GoldTechETF: A Rules-Based Tech–Gold Rotation Strategy

Monte Carlo Evaluation and Implementation Framework

MSDS-451 Financial Engineering • August 31, 2025

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Agenda & Strategic Motivation

01

Motivation & Product Rationale

Why combine tech momentum with gold defense

02

Strategy Rules & Implementation

Transparent, auditable decision framework

03

Data & Monte Carlo Evaluation

Rigorous testing methodology

04

Results Analysis

Three key performance visualizations

05

Business Recommendation

Go/no-go decision and reproducibility

Core Investment Thesis

Technology Sector

Delivers long-run growth but exhibits high cyclical volatility

Gold Allocation

Provides diversification during equity stress regimes

Rules-Based Approach

Replace discretionary timing with codified, auditable rules

Strategy Architecture at a Glance

Growth Sleeve

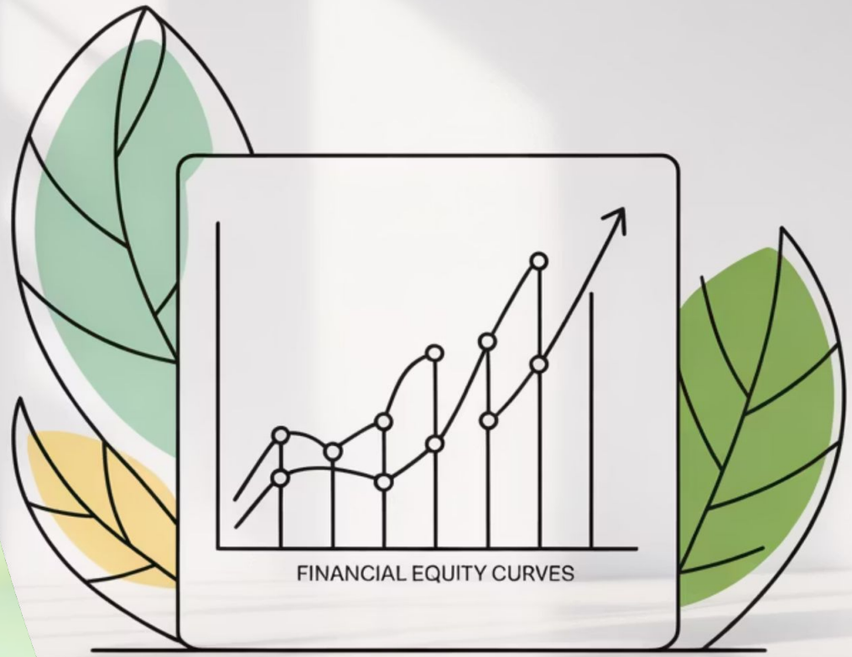
Momentum-ranked large-cap technology stocks with equal-weight allocation and weekly rebalancing cadence

Defense Sleeve

Strategic allocation to GLD when gold trend is positive **and** volatility indicators show market stress

Benchmark & Reporting

Performance measured against SPY with all outcomes reported **net** of trading costs and management fees



Key Design Principles: Compact rules with bounded turnover, liquid underlying assets, and ETF-friendly weekly rebalancing for optimal implementability in institutional portfolios.

Data Architecture & Evaluation Framework

Monte Carlo Engines

1

Parametric (Gaussian) Model

Calibrated to historical means and covariances stored in `mc/params.json` for consistent baseline scenarios

2

Block Bootstrap Resampling

Resamples from `mc/hist_returns.csv` to preserve temporal dependence structures and regime clustering

