

Bond CCP

Risk Management – Market Consultation Session 2

4 June 2024



let's connect

AGENDA

1. Context
2. Initial margin methodology
3. Variation margin methodology
4. Default management processes
5. Appendix

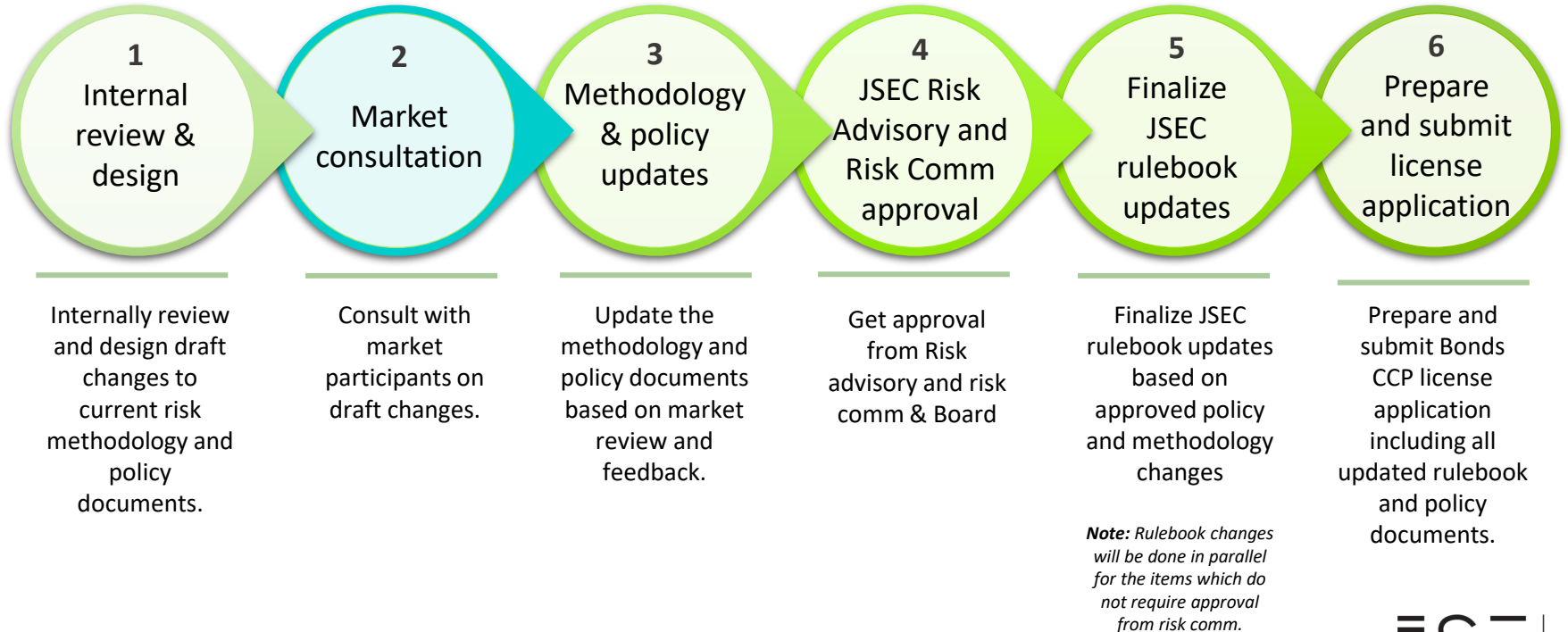
Context

Primary drivers for CCP clearing

- CCP clearing is a critical service required to scale and increase trading activity in the Bonds ETP market, that is currently limited in access to the 10 Primary Dealers and represents only 1% of the total bonds and repo trading activity in SA. Electronic trading and CCP clearing of repos in European markets is close to 40% (and rising) of total trading activity.
- The three primary objectives and market benefits of Bond and Repo CCP clearing include:
 - i. broadened access to ETP and repo markets and increased trade liquidity;
 - ii. reduced counterparty credit risk and increased operational efficiency for banks; and
 - iii. improved market protection and price transparency.

