Case Study 3
Exploring Multi-Sector Options

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Disclaimer

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This presentation and supporting research do not constitute financial advice and do not present normative recommendations for the management of funds with illiquid assets.

The purpose of this presentation and supporting research is to stimulate dialogue, discussion, and further research on the issues presented.

Multi-Sector Funds

Working definitions

- Multi-sector option
  - Is assumed to invest into a range of liquid and illiquid asset classes
  - Liquidity frequency is assumed to be daily
  - May provide a 'banker option' service to single sector options (for more information about the 'banker option' refer to Case Study 1 or Case Study 2)

Framing Liquidity Risk

There exists a range of risks associated with portfolios containing illiquid assets. Not all risks apply to each of our case studies:

First Order Risks	Solvency • Ability to meet cashflow demands as they arise		
Second Order Risks	1. Portfolio Quality • Deterioration in portfolio quality	2. Pricing Inequities • Inequities due to 'stale' pricing	3. Costs • Costs of meeting liquidity demands and restoring portfolio quality

Framing Liquidity Risk (ctd.)

- The Multi-Sector Case Study explores multiple areas associated with illiquidity:
- Portfolio quality is difficult to quantify. We focus on the following:
    - Allocating to illiquid assets
    - Distance from SAA (strategic asset allocation), measured by tracking error
    - Change in expected return
- Unit price inequities: we consider
    - Expected degree of mispricing: present asset valuation (which may be stale) compared against actual valuation. Note this is deterministic, not stochastic
- The cost of restoring portfolio quality:
    - To restore a portfolio to its SAA by applying user-defined estimates of transaction costs

Model Explained

- For a defined event scenario, on a month-by-month basis:

1 → **2**

We estimate market movements and investor activity (e.g. member switching)

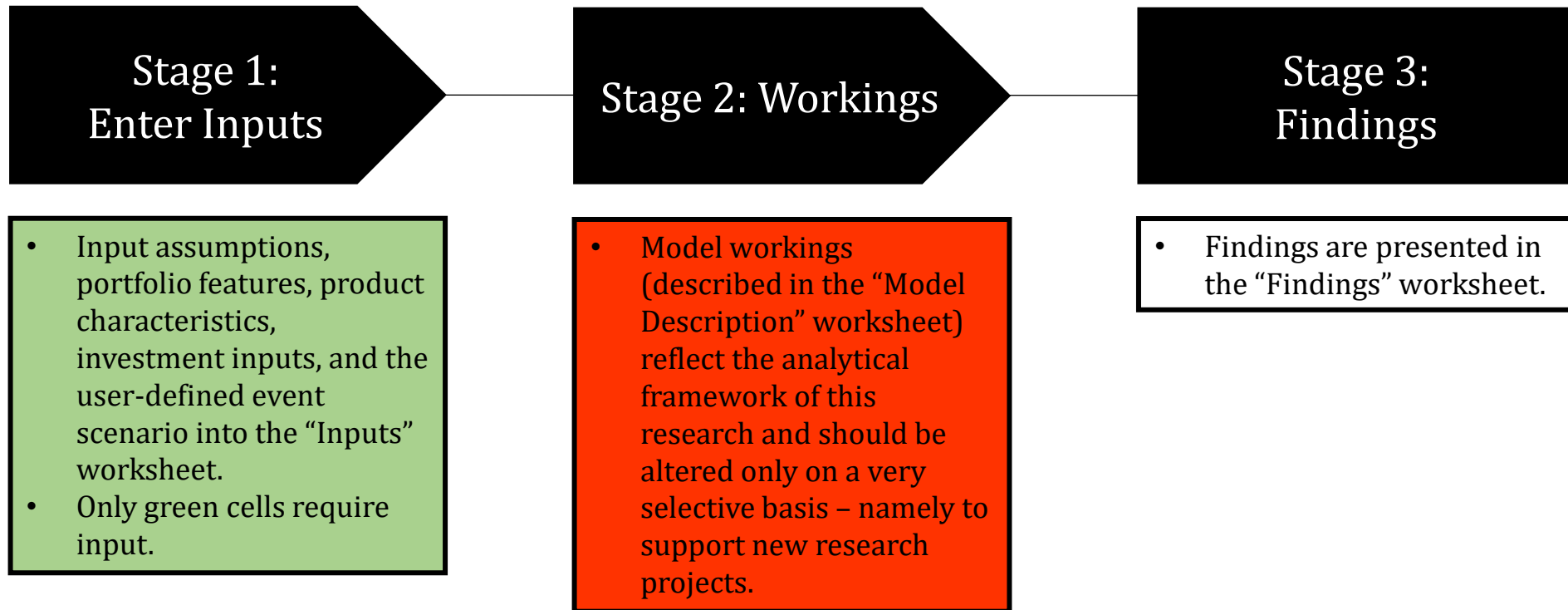**We approximate the cashflow management and portfolio rebalancing process**

