

NOTICE TO MEMBERS

No. 064-23

May 8, 2023

SELF-CERTIFICATION

**AMENDMENTS TO THE RISK MANUAL OF THE CANADIAN DERIVATIVES CLEARING CORPORATION
BASE INITIAL MARGIN MODEL CHANGE FOR FIXED INCOME PRODUCTS**

On February 4, 2022, the Board of Directors of the Canadian Derivatives Clearing Corporation (“**CDCC**”) approved amendments to the Risk Manual of CDCC in connection with the initial margin model change for fixed income products. CDCC wishes to inform the Clearing Members that these amendments have been self-certified pursuant to the self-certification process set forth in the *Derivatives Act* (C.Q.L.R., c I-14.01) and submitted to the Ontario Securities Commission in accordance with the “Rule Change Requiring Approval in Ontario” process.

You will find attached hereto the amendments set to come into force and to be incorporated into the version of the Risk Manual of CDCC that will be made available on the CDCC website at www.cdcc.ca on **May 12, 2023** after market close.

The amendments described in the present notice were published for public comment by CDCC on February 15, 2022 (see [Notice 018-22](#)). Further to the publication of this notice, no comment was received by CDCC.

If you have any questions or concerns regarding this notice, please contact Sophie Brault, Legal Counsel, at 514-268-0591 or at sophie.brault@tmx.com.

George Kormas
President



**APPENDIX 1: AMENDED RISK MANUAL
AMENDED VERSION**

RISK MANUAL

~~October 28~~, 2024

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Glossary

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~~Margin Buffer Multiplier: Multiplier to the Base Initial Margin for Fixed Income Transaction to prevent and control potential procyclical effects.~~

[...]

Section 1: Margin Deposits

As set out in the Rules, every Clearing Member shall be obligated to deposit Margin with the Corporation, as determined by the Corporation. Deposits must be made in the form of eligible collateral, as specified in Section 2 of this Risk Manual, in an amount sufficient, taking into account the market value and applicable Haircuts.

The Corporation requires Margin Deposits to cover two types of requirements, namely:

- Margin requirement; and
- Clearing Fund Requirement.

1.1 MARGIN REQUIREMENT

The Margin requirement is composed of the Initial Margin and the Variation Margin.

1.1.1 Initial Margin

The Initial Margin is composed of the Base Initial Margin (or Adjusted Base Initial Margin, as the case may be) and the Additional Margins. In order to cover the Initial Margin described below, Clearing Members shall deliver to CDCC an acceptable form of Deposits in accordance with Section 2 of this Risk Manual.

1.1.1.1 Base Initial Margin

The Base Initial Margin requirement covers the potential losses and market risk that may occur as a result of future adverse price and/or Risk Factors across the portfolio of each Clearing Member under normal market conditions.

The risk methodology for the Options, Futures and Unsettled Items incorporates the historical volatility of the daily price returns of the Underlying Interests for Options, Unsettled Items and Share Futures and the daily price returns of the Futures prices for Futures (excluding Share Futures). In addition, as part of the methodology, the Corporation uses a volatility estimator, a confidence level over 99% under the normal distribution or the student's t-distribution assumption and a variable

number of days as the MPOR. The Corporation also considers various measures to mitigate the procyclicality of margins:

- A Stress Risk component, calculated with a Stress Value at Risk (SVaR) and a weighting factor of 25%.
- A volatility floor, calculated as an average of the daily volatility estimator observed over the last 10 years.

The risk methodology for Fixed Income Transactions is the Value at Risk methodology (VaR). This methodology considers a full revaluation method and it is based on Zero Curves. In addition, as part of the methodology, the Corporation uses a volatility estimator, ~~a Margin Buffer Multiplier to prevent a large decrease in Margin requirements during periods of low volatility,~~ a confidence level over 99% and a variable number of days as the MPOR. The Corporation also considers a Stress Risk component to mitigate the procyclicality of margins, calculated with a Stress Value at Risk (SVaR) and a weighting factor of 25%.

Please refer to Sections 6.1 and 6.2 for additional details on the Base Initial Margin calculation.

With respect to the Limited Clearing Members, the Base Initial Margin is multiplied by the Effective Ratio to calculate the Adjusted Base Initial Margin. Please refer to Section 6.3 for additional details on Effective Ratio Recalibration.

[...]

Section 6: Appendix

6.2 BASE INITIAL MARGIN CALCULATION FOR FIXED INCOME TRANSACTIONS

For greater certainty, this section only applies to Fixed Income Transactions.

To calculate the Base Initial Margin, the VaR methodology is based on Historical Scenarios for all relevant Risk Factors. The Historical Scenarios consist of a set of scenarios for a Risk Factor over a relevant historical period that represents an hypothetical market observation movement (shocked market observation based on market history) reasonably likely to occur, from the current situation to a specific point in time in the future.