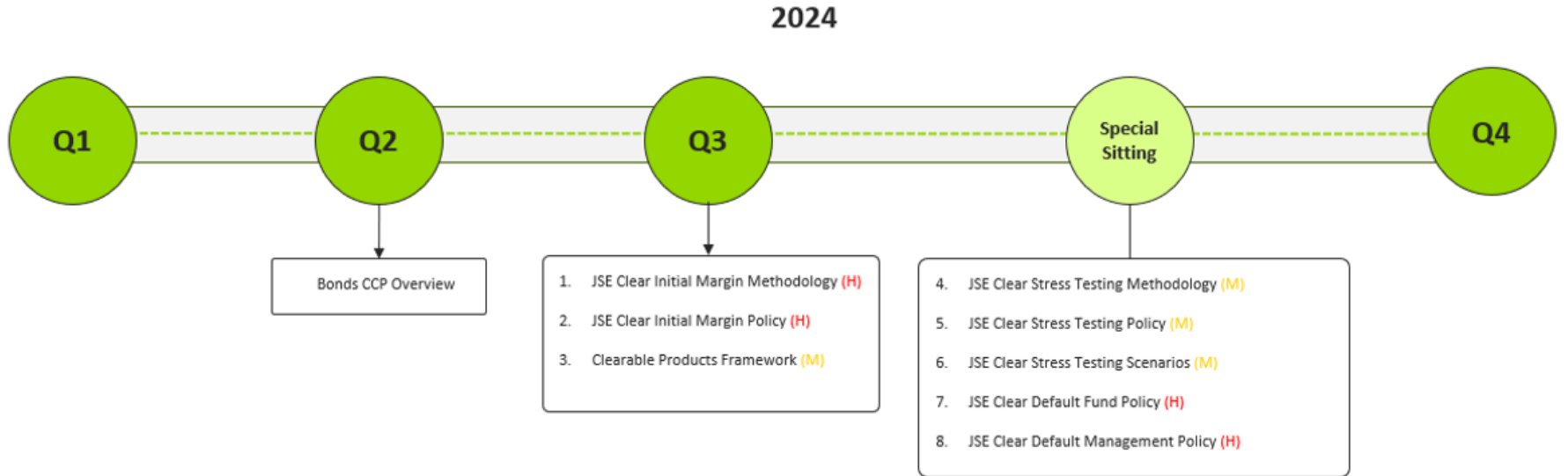
Context

Approach for updating risk policies, methodologies and frameworks



Context

Risk policy/methodology docs requiring Risk Comm approval



Context

Clearable products (indicative scope)

Only products with sufficient liquidity and daily trading volumes over a certain limit will be centrally cleared.
This is to ensure that the CCP has the ability adequately liquidate positions in the event of a clearing member default.

Phase 1 (Indicative – product scope to be confirmed)

Cash bonds

- **Issuer Type (of underlying security):**
 - SA Government Nominal bonds
 - SA Government Inflation linked bonds
 - State Owned Enterprise

Buy sell backs

- **Issuer Type (of underlying security):**
 - SA Government Nominal bonds
 - SA Government Inflation linked bonds
 - State Owned Enterprise
- **Underlying type:** Single securities: fixed rate, floating rate and inflation-linked bonds
- **Repo rate type:** Fixed
- **Tenor Type:** Closed (e.g. maximum 1 year)

Future Phases (clear-ability to be confirmed)

Classic repos

Switch trades (collateral swap i.e. bond A vs bond B)

General collateral (GC) baskets

Open-ended and evergreen repos

Context

Summary of primary CCP operating model changes

NO.	CATEGORY	DESIGN	REASONING
1	Clearing membership and obligations	<p>Existing JSEC clearing membership criteria to apply, with addition:</p> <ul style="list-style-type: none"> Clearing members must have an arrangement with National Treasury to be the lender of last resort to fulfil client settlement obligations in the event of client default or cash/script liquidity constraints. 	<ul style="list-style-type: none"> Alignment with industry standard practices
2	Default fund structure	<p>Single mutualised default fund</p> <ul style="list-style-type: none"> The inclusion of cash bonds and repos in the current JSEC default fund structure that currently covers clearing of all JSE listed derivatives markets i.e. EQD, FXD, IRD and CMD. 	<ul style="list-style-type: none"> Greater capital efficiency Easier to provide cross product margin offset
3	Margining methodology	<p>IM methodology</p> <ul style="list-style-type: none"> Bond CCP will apply the new IM methodology approved at Q4 2023 Risk Comm for the derivatives markets. Parameter calibration and quantitative analyses of the methodology for Bond CCP in progress <p>VM methodology</p> <ul style="list-style-type: none"> Finalisation of proposed Bond CCP VM methodology is being progressed (decision to apply contingent or realised VM methodology) 	<ul style="list-style-type: none"> Aligns closely to other CCP margining methodologies
4	Cross product margin offset	<p>Cross product margin offset to be explored in Phase 2</p> <ul style="list-style-type: none"> Cross product margin offset between listed bond future, cash bonds and bond repo positions within the same underlying group i.e. nominal govt bonds and inflation linked bonds. 	<ul style="list-style-type: none"> Cross product margin offset will assist in reducing the overall initial margin which will aid in growing cleared volumes.
5	Security collateral	<p>Securities collateral to be allowed</p> <ul style="list-style-type: none"> ZAR cash and securities (liquid SA govt bonds) will be accepted as collateral against bond futures, cash bonds and bond repo margin requirements. Pledging of securities to be done via the Strate CMS service. 	<ul style="list-style-type: none"> Will significantly reduce the cash capital required for initial margin and members can utilize lazy assets on their balance sheet to meet the margin requirements.