- We can then track the evolution of the multi-sector option through the event scenario, monitoring characteristics of:
  - Portfolio quality
  - Unit price inequity
  - Cost of restoring portfolio quality

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Model Explained

- The model is deterministic i.e. it assumes an expected outcome and does not explore the range of possible outcomes
- Based on user inputs (including a user-defined scenario) the model provides expectations of how portfolio characteristics will evolve during the scenario

Using the Model

- The model is operated as detailed below, where each stage references model worksheets.

Stage 1: Enter Inputs

Stage 2: Workings

Stage 3: Findings

- Input assumptions, portfolio features, product characteristics, investment inputs, and the user-defined event scenario into the "Inputs" worksheet.
- Only green cells require input.

- Model workings (described in the "Model Description" worksheet) reflect the analytical framework of this research and should be altered only on a very selective basis – namely to support new research projects.

- Findings are presented in the "Findings" worksheet.

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Using the Model - Inputs

Portfolio Inputs

	Allocation	Growth%	Global%	FX Hedging Level	Total FX Hedging Exposure	Directly or externally managed
Liquid - Defensive	22.5%	0%	40%	100%	9.00%	Externally
Liquid - Growth	47.5%	100%	50%	50%	11.88%	Directly
Illiquid	30.0%	75%	40%	100%	12.00%	Directly
	100.0%					

Externally managed means an external manager will manage liquidity for FX hedging (i.e. no direct funding required).

Portfolio characteristics

	Liquid		Illiquid		
	Growth	Defensive	Growth	Defensive	
Domestic	23.8%	13.5%	13.5%	4.5%	55.3%
Global	23.8%	9.0%	9.0%	3.0%	44.8%
	47.5%	22.5%	22.5%	7.5%	
	70.0%		30.0%		100.0%

Using the Model - Inputs

Return and risk expectations

	E(Return)	E(Volatility)	Valuation frequency (every x mths)	Deterministic Monthly Movement		
Liquid - Defensive	2%	3%		1.0%		
Liquid - Growth	6%	12%		-2.8%		
Illiquid	6%	7%	6	0.0%	-8.4% periodic revaluation	-1.4% monthly theoretical
FX	0%	7%		-1.9%		

Return expectations are nominal returns.

These two numbers are calculated based off the market event.

Market event

Timeframe (duration of the shock)	18	months
Number of Standard Deviations	4	

Our market event is a GFC-style scenario.

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Using the Model - Inputs

Member / flows event

Member switching is assumed to be out of the multi-sector option and into cash.

Degree of member switching	Initial month:	1.00%	Subsequent months:	0.25%
Net fund flows (normal)	0.5% per month			
Impairment to fund flows (shock)	-1.0% per month	(e.g. reduced contributions, early release scenario etc.)		

This is the steady state inflow position pre-event.

