CCP clearing for the South African bonds and repo markets

Market workshop – Session 13

20th Aug 2024

JSE | CLEAR

let's connect

Bonds CCP | Agenda

- Introduction and Project Update
- Summary of primary CCP operating model changes
- Initial Margin methodology
- Variation Margin methodology
- Other Risk considerations
- Conclusion and next steps

Bonds CCP | Recap: Primary drivers for CCP clearing

Primary drivers for Bonds CCP

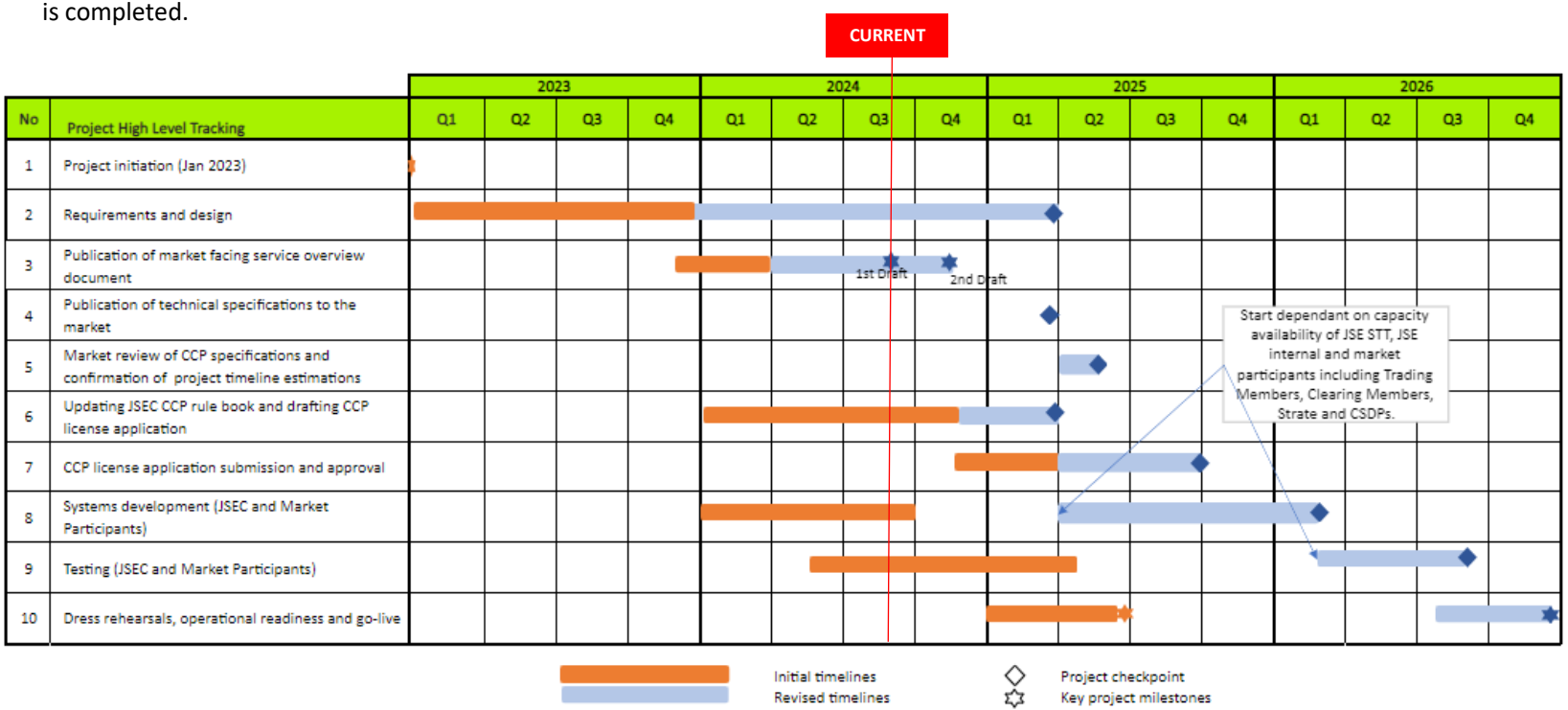
- CCP clearing is a critical service required to scale and increase trading activity in the Bonds ETP market, that is currently limited in access to the 10 Primary Dealers and represents only 1% of the total bonds and repo trading activity in SA. Electronic trading and CCP clearing of repos in European 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.

Why JSE Clear?

- JSE Clear is a fully independent and internationally recognised CCP.
- It is well positioned to leverage its existing CCP clearing infrastructure and integration with clearing member banks to provide a timeous and cost-effective domestic bond and repo CCP clearing service for SA.

Bonds CCP | Revised timelines (indicative)

- Primary focus for 2024 will be on finalizing the risk management requirements, updating the CCP rulebook and submission of the CCP license application.
- Bonds CCP timelines and dependencies to be firmed up once detailed requirements and technical impact assessments on the JSE Repos Project is completed.



Bonds CCP | Market workshop sessions

Primary objectives of the Bonds CCP market workshops:

I. **Consulting and collaborating with market participants** including trading members, clients, clearing members, Strate and CSDPs around the detailed design and requirements of the CCP clearing service.

II. **Discussing and understanding the change impact and interdependencies** across the various market participants' business processes and IT systems.

III. **Providing necessary project status updates** including updates to project timelines and key milestones.

IV. **Providing the required training and support** to operational teams prior to market testing and go-live.

Who should attend these workshops?