Key Performance Indicators

Net CAGR: Compound annual growth rate after all fees

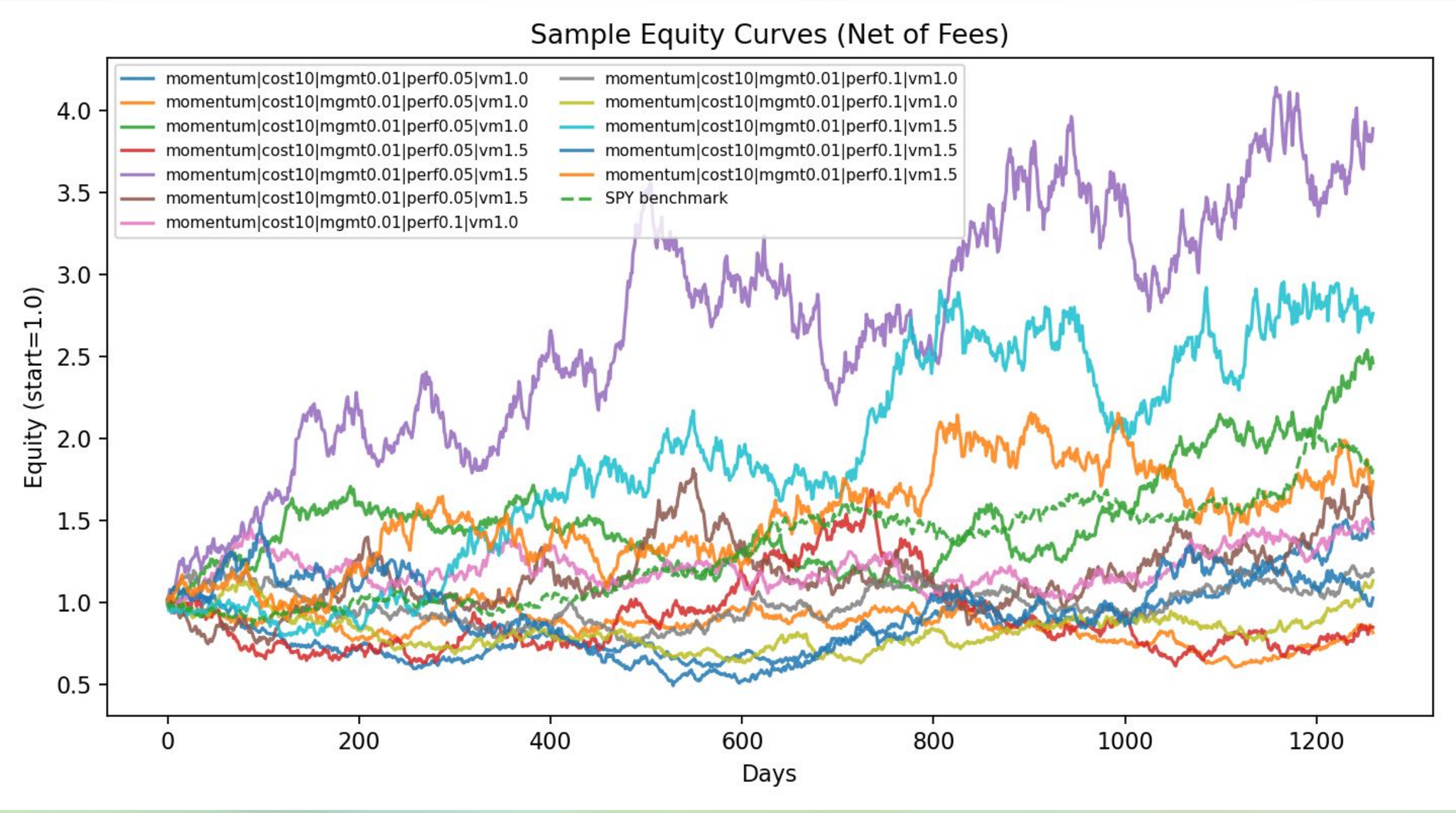
Net Sharpe Ratio: Risk-adjusted returns

