

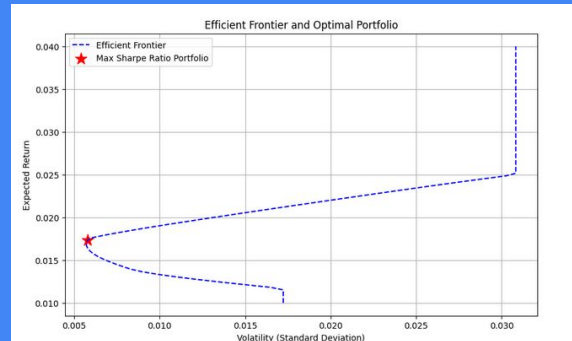
Efficient Frontier & Portfolio Optimization

Efficient Frontier = set of optimal risk–return portfolios.

MVO (Mean-Variance Optimization): maximizes Sharpe ratio → best risk-adjusted return.

Alternatives:

- Risk Parity → balances risk across assets.
- Equal Weighted → simple benchmark.



Allocation by Strategy

The comparison of allocations made as per portfolio methods:

- **MVO (Max Sharpe):** INFY ~65%, RELIANCE ~24%, HDFC Bank ~12%, others ~0%.
- **Risk Parity:** RELIANCE ~20%, HDFCBANK ~18%, INFY ~21%, TCS ~19%, ITC ~21%
- **Equal Weighted:** Fixed 20% each stock.

Performance Comparison (5-Year Backtest)

| Metric | MVO Portfolio | Risk Parity Portfolio | Equal Weighted Portfolio |
|-------------------|---------------|-----------------------|--------------------------|
| Total Return | 141.65% | 86.26% | 74.87% |
| Annualized Return | 19.30% | 13.25% | 11.83% |
| Volatility | 1.04% | 0.91% | 0.94% |
| Sharpe Ratio | 18.49 | 14.62 | 12.62 |

Recommendation – Sharpe vs Drawdown

- **MVO:** Best return & Sharpe, but concentrated → higher drawdown risk.
- **Risk Parity:** Lower risk, balanced allocation → safer choice for risk-averse investors.
- **Equal Weighted:** Simplest, but least efficient.

Recommendation:

- Use **MVO with risk constraints** (cap sector/stock exposure).
- If drawdown control is top priority → **Risk Parity**.