Business managers, Business operation leads/managers, IT leads/ managers, Project managers

MARKET WORKSHOP DATES FOR 2024:

- ✓ Session 13 – 20th Aug
- Session 14 – 17th Sept
- Session 15 – 22nd Oct
- Session 16 – 19th Nov

Topics to be covered in workshop sessions:

- Trade novation
- Account structure
- Trade publication
- Trade cancellation
- Integration with internal and external systems
- Deal management
- Position management
- Collateral Management (cash & securities)
- Settlement management
- ETP trade flow & trade reconciliation
- Risk management and margining
- Billing
- Reporting
- Fees
- Default management
- Clearing membership criteria
- CCP rules, policies and procedures

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Bonds CCP | Summary of primary CCP operating model changes

NO.	CATEGORY	DESIGN	REASONING
1	**Clearing membership and obligations**	**Existing JSEC clearing membership criteria to apply, with addition:** • 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 liquidly constraints.	• Alignment with industry standard practices
2	**Default fund structure**	**Single mutualised default fund** • 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.	• Greater capital efficiency • Easier to provide cross product margin offset
3	**Margining methodology**	**IM methodology** • Bond CCP will apply the new IM methodology approved at Q4 2023 Risk Comm for the derivatives markets. • Parameter calibration finalised and remaining quantitative analysis in progress **VM methodology** • Proposed Bond CCP VM methodology finalised - contingent VM methodology	• Aligns closely to other CCP margining methodologies
4	**Clearable Products**	**Phase 1 scope** • Cash bonds and buy sell backs on underlying SA govt bonds (nominal, inflation-linked) • Closed-ended BSBs with max tenor of 1 year and fixed repo rates	• Future phases would consider classic repos, open-ended or evergreen, GC baskets etc. TBC.
5	**Cross product margin offset**	**Cross product margin offset to be explored in future phase** • Cross product margin offset between listed bond future, cash bonds and bond repo positions within the same underlying group i.e. nominal govi bonds and inflation linked bonds.	• Cross product margin offset will assist in reducing the overall initial margin which will aid in growing cleared volumes.
6	**Security collateral**	**Securities collateral to be allowed** • ZAR cash and securities (liquid SA govi 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.	• 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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Bonds CCP | 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 finalised and remaining quantitative analysis 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.

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

Margin add-ons

Initial margin levied on participant portfolios to cover potential future exposures is comprised of

- A base margin component
- A concentration margin add-on levied based on the size of position in different bonds
- A large exposure add-on (LEAO) margin levied on large portfolios that would threaten a defined proportion of the default fund if the participant were to default in a stressed market

Concentration margin add-on

- 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 to cover the higher liquidation costs typically associated with large positions
- This higher IM requirement is achieved by adding the concentration margin add-on 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

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.
- **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).

Bonds CCP | Initial 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	Worst case scenario	**99.5%**
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)	**Contingent VM model** – CVM theoretical profits can offset IM requirement (IM floored to zero)
Total Initial margin	VaR(base margin) + conc margin + safety net (includes recovery cost)	VaR(base margin) + concentration margin + large exposure add-on margin
Maintenance margin	90th percentile of each participant's daily IM over the previous quarter	n/a – daily VM applied (CVM)
Default fund	No	**Yes**

Bonds CCP | Initial Margin methodology

	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 govi bonds only)
Position netting	Yes	Yes
Cross product margin offset	No	Possibility of offering cross product margin offset (between interest rate spot and derivatives positions) to be investigated for future phases

Rationale for Bond CCP confidence interval of 99.5%

ESMA and FMA guidelines on CCP confidence intervals

- **A central counterparty must adhere to the following confidence intervals for the calculation of initial margins**
  - (a) for OTC derivatives, 99.5%; and
  - (b) for securities other than OTC derivatives, 99%.

- **For the determination of the adequate confidence interval for each class of securities it clears, a central counterparty must in addition consider at least the following factors**
  - the complexities and level of pricing uncertainties of the class of securities which may limit the validation of the calculation of initial and variation margin;
  - the risk characteristics of the class of securities, which can include, but are not limited to, volatility, duration, liquidity, nonlinear price characteristics, jump to default risk and wrong way risk;
  - the degree to which other risk controls do not adequately limit credit exposures
  - the inherent leverage of the class of securities, including whether the class of securities-
    i. is significantly volatile;
    ii. is highly concentrated among a few market players; or
    iii. may be difficult to close out.

Bonds CCP | Initial Margin methodology

Rationale for bond CCP confidence interval of 99.5% (cont.)

- In general, the liquidity of ZAR denominated SA government bonds is homogenous and interest rate derivatives (IRD) and bonds typically have fewer complexities and lower level of pricing uncertainty compared to other asset classes
- IRD and bond ETP margins have historically been very stable and low compared to other asset classes reflecting the lower price volatility
- IRD production margin backtesting also highlights very low number of breaches relative to target CI
- The default fund covers exposures which exceed those covered by initial margin.
    - A 99.5% CI for the base margin, together with the concentration and large exposure margin add-on's, maintains the preference for a 'defaulter pays' approach while supporting an appropriate level of mutualisation of losses

Summary of quantitative analysis performed

- The following section summarises the quantitative analysis performed, applying the new margin methodology (with various parameter values) to the bond instruments and to the unsettled bond and repo trades transacted between Primary Dealers on the ETP and in the reported bond market.
    - Instrument level margin requirements and back-testing.
    - Client level back-testing.
- Analysis covers the period from 1 Jan 2020 (pre-Covid market stress) to date.