Banker option obligations	Single Sector % in Illiquid Assets	% Flows out of illiquid single sector options (p/m)	Illiquid single sector options as a % of multi-sector option (p/m)	Total monthly cashflow requirements
	100%	2%	2%	0.04%

Correlation Matrix

Liquid Defensive	1	0	0
Liquid Growth	0	1	0.7
Illiquid	0	0.7	1

Cost of transacting illiquids

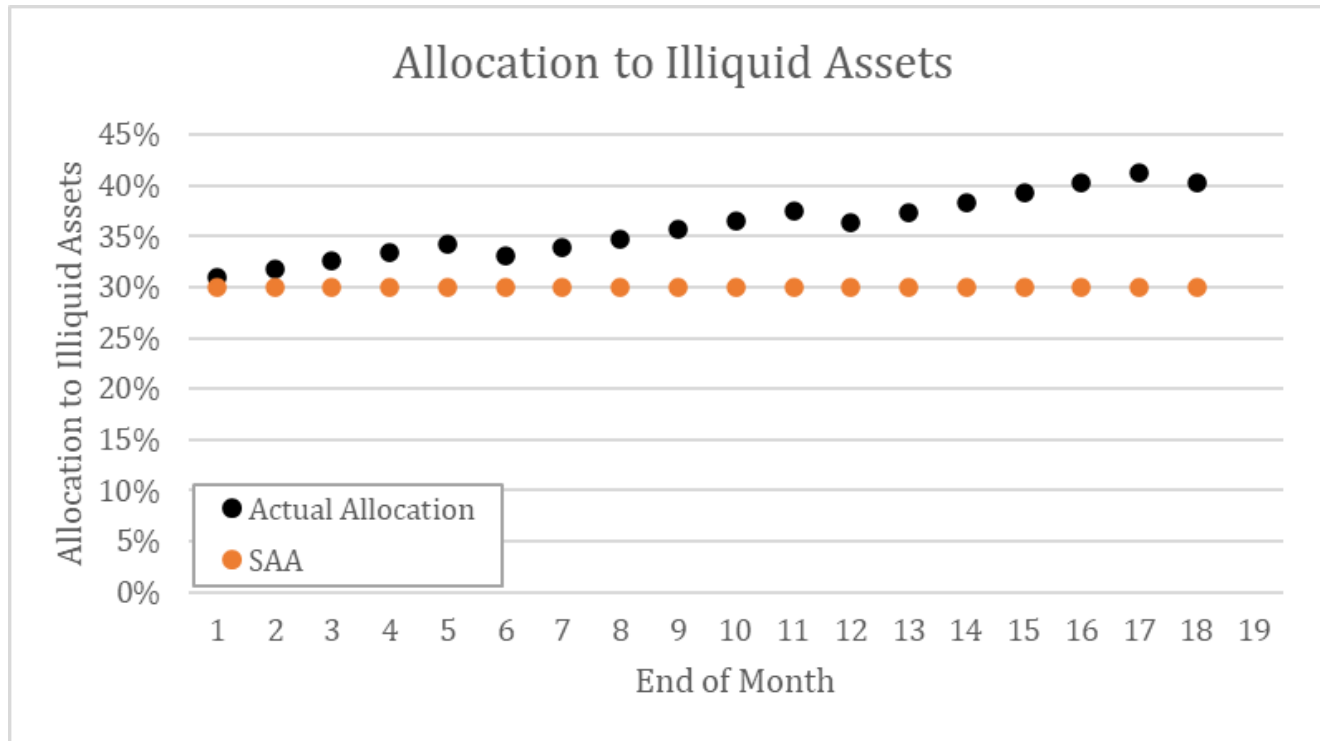|		
Fixed cost	5%	(linked to stamp duty etc)
Variable cost	4%	multiple of the variability of the environment (i.e. # standard deviations)

<u>Note</u>: This page includes default values. These default values are used to illustrate the model and are not a recommendation.

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Findings

Findings

This chart illustrates how the actual asset allocation to illiquid assets evolves relative to the targeted SAA.

