



# **Case Study 2**

# **Exploring Liquid Proxies**

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August 2021

David Bell, Stefano Cavaglia and Reece Zachariah

# Disclaimer

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The authors acknowledge the support of the Conexus Institute and the CFA Societies Australia.

This presentation and supporting research reflect the views of the authors. It does not necessarily reflect the views of the Conexus Institute, CFA Societies Australia, or the authors' employers.

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

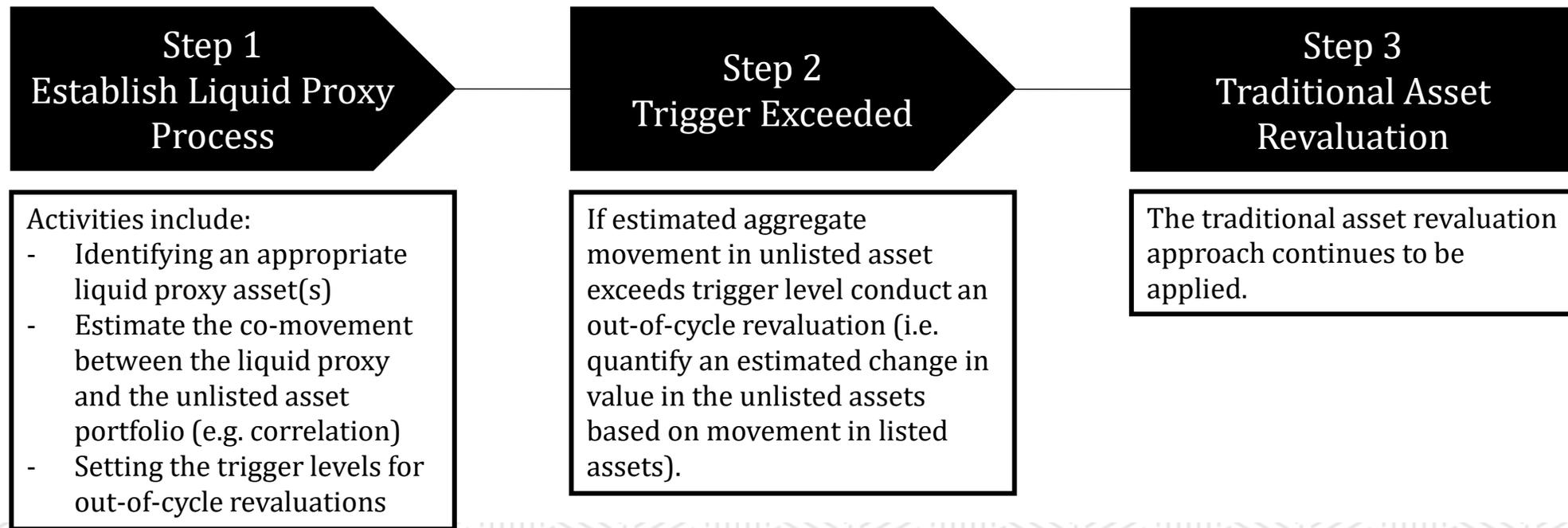
The purpose of this presentation and supporting research is to stimulate dialogue, discussion, and further research on the issues presented.

# Liquid Proxies

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## Working definitions

- Working definitions from Case Study 1 (Single Sector Options) carry over
- Systematic out-of-cycle re-valuations. How the process works:



# Liquid Proxies (ctd.)

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SPG 531 – APRA Prudential Practice Guide – Valuation (Paragraph 35)

*“The interim valuation may be estimated using a proxy valuation approach, where an index or benchmark is used as a proxy for the movement in the value of an investment in the interim period. APRA expects that an RSE licensee would be mindful that movements in the proxy could depart significantly from the actual movement of the investment value.”*

# Framing Liquidity Risk

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There exists a range of risks associated with portfolios containing illiquid assets.