Bonds CCP | Initial Margin methodology

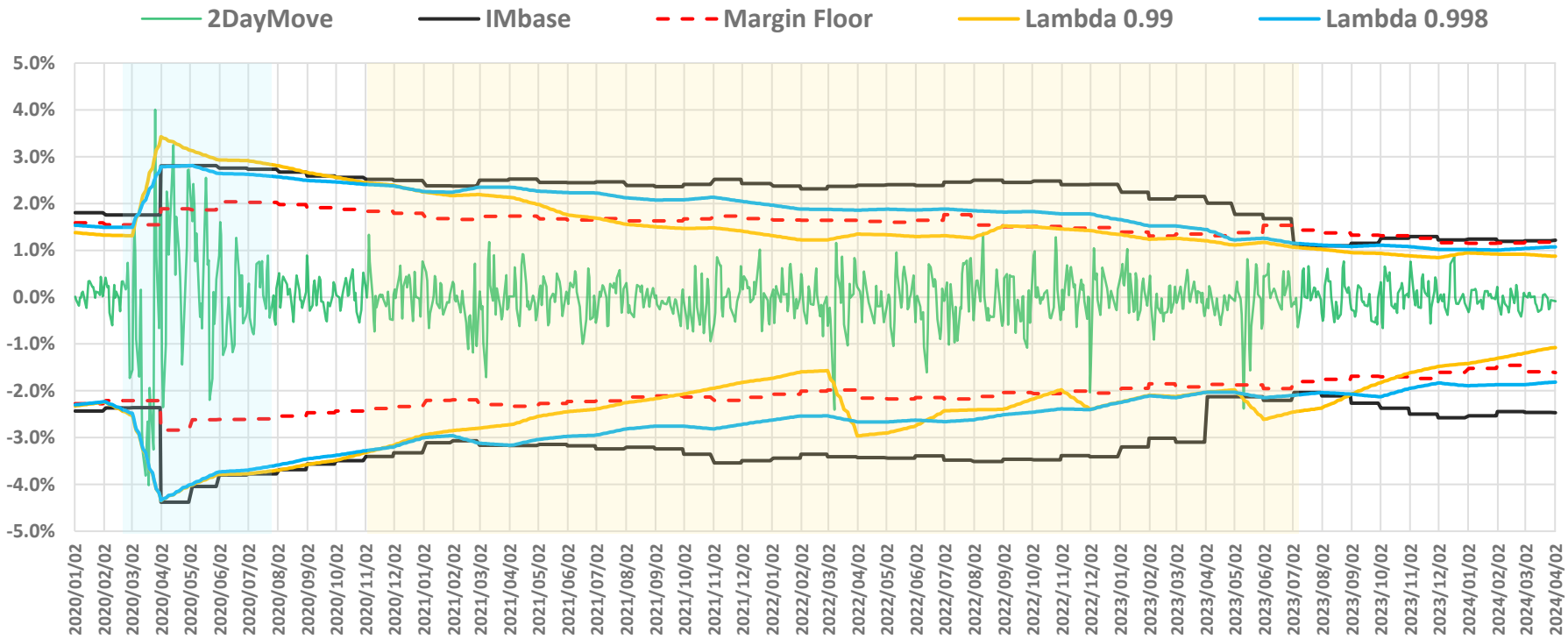
Prod/current model
- Hist VaR
- 99.7% CI
- MPOR: 2 days
- Lookback: 3Y + 1Y stress

New model
- **99.5% CI**
- MPOR: 2 days
- FHS: 3Y rolling lookback
- FHS: Lambda: 0.99 & 0.998
- Stress component: Avg of 5 tail returns from 1Y stress period
- Margin floor: Hist VaR, 10Y LB

