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Unleashing the Power of Modern Portfolio Theory: Maximizing Returns while Managing Risk

1. Overview

- Modern portfolio theory is a mathematical approach that helps in creating an investment portfolio by considering both the potential risks and returns.
- It involves selecting assets that have a correlation with historical returns and that can diversify the portfolio.
- MPT key component is diversification meaning that optimal results are achieved by selecting a balanced mix of high-risk/high-return and low-risk/low-return investments, tailored to individual risk tolerance.

4. Balance Risk and Reward

- MPT assumes risk-averse investors who prefer less risky portfolios with the same expected return. They accept higher risk only when rewarded with higher expected returns.
- Ticker daily returns: Volatile with frequent ups and downs.
- Highest annual return: PFE (2021) at **31.6%.**
- Lowest annual return: CAT (2018) at **-16.2%.**

2. Goal

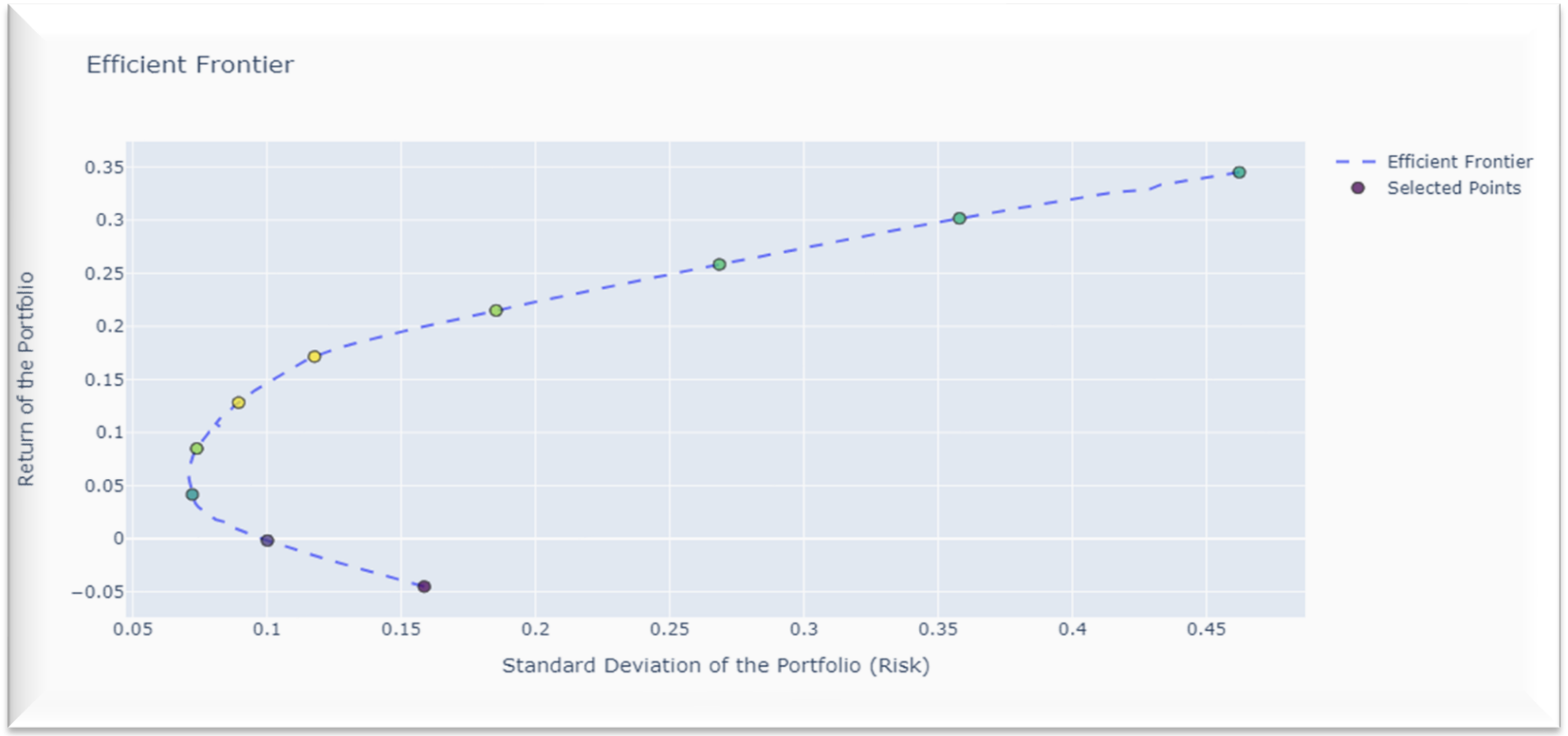
- By the end of the poster, I will make sure that you will understand the end-to-end process of Modern Portfolio Theory in detail.
- I promise you; it is an interesting one!