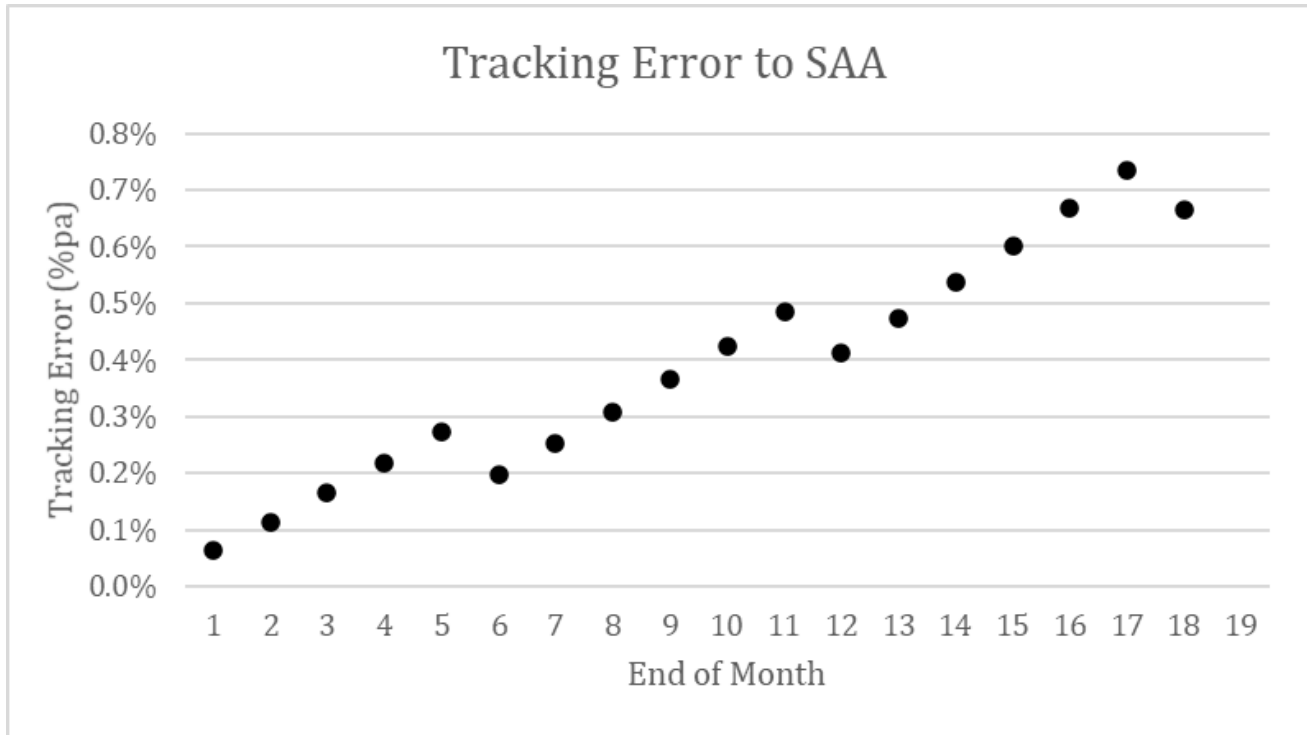This provides an indicator of portfolio solvency and a characteristic of portfolio quality.

Trustees may want to consider whether there is a threshold exposure to illiquid assets at which trustees need to freeze redemptions.

The scenario is a GFC-style scenario.

This is the top left chart on the "Findings" worksheet.