New methodology instrument level margin impact

R186

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



Bonds CCP | Initial Margin methodology

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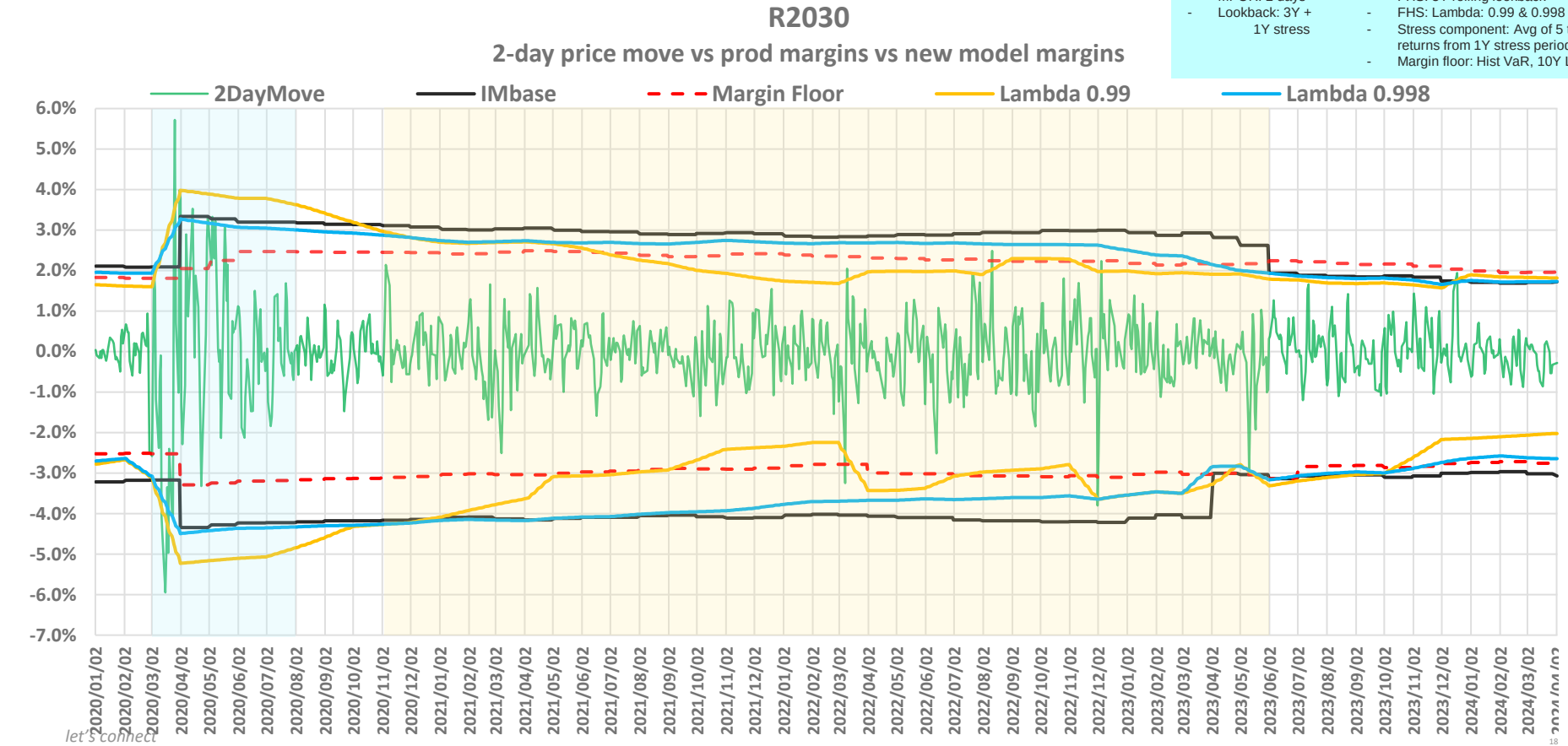
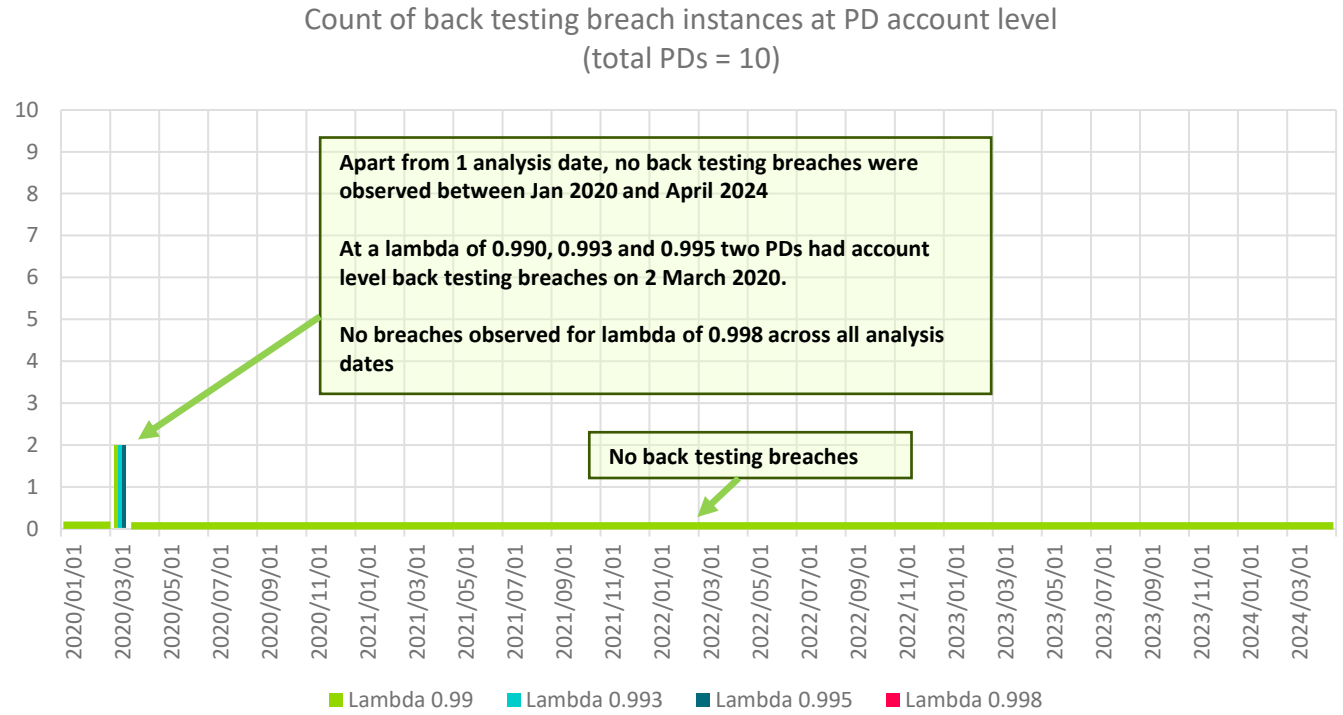