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Initial margin methodology

Current Bond ETP margin methodology compared to the proposed Bond CCP margin methodology

	Current Bond ETP initial margin methodology	Proposed Bond CCP initial margin methodology
Model	Portfolio VaR (HS)	Filtered Hist Simulation (FHS) Portfolio VaR 75%*time-weighted FHS margin rate + 25%*stress component margin rate, floored at a 10Y HistVaR margin rate
Liquidation period	3 days	At least 2 days
Confidence level	99.9%	99.7%
Lookback period	750-day rolling lookback (3Y) + 250-day stress period (1Y)	Time-weighted FHS: 3-year to 5-year rolling lookback, as determined per market stress component: 1Y stress period margin floor: 10Y rolling lookback (9Y rolling including 1Y stress period)
Variation margin	Indirectly via recovery cost component of total margin (nominal*trade price – MTM price)	Yes – methodology tbc (realised or contingent VM model)
Total margin	VaR(base margin) + conc margin + safety net (includes recovery cost)	VaR(base margin) + concentration margin + safety net + large exposure add-on margin
Maintenance margin	90th percentile of each participant’s daily IM over the previous quarter	Not applicable
Default fund	No	Yes

Initial margin methodology

Current Bond ETP margin methodology compared to the proposed Bond CCP margin methodology (cont.)

	Current Bond ETP initial margin methodology	Proposed Bond CCP initial margin methodology
Margin frequency	Calculated daily, margin top-up settled only when total margin exceeds maintenance floor amount	Calculated and settled daily
Margin investment management	SARB	JSE Clear
Collateral Type	ZAR cash only	ZAR cash and securities (initially specific liquid SA ZAR govt bonds only)
Position netting	Yes	Yes
Cross product margin offset	No	Currently investigating the possibility of offering cross product margin offset

Initial margin methodology

Proposed methodology

- Bond CCP will apply the new IM methodology approved at Q4 2023 Risk Comm for the derivatives markets
- Parameter calibration and quantitative analyses of the methodology for Bond CCP in progress
- The hybrid initial margin model is based on 3 key components:
 - Time-weighted filtered historical simulation Value-at-Risk (FHS VaR), incorporating
 - A distinct stress period component, and
 - A margin floor based on historical simulation (HS) Value-at-Risk based on a long lookback period including a stress period.

$$\text{Base IMR} = \text{MAX}[75\% * \text{time weighted FHS margin rate} + 25\% * \text{stress component margin rate}, \text{HS margin floor}]$$

Note: the regulatory guidance considered in design of the margin methodology is included in the appendix