First Order Risks	Solvency <ul style="list-style-type: none"><li>• Ability to meet cashflow demands as they arise</li></ul>		
Second Order Risks	1. Portfolio Quality <ul style="list-style-type: none"><li>• Deterioration in portfolio quality</li></ul>	2. Pricing Inequities <ul style="list-style-type: none"><li>• Inequities due to 'stale' pricing</li></ul>	3. Costs <ul style="list-style-type: none"><li>• Costs of meeting liquidity demands and restoring portfolio quality</li></ul>

# Framing Liquidity Risk (ctd.)

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- The focus of the Liquid Proxies Case Study is on unit price inequities
  - Specifically, would the adoption of a systematic out-of-cycle revaluation approach reduce inequities?
- Unit price inequities take the form of:
  - Degree of mispricing: present asset valuation (which may be stale) compared against actual (theoretical) valuation
  - Gapping in the unit price: the size of the movement in unit price when asset valuations are updated

# Model Explained

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1



2

**We simulate the actual unit price, including the systematic out-of-cycle revaluation approach**

**We simulate the theoretical unit price**

- The difference between (1) and (2) at any point in time represents a simulation of the hypothetical unit price inequity.
- (1) and (2) converge at the time of scheduled valuations, at which point the actual unit price 'gaps' to its updated valuation.
- We run many simulations to estimate the distribution of unit price inequities and unit price gapping outcomes.
- The level and frequency of inequities reaching user defined thresholds provide quantifiable measures of the equitable characteristics of the product.

# Model Explained

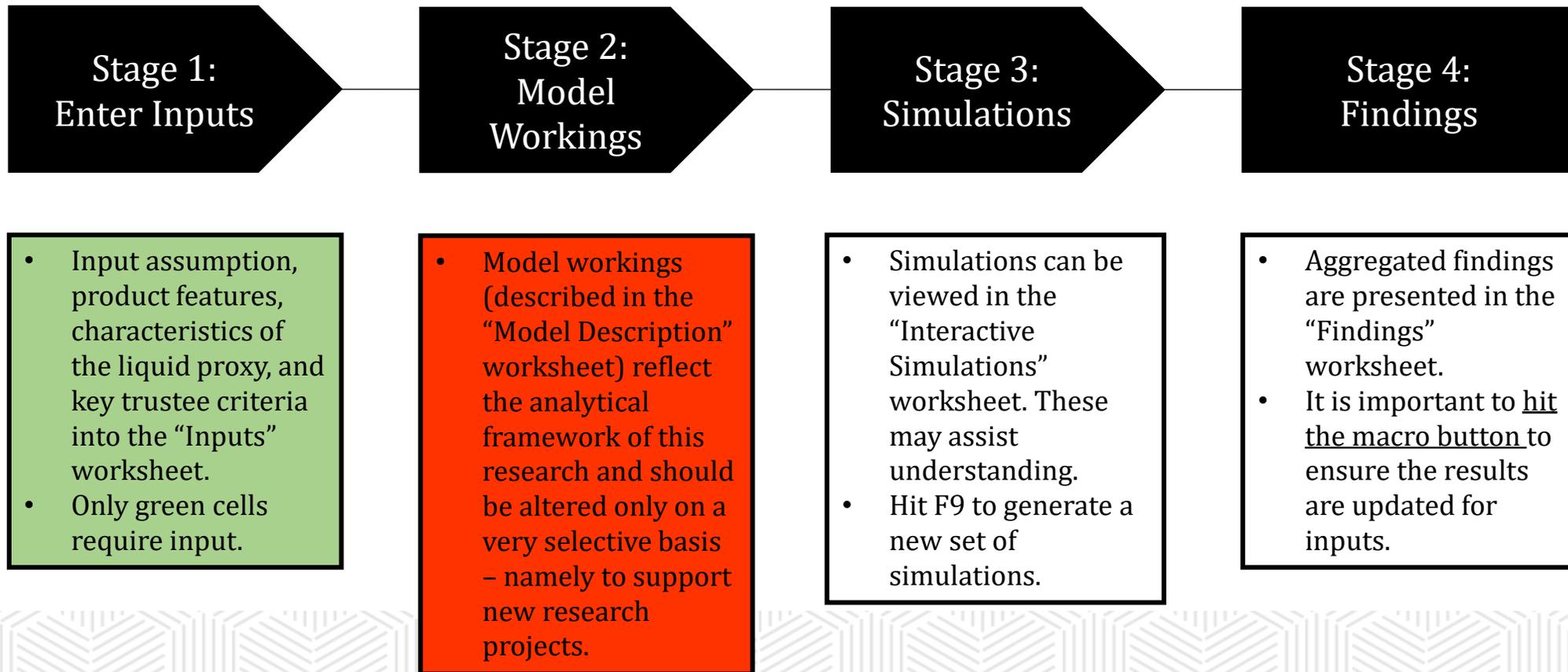
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- The model is stochastic i.e. it considers the full distribution of possible outcomes
- Based on user inputs the model simulates possible outcomes of inequity and gapping
- Aggregating many simulations provides estimates of likelihood of pre-defined threshold outcomes