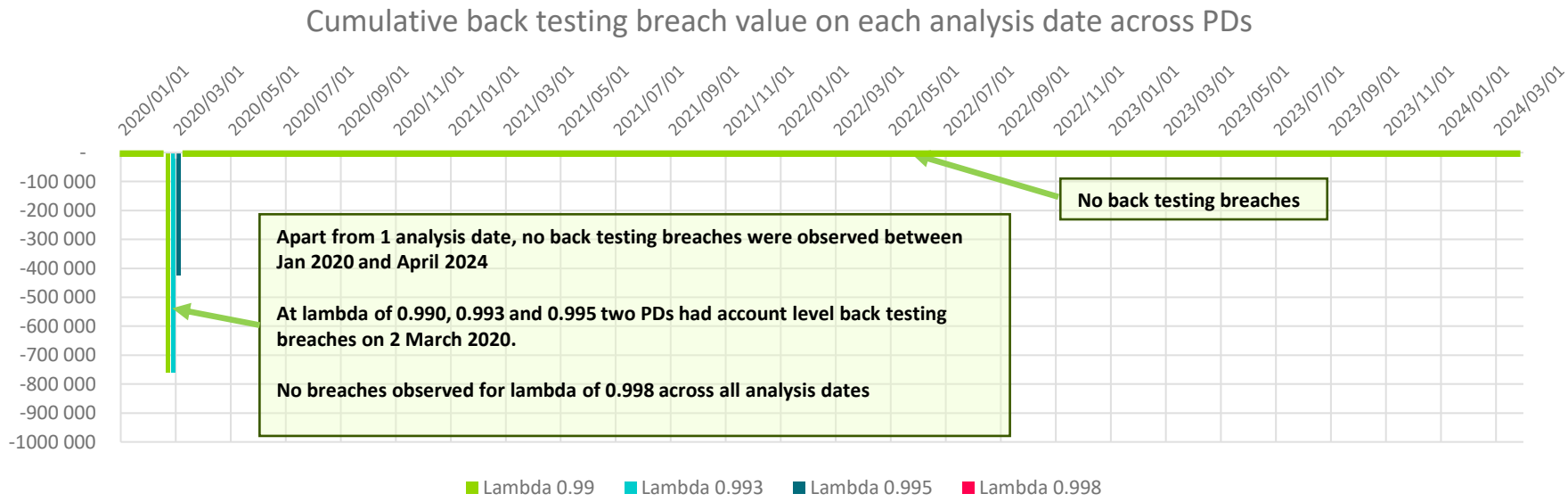
Client level back testing



- Account-level back testing analysis conducted over the period from Jan 2020 to April 2024 – a total of 52 monthly dates were selected for the back testing analysis
- Analysis performed on the 10 Primary Dealer portfolios (ETP & reported market) during the period
- Only base margin is considered in the account level back testing (concentration margin and large exposure add-on margin are not included)
- Factoring of add-ons could further reduce or eliminate breaches
- Target coverage 99.7% CI

Client level back testing (cont.)

- Apart from 1 analysis date, no back testing breaches were observed between Jan 2020 and April 2024
- 2 March 2020: Cumulative breach value < R1m at lambda of 0.99, 0.993 and 0.995. No breach observed for lambda of 0.998.
- Only base margin is considered in the account level back testing (concentration margin and large exposure add-on margin are not included). Factoring of add-ons could further reduce or eliminate breaches.