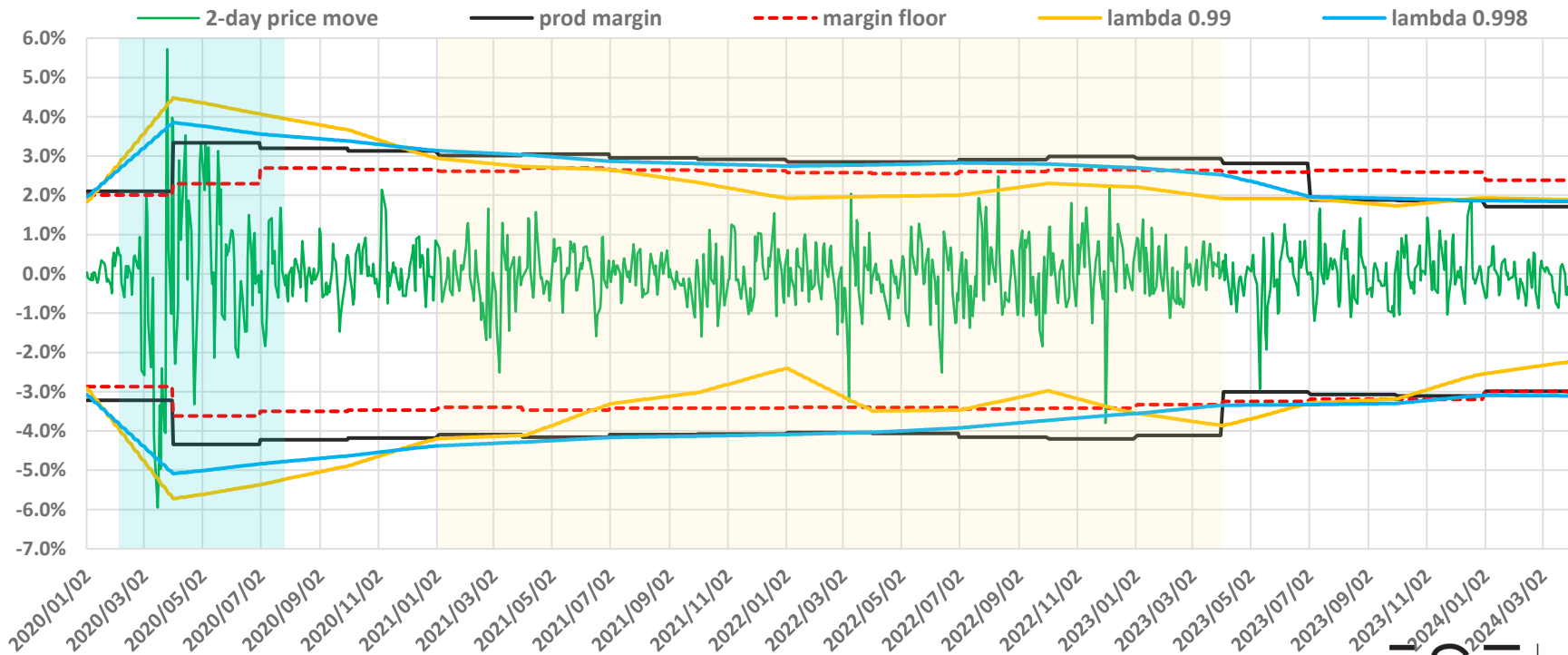
Initial margin methodology

New methodology instrument level margin impact

Prod/current model	New model
- Hist VaR	- 99.7% CI
- 99.7% CI	- MPOR: 2 days
- MPOR: 2 days	- FHS: 3Y rolling lookback
- Lookback: 3Y + 1Y stress	- FHS: Lambda: 0.99 & 0.998
	- Stress component: Avg of 5 tail returns from 1Y stress period
	- Margin floor: Hist VaR, 10Y LB

R2030

2-day price move vs prod margins vs new model margins



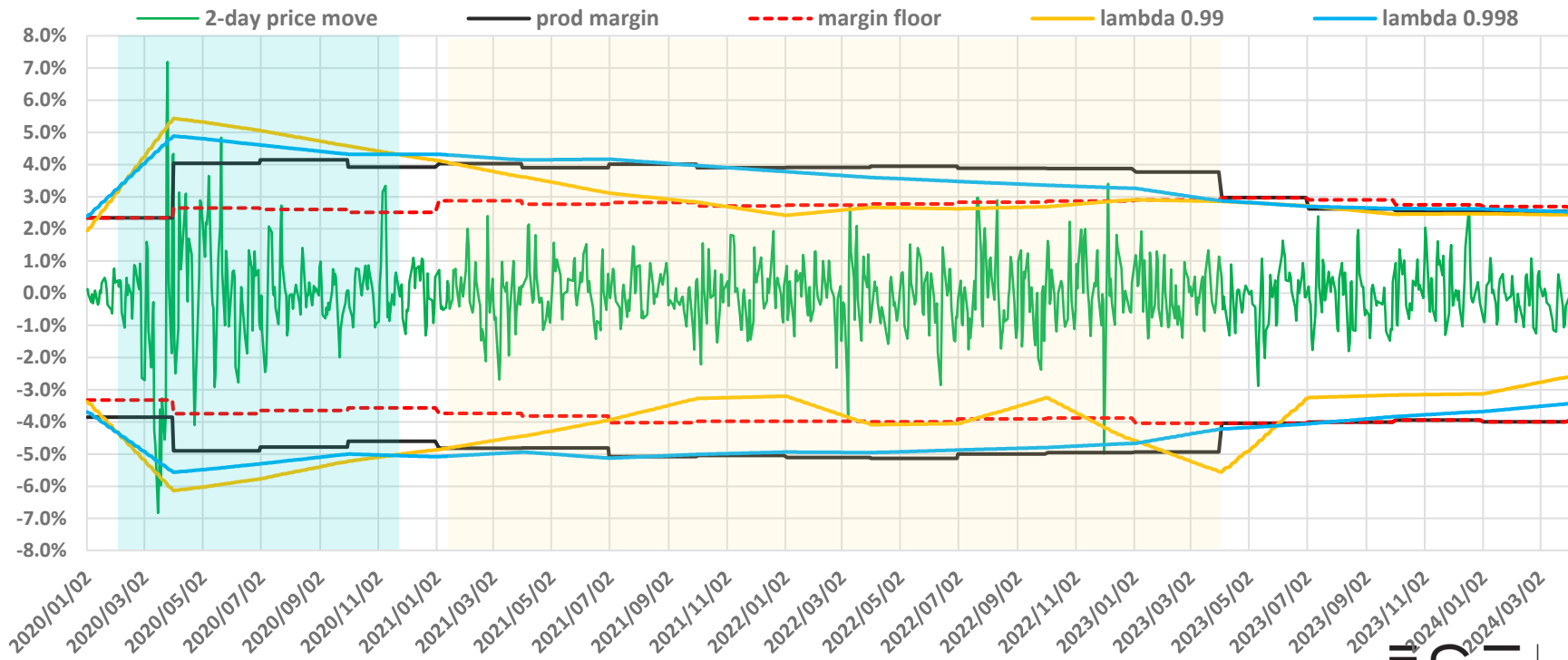
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New methodology instrument level margin impact

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- MPOR: 2 days	- FHS: 3Y rolling lookback
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	- Stress component: Avg of 5 tail returns from 1Y stress period
	- Margin floor: Hist VaR, 10Y LB