# Using the Model

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



# Using the Model - Inputs

**Note:** This page includes default values. These default values are used to illustrate the model and are not a recommendation.

## Asset Return Characteristics

- Expected return:	Unlisted	Listed Proxy
- Income:	4%	4%
- Capital growth:	3%	3%
- Total expected return:	7%	7%

Income from unlisted asset assumed to be accrued into unit price daily.

- Volatility (ann.):	Unlisted	Listed Proxy
	7%	12%

- Correlation:	0.9
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Assumed correlation between the daily returns of unlisted asset and the listed proxy.

- Calculated beta:	0.53
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## Portfolio Allocation to Illiquid Assets

Allocation to illiquid assets:	100%
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## Transaction Frequency

- Transaction frequency (pa):	Daily
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We assume that application and redemption frequency are the same.

# Using the Model - Inputs

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

## Valuation Framework

- Valuation frequency (pa):

- Note:
- (1) For simplicity we assume a 240 business day year.
  - (2) For simplicity we assume that there are no distributions.
  - (2) For this case study, to remove complexity, we do not allow for lagged valuations (this is considered in the Single-Sector - No Proxy example).

For illiquid assets.

## Operational Considerations

- Out-of-cycle trigger:

The level of suspected movement in the unlisted asset (based on listed market movements) which triggers an out-of-cycle revaluation.

## Trustee concerns

- Trustee is concerned about level of unit price inequity exceeding:	5%
- Trustee is highly concerned about level of unit price inequity exceeding:	10%
- Trustee is concerned about the unit price gapping by:	6%

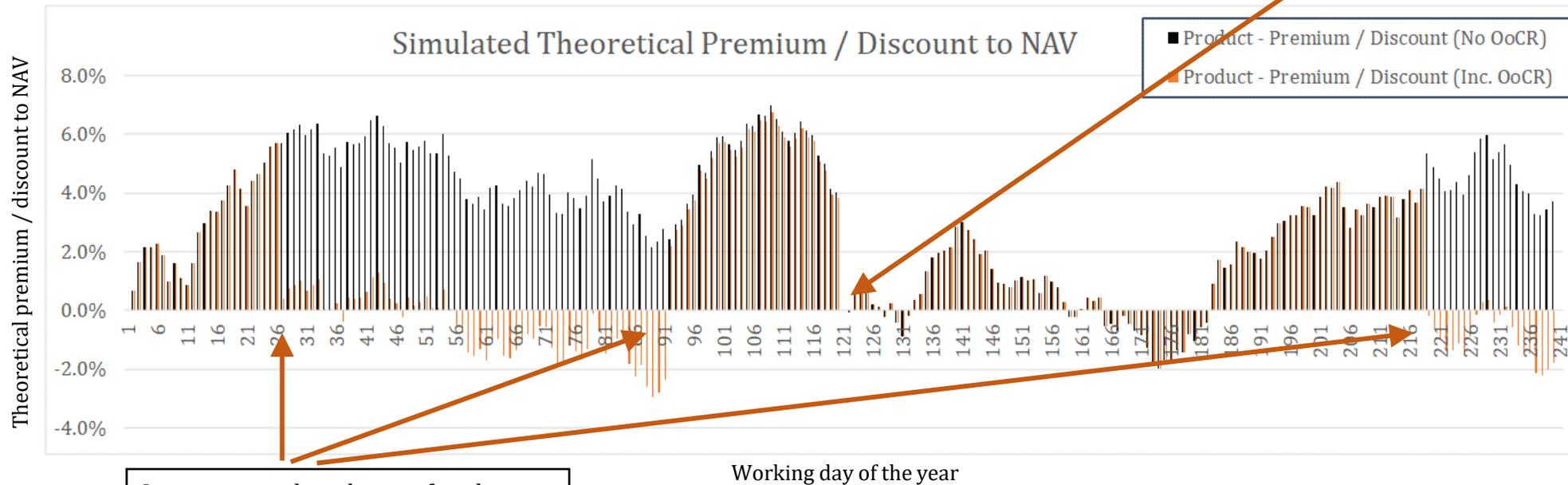
These values are based on anecdotal experience and are not recommendations. The analysis will provide greater insight if based on inputs that a Trustee considers appropriate.

