*Summary & Highlights*

**EMC performance.** Using a 5-year historical view, the majority of assets held have tracked the S&P/TSX closely. Since Q1 2024, these assets have negatively diverged and are currently underperforming.

# Energy, Materials, and Commodities

List of assets omitted from the analysis:
- ABRASILVER RESOURCE CORP
- CEGH VTP Nat Gas MDec24
- CONSTELLATION ENERGY
- COPPER FUTURE Dec24
- COPPER FUTURE Mar25
- Dogecoin
- FCOJ-A FUTURE Jul25
- Lumber Future Nov24
- SLV US 11/15/24 C33
- Solaris Resources Inc

*Performance Summary*

EMC's assets have performed well historically. Cumulative returns outperformed the S&P/TSX from Q2 2022 to Q4 2023. Beginning in 2024, performance has diverged and is currently underperforming.

Upside risk is moderate. Using a monthly minimum acceptable return (MAR) threshold of 0.5%, historical data suggests a favourable risk-return profile. Volatility is moderate at 3.84% which suggests returns above MAR are subject to some variability but are not extremely volatile. Variance is low at 0.15% indicating returns above MAR are relatively consistent. Potential is positive and suggests that when monthly returns exceed 0.5%, they tend to higher by 2.16% suggesting good performance during favourable periods.

Using a 95% confidence level, the portfolio is unlikely to incur a loss greater than 11.08% in a given month.
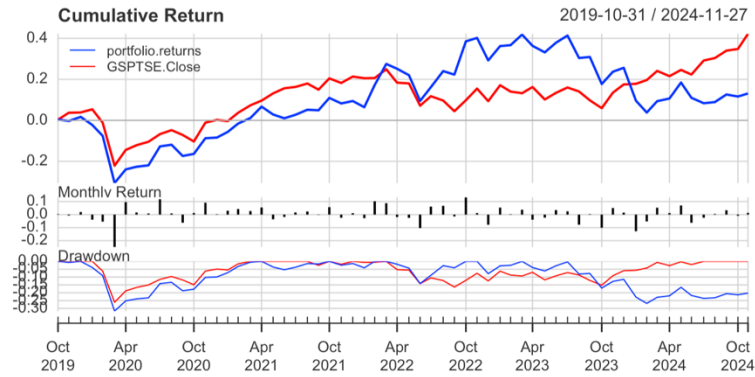
**Selected Assets (EMC) Summary**



Figure 1. Historical performance of selected assets (EMC)


*Technical Summary*

Performing risk analysis requires reliable data. If there are not a large number of historical observations of returns for an asset, then any risk measure calculated needs to be viewed with caution. Accordingly, several assets were removed from the analysis to analyze 5-year historical data. The portfolio analyzed consisted of 24 assets ranging from 2019-10-17 to 2024-11-27.

To begin the analysis, monthly returns were calculated for the portfolio of selected assets and the S&P/TSX. A quantile-quantile (QQ) and density plot were used to assess the distribution of returns. From inspecting Figure 2., the majority of points align closely with the reference line indicating the majority of the data approximately follows a normal distribution. Right tail behaviour demonstrates minimal skewness and left tail behaviour demonstrates noticeable deviation suggesting a Gaussian assumption is inappropriate for these returns. Inspecting Figure 3., the density plot demonstrates leptokurtic behaviour with a fat left tail of the distribution. This was confirmed with a kurtosis value of 6.15. To adjust for the heavy tailed behaviour, the Cornish-Fisher expansion was used to calculate Value-at-Risk (VaR) which will better represent the data.
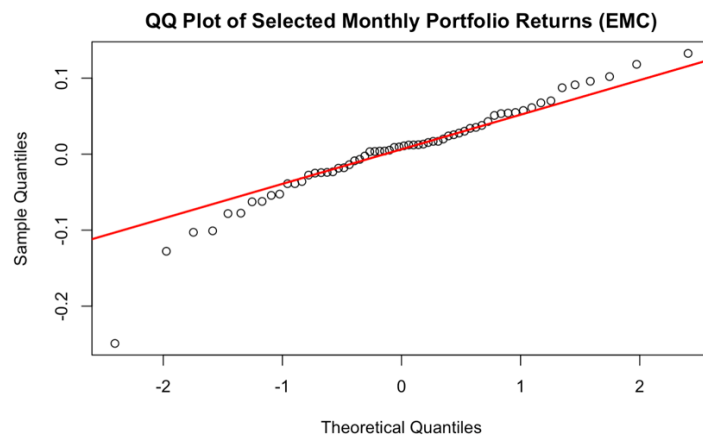


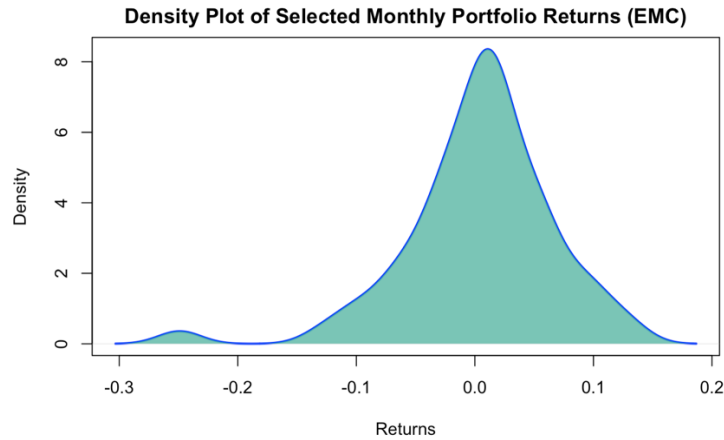Figure 2. QQ-plot of selected monthly portfolio returns

Figure 3. Density plot of selected monthly portfolio returns

To assess whether the Cornish-Fisher expansion was the correct method, multiple VaR calculations were completed using varying parameters. As well, expected shortfall was also calculated. From Figure 4., the methods of VaR estimation were evaluated as the confidence level changed. This was done to assess how changing confidence levels affect the tail quantiles of the distribution. As confidence level increased, the risks measured increase indicating that at higher confidence levels we can expect to see greater potential losses. Moreover, if we used a Gaussian assumption to assess maximum potential loss, we would underestimate the magnitude of the loss at a 99% confidence level by over 5%. This suggests the Cornish-Fisher expansion provides a conservative VaR that better insulates the portfolio to risk than if a normal assumption was used to model monthly returns.
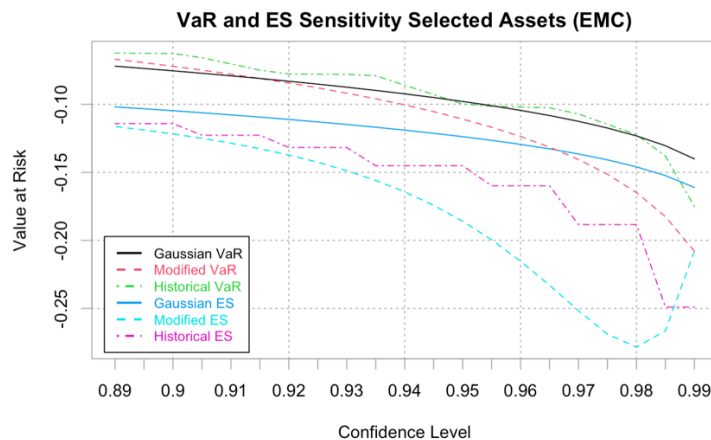


Figure 4. VaR sensitivity plot