3. Diversified Portfolio Analysis

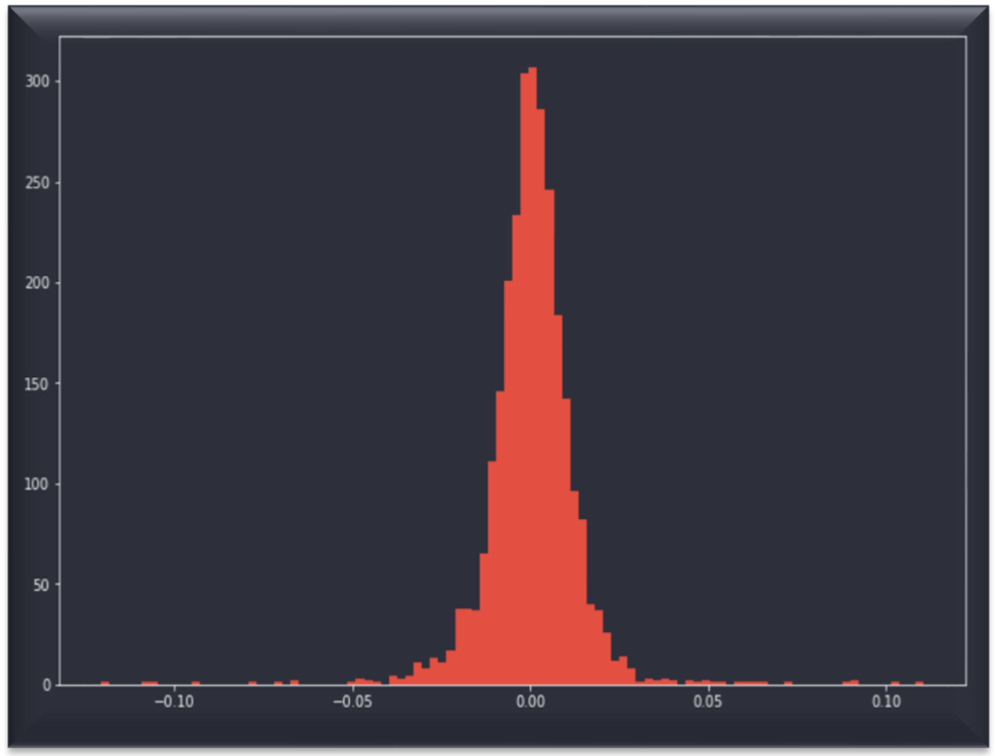
- Our sample portfolio comprises eight diverse assets, representing exposure to various sectors in the Global Industry Classification Standard (GICS).
- Historical data from Yahoo Finance was collected, spanning from **January 1, 2018, to December 31, 2022,** providing valuable insights for our analysis.

Software & Tools

6. Visualizing Efficient Portfolio



7. Portfolio Risk Assessment



5. Sharpe Ratio

- The Sharpe ratio measures the risk-adjusted return, considering both portfolio return and risk.
- With a Sharpe ratio of **0.8578**, the portfolio generates a return **85.77%** higher than the risk-free rate, accounting for its inherent risk.

8. Results

- Ideal Portfolio: **WMT 12%, MCD 18%, PFE 22%, CAT 17%, DOW 8%, AAPL 9%, NEE 16%, DD% -4, Sharpe ratio 1.14.**
- Risk Range: Lowest risk **(WMT)** to highest risk **(DOW)** portfolios on the efficient frontier.
- **AAPL** has the highest return and risk, while **DD** has the lowest risk and return.
- The VaR for our **WMT** assets is **$14,724** with **95%** certainty, indicating a potential maximum loss of that amount.

9. Recommendations

- Investors can choose higher Sharpe ratio portfolios for more risk**(For eg-AAPL)**
- Select portfolios along efficient frontier with desired Sharpe ratio.
- Consider specific assets in portfolio for desired exposure.
- Use VaR as measure of risk, considering its probabilistic nature

10.References

- https://www.forbes.com/advisor/investing/modern-portfolio-theory/
- Practical Portfolio Performance Measurement and Attribution
- Mastering pandas for Finance
- Python for Algorithmic Trading

***Disclaimer**: This educational poster does not provide financial advice and I do not claim to be a financial expert. Its purpose is to facilitate knowledge sharing and encourage learning.*