Report

Introduction

The following report analyzes the Marginal Value at Risk (mVaR) for various sectors and individual tickers within a diversified portfolio. The mVaR provides insights into the incremental risk each sector and ticker contribute to the overall portfolio's Value at Risk (VaR). This analysis uses both parametric and historical methods to calculate the portfolio VaR.

Portfolio VaR Calculation

The total portfolio VaR was calculated using two different methods:

1. **Parametric Method**: -$2,053,996
2. **Historical Method**: -$2,576,477
3. **Monte Carlo Method**: -$2,067,942

These values indicate the potential maximum loss in the portfolio's value at a given confidence level, with the historical method yielding a higher risk estimate compared to the parametric method.

Sector-Level mVaR Analysis

Sector	mVaR
Basic Material	-0.023679
Communication Services	- 0.017924
Consumer Cyclical	-0.022721
Financial Services	-0.016115
Healthcare	-0.020883
Technology	-0.061365
Utilities	-0.004760

Observations:

- The **Technology** sector exhibits the highest mVaR (-0.061365), suggesting that it provides the greatest risk diversification benefit within the portfolio.
- The **Utilities** sector shows the lowest mVaR (-0.004760), indicating a minimal impact on reducing portfolio risk.
- Other sectors such as **Basic Materials**, **Consumer Cyclical**, and **Healthcare** also contribute significantly to risk diversification

Ticker-Level mVaR Analysis

The table below presents the mVaR values for individual tickers along with their corresponding sectors:

Ticker	mVaR	sector
ADI	-0.02518	Technology
APD	-0.02478	Basic Materials
CLVT	-0.26428	Technology
DIS	-0.02154	Communication Services
GOOGL	-0.02404	Communication Services
IFF	-0.02101	Basic Materials
KLAC	-0.02778	Technology
LOW	-0.02476	Consumer Cyclical
MDT	-0.01597	Healthcare
NTES	-0.0201	Communication Services
NXPI	-0.02668	Technology
SAP	-0.02387	Technology
SCHW	-0.01875	Financial Services
SONY	-0.0185	Technology
TEL	-0.02375	Technology
UNH	-0.0259	Healthcare
WFC	-0.01413	Financial Services
WMG	-0.00486	Communication Services
XEL	-0.00476	Utilities
YUM	-0.02055	Consumer Cyclical

Observations:

- **CLVT (Technology)** has the most significant mVaR (-0.264275), indicating it contributes substantially to reducing overall portfolio risk.
- **WMG (Communication Services)** and **XEL (Utilities)** have the lowest mVaR values, suggesting limited impact on risk reduction.
- Most of the tickers in the **Technology** sector show high negative mVaR values, reinforcing the sector-level observation that technology stocks are significant diversifiers.

Conclusion

The analysis demonstrates that both sector and ticker-level mVaR provide valuable insights into the risk contribution of individual components within a portfolio. The **Technology** sector, and specific tickers such as **CLVT**, offer substantial diversification benefits. This information is crucial for portfolio optimization, enabling better risk management and strategic asset allocation.

Further, the differences between parametric and historical VaR estimates highlight the importance of using multiple methods to understand portfolio risk comprehensively.