



NOTICE TO MEMBERS

No. 2014 – 219

November 25, 2014

REQUEST FOR COMMENTS

AMENDMENT TO THE RISK MANUAL OF THE CANADIAN DERIVATIVES CLEARING CORPORATION TO ADDRESS THE STRESS TESTING FRAMEWORK

Summary

On October 22, 2014, the Board of Directors of Canadian Derivatives Clearing Corporation (CDCC) approved amendments to the Risk Manual of CDCC. The purpose of the proposed amendment is to review the Stress Testing Framework and continue to ensure that CDCC has sufficient financial resources during extreme but plausible market conditions. In addition, evaluating the risk profile of the Clearing Members through various stress tests will ensure the robustness of the risk framework.

Please find enclosed an analysis document as well as the proposed amendments.

Process for Changes to the Rules

CDCC is recognized as a clearing house under section 12 of the *Derivatives Act* (Québec) by the Autorité des marchés financiers (AMF) and is a recognized clearing agency under section 21.2 of the *Securities Act* (Ontario) by the Ontario Securities Commission (OSC).

The Board of Directors of CDCC has the power to approve the adoption or amendment of Rules and Operations Manual of CDCC. Amendments are submitted to the AMF in accordance with the self-certification process and the Ontario Securities Commission in accordance with the process provided in its Recognition Order.

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Comments on the proposed amendments must be submitted within 30 days following the date of publication of the present notice. Please submit your comments to:

Mrs. Pauline Ascoli
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A copy of these comments shall also be forwarded to the AMF and to the OSC to:

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For any question or clarification, Clearing Members may contact CDCC's Corporate Operations.

Glenn Goucher
President and Chief Clearing Officer



AMENDMENTS TO THE RISK MANUAL OF THE CANADIAN DERIVATIVES CLEARING CORPORATION TO ADDRESS THE STRESS TESTING FRAMEWORK

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I. SUMMARY

Stress tests are widely used in the financial industry as a risk management tool. For a Central Counterparty Clearing House (CCP), determining extreme but plausible scenarios is valuable when assessing the amount of total financial resources required.

Therefore, CCPs must evaluate various stress tests under a wide range of potential scenarios. One of the main purposes of the stress tests is to assess the size of the Clearing Fund. Secondly, the stress tests are used to monitor the Clearing Member's risk. Various tools are used to monitor the Clearing Member's risk such as sensitivity stress tests, reverse stress tests and various plausible market events whether used or not in the Clearing Fund calibration.

The Stress Testing Framework follows rigorous risk management processes in accordance with the industry best practice and regulatory requirements. The Stress Testing Program also addresses the CPSS-IOSCO Principles for Financial Market Infrastructure [FMI] on credit risk.

II. ANALYSIS

a. Background

At any given day, CDCC may be exposed to the risk from extreme but plausible market conditions. PFMI requires that CCPs must have enough financial resources in extreme but plausible market conditions. Therefore, stress tests evaluate wide range of plausible market conditions. Stress tests are run on a daily basis and are aggregated at the Clearing Member level. Affiliation amongst Clearing Members is also considered since one of the most important primary objectives is to be covered for the largest Clearing Member default including their Affiliate(s).

Stress tests are actually covered in the Risk Manual in the Monitoring program section. In addition, the Clearing Fund section describes the current stress tests used in calibration. Due to the possible rapid change in market conditions, the nature of the risk factors, the introduction of new products and risk model, the Stress Testing Framework must be reviewed yearly. On a monthly basis, CDCC needs to review the appropriateness of the stress tests.

b. Description and Analysis of Impacts

As market conditions are evolving, CDCC needs to develop a flexible Stress Testing Framework. PFMI requires that the Stress Testing Framework be reviewed and updated regularly. In comparison, other CCPs do not explicitly enumerate stress tests shocks but generally point out risk factors addressed in the stress testing.

For instance, a new extreme market condition may occur, in which case CDCC must re-adjust actual stress tests since they won't cover the whole universe of extreme but plausible market conditions. The second reason for having more flexible stress tests is the necessity of considering the level of certain risk factors. In a low interest rate environment, a small change in interest rates could have a significant impact on the market value. However, the same movement in interest rate could be less significant in a high interest rates environment. The new

proposed methodology for the stress tests would be more dynamic in considering the actual level of the risk factors. Lastly, new products must also be added in the Stress Testing program. Having an appropriate Stress Testing Framework would ensure the inclusion of new products in a timely fashion.

In addition to extreme but plausible market conditions, Stress Testing Framework will include sensitivity stress test and reverse stress testing.

c. Proposed Amendments

The proposed amendments are presented in Appendix 1.

d. Benchmarking

CDCC has reviewed methodologies applied by other Central Counterparties (CCPs) (namely, LCH Clearnet, Eurex Clearing, ASX, CME and OCC) to deal with the Clearing Fund.

LCH Clearnet:

LCH Clearnet performs daily stress testing. Stress tests are also used to calibrate the size of the Clearing Fund. Historical and theoretical stress tests are considered. Stress tests are regularly reviewed. LCH may call for additional margin if specific Clearing Members exceed specific thresholds.

