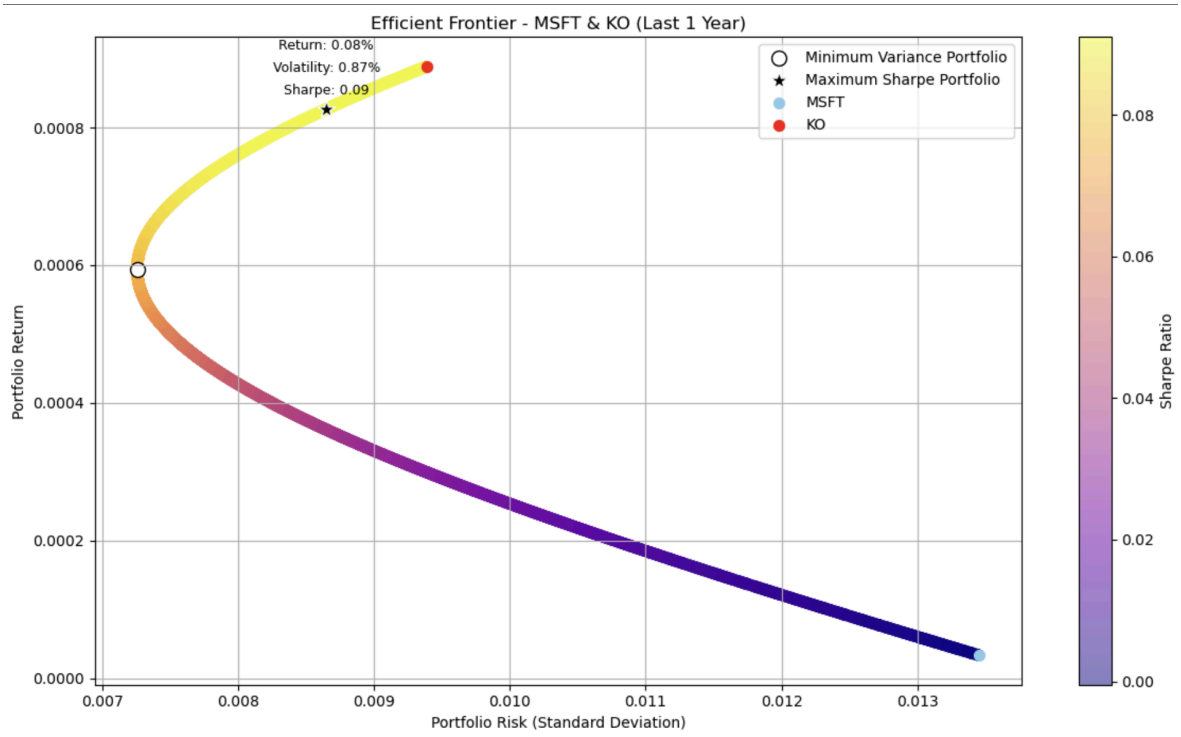


3. Portfolio Optimization

a. Efficient Frontier (5 year data)



b. Efficient Frontier (Latest 1 year data)



4. Performance of the Portfolios

5-Year_Portfolio_Performance

Portfolio	Return (%)	Risk (std. dev. %)
Microsoft (MSFT)	14.23	28.14
Coca-Cola (KO)	9.87	18.54
Minimum Variance Portfolio	12.62	16.02
Maximum Sharpe Portfolio	14.63	16.26

1-Year_Portfolio_Performance (1)

Portfolio	Return (%)	Risk (std. dev. %)
Microsoft (MSFT)	7.12	22.3
Coca-Cola (KO)	13.48	14.1
Minimum Variance Portfolio	11.33	13.08
Maximum Sharpe Portfolio	13.37	13.22