Alpha/Beta vs SPY: Systematic risk decomposition

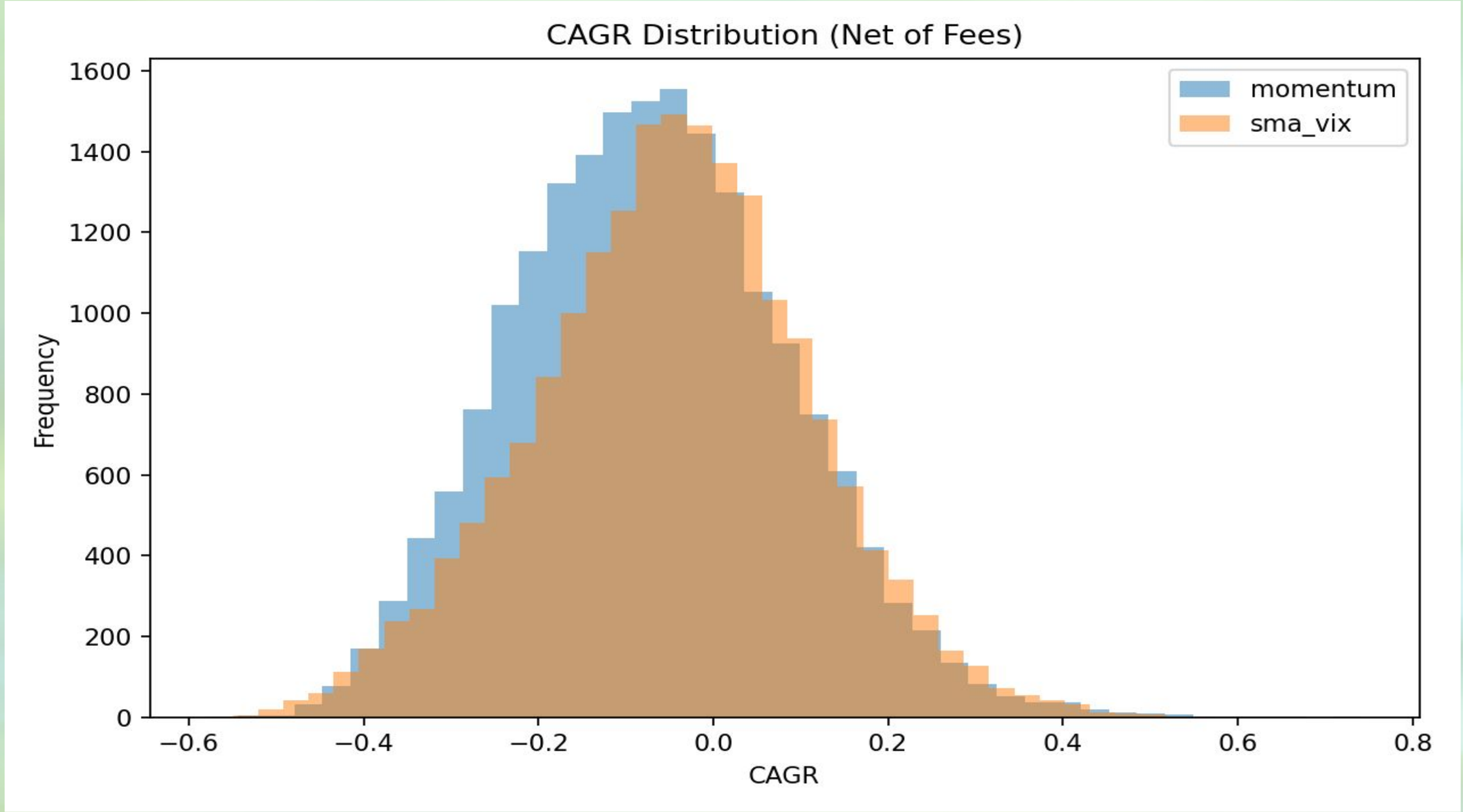
Maximum Drawdown: Worst-case loss scenario