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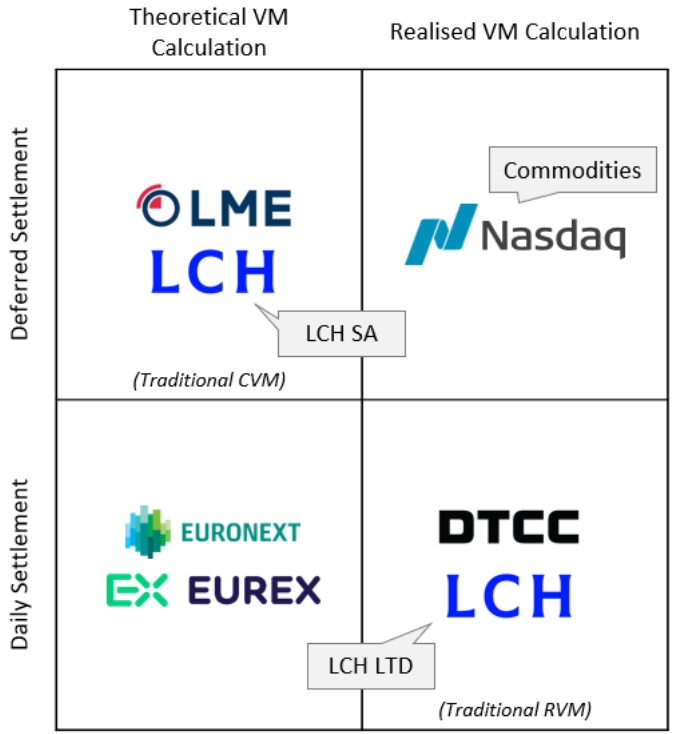
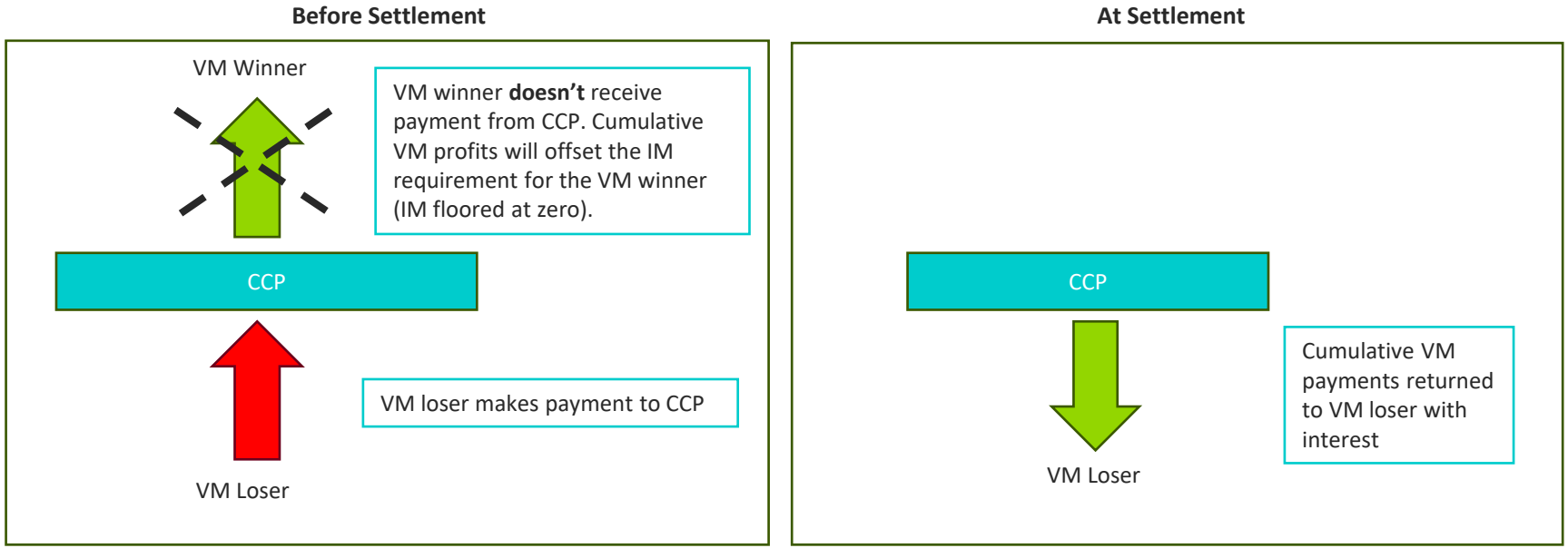
Overview of Variation Margin Methodologies

- 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

Peer comparison matrix



Proposed Bond CCP VM Methodology: Contingent Variation Margin Methodology (CVM)



Trade economics are not impacted by VM flows.
The need to manage the risk and implications of cumulative VM gain returns is avoided.

Contingent Variation Margin Methodology (CVM): Example

A key difference between CVM and RVM is that under CVM the need to manage the risk and implications of cumulative VM gain returns is avoided.

CVM

Bond closing price	R100	R101	R103	R104	R101	R98	R99	R103
Cpty A								
Near leg position		-100	-100	0	0	0	0	0
Far leg postion		100	100	100	100	100	100	0
Net position		0	0	100	100	100	100	0
Cash position		R0	R0	R10 000	R0	R0	R0	-R10 009
Scrip position		0	0	-100	0	0	0	100
IM		R0	R0	-R200	R0	R0	R0	R200
cVM (Near)		-R100	-R300	R0	R0	R0	R0	R0
cVM(Far)		R100	R300	R400	R100	-R200	-R100	R0
Net cVM margin cashflow		R0	R0	R0	R0	-R200	R100	R100
Cash balance		**R0**	**R0**	**R9 800**	**R9 800**	**R9 600**	**R9 700**	-R9

RVM

Bond closing price	R100	R101	R103	R104	R101	R98	R99	R103
Cpty A								
Near leg position		-100	-100	0	0	0	0	0
Far leg postion		100	100	100	100	100	100	0
Net position		0	0	100	100	100	100	0
Cash position		R0	R0	R10 000	R0	R0	R0	-R10 009
Scrip position		0	0	-100	0	0	0	100
IM		R0	R0	-R200	R0	R0	R0	R200
rVM (Near)		-R100	-R200	R0	R0	R0	R0	R0
rVM(Far)		R100	R200	R100	-R300	-R300	R100	R0
Net rVM margin cashflow		R0	R0	R100	-R300	-R300	R100	R0
Cash balance		**R0**	**R0**	**R9 900**	**R9 600**	**R9 300**	**R9 400**	-R409

CVM: Calculated from the change in price between the original transaction execution price and the current market price.

