JPX
JAPAN SECURITIES CLEARING CORPORATION

Outlines of Accommodation of New Margin Calculation Method (VaR Method) for Futures/Option Contracts

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Japan Securities Clearing Corporation

Introduction

- When trading Futures/Options, investors need to post margin with a securities company or a commodity futures trading firm (collectively referred to as “Securities Company, Etc.”). Securities Companies, Etc. deposit margin posted by investors with Japan Securities Clearing Corporation (JSCC) as an agent of the investor.
- While currently JSCC has been using SPAN developed by CME to calculate the required margin amount deposited by Securities Companies, Etc., JSCC plans to introduce new margin calculation method (VaR Method) toward 3rd Quarter in FY ending March 2024 (Oct. 2023- Dec. 2023), aiming to enhance the function of original purpose of margin, that is protecting investors and Securities Companies, Etc. by suppressing abrupt rise/fall of margin level and achieving sophisticated risk management.
- This material explains the outlines of framework and calculation method related to the revised margin calculation method in align with VaR Method introduction.

- As described in this material (P.12), calculation method and application timing of parameters used for calculation of margin deposited with JSCC by Securities Companies, Etc. will be changed in align with VaR Method introduction. Accordingly, calculation method and posting timing of margin which Securities Companies request investors to deposit may change.
- Handling of margin amount set by Securities Companies, Etc. for investors and timing to deposit such margin will be prescribed by Securities Companies, Etc. on an individual basis, in light of the margin amount notified by JSCC to each Securities Company, Etc. Please refer to the announcement made by your Securities Company, Etc., for specific handling of investors’ margin.

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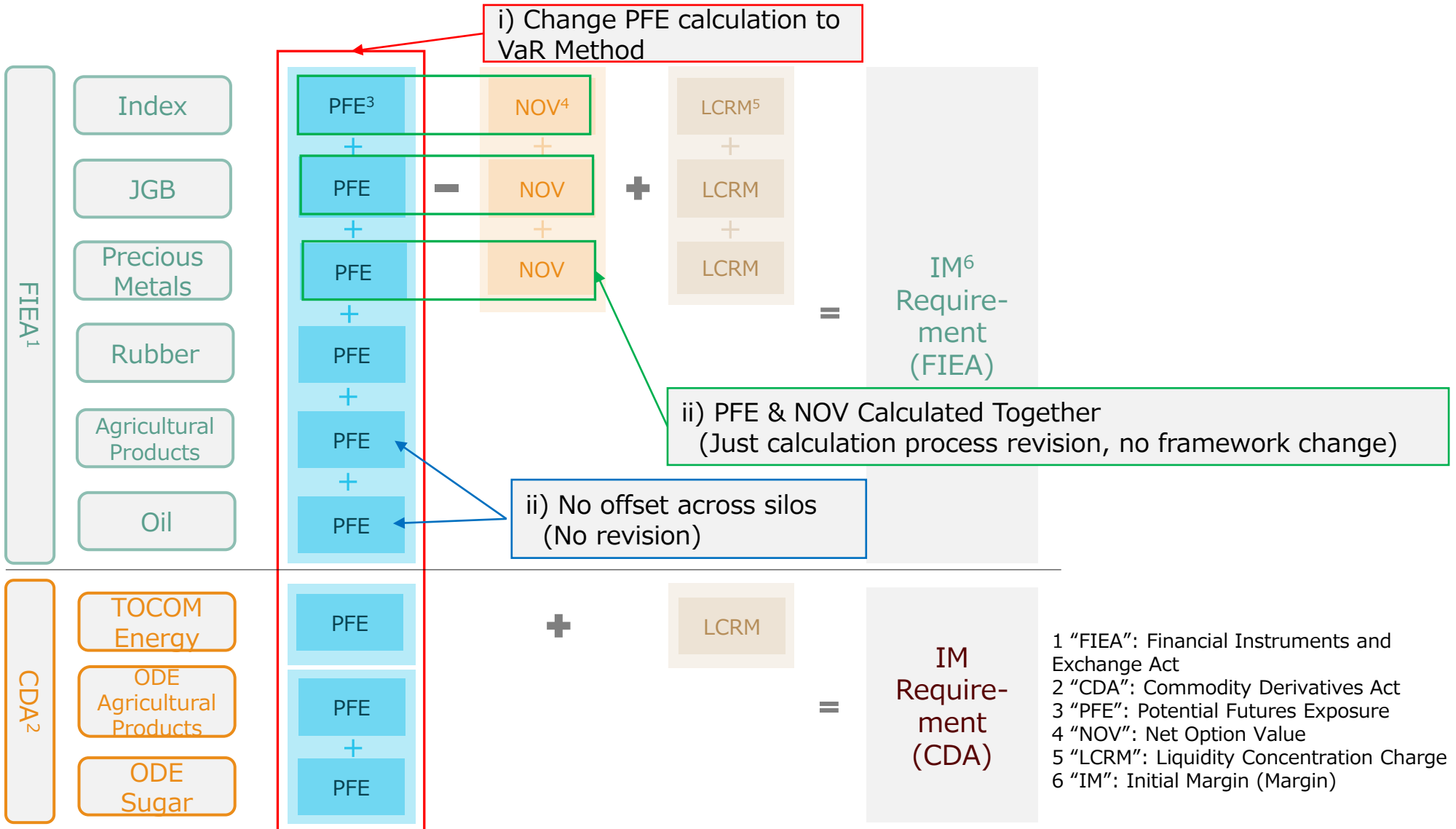
I. Framework

