2024 IMAP PMC
- New Technology and Portfolio Construction

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Milliman

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Constructing a systematic risk management strategy

Why?

Build low-cost, resilient portfolios that help provide retirees and risk adverse investors the confidence to stay invested through managing risk

1

Defining objectives

- Advisor/client facing objectives
- Internal performance/risk metrics

2

Building a modelling framework

- Realistic scenarios for asset class returns
- Model and test the strategy across scenarios
- Look beyond return/risk to focusing on retirement goals/outcomes.

3

Designing the strategy

- Establishing levers
- Build a rules-based algorithm to optimise against the objectives.

4

Review outcomes

- Assess expected outcomes against objectives
- Assess live performance

1. Defining objectives and investment metrics

Providing confidence to stay invested and move up the risk spectrum

Average Return

- Measures point to point investment returns
- Objective is for the risk managed portfolios to yield a similar expected average return to its benchmark

Volatility

- Frequency and magnitude of price movements
- Objective is to deliver a marginally lower, but significantly more stable volatility than its benchmark

Sharpe Ratio

- Measures risk adjusted returns.
- Objective is to deliver better Sharpe ratios than its benchmark

CTE90: Average in worst 1 in 10 years

- Measures the average outcome in ‘bad’ scenarios (commonly used by regulators/banks for capital)
- Objective is to halve negative returns in the worst 1 in 10 scenarios

Return Distribution (middle)

- Performance in “normal” markets
- Objective here is track the benchmark closely, but allow some underperformance

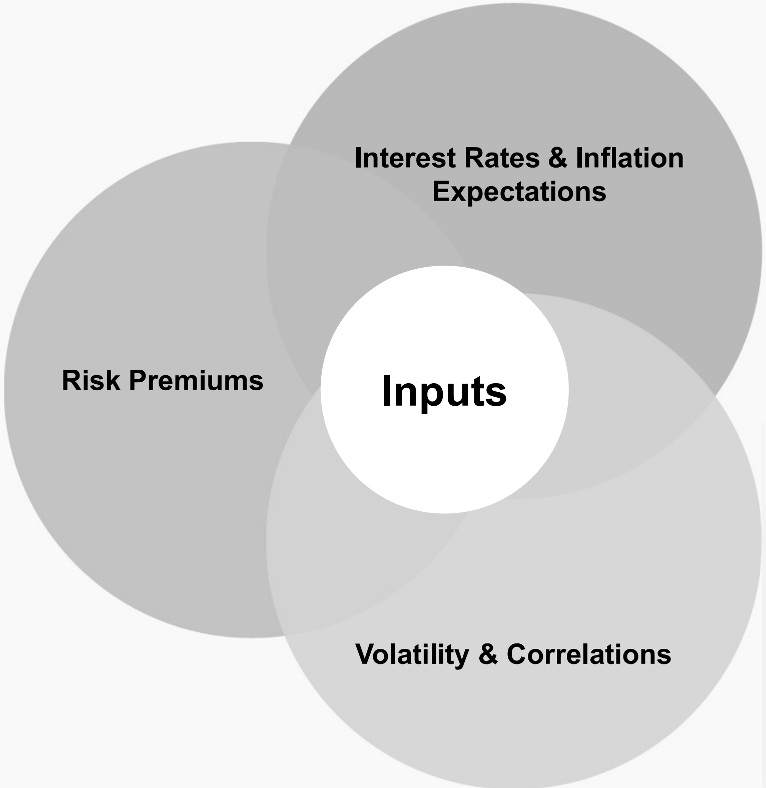
Return Distribution (right tail)

- Performance in strong markets (90^{th} percentile)
- Objective is to track or exceed the benchmarks to help offset any underperformance in the middle.

2. Building a robust modelling framework

Process:

1. Selecting models that reflect long-term dynamics of financial markets
2. Calibrating model parameters against historical data and expert judgement
3. Review scenarios for reasonableness compared to history and current market conditions



Outputs:

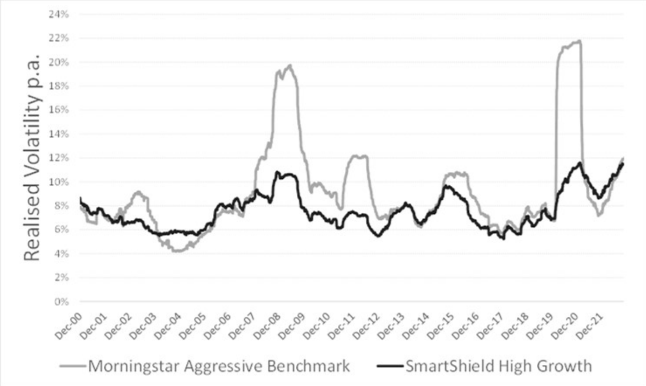
5,000 sets of daily returns over **40** years, for major asset classes

Stochastic member outcome modelling

3. Designing the strategy – selecting key components

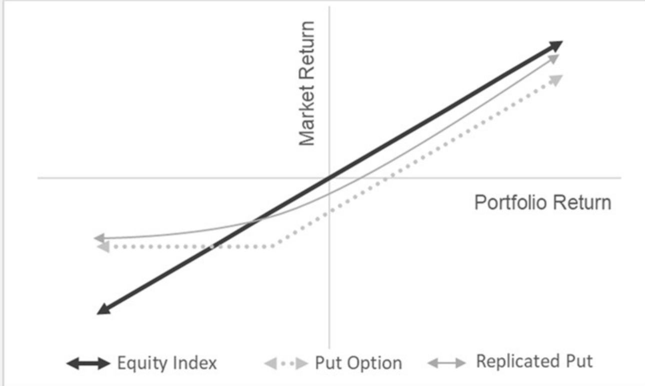
Volatility management

- Designed to provide a *smoother ride* by stabilising volatility.
- Implemented using a sophisticated volatility forecasting model.
- Hedging is generally increased as volatility spikes up and decreased as volatility subsides.