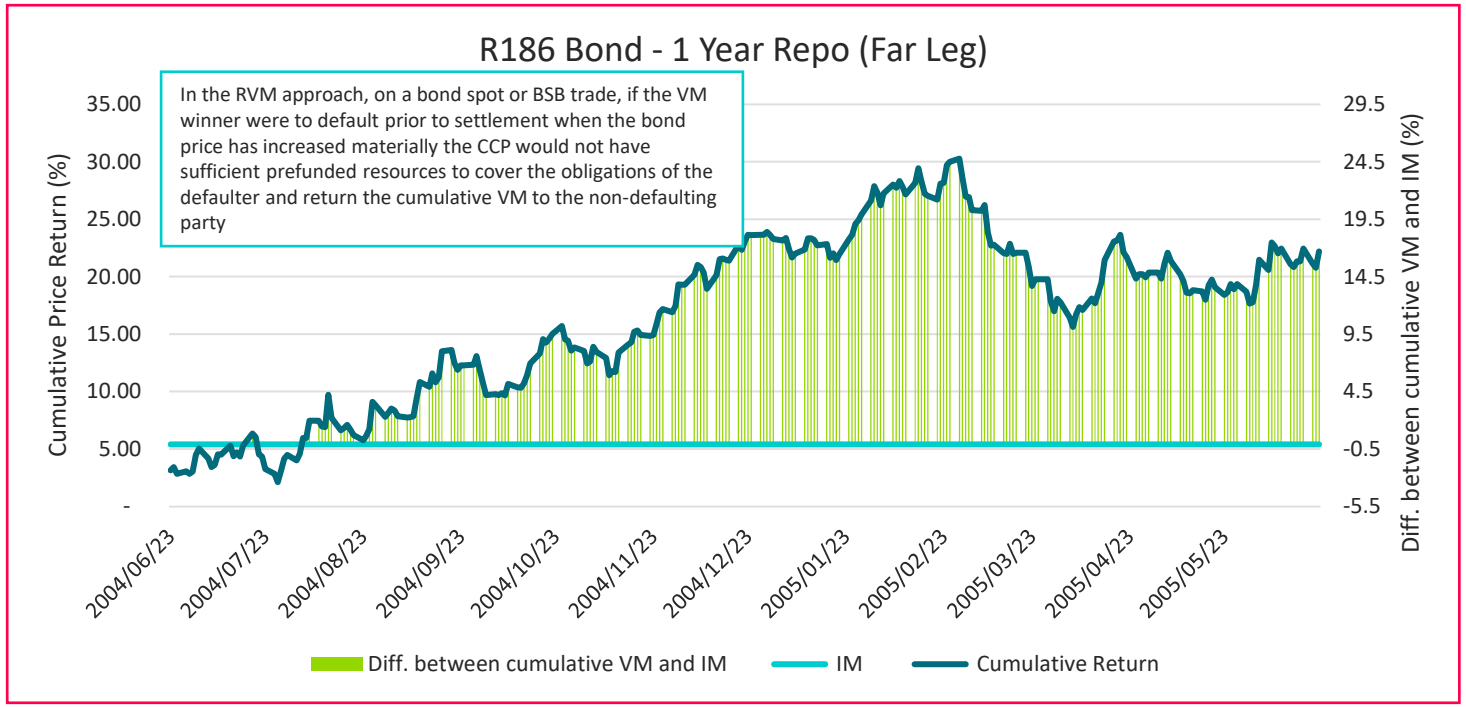
RVM: Calculated from the change in price between the trade price or previous closing price and the current closing price. This is then settled on a daily basis.

Repo Interest

Repo Interest + net cumulative VM

Return of cumulative VM gain of 400 would need to be managed to avoid altering the economics of the trade (price distortion)

Repo buyer example (buys bond at near leg and sells back at far leg)



Repo buyer agreed to sell the bond at a certain fixed price 1 year from now (e.g., R101) but the spot price has now increased (e.g., R126) hence he is a VM loser making payments to the CCP

Rationale and Considerations for CVM

CVM Rationale

- Trade economics are not impacted by VM flows and the need to manage the risk and implications of cumulative VM gain returns is avoided. In an RVM approach, in the event the VM winner defaults, there is the risk that the VM payments made by the VM loser cannot be returned to him
- Cumulative VM profits will offset the IM requirement for the VM winner (IM floored at zero)

Other CVM Considerations

- Interest will be earned by the VM loser and paid back to him periodically.
- Future phases may consider RVM
  - To ensure that participants with both spot positions (bonds and repos) and derivatives (bond futures and options) would benefit from VM netting i.e., they would be able fund VM losses on interest rate derivatives positions (if applicable) with the corresponding VM profit on spot positions in the opposite direction.
  - To support cross product initial margin offset between spot bonds, buy sell backs/repos and IRD trades.
  - To achieve this, we would need to formulate an approach to manage the risk and implications associated with the return of cumulative VM gains by the settlement date.

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Wrong way risk

- **Wrong way risk refers to the counterparty credit risk associated with an adverse correlation between a credit exposure to a counterparty and the credit quality of that counterparty, in other words, the exposure to a counterparty increases together with the risk of the counterparty's default.**

- **Types of WWR**

  - Specific WWR – driven by specific characteristics of the counterparty and transaction e.g. counterparty pledging its own bonds or equity as collateral or entering a bond future on its.

    - For Bond CCP (spot bonds, repos, IRD) we have not identified any material SWWR scenario since only SA ZAR government bonds accepted as collateral and underlying for trades. Corporate bonds or SOE bonds are not accepted as collateral. In future with equities this would be a greater consideration.

  - General WWR – driven by general macro economic factors that have an impact on the probability of default of a counterparty and on the counterparty risk exposure e.g. counterparty to a transaction operates in a related industry/sector or jurisdiction/country of risk to the issuer to the security involved in the transaction.