1. Margin Calculation Framework Revision

- Change PFE (Potential Future Exposure) calculation method from SPAN to VaR.
  - No significant change to calculation framework itself. Major changes include i) VaR-based PFE calculation, and ii) NOV (Net Option Value) and PFE calculated together.

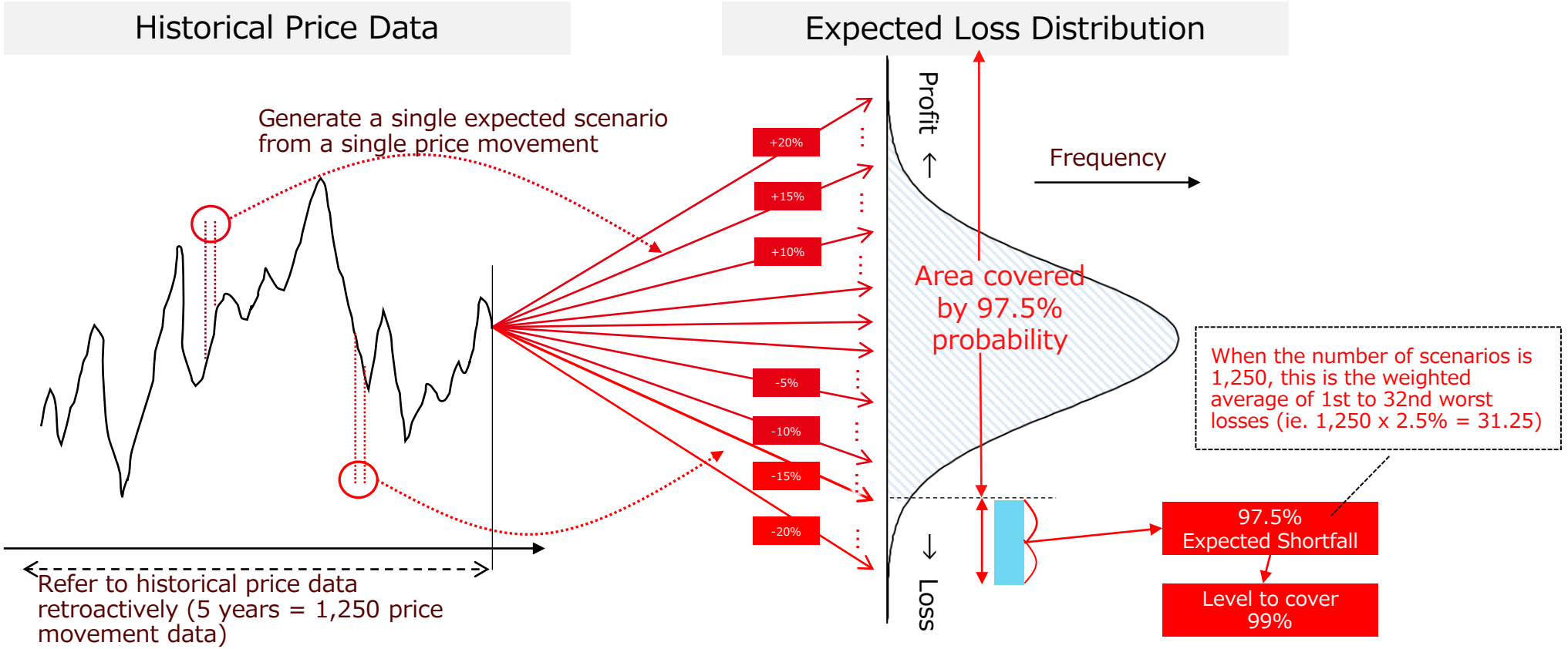


1 "FIEA": Financial Instruments and Exchange Act
2 "CDA": Commodity Derivatives Act
3 "PFE": Potential Futures Exposure
4 "NOV": Net Option Value
5 "LCRM": Liquidity Concentration Charge
6 "IM": Initial Margin (Margin)

2. Outline of VaR Method

- Under VaR method, set Margin at the level to cover 99% expected loss calculated from historical data
- Adopt average of top 2.5% loss amount* calculated from each scenario (97.5% Expected Shortfall)

  * Assuming normal distribution, theoretically, almost equal to 99% coverage.
- In addition to Historical Scenarios in Lookback Period (past 5 years:1,250 days), Stress Scenarios are also considered.
  - Historical Scenarios will be adjusted to strongly reflect recent fluctuation.