R2035

2-day price move vs prod margins vs new model margins



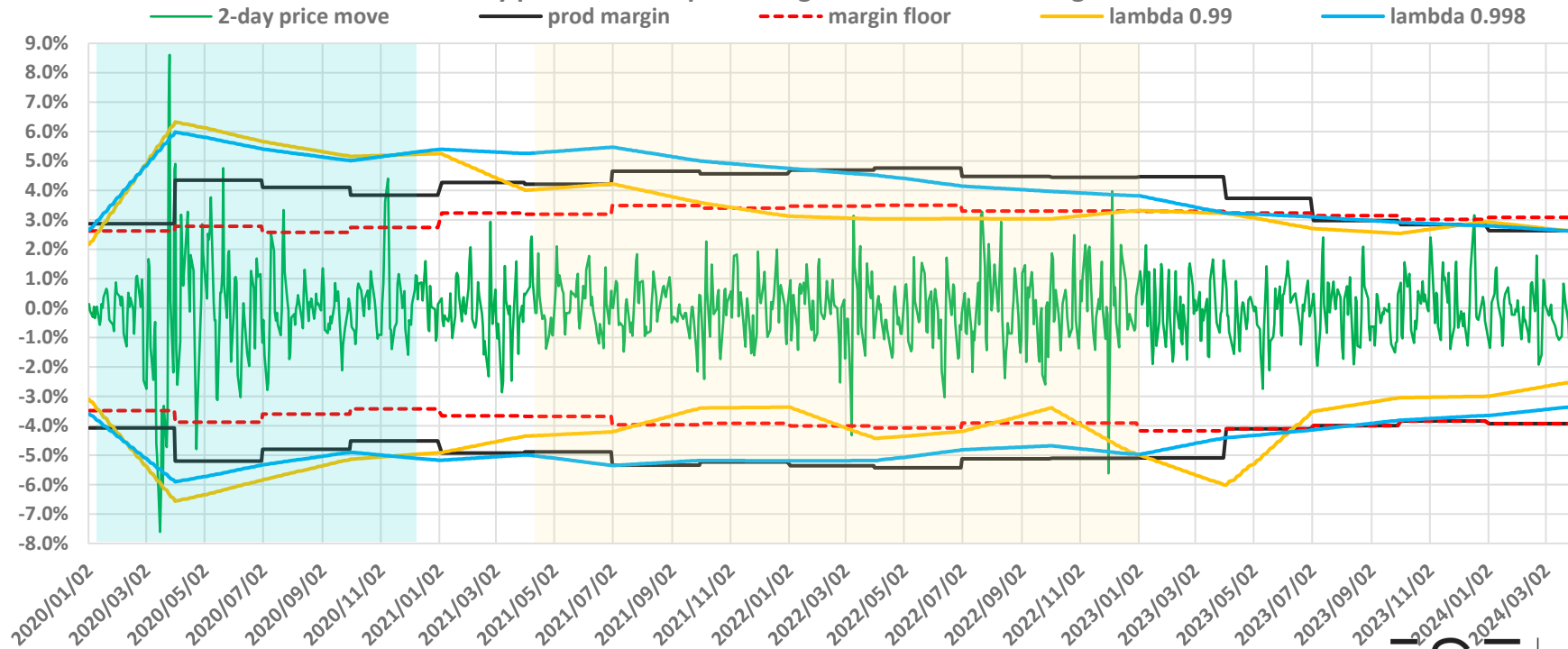
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- MPOR: 2 days	- FHS: 3Y rolling lookback
- Lookback: 3Y + 1Y stress	- FHS: Lambda: 0.99 & 0.998
	- Stress component: Avg of 5 tail returns from 1Y stress period
	- Margin floor: Hist VaR, 10Y LB

R2040

2-day price move vs prod margins vs new model margins



Initial margin methodology

Advantages compared to the current methodology

- **More responsive by giving a higher weighting to recent returns**
 - Minimises the need for reliance on discretionary adjustments in periods of stress (as volatility increases margins adjust upwards).
 - Gradually adjusts margins downwards as market conditions return to normal (as volatility decreases) leading to improved margin efficiency.
- **Greater exposure to tail returns through the stress component that averages multiple tail returns**
 - Having distinct rolling lookback and stress period lookback for the time-weighted and stress components of the model respectively allows for better control over the contribution of each component to the final margin rate.
- **Improved anti-procyclicality through inclusion of two APC measures proposed by the FMA and ESMA**
 - Incorporation of stress component (with at least 25% weight) ensures a level of conservatism and counters the dilutionary effect of extending the lookback.
 - Implementation of a margin floor.
- **Removal of the Liquidation Period Add-On (LIPAO) threshold ensures an even, competitive playing field**
 - Liquidation period add-on levied on all positions determined to take longer than 2 days to liquidate.
 - Ensures sufficient margin held on all large individual positions.
- **Large Exposure Add-on threshold** – threshold level to be considered as part of the default fund size analysis (single mutualised default fund for derivatives, cash bonds and repos)

Initial margin methodology

Margin add-ons

Initial margin levied on participant portfolios to cover potential future exposures is comprised of a base margin and safety component, the liquidation period add-on and a large exposure add-on (LEAO) margin

Concentration margin / liquidation period add-on margin

- A key component of an IM methodology is its ability to incorporate the costs associated with liquidating a defaulting portfolio
- JSEC's account-level IM methodology applies a more punitive IM requirement (in relative terms) for large positions than for small positions in order to acknowledge the higher liquidation costs typically associated with large positions
- This higher IM requirement is achieved by adding the liquidation period margin to the base account-level IM requirement for positions that take longer to liquidate than the liquidation period captured by the base IMR