Downside risk management

- Designed to address sequencing risk, by *reducing the likelihood and severity of large market drawdowns.*
- Implemented by *'manufacturing'* a long-dated put option payoff, that delivers similar cushioning on the downside at a lower cost.
- Hedging is generally increased as equities sell-off and decreased as equities rally.



3. Designing the strategy – adjusting levers

Average Return

- Tilt towards growth asset (++)
- Volatility management (-)
- Downside risk management (-)

Volatility

- Tilt towards growth asset (++)
- Volatility management (--)
- Downside risk management (-)

Sharpe Ratio

- Tilt towards growth asset (variable)
- Volatility management (0)
- Downside risk management (+)

CTE90: Average in worst 1 in 10 years

- Tilt towards growth asset (-)
- Volatility management (+)
- Downside risk management (++)

Return Distribution (middle)

- Tilt towards growth asset (+)
- Volatility management (0)
- Downside risk management (--)

Return Distribution (right tail)

- Tilt towards growth asset (+)
- Volatility management (0)
- Downside risk management (0)

4. Review expected range of outcomes (Growth risk profile)

Average Return (Net of fees)

- Benchmark: 7.4%
- SmartShield: 7.7%

Expected to marginally exceed benchmarks over the long term.

Volatility

- Benchmark: 10.6%
- SmartShield: 10.0%

Expected to be marginally less volatile over the long term.

Sharpe Ratio

- Benchmark: 50.4%
- SmartShield: 56.9%

Expected to be have better Sharpe ratio over the long term

CTE90: Average in worst 1 in 10 years

- Benchmark: -10.0%
- SmartShield: -6.2%

Expected to capture approx. 60% of the drawdown in poor markets.

Return Distribution (middle)

- Benchmark: 6.8%
- SmartShield: 6.1%

Expected to underperform marginally in ‘normal’ markets.

Return Distribution (right tail)

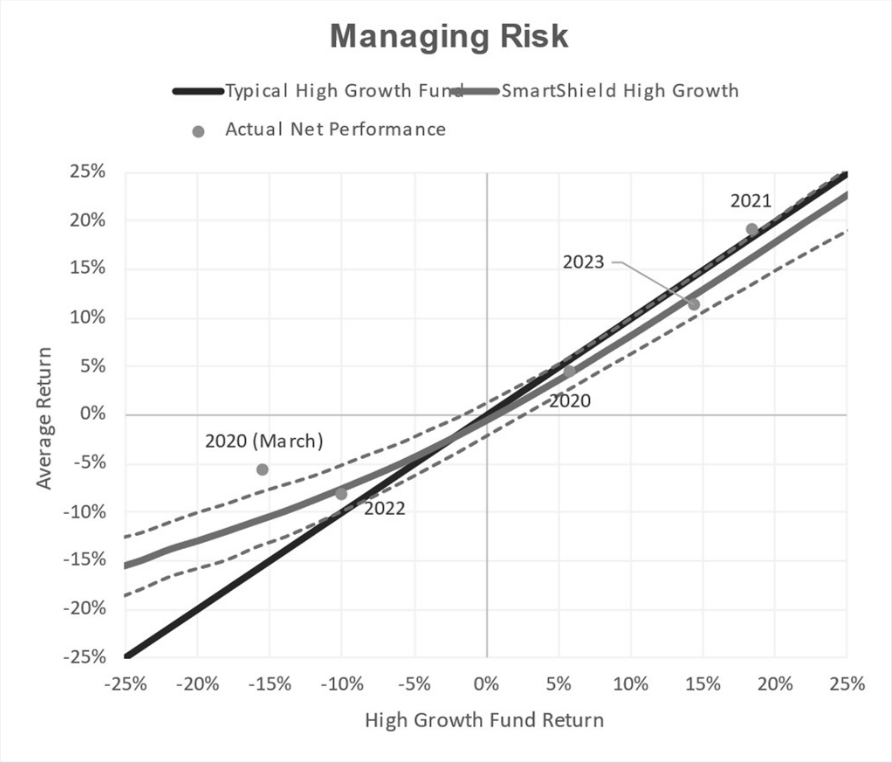
- Benchmark: 20.8%
- SmartShield: 21.4%

Expected to marginally outperform in strong bull markets.

*Based on 5,000, random, 40 year scenarios, calibrated using Milliman’s Standard Calibration as of 31st March 2022.

4. Review live outcomes against expectations

As at 31st December 2023, based on 5,000 stochastic scenarios, calibrated using Milliman's Standard Calibration*



Performing *as expected*

- Robust, systematic strategy ensures predictable outcomes.
- Since inception, live performance has landed within (or better than) expectations.
- True to label, cushioning the downside in 2020 & 2022, but also participate in the upside in 2021, as well as 2023 with whipsaws along the way.

*Based on 5,000, random, 40-year scenarios, calibrated using Milliman's Standard Calibration as of 31st March 2022. The dotted bands represent the 10th and 90th percentile of the selected strategy. All results are net of typical fees.

Thank you

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