- Points of attention: Margin changes daily, margin differs between long and short, as well as by contract month, even in a position of 1 contract of Futures
  - Under SPAN method, in a position of 1 contract of Futures, daily margin update, same margin regardless of long/short and contract month.



3. HS-VaR Method & AS-VaR Method

- Select either “Historical Simulation Method (HS-VaR)” or “Alternative Simulation Method (AS-VaR)” depending on liquidity, historical data availability and other product features.
- Following rules to apply to offset within the same silo:
  - No offset between Margins under HS-VaR and those under AS-VaR; and
  - For products using the same method, offset remains effective if allowed now. Also, offset between different contract months is allowed even in the products whose offset between different contract months are not allowed now. (for new products etc., offset restrictions will be imposed as necessary depending on status, such as existence of correlations.)
- We will publish the product of HS-VaR or AS-VaR and the detail of offset later.

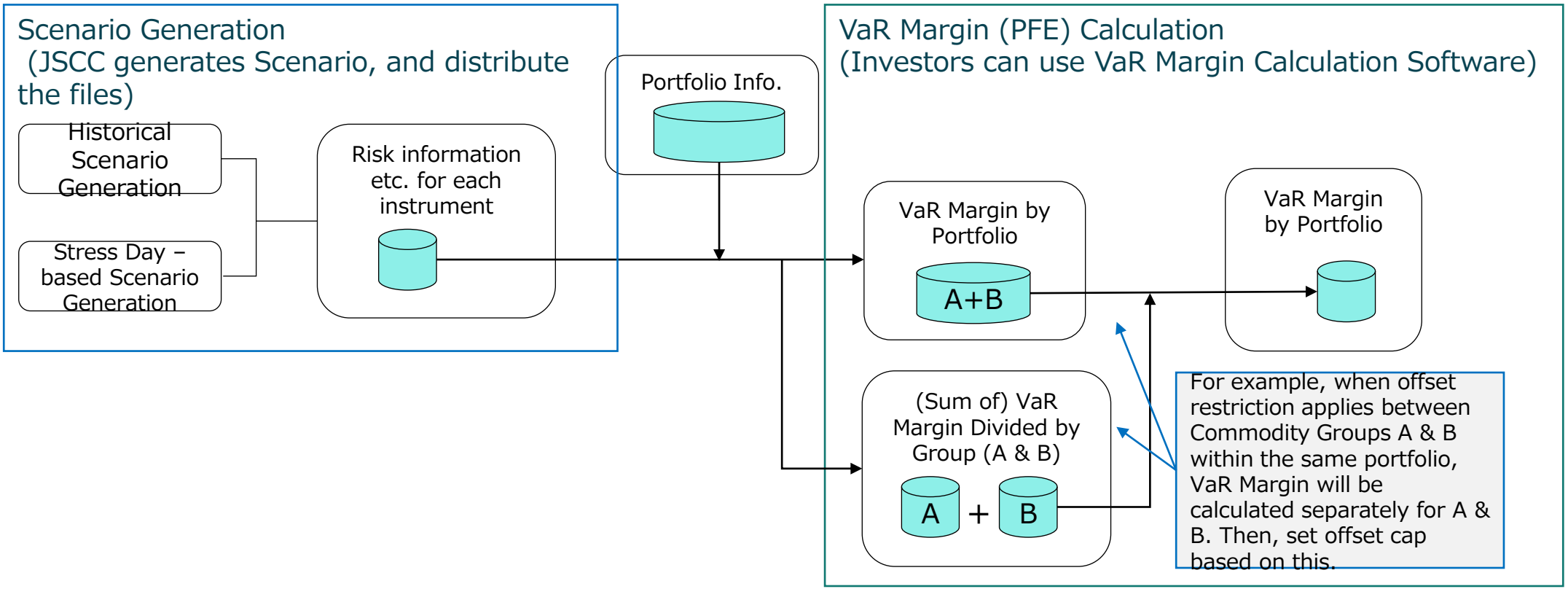
Calculation Method according to Product Features