Large exposure add-on margin

- The LEAO is levied on very large portfolios which under historical and hypothetical stress scenarios would expose a significant proportion of the default fund were the participant to default

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Variation Margin Methodology

Overview of methodologies

A key methodology decision is the choice of variation margin (VM) methodology for the Bond CCP

- There are two main types of VM methodologies: **Contingent Variation Margin (CVM)** and **Realised Variation Margin (RVM)**
 - **CVM**: Theoretical profits and losses are calculated. In the case of losses, collateral is collected daily to cover these losses, while the profits are held as an asset (theoretical credit) for the account of the clearing member and is typically available for offset against other margin requirements of that member's account.
 - **RVM**: Profits and losses under an RVM model are exchanged on t+1 (this is the VM method applied in the derivatives markets)
- Globally, both RVM and CVM are used by CCPs that clear bond and repo transactions

RVM	CVM
Depository Trust and Clearing Corporation (US)	LCH Repo Clear (London)
JPX (Japan)	SGX (Singapore)
	Eurex (Europe)

- The cash flow and risk management implications of the RVM and CVM methodologies as it applies to a Bond CCP need to be considered

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Default management processes

Context

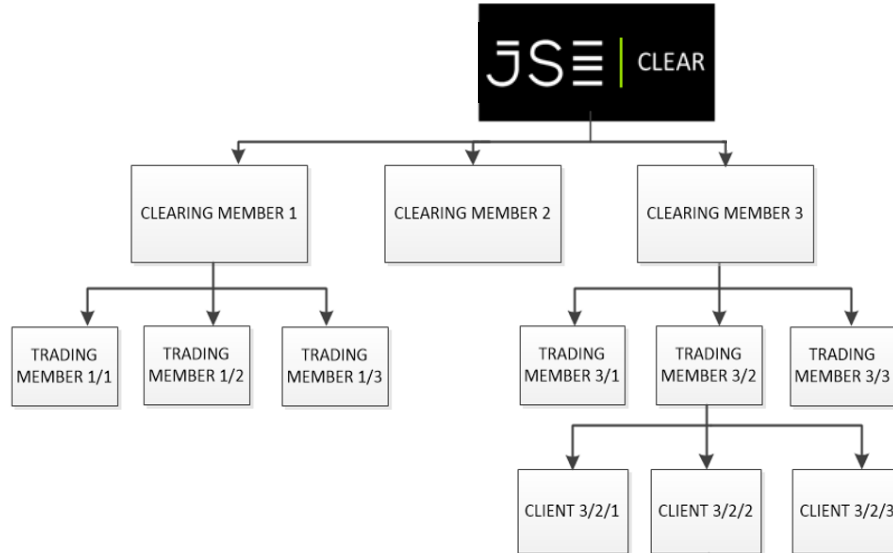
- The default management processes for the derivative markets will be adapted, where required, to cater for the mechanics of the cash bond market
- Existing tried and tested frameworks and processes will be leveraged
 - The default management process for Bond ETP and the derivative markets
 - The integration with Strate for physical settlement and Strate's processes that encompass the settlement of cleared, uncleared and OTC trades
 - The settlement processes in the IRD market
- Consider the default management processes of other CCPs clearing cash bonds and repos (buy-sell-backs)



Default management processes

CCP risk management structure

- In a **client default** the Trading member must meet the obligations of the defaulted client
- In a **trading member default**, the clearing member must meet the obligations of the defaulted trading member
- In a **clearing member default**, the defaulted clearing member's portfolio is closed out through the default auction or other mechanisms and the prefunded resources in the risk waterfall are used to settle the obligations of the defaulted clearing members



Default management processes

Settlement failure vs default

Settlement failure

When a Client or TM is unable to meet their trade settlement obligations (stock if selling, cash if buying) to their counterparty on settlement date