Bonds CCP | Other Risk considerations

Management of wrong way risk

- Given the systemic importance and the close relationship between banks and the Sovereign in a concentrated local market (small number of relatively large interrelated local banks and Sovereign operating in a common industry/sector and country) the default is likely to be correlated with an adverse impact on Government bond prices that will materially reduce bond collateral values, increasing risk of JSE Clear and other market participants.

- Limited SA bank default data, particularly for large systemically important banks in recent history. Default of non-systemic banks (e.g. VBS Mutual Bank in 2018 and African Bank in 2014) and credit rating downgrades have been observed, however. Impact of rating downgrades in the 20-year lookback are encompassed in the timeseries used to calibrate haircuts.

- Default of a large local clearing member bank is unlikely to result from an abrupt immediate collapse (i.e. jump to default) – credit monitoring and market awareness is expected to be an early warning indicator. JSE Clear would take appropriate action to revise collateral haircuts, limits and inclusion of impacted securities in the collateral eligibility list, as well as potential liquidity risks brought on by such changes.

- Instead of factoring a wrong-way risk buffer in the haircut upfront (which would lead to extremely punitive haircuts), while the probability of a large clearing member bank default is very low, haircuts will be reviewed regularly and updated accordingly.

- Haircuts will be reviewed quarterly or more frequently, as required, for any material changes in risks associated with collateral securities

- JSE Clear Rules allow the CCP to levy additional margin if we are concerned with credit standing or risk profile of a counterparty.

Bonds CCP | Other Risk considerations

Securities collateral

- **Background**
  - The acceptance of securities collateral by JSE Clear, will allow members to meet their IM requirements through a combination of ZAR cash and liquid South African fixed rate government bonds.

- **Securities collateral will be offered in the following markets for Bond CCP**
  - Interest Rate Derivatives and cleared Bond CCP trades

- **Securities Collateral Value Proposition**
  - Reduce liquidity pressures and funding costs for derivative market participants in an environment of increasing regulatory capital requirements and other cost pressures
  - Alleviate liquidity pressures in times of market stress when margins inevitably increase
  - Mitigation of the concentration risk that arises from the CCP investing the margins it receives from clearing members for derivative exposures back with the same institutions

Bonds CCP | Other Risk considerations

Securities collateral

- **Eligible securities**
  - Initial phase - liquid South African government bonds
  - Later phases - equities will be considered

- **Obligations for which securities collateral will be accepted**
  - Initial margin (including the margin add-on's)
  - Clearing member default fund contributions will be catered for in a later phase
  - Note:
    - Additional margin required by Clearing Members on top of the CCP margin call will not be able to be covered by securities via the JSE Clear collateral solution
    - Variation Margin will remain payable in ZAR cash

- **A minimum percentage of the IM obligation will still need to be settled in ZAR cash**
  - Initially this will be 65% i.e., up to 35% of the IM obligation can be collateralized through securities

Bonds CCP | Other Risk considerations

Securities collateral

- **The following criteria will be used to determine which bonds form part of the list of eligible securities:**
  - Nominal value in issue greater than R100 billion
  - Average daily value traded (ADVT) of more than R500 million
  - Term to maturity greater than 6 months
  - Ability to value the security and determine the valuation haircut and concentration limits
  - Availability of data to support these functions

- **Eligible collateral will be reviewed quarterly and ad hoc as required**

- **Valuation and haircuts:**
  - In determining the sufficiency of the cash and securities posted to cover IM obligations, JSEC will value the securities pledged to JSE Clear at their market value less any haircut applicable.
  - JSE Clear will mark these securities to market on at least a daily basis and will adjust the amount of cash to be paid to (or from) JSE Clear from (or to) market participants to cover their remaining initial margin requirements.
  - The haircuts will be calculated to account for market volatility of each security
  - Haircuts will be reviewed at least quarterly for appropriateness and more frequently should JSE Clear so require.
  - Market participants will be notified of applicable haircuts and any changes thereto.

Bonds CCP | Other Risk considerations

Securities collateral

- Valuation haircuts are based on a 99.96% confidence interval 3-day move observed over a 20-year lookback period (including an appropriate stress period), where available, per security

- Haircut estimates for eligible SA government bonds are conservative, without explicitly adding a wrong-way risk component to the haircut

Confidence interval	Haircut range
99.96%	6.96% - 10.87%

- In the context of the initial eligible collateral list limited to specific liquid government bonds, the scenario that could introduce potential Wrong Way Risk (though very unlikely) is the default of a large local clearing member bank.

- ***Wrong-way risk is the potential loss that may be suffered during the Default Management Process, due to an unfavorable correlation between the counterparty's creditworthiness, the value of its collateral pool and the value of its derivatives portfolio***

Securities collateral

- **Concentration Limits**
  - JSE Clear will impose limits on the aggregate amount of a particular security per clearing member and clearing members may set account level limits
  - Limits are set for the following reasons:
    I. to avoid undue concentration of collateral in a particular asset class, type of security, obligor, etc.
    II. to restrict the maximum amount of non-cash collateral a market participant may pledge to JSE Clear for its margin requirements in respect of its position
  - Limits will be based on liquidity of the security

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Conclusion and next steps:

- One-on-one sessions with Clearing members, JSEC will contact Clearing members to request availability.
- Market participants to review the CCP design and requirements shared thus far and engage directly with JSE on any questions or queries they may have.
- Market participants to start mobilising their internal teams to commence internal design and system development work.

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