# Simulations

## Interactive Simulation

### Chart 1: Simulated Theoretical Premium / Discount to NAV

This chart simulates the possible daily theoretical premium / discount to NAV.



In this example, half-yearly asset re-valuation process re-sets premium / discount to zero.

When the OoCR is applied the theoretical discount / premium is likely to be smaller in absolute size (assuming the liquid proxy is effective).

It appears as though out-of-cycle revaluations (OoCR's) occurred at these points. Note the trigger for an OoCR is an estimated (with reference to the liquid proxy) rather than an observed level of inequity.

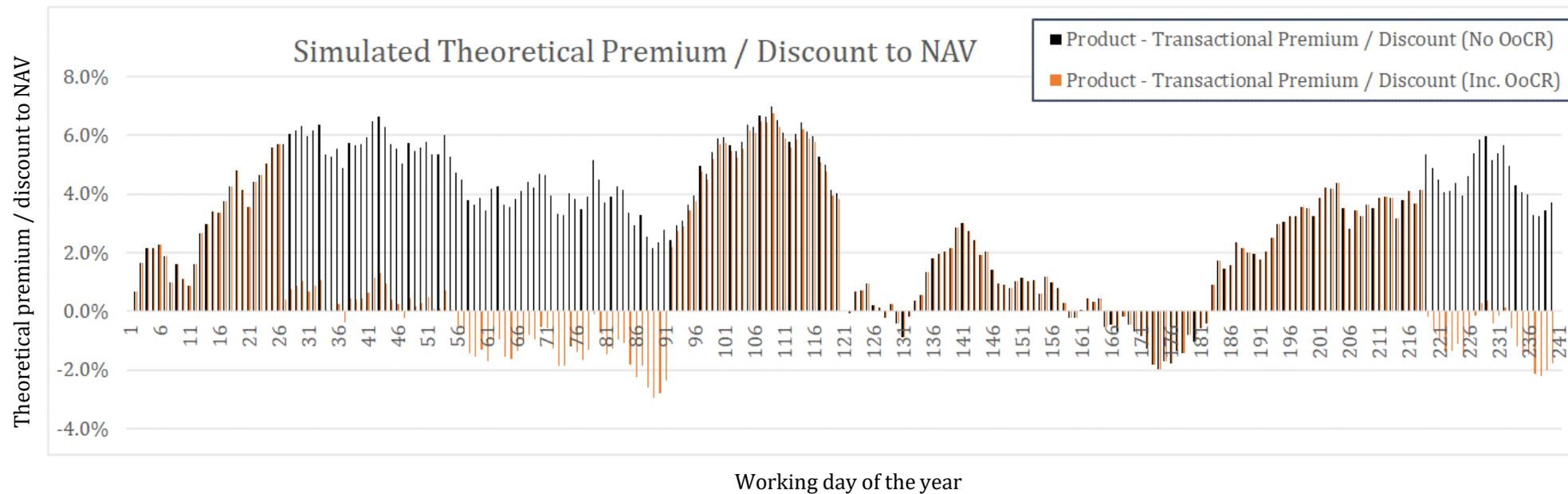
Source: first picture on the worksheet "Interactive Simulations". Hit F9 to produce a new simulation.