Default

When a Client, TM or CM is unable to meet their margin obligations to the CCP

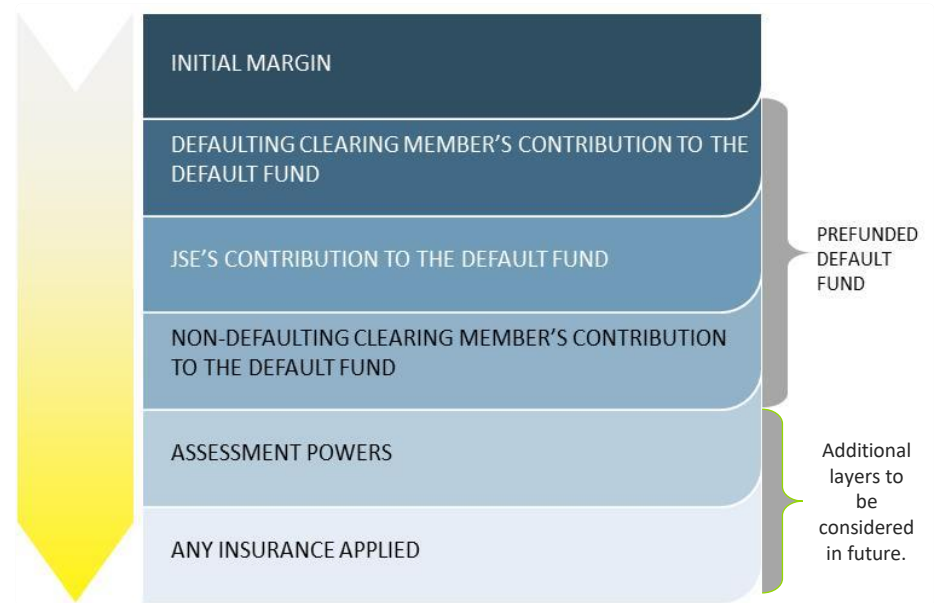
Lender of last resort

Clearing member must have arrangement with SARB/NT to access cash and bonds via a repo or loan in the event of a default

Default management processes

Current JSE Clear risk waterfall structure

- 1) All initial margin, additional margin and/or other collateral held by JSE Clear in favour of or on behalf of or for the account of the clearing member is used first to settle any obligations the clearing member has to the market.
- 2) Should these be insufficient to cover all obligations, the defaulting clearing member's contribution to the JSE Clear Default Fund is used.
- 3) Thereafter, JSE Clear's contribution to the JSE Clear Default Fund is used.
- 4) If any obligations to the market remain thereafter; the non-defaulting clearing members' contributions to the JSE Clear Default Fund are utilised.
- 5) Should the defaulting clearing member have any obligations to the market that are not covered by the financial resources listed above, affected market participants will have a claim against the defaulting clearing member.



Default management processes

Trading member default management

	Current Process	Bond CCP
1 Defaulting member's obligations	Clearing member immediately assumes obligations of defaulted trading member i.e. margin payments and fees as they become due including that of their clients	Same principle applicable in Bond CCP except no clients in phase 1
2 Suspend defaulting member	Prevent trading and deal management	Additionally: Inform CSD and CSDP of default Irrevocable trades will settle on S Remaining trades fail as CSDP will lift commits
3 Close-out the trading member's exposure	Transfer the positions to the trading member's clearing member at an agreed price - book reported trades	Conclude appropriate mechanism for clearing member to replace defaulting trading member as the counterparty
4 Healthy clients of defaulting member	Transfer clients to clearing member's house trading member	Not applicable for phase 1 – clients will be onboarded for clearing in later phases
5 Final recon	JSEC retains initial margin until all positions closed out <ul style="list-style-type: none"> Surplus IM is returned to the clearing member Shortfall in IM is claimed from the trading member 	Process to determine the PNL will depend on the close-out mechanism and the practical implications to calculate the PNL