Turnover Analysis: Transaction cost impact

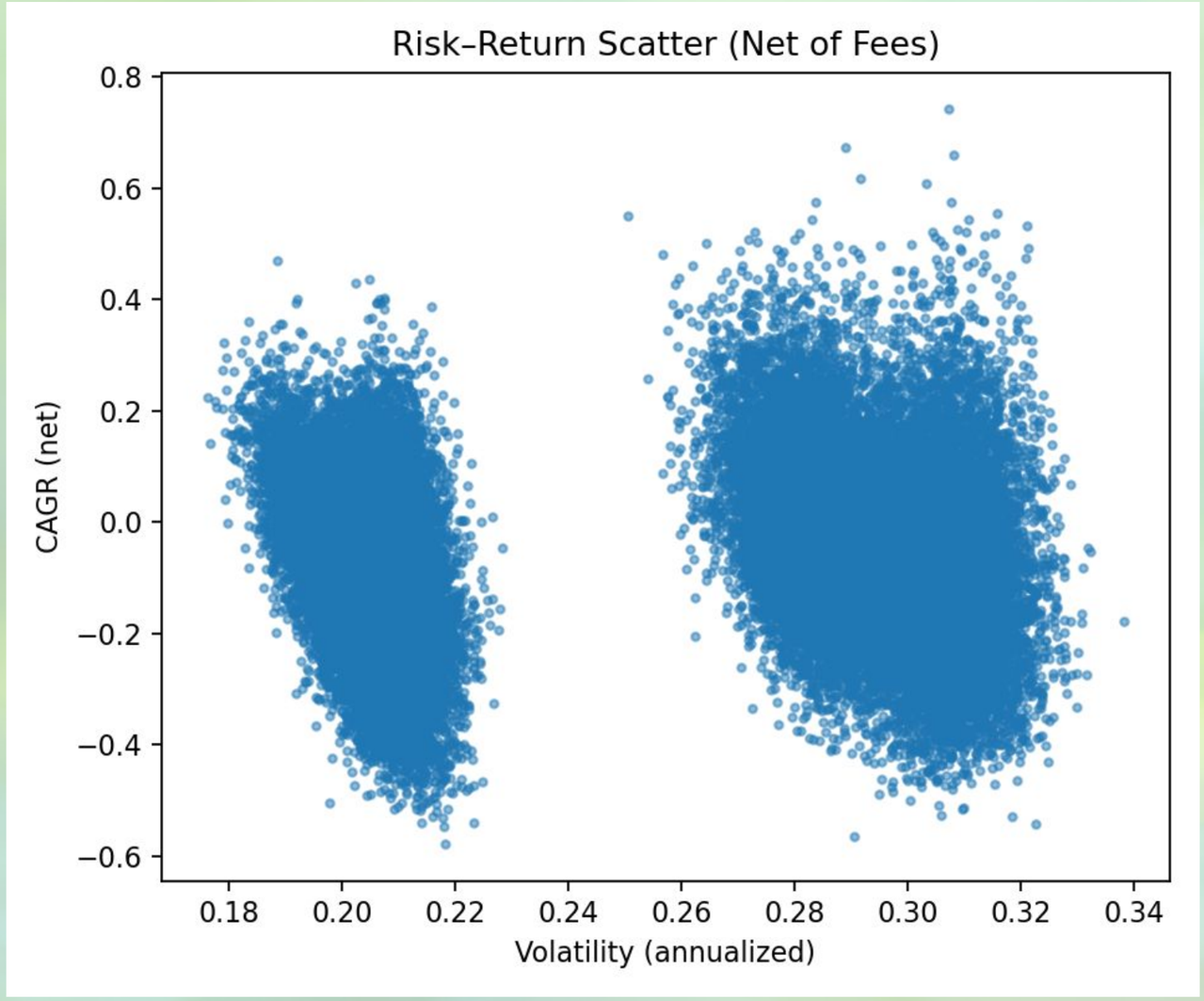
Results: Sample Equity Curve Paths



Results: Return Distribution Analysis

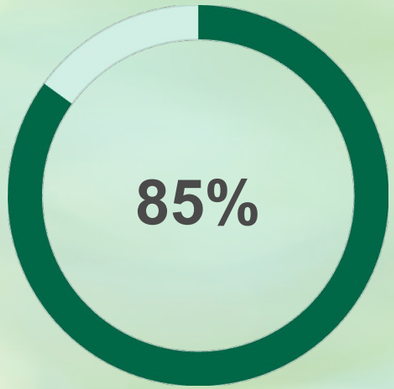


Results: Risk-Return Profile



Risk-Return Correlation

Strong positive relationship

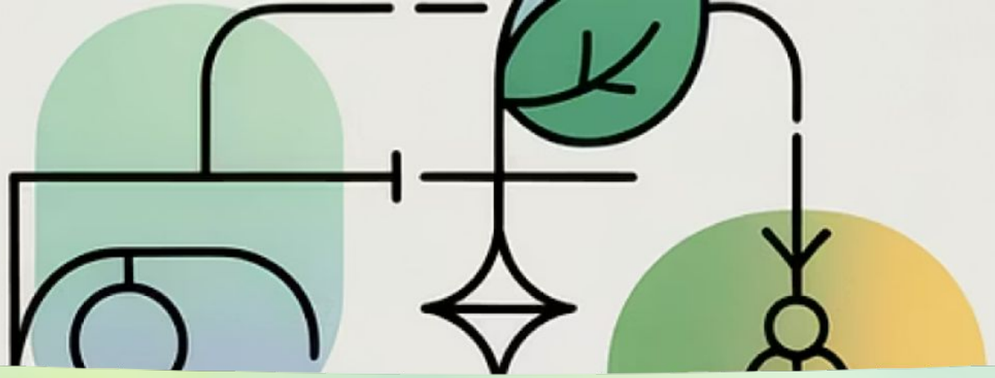


Scenarios Above Benchmark

Risk-adjusted outperformance

Reward-to-Risk Ratio

Versus market average



Business Recommendation: Go/No-Go Analysis

Phase 1: Paper Trading Pilot

Implement 6-month paper-traded pilot with daily NAV calculation and public signal transparency. Monitor live slippage and flow dynamics.

1

Phase 2: ETF Launch Decision

If live tracking matches net distribution projections with modest slippage, proceed to small ETF launch with transparent, single management fee structure.

2

Phase 3: Team Assembly

Deploy focused team: quantitative PM for rules/data/risk, researcher for stress-testing, engineer for pipeline/compliance automation.

3

Recommendation: PROCEED with disciplined, visible pilot approach. Escalate to full launch only upon validated live performance matching Monte Carlo projections.

Implementation Details & Limitations

Reproducibility Framework