# Simulations

## Interactive Simulation

### Chart 2: Simulated Theoretical Transacted Premium / Discount to NAV

This chart simulates the possible daily theoretical premium / discount to NAV.



In this example transactional frequency is daily which makes this chart identical to Chart 1.

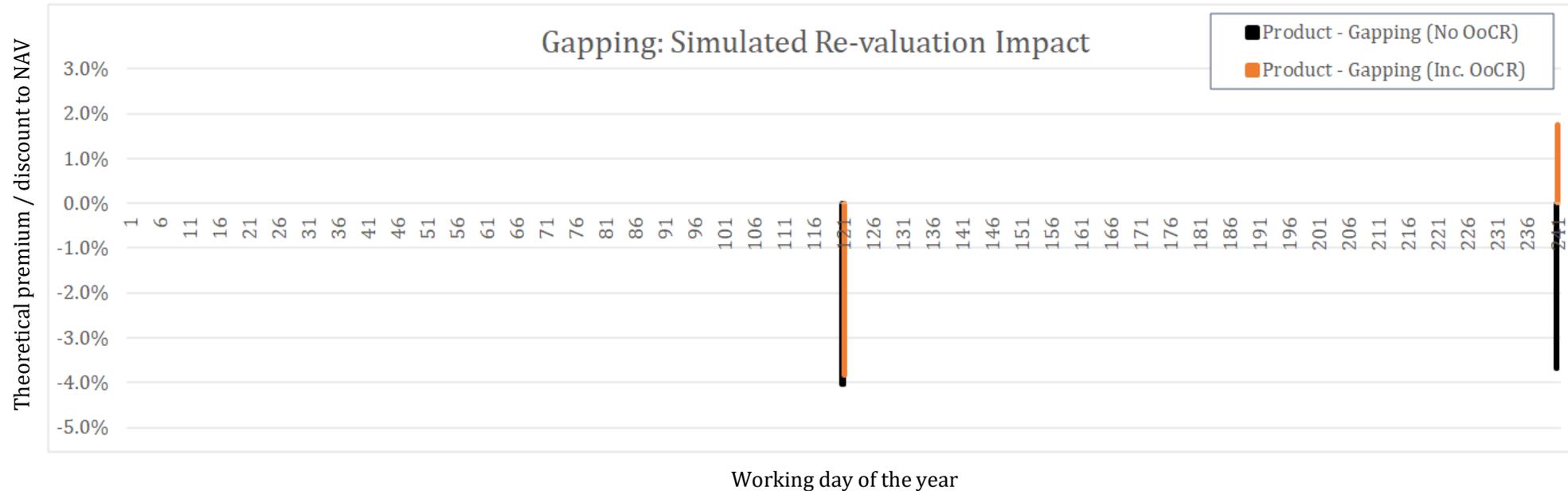
Source: second picture on the worksheet “Interactive Simulations”.

# Simulations

## Interactive Simulation

### Chart 3: Gapping: Simulated Re-valuation Impact

This chart simulates the possible impact when the unlisted valuation is updated.



In this example assets are valued twice a year. You can see that when OoCR's are applied the size and direction of revaluations will be different.