Findings

Findings

Tracking Error to SAA

This chart illustrates how the tracking error to the SAA evolves through time.
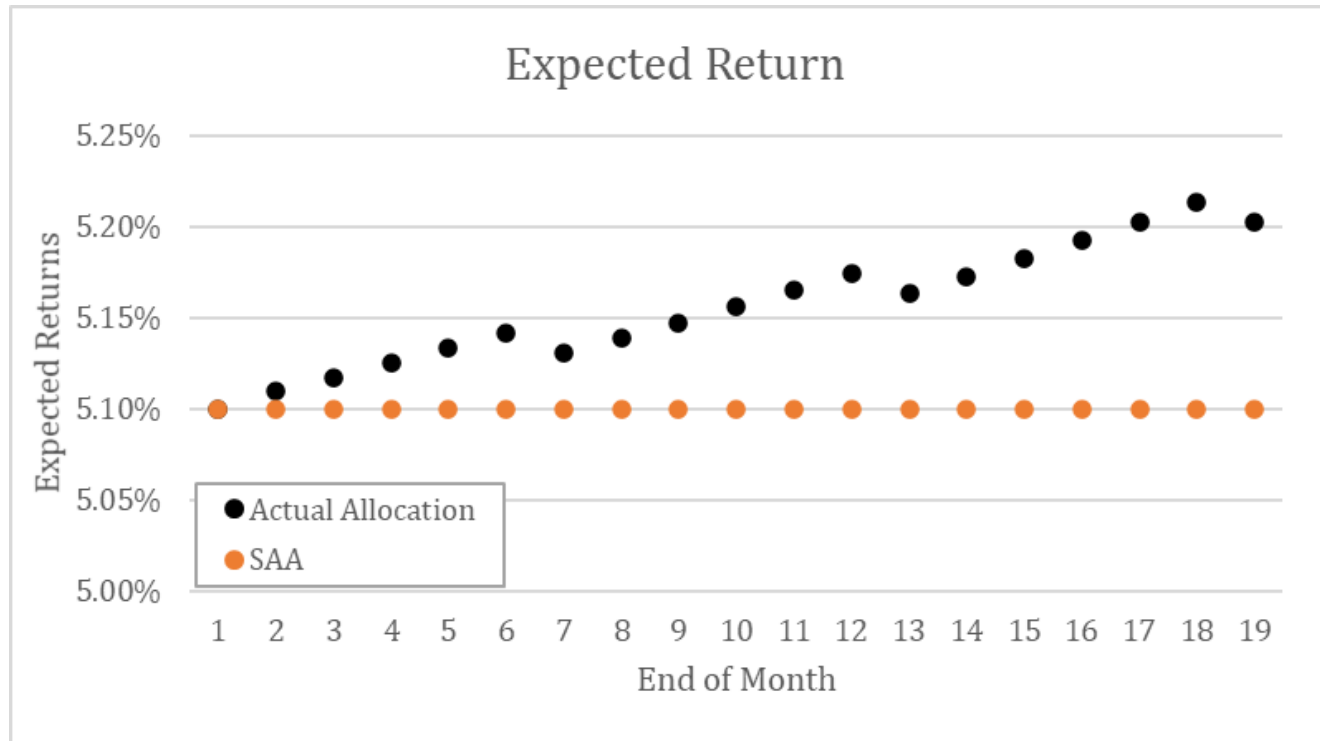
This could be considered a characteristic of portfolio quality.

The scenario is a GFC-style scenario.

This is the top right chart on the "Findings" worksheet.

Findings

Findings

This chart illustrates how the expected return evolves through time, compared with the expected return of the SAA.

This is a characteristic of portfolio quality.

The scenario is a GFC-style scenario. In this case the expected return actually increases slightly because the allocation to illiquid assets increases and the assigned expected returns of illiquid assets are high on a growth-adjusted basis.

This analysis would be more insightful if it accounted for time-varying expected returns.

This is the middle left chart on the "Findings" worksheet.