Eurex:

Clearing Members' risk exposures are tested against stress tests. Future price movements and extreme historical observations are considered when developing stress tests. For each product cleared, Eurex considers the largest historical move. Specific crisis days are also considered for determining interaction between different products.

Stress tests results are compared to the financial resources and are integrated in the Clearing Fund calibration. The latter is done on a daily basis. Stress tests are regularly reviewed.

ASX:

ASX uses stress tests to assess the total financial resources to cover the largest default. Procedures are in place to adjust the stress tests due structural changes in the market conditions. These procedures ensure sufficient flexibility if model is changed and/or market dynamics evolved. Main risk factors are selected as inputs for stress tests (implied volatility, yield curve shifts ...)

CME:

Daily stress tests using historical and hypothetical data are compared to the total financial resources. Stress tests are reviewed monthly. Reverse stress tests are designed to evaluate the adequacy of total financial resources.

OCC:

OCC executes regular stress tests on the Clearing Members. Additional margin requirements may be required if a specific Clearing Member exceeds specific threshold. OCC runs stress tests on a daily basis. Stress tests are part of the Clearing Fund calibration.

III. PRIMARY MOTIVATION

The Committee on Payment and Settlement Systems had clearly stated in April 2012¹ that stress tests must be reviewed and updated regularly. In addition, a CCP should perform a comprehensive analysis of the stress tests. As a result of a change in methodology, parameters and assumptions, stress tests may need to be modified.

IV. IMPACTS ON TECHNOLOGICAL SYSTEMS

The proposed solution will be implemented in Sola® Clearing as part of the PFMI remediation strategy. In order to minimize the potential for operational risk, the new solution will be properly tested with a complete user acceptance test (UAT) prior to its implementation in the production system.

V. OBJECTIVES OF THE PROPOSED MODIFICATIONS

The objective of the proposed modification is to review the Stress Testing Framework and continue to ensure that CDCC has sufficient financial resources during extreme but plausible market conditions. In addition, evaluating the risk profile of the Clearing Members through various stress tests will ensure the robustness of the risk framework.

VI. PUBLIC INTEREST

In CDCC's opinion, the proposed amendment to CDCC's Risk Manual is not contrary to the public interest.

¹ Bank for International Settlements: "Principles for financial market infrastructure". April 2012.

VII. MARKET IMPACTS

As mentioned, CCPs use extreme but plausible scenarios to assess the amount of total financial resources. Even if the Stress Testing Framework is broader, calibrating the total financial resources is considered the primarily objective of the stress tests. CDCC stress tests aim to follow the PFMI recommendations. For instance, the Clearing Fund sizing is based on the stress tests. In this particular case, CDCC has to review the various results from extreme but plausible stress tests and select the highest potential losses. For the period from February 2012 to June 2014, CDCC has analyzed the impact of using the modified stress tests. If the analysis includes the effect in the methodology change, the new developed stress tests would require in average 44% higher contributions to the Clearing Fund.

VIII. PROCESS

The proposed amendment is submitted for approval by the CDCC Board. Once the approval has been obtained, the proposed amendment, including this analysis, will be transmitted to the Autorité des marchés financiers in accordance with the self-certification process and the Ontario Securities Commission in accordance with the “Rule Change Requiring Approval in Ontario” process. The proposed amendment and analysis will also be submitted for approval to the Bank of Canada in accordance with the Regulatory Oversight Agreement.

IX. EFFECTIVE DATE

The proposed changes to address the Stress Testing Framework are supposed to be implemented in the first quarter of 2015. This is subject to the regulatory approval.

X. ATTACHED DOCUMENTS

Appendix 1: Amended Risk Manual

APPENDIX 1



Risk Manual

STRESS SCENARIOS

The Corporation uses ~~various~~four stress scenarios to evaluate the ~~URR biggest loss amongst all Clearing Members and their Affiliate(s)~~. ~~Stress scenarios are intended to assess the impact of extreme but plausible market conditions.~~ This ~~resulting potential~~ loss is utilized to determine the size of the Clearing Fund. ~~A shortfall is equal to the difference between the loss incurred under a stress scenario, reduced of the Margin Fund and the Difference Fund, both belonging to the Clearing Member. By consequence, the size of the Clearing Fund should be at least equal to the greatest shortfall.~~ The stress scenarios ~~are applied on a daily basis in order to estimate the risk exposure~~use end-of-month positions.

~~The Corporation also uses stress tests to monitor the risk of each Clearing Member. Such stress tests take into consideration potential movements in the yield curves, equity return, stock indices return, implied volatility and exchange rate.~~

~~The four stress scenarios currently used by the Corporation are:~~

- ~~➤ Black Monday (1987)~~
- ~~➤ Financial Crisis (2008)~~
- ~~➤ Russian Default (1998)~~
- ~~➤ Bond Market Crash (1994)~~

The Corporation regularly assesses whether it is appropriate to add other stress scenarios to the existing scenarios.