Product Feature		Calc. Method	Outline of Calculation Method	Products (Example)
Highly Liquid or Sufficient Historical Data		HS-VaR	• Calculate from scenarios generated based on historical data of its own risk factors (fluctuation factors, such as price, IV and interest rate)	• Nikkei225 Futures/OP • Other Major Domestic Index Futures (such as TOPIX, JPX400) • JGB Futures/OP • Precious Metal Futures/OP (such as gold, platinum) • Energy Futures (such as crude oil, electricity)
Low Liquidity and Insufficient Historical Data	Benchmark Exist	HS-VaR	• Use risk factors of similar highly liquid products as benchmark	• TOPIXOP, JPX400OP, single stock OP and the like (Use IV of Nikkei225OP as benchmark)
	No Benchmark	AS-VaR	• Apply scenarios generated by combining fluctuation range and directions of risk factors, in the same manner as SPAN method	• Overseas index futures, dividends index futures, Nikkei VI Futures, agricultural futures and the like

4. VaR Method: Calculation Flow

- Outline of VaR method calculation flow is as follows:
  - In the early part of the process, generate scenario profit and loss (PnL) for each issue from historical data and data on stress days
  - In the latter part of the process, calculate portfolio-based scenario PnL by applying scenario PnL for each issue to portfolio information, then calculate VaR Margin based on this

Calculation Flow under VaR Method



5. HS-VaR: Scenario Generation

- Under HS-VaR, combine 1,250 Historical Scenarios and Stress Day-based Scenarios since 2008.
- Historical Scenarios capture recent fluctuations through volatility scaling using EWMA.
- Additionally, pick Stress Day-based Scenarios according to portfolio features from data of sufficiently long period in the past (10 years or more) to avoid recent fluctuations giving too much impact (deal with procyclicality).

Historical Scenario

Sample	Latest 1,250 (5 years)
MPOR	2 days
Volatility Adjustment	Yes (EWMA) ・EWMA parameters (λ & HVS) to be decided considering IM level

Stress Day-based Scenario

Sample	JSCC to pick from data since 2008 ・Number of samples and setting method to be decided considering IM level
MPOR	Same as Historical Scenarios
Volatility Adjustment	No

Illustration of Scenario Generation under HS-VaR (example of Index/Value)

Historical Scenario PnL

Fluctuation Rate

Instrument	1	2	3	…	1250
NK225F 2009	-0.5%	+1%	-1.5%		+2.5%
TOPIXF 2012	+1%	-2%	+3%		-0.5%
:			:		

Calculate PnL by applying historical 1,250 fluctuation rates to today's price

【PnL】

	1	2	3	…	1250
NK225F 2009	-1	+2	-3		+5
TOPIXF 2012	+2	-4	+6		-1
:			:		