For Fixed Income Transactions, the Risk Factors are the Zero Curves. On any given Business Day, the shocks derived from the Historical Scenarios are applied to the initial reference market inputs values. The difference between the initial reference price and the shocked historical price represents an Historical P&L Scenario. The initial reference price and historical shocked price are derived respectively from the initial reference Zero Curves and the shocked Zeros Curve using a full revaluation method.

The Historical P&L Scenarios are calculated at the VaR Risk Group level and are denominated in the same currency as the Fixed Income Transactions. For Fixed Income Transactions belonging to the same VaR Risk Group, the Historical P&L Scenarios results are added up for Fixed Income Transactions.

Lastly, the Historical P&L Scenarios are ranked to derive the Historical P&L Distribution that is used to calculate the average loss of the portfolio using the Expected Shortfall method. ~~A Margin Buffer Multiplier is then applied to the Expected Shortfall value to obtain the Base Initial Margin.~~ The Base Initial Margin is then obtained by combining the Historical Risk component (based on the Expected Shortfall methodology) with a Stress Risk component (based on the Stressed Value at Risk methodology) using a weighted approach.

The main steps to calculate the Base Initial Margin are described in the section below.

6.2.1 Historical Filtered Scenarios

The Historical Filtered Scenarios are generated using the initial reference Risk Factors value and historical observations of different tenors on the Zero Curves.

The shocked Risk Factors are calculated using the following formula:

$$y'_{t,\tau} = y_{T,\tau} (1 + R_{t,\tau} c_{t,\tau})$$

$$y'_{t,\tau} = y_{T,\tau} + R_{t,\tau} c_{t,\tau}$$

Where c is the scaling factor for the volatility scaling adjustment and R is the daily ~~relative~~-market variation return over the Margin Period of Risk 'n'. CDCC uses a look-back period of 5 years.

$$R_{t,\tau} = y_{\tau,t} - y_{\tau,t-n}$$

The scaling factor formula at time t and for a given tenors is calculated using the following formula:

$$c_{t,\tau} = \text{Max} \left(\frac{\sigma_{T,\tau} + \sigma_{t,\tau}}{2 \sigma_{t,\tau}}, \text{Min SF} \right)$$

Where σ is the EWMA volatility forecast and Min SF is the minimal scaling factor.

The implemented formula for the EWMA volatility forecast is:

$$\begin{aligned} \sigma_{t,\tau}^2 &= (1 - \lambda) R_{t-1,\tau}^2 + \lambda \sigma_{t-1,\tau}^2 \\ \sigma_{t,\tau}^2 &= (1 - \lambda) R_{t,\tau}^2 + \lambda \sigma_{t-1,\tau}^2 \end{aligned}$$

Where R is the ~~daily relative~~-market variation return over the Margin Period of Risk 'n' and λ is the decay factor. CDCC uses $\lambda = 0.99$. The Min SF is updated by CDCC from time to time.

6.2.2 Historical P&L Scenario generation

The Historical P&L Scenarios are valued by calculating the difference between the shocked prices of Fixed Income Transactions under an Historical Filtered Scenario and the initial reference prices. The Historical P&L Scenarios results are added up for all Fixed Income Transactions within a VaR Risk Group.

The initial reference prices are calculated using a full revaluation method and the initial reference Risk Factors. The shocked prices are calculated using a full revaluation method and the shocked Risk Factors.

6.2.3 Expected Shortfall

For each VaR Risk Group, the Historical P&L is sorted from largest loss to largest profit to construct the Historical P&L Distribution. Using a confidence value equivalent to 99.62% and the Historical P&L Distribution, the Expected Shortfall is determined by averaging the losses exceeding the confidence value.

6.2.4 Stressed Value at Risk (SVaR) Margin Buffer Multiplier

~~The Base Initial Margin for each VaR Risk Group is obtained by applying a Margin Buffer Multiplier to the Expected Shortfall value.~~

~~The Margin Buffer Multiplier is based on the ratio of the average 10 years volatility and the previous month volatility. CDCC will change the Margin Buffer Multiplier level if it is deemed stable for at least 3 consecutive months. The ratio is then rounded to the nearest 0.25. A floor of 1 and a cap value of 1.5 are applied.~~

~~The Margin Buffer Multiplier is updated by CDCC from time to time.~~

In addition, CDCC considers a Stress Risk component based on the Stressed Value at Risk (SVaR) methodology to mitigate the procyclicality of margins:

$$Base\ Initial\ Margin = (1 - w) \times Historical\ Risk + w \times Stress\ Risk$$

Where the Stress Risk component is equal to a confidence level equivalent to a minimum of 99% of the ranked distribution of the absolute stressed P&L over a fixed period of a minimum of 260 days with a high market volatility, a variable number of days as MPOR and a weighting factor of 25% ('w'). The stressed P&L are also calculated using a full revaluation method and the Risk Factors.

The SVaR methodology is applicable to all VaR Risk Groups.



**APPENDIX 1: AMENDED RISK MANUAL
CLEAN VERSION**

RISK MANUAL

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The SVaR methodology is applicable to all VaR Risk Groups.