Complete analytical pipeline ensures full reproducibility through standardized notebooks and configuration management:

Primary Workflow: `fit_params.ipynb → run_mc_experiments.ipynb`

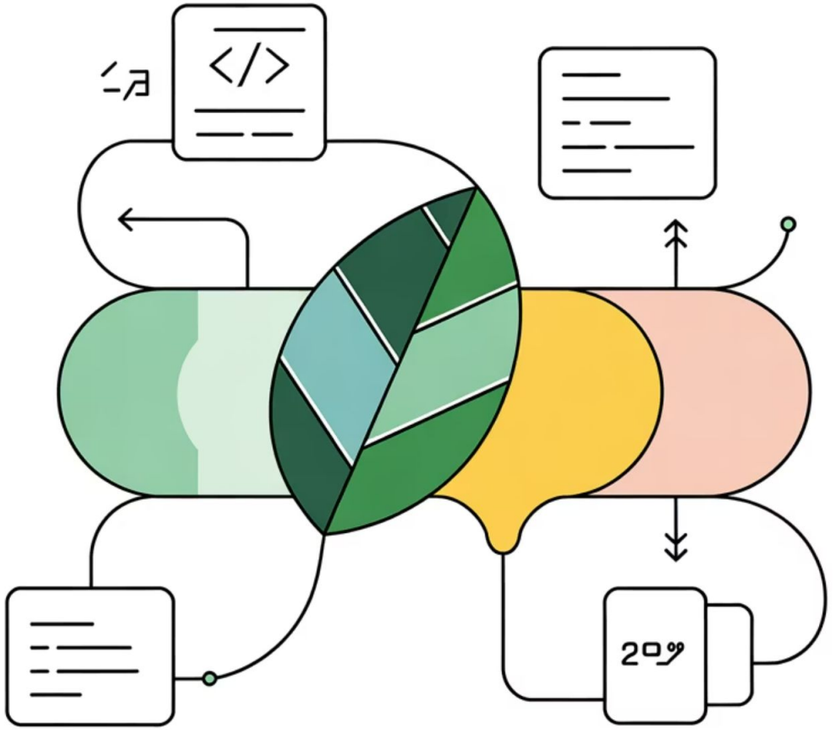
Input Configuration: `mc/params.json, mc/hist_returns.csv`

Output Artifacts: `mc/out/summary.csv, mc/out/logs.txt` plus all figures

Every numerical result and visualization is traceable to specific configuration parameters and random seeds, enabling complete audit trails and sensitivity analysis.

Current Limitations

- Monte Carlo generators abstract from intraday liquidity constraints and tax considerations
- Single volatility gauge implementation—alternative definitions may alter timing
- Flow impact modeling requires live validation during pilot phase



Financial Software Development

Key Takeaways

Transparent Execution

Compact rules operating on liquid assets with weekly rebalancing cadence ensure operational simplicity and regulatory compliance.

Robust Performance

Monte Carlo analysis demonstrates attractive distributions of **net outcomes** versus current market alternatives across diverse scenarios.

Clear Implementation Path

Practical progression from pilot validation through lean ETF launch with disciplined risk management throughout.

Thank you!