Stress Day-based PnL

JSCC to pre-define N stress days since 2008

Fluctuation Rate

Instrument	2020.3.x	…	2011.3.x	…	2008.10.x	…
NK225F 2009	-15%		-10%		-20%	
TOPIXF 2012	-10%		-15%		-25%	
:			:		:	

Calculate PnL by applying fluctuation rates on N stress days to today's price

【PnL】

	1	2	3	…	N
NK225F 2009	+5	+8	-4		-15
TOPIXF 2012	-7	-6	+2		+1
:			:		

5. HS-VaR: Stress Day-based Scenario Generation (Reference)

- Generate Stress Day-based Scenarios from return on the stress days designated for each silo (no volatility scaling).
- Stress days are designated from data since 2008 as shown below using representative risk factors:
  - To accommodate various types of portfolios, pick days with significant fluctuations not only for Up/Down of a single risk factor, but also Up/Down of a combination of risk factors.
    - Example of Index Silo (under consideration):

(NK225 Futures, ATM IV of NK225OP)	Top 25 fluctuations
(NK225 Futures 1st and 2nd Contract Month)	Top 25 fluctuations
(TOPIX Futures 1st and 2nd Contract Month)	Top 25 fluctuations
(NK225 Futures 1st Contract Month, TOPIX Futures 1st Contract Month)	Top 25 fluctuations

  - Eliminate overlapping days from days picked under each pattern.

5. HS-VaR: VaR Margin Calculation

- After adding up Scenario PnL generated for each issue by portfolio, calculate PFE using Scenario PnL with some top losses.
  - Calculate using ES (Expected Shortfall) to avoid individual sample giving too much impact on change of IM level (set at 97.5% ES so that cover ratio will be about the same as 99%VaR).

Illustration of PFE Calculation via HS-VaR (Example of Index/Value)

Historical Scenario PnL (by Portfolio)

Instrument	Qty.	1	2	3	…	1250
NK225F 2009	+10	-10	+20	-30		+5
TOPIXF 2012	-20	+20	-40	+60		-10
:	:			:		
NK225C 2112 22000	-5	+5	-2	+1		-10
Portfolio		**+210**	**-120**	**-160**	…	**+20**

Stress Day-based Scenario PnL (by Portfolio)

Instrument	Qty.	1	2	3	…	N*
NK225F 2009	+10	+50	+80	-40		-15
TOPIXF 2012	-20	-70	-60	+20		+10
:	:			:		
NK225C 2112 22000	-5	-15	-12	+5		-50
Portfolio		**-200**	**-320**	**+80**	…	**-120**

(1)	(2)	…	(1250)
-450	**-360**	…	**+250**

(1)	(2)	(3)	…	(n*)
-500	**-400**	**-300**	…	**+100**

Sort 1,250 Historical Scenario PnLs by loss amount from largest loss

Sort N Stress Day-based Scenario PnLs by loss amount from largest loss, and pick top n PnLs

S	H	S		H
(1)	(1)	(2)	…	(1250)
-500	**-450**	**-400**	…	**+250**

Due to calculation by 97.5%ES, adopt average of losses in top 2.5% of samples from 1,250+n losses as PFE

Portfolio PFE	**-300**

- N and n to be decided before migration considering Margin level and the like.

6. AS-VaR: Scenario Generation, VaR Margin Calculation

- Under AS-VaR, scenarios to be used for PFE calculation are combination of fluctuation range and direction (Up/Flat/Down) of risk factors.
  1. “Fluctuation range of risk factors” to be generated from historical data of risk factors.
  2. As to “fluctuation direction,” 30 combinations for each issue: i.e., price (up, ½ up, flat, ½ down, down), interest rate (up, flat, down) and IV (up, down) (5 x 3 x 2).
  3. Spread between contract months will be set.
  4. Risk offset considering correlation coefficient is implemented across commodities specifically permitted.
- PFE is the largest loss among PnLs calculated for each scenario.