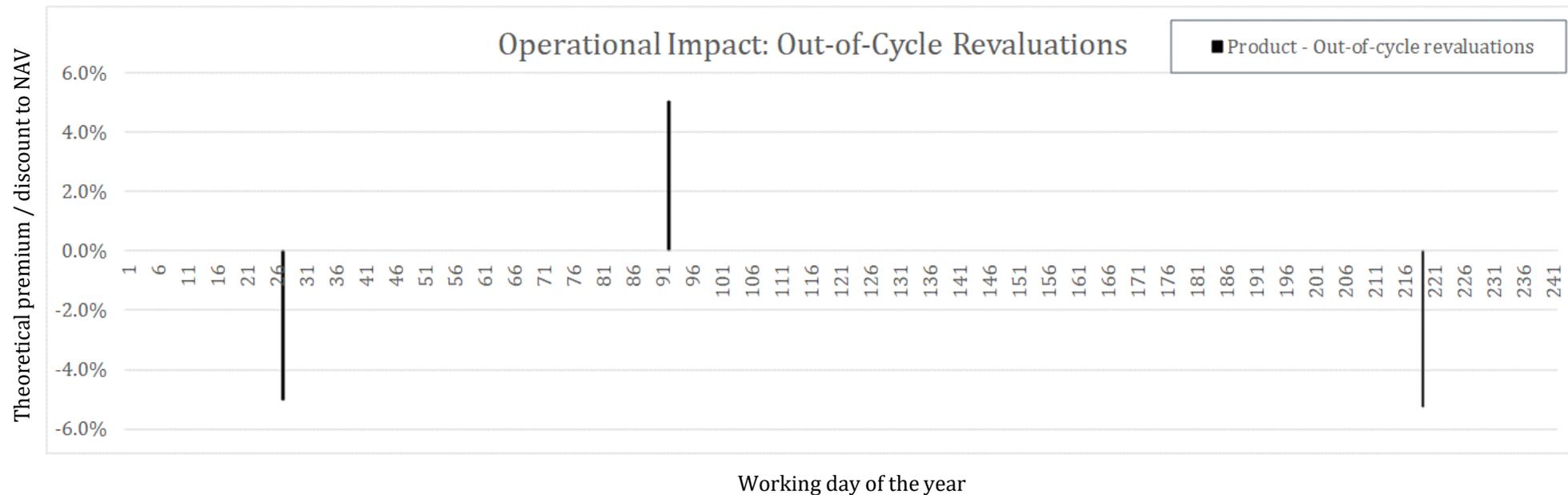
Source: third picture on the worksheet "Interactive Simulations".

# Simulations

## Interactive Simulation

### Chart 4: Operational Impact: Out-of-Cycle Revaluations through the year

This chart simulates the possible operational impact, namely the number of out-of-cycle revaluations through a year.



In this simulation three out-of-cycle revaluations were undertaken.

Source: fourth picture on the worksheet "Interactive Simulations".