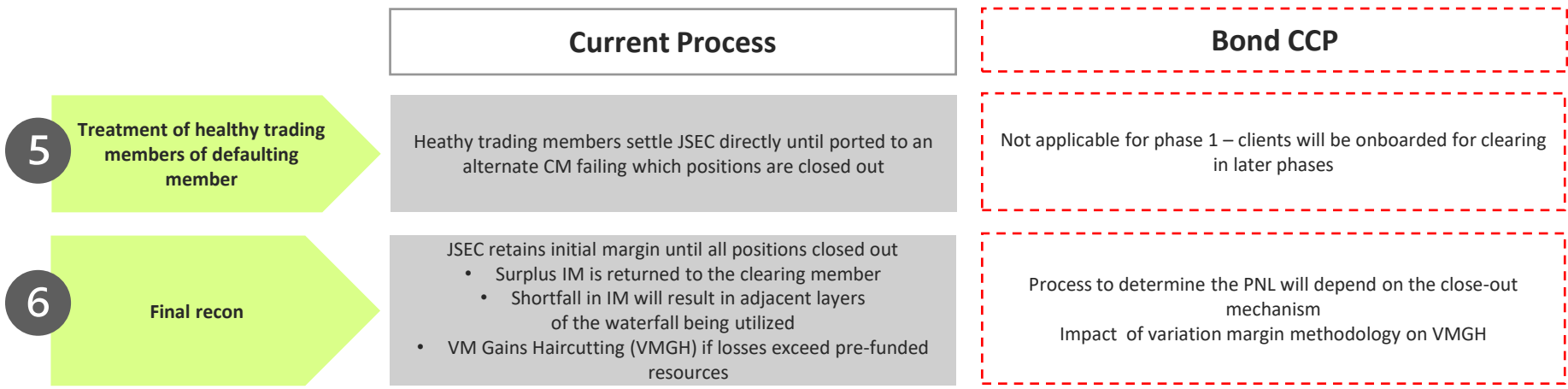
Default management processes

Clearing member default management

	Current Process	Bond CCP
1 Request concurrence from SARB	Concurrence required to initiate default proceedings	Same principle applicable in Bond CCP
2 Defaulting member's obligations	Clearing member's obligations are initially settled with liquidity lines while positions are being closed out. Thereafter, initial margin is made available to settle liquidity lines and cover remaining obligations	Same principle applicable in Bond CCP
3 Defaulting member and clients suspended	Prevent trading and deal management	<ul style="list-style-type: none">• Inform CSD and CSDP of defaulting clients only<ul style="list-style-type: none">• Irrevocable trades will settle on S• Remaining trades fail as CSDP will lift commits.<ul style="list-style-type: none">• Treatment of trades settling on S
4 Close-out the defaulting clients' exposures	Hedge, auction, trade on exchange or cancel positions to close out positions – book reported trades	<ul style="list-style-type: none">• Investigate merits of hedging and possible hedging strategies• Appropriate mechanism for a participant to replace defaulting clearing member as the counterparty• Netting of positions with various near and far settlement dates<ul style="list-style-type: none">• Auction platform• Costs associated with cover trades for affected counterparties

Default management processes

Clearing member default management (cont.)



Questions?

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Appendix - FMA and ESMA regulatory requirements pertaining to CCP margin models

Key points from relevant regulations

- The FMA and ESMA regulations pertaining to CCP margin models are very closely aligned.
- Both specify
 - A minimum confidence interval of 99% (refer to ESMA regulations below for additional considerations in determining the CI)
 - A lookback period of at least 1 year and one which captures a full range of market conditions including periods of stress, and
 - A conservatively estimated liquidation period. ESMA specifies at least 2 days for the liquidation period for listed instruments.
 - Both regulations emphasise anti-procyclicality (APC) and specify that at least one of three APC measures are applied (see FMA and ESMA details below)

Financial Markets Act

Confidence Interval	Lookback period	Liquidation Period	Anti-procyclicality (APC) Measures
<ul style="list-style-type: none"> • CCP margin models must establish single-tailed confidence levels of at least 99% with respect to the estimated distribution of future exposure 	<ul style="list-style-type: none"> • A CCP must consider the exposures resulting from historical volatility calculated based on data covering at least the latest 12 months; • The data used for calculating historical volatility must capture a full range of market conditions, including periods of stress; 	<ul style="list-style-type: none"> • Use a conservative estimate of the time horizons for the effective hedging or close out of the particular types of products cleared by the central counterparty, also in stressed market conditions; 	<ul style="list-style-type: none"> • The margin model must, to the extent practicable and prudent, limit the need for destabilising, procyclical changes • A central counterparty must- <ul style="list-style-type: none"> (a) apply a margin buffer at least equal to 25% of the calculated margins which it allows to be temporarily exhausted in periods where calculated margin requirements are rising significantly; or (b) assign at least 25% weight to stressed observations in the look-back period; or (c) ensure that its margin requirements are not lower than those that would be calculated using volatility estimated over a 10-year historical look-back period.

Appendix - Initial margin methodology

Model component details

Time-weighted margin component	
Component weight	Up to 75%
Method	<p>Time-weighted filtered historical simulation Value-at-Risk (FHS - Boudoukh, Richardson and Whitelaw (BRW) method)</p> <ul style="list-style-type: none"> - The BRW approach combines exponential smoothing and historical simulation, by applying exponentially declining probability weights (the decay factor or λ) to past returns of the portfolio - After the probability weights are assigned, VaR is calculated from the empirical cumulative distribution function weighted by the modified probability weights - The historical simulation (HS) method can be considered as a special case of the more general BRW model in which the decay factor (λ) is set equal to 1.
Confidence interval	99.70%
Liquidation period	At least 2 days
Lookback period	3-year to 5-year rolling lookback, as determined per market
Decay factor/ lambda	<ul style="list-style-type: none"> - Calibration of lambda should aim to optimise and balance responsiveness with pro-cyclicality - Reviewed and recalibrated (considering qualitative and quantitative assessments e.g. Lopez (1998) test, Kupiec and/or Christoffersen independence (IND) tests) annually, and/or ad hoc as required, and approved by JSEC CRO and reported at the Group Model Committee and Risk Committee at the next sitting

Stress period margin component	
Component weight	At least 25%
Method	Average of the 3 most severe tail returns, or other appropriate number of tail returns assessed to ensure stability and avoid pro-cyclicality, considering the distribution of the tail returns, and conditional on approval by JSE Clear CRO
Liquidation period	At least 2 days
Lookback period	1-year stress period

Margin floor	
Method	Historical simulation Value-at-Risk (HS)
Confidence interval	99.70%
Liquidation period	At least 2 days
Lookback period	<p>10-year rolling lookback period including a stress period</p> <p>Where the 10-year rolling lookback doesn't contain a stress period we apply a 9-year rolling lookback with a 1-year stress period taken prior to the 10-year lookback period</p>

Add-on threshold	Proposed change to threshold
<p>Liquidation period margin add-on</p> <p>Currently: R50m threshold applied</p>	Remove liquidation period margin add-on threshold i.e. set to R0
<p>Large exposure margin add-on</p> <p>Currently: R150m LEAO threshold for all derivatives markets</p>	LEAO threshold for the mutualised default fund covering derivatives, cash bond and repos TBC