Findings

Findings
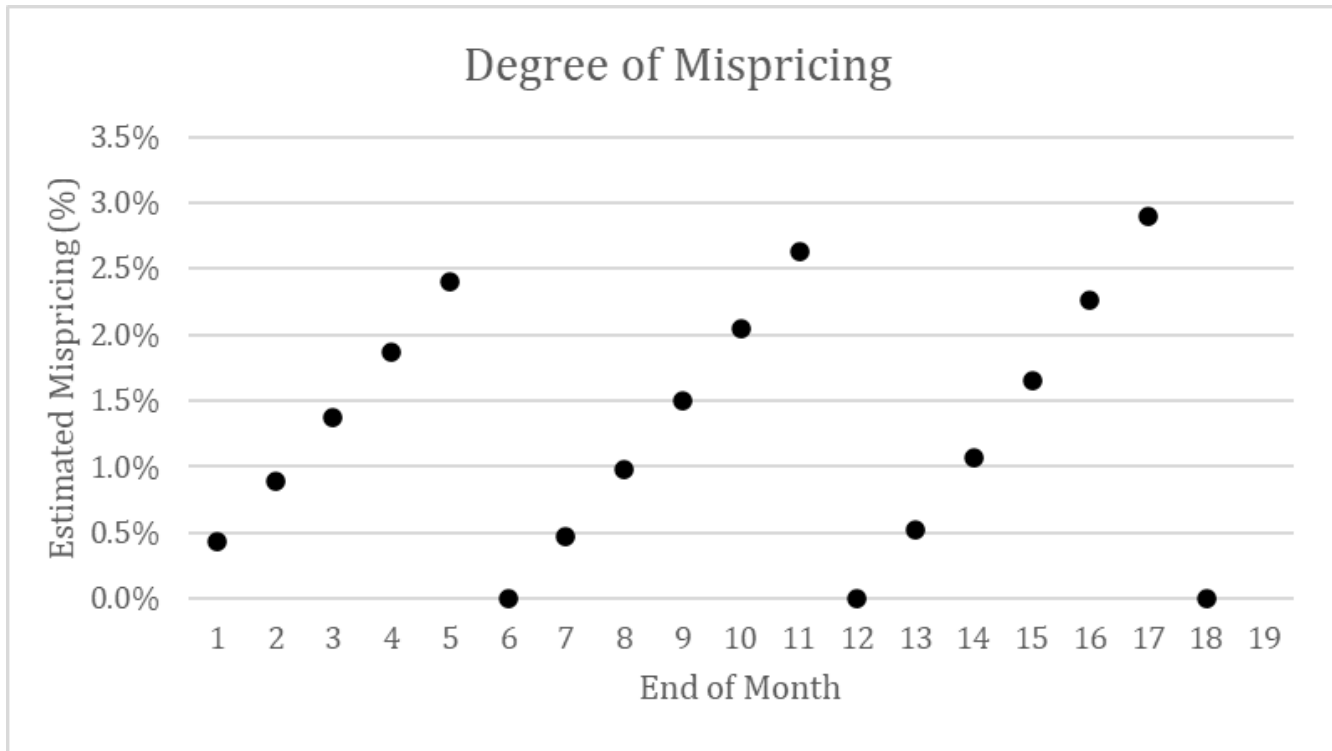
This chart illustrates how the degree of mispricing evolves through time.
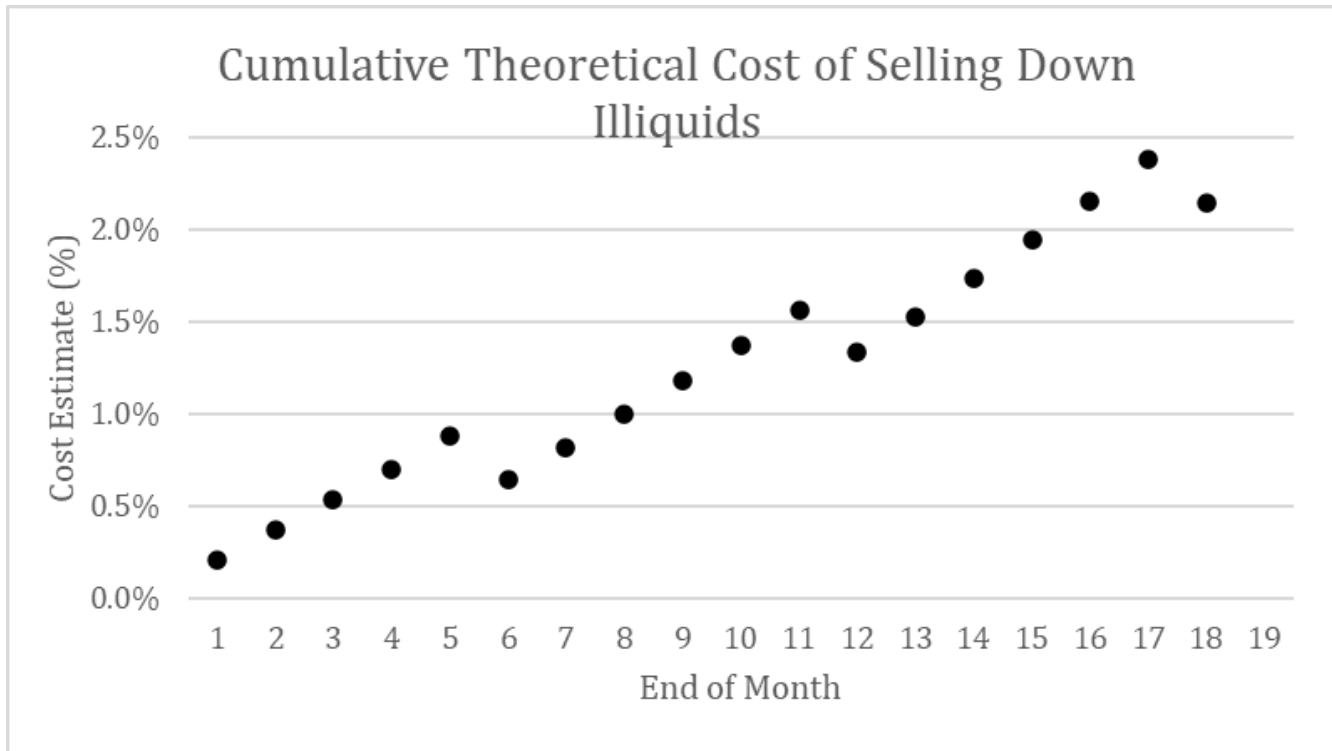
This could be considered a measure of inequity.