# Findings

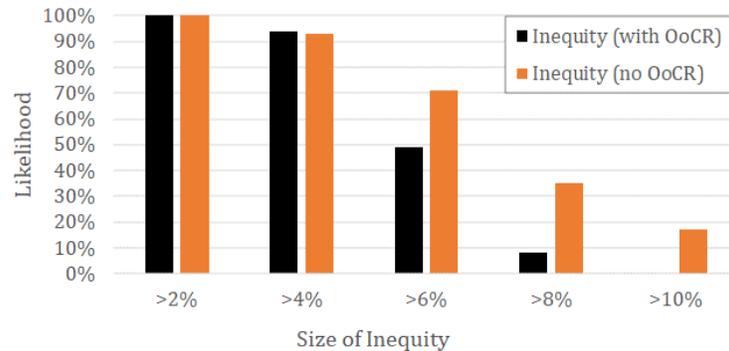
## Findings

### Trustee Considerations

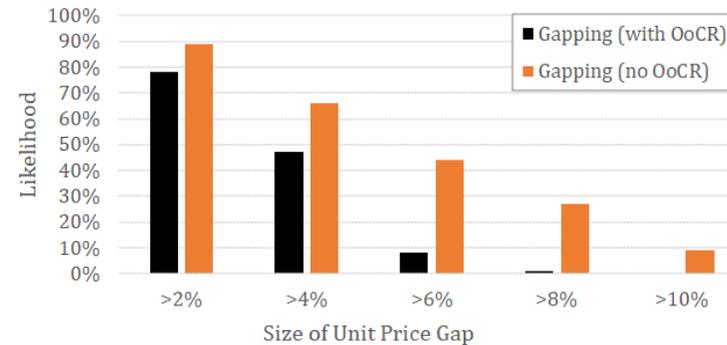
#### Recall - Trustee concerns

- Trustee is concerned about members transacting at a level of unit price inequity exceeding 5% during the course of a year.  
==> The estimated likelihood of this occurring is 81%. It would be 86% without out-of-cycle revaluations.
- Trustee is highly concerned about members transacting at a level of unit price inequity exceeding 10% during the course of a year.  
==> The estimated likelihood of this occurring is 0%. It would be 17% without out-of-cycle revaluations.
- Trustee is concerned about the unit price gapping by 6% or more.  
==> There is an estimated 8% likelihood of this occurring during a year. It would be 31% without out-of-cycle revaluations.

Inequity - how likely is it that during a year we would experience a transactable degree of unit price inequity of different magnitude



Gapping - how likely is it that during a year we would experience a unit price gap of different magnitude



#### Operational considerations

- The expected number of out-of-cycle revaluations per year is expected to be 1 (rounded).
- A more busy year (say a 1-in-10 year) due to market volatility could result in 2 out-of-cycle valuations.

The information on the “Findings” worksheet is calibrated to the inputs, including the concern levels. It is based on 100 simulations.

Source: worksheet “Findings”.

# Exploring the Model

- The following individual exercises illustrate the model and allow trustees to further explore product design
- Altering inputs allows users to explore the relationship between the input and unit price inequity and gapping outcomes

Exercise	Expected Impact on Unit Price Inequity and Gapping
Expected return <ul style="list-style-type: none"> <li>• Income</li> <li>• Capital gains</li> </ul>	<ul style="list-style-type: none"> <li>• Income has no impact.</li> <li>• Positive relationship between expected capital gains and scale of inequity and gapping.</li> </ul>
Volatility	There is a positive relationship between volatility and the scale of inequity and gapping.
Correlation between illiquid and liquid assets	There is a positive relationship between the assumed correlation between illiquid and liquid assets and the effectiveness of the OoCR process.
Allocation to illiquid assets	There is a direct positive relationship between the level of exposure to illiquid assets and the scale of inequity and gapping.
Transaction frequency	There is a complex interaction between transaction frequency and valuation frequency. If they perfectly align then there is no inequity or gapping.
Valuation frequency	There is a direct positive relationship between valuation frequency and the level of inequity and gapping.
Trustee concerns	Setting the concern levels higher will mean they are less likely to be experienced.

# Reflections on Liquid Proxies

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## Reflections

- Liquid proxies can be effective when:
  - A liquid proxy can be identified which is an accurate match for the unlisted assets.
  - A trustee has a strong fundamental belief that extreme moves in liquid asset prices are representative of what would be reflected by a valuer when revaluing an asset.
- What is the appropriate response to a trigger event?
  - One approach (applied in this Case Study) is a systematic out-of-cycle revaluation approach .
  - An alternative approach combines quantitative and qualitative considerations:
    - ➔ A quantitative 'trigger event' results in a prompt for a valuation committee of a super fund to consider the most appropriate response given the market environment and other administrative issues (e.g. time to next scheduled revaluation).

# Additional Resources

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- The following additional resources are provided:
  - Overview: Exploring Portfolios with Illiquid Assets (presentation and video)
  - Accompanying model: Model 2: Exploring Liquid Proxies. The worksheet “Model Description” provides additional detail (spreadsheet)
  - Frequently Asked Questions (document)

# Further Information

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If you have any questions or feedback, please contact:

David Bell

*Executive Director*

**The Conexus Institute**

<https://theconexusinstitute.org.au/>

E: [david.bell@theconexusinstitute.org.au](mailto:david.bell@theconexusinstitute.org.au)