AS-VaR PFE Calculation Example (example of IDX)

Dow Futures

Instrument	Qty.	1 (uuu)	2 (udu)	3 (suu)	…	30 (ddd)
DJIAF 2009	+10	+10	+10	0		-10
DJIAF 2012	-20	-20	-20	0		+20
Spread	10	-2	-2	-2		-2
Portfolio		**-12**	**-12**	**-2**	…	**+8**

Nikkei VI Futures

Instrument	Qty.	1 (uuu)	2 (udu)	3 (suu)	…	30 (ddd)
NKVIF 2009	+20	+20	+20	0		-20
NKVIF 2010	-10	-10	-10	0		+10
Spread	10	-2	-2	-2		-2
Portfolio		**+8**	**+8**	**-2**	…	**-12**

1 (uuu)	2 (udu)	…	30 (ddd)
-12	**-12**	…	**+8**

1 (uuu)	2 (udu)	…	30 (ddd)
+10	**-20**	…	**-5**

1 (uuu)	2 (udu)	…	30 (ddd)
+8	**+8**	…	**-12**

i) Select largest loss out of 30 scenarios

ii) PFE shall be simple total of largest loss of each product (when no offset between commodities)

7. Operational Flow Revision Points

- After VaR Margin introduction, operational flow will be changed as shown in table below:

Item	Currently under SPAN	Expected Timing	Post-VaR Introduction	Expected Timing*
SPAN Parameters Publication	Publish last business day of each week and apply from next business day (OP Margin is distributed daily after close)	Early: around 17:00 Final: around 18:00	Distribute Margin applied to today's position after today's close (Annex)	Daily around 16:15
SPAN Parameters Ad Hoc Modification	In case of significant market fluctuation, recalculate SPAN Parameters and apply from next business day	Around 18:00	Abolish	–
EOD (Early)	Distribute SPAN RPF (Early) containing products other than FLEX futures/OP and RN Prime Futures	Around 15:45	Distribute BPF and VPF excluding FLEX Futures/OP and RN Prime Futures	Around 15:45
EOD (Final)	Distribute SPAN RPF (Final) containing products including FLEX Futures/OP and RN Prime Futures	Around 16:00	Distribute BPF related to FLEX Futures/OP and RN Prime Futures	Around 16:00

* Please note that expected timing is a rough indication based on current average distribution timing, and sometimes we may need more time depending on market conditions.

II. System

1. Outlines of Third-party Services

- JSCC provides “Margin Calculation Software" for Clearing investors to reconcile/simulate VaR Margins.

Service Menu	Summary	Provision Form
VaR Margin Calculation Software (Equivalent to current PC-SPAN)	• JSCC provides software and files (such as Scenario PnL files) necessary for VaR Margin calculation. • Investors will import the files and conduct simulation on users’ environment.	• Software (GUI)
WEB Simulation Environment	• JSCC provides environment for WEB-based VaR and SPAN Margin simulation before VaR Margin introduction (after around July 2022) as reference • Details to be notified/published separately - Environment after VaR Margin introduction is currently under separate review	• WEB Screen
Margin Data per Contract	• Publish Required Margin Amount for short or long one contract of Futures/OP on JSCC Website every business day (around 16:15). • See P.18 “File for Margin per Contract” for detail	• JSCC Website

3. File for Margin per Contract

- As reference information for investors, JSCC will post, on JSCC Website, files recording VaR Margin when long or short 1 contract of each issue of Futures/OP, in a manner shown below:
  - Please refer to the Annex for the file details and the sample file.

Item	Description	Remarks
File Format	CSV	
Recorded Data	VaR Margin when short or long 1 contract of each issue set as of close of day session (EOD)	VaR Margin is value calculated using EOD parameter files (VPF, BPF) for the day
Posting Location	JSCC Website	URL is to be notified upon determination.
Posting Time	Every business day around 16:15	

III. Timelines

Timeline

- Introduction of VaR Method is aimed at 3rd quarter 2023 (Oct. 2023- Dec. 2023). Timeline up to introduction is as outlined below:

Oct.–Dec. 2022	VaR Margin Calculation Software β Version Publication
Around Mar. 2023	VaR Margin Calculation Software Final Version Publication
Jun.-Sep.	Start Publication of Parameter Files for VaR Calculation * We plan to set about three month between the publication of the file and VaR Go-live. (Meanwhile, VaR margin calculation can be done by the file just for reference value)
Oct.-Dec.	VaR Go-live