The scenario is a GFC-style scenario. In this case the degree of mispricing grows until illiquid assets are revalued (6 monthly in this case). The increasing scale of mispricing between valuations is because the exposure to illiquids grows throughout the scenario.

This is the middle right chart on the "Findings" worksheet.

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Findings

Findings

Cumulative Theoretical Cost of Selling Down Illiquids

This chart illustrates the cost to portfolio performance of selling down illiquid assets to return the portfolio to its SAA.

This could be considered a characteristic of portfolio cost and inequity.

The scenario is a GFC-style scenario.

This is the bottom left chart on the "Findings" worksheet.

Exploring the Model

- The following individual exercises illustrate the model and allow trustees to further explore product design
- Altering assumptions and choice product features illustrates the relationship with unit price inequity and gapping

Exercise	Expected Impact
Portfolio holdings • Allocation to illiquids • Currency hedging	• Negative relationship between the allocation to illiquids and some measures of portfolio solvency, quality, inequity and cost. • Negative relationship between directly managed hedged global exposure and some measures of portfolio solvency, quality, inequity and cost.
Market event • Timeframe (duration of event) • # Standard deviations	• Negative relationship between event timeframe and severity and some measures of portfolio solvency, quality, inequity and cost.
Member flows	• Negative relationship between member flows and some measures of portfolio solvency, quality, inequity and cost.
Correlations	• Lower correlation assumptions between illiquid assets with other assets increases the tracking error calculations.
Transaction costs	• Positive relationship between transaction cost assumptions and the cost of selling illiquid assets to restore the SAA.

Additional Resources

- The following additional resources are provided:
  - Overview: Exploring Portfolios with Illiquid Assets (presentation)
  - Accompanying model: Model 3: Exploring Multi-Sector Options. The worksheet "Model Description" provides additional detail (spreadsheet)
  - Frequently Asked Questions (document)

Further Information

If you have any questions or feedback, please contact:

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