~~The Corporation mostly stresses Futures contracts and Fixed Income Transactions that are considered to be the highest Initial Margin drivers, by historical stressful events. Note that for Fixed Income Transactions, the variations are based on the most representative Fixed Income Securities of each Bucket⁴. Here are the historical percentage variations applied:~~

Scenario 1 (Black Monday)			
	1987-10-16	1987-10-19	Variation
SXFTM S&P/TSX 60 Index Standard Futures⁻²	174.75	154.63	-11.51%
EMFTM FTSE Emerging Markets Index Futures⁻³	433.61	289.09	-33.33%

⁴ Selected Government of Canada (GoC) Benchmark Bond yields

² The SXF contract has started trading in 1999. Thus, these prices represent the Futures Contract and not the S&P/TSX 60 Index, which is the Underlying Interest of the contract.

³ The EMF contract started being traded in 2014. Therefore, the prices indicated represent the FTSE Emerging Markets Index in US dollars, which is the underlying asset for the contract. Given that the FTSE Emerging Markets Index was launched in December 1993, the Hang Seng Index converted into US dollars was chosen as the

BAX TM —Three-Month Canadian Bankers' Acceptance Futures ⁴	90.81	90.69	-0.14%
CGB TM —Ten-Year Government of Canada Bond Futures ⁵	74.40	76.93	3.40%
Fixed Income Security Buckets			
0-3 months GoC yields			0.1857%
3-6 months GoC yields			0.4864%
6-12 months GoC yields			1.0164%
1-2 years GoC yields			1.1663%
2-3 years GoC yields			1.4660%
3-5 years GoC yields			1.7657%
5-7 years GoC yields			2.0654%
7-10 years GoC yields			2.3651%
10-15 years GoC yields			2.1761%
15-20 years GoC yields			2.1760%
20-30 years GoC yields			2.4687%
0-5 years Provincial yields			1.7657%
5-10 years Provincial yields			2.3651%
10-20 years Provincial yields			2.1760%
20-30 years Provincial yields			2.4687%
Scenario 2 (Financial Crisis 2008)			
	2008-10-17	2008-10-20	Variation
SXF TM —S&P/TSX 60 Index Standard Futures	568.5	622.7	9.53%
EMF TM —FTSE Emerging Markets Index Futures	293.59	288.84	-1.62%
BAX TM —Three-Month Canadian	97.63	97.75	0.12%

replacement index for the purposes of the Black Monday scenario. Prices were harmonized to take into account the time zone.

⁴ The BAX contract was introduced in April 1988. Consequently, the historical price is obtained by using the 3 month US LIBOR interest rates.

⁵ The CGB contract was introduced in September 1989. Consequently, the theoretical price is obtained by calculating a 10-year bond, 6% coupon rate actualized with a 10-year Canadian Government rate extracted from an on-the-run Canadian Government Bond.

Bankers' Acceptance Futures			
CGB™ — Ten-Year Government of Canada Bond Futures	117.16	117.14	-0.02%
Fixed Income Security Buckets			
0-3 months GoC yields			-0.0056%
3-6 months GoC yields			0.0354%
6-12 months GoC yields			0.0719%
1-2 years GoC yields			0.1318%
2-3 years GoC yields			0.1635%
3-5 years GoC yields			0.1883%
5-7 years GoC yields			0.1247%
7-10 years GoC yields			0.0528%
10-15 years GoC yields			0.1163%
15-20 years GoC yields			0.1718%
20-30 years GoC yields			0.1491%
0-5 years Provincial yields			-0.0475%
5-10 years Provincial yields			-0.1232%
10-20 years Provincial yields			-0.3703%
20-30 years Provincial yields			-0.2787%
Scenario 3 (Russian Default)			
	1998-08-26	1998-08-27	Variation
SXF™ — S&P/TSX 60 Index Standard Futures	356.54	333.25	-6.53%
EMF™ — FTSE Emerging Markets Index Futures	110.44	108.99	-1.31%
BAX™ — Three-Month Canadian Bankers' Acceptance Futures	94.56	93.77	-0.84%
CGB™ — Ten-Year Government of Canada Bond Futures	122.15	121.3	-0.70%
Fixed Income Security Buckets			
0-3 months GoC yields			-0.2069%
3-6 months GoC yields			-0.3263%
6-12 months GoC yields			-0.5015%
1-2 years GoC yields			-1.0739%
2-3 years GoC yields			-1.0429%

3-5 years-GoC-yields			-1.3803%
5-7 years-GoC-yields			-0.8457%
7-10 years-GoC-yields			-1.4312%
10-15 years-GoC-yields			-1.5248%
15-20 years-GoC-yields			-1.2586%
20-30 years-GoC-yields			-1.3089%
0-5 years-Provincial-yields			-1.2163%
5-10 years-Provincial-yields			-1.7576%
10-20 years-Provincial-yields			-1.8987%
20-30 years-Provincial-yields			-1.4248%
Scenario 4 (Bond Market Crash)			
	1994-04-01	1994-04-04	Variation
SXF TM —S&P/TSX 60 Index Standard Futures	221.09	215.97	-2.32%
EMF TM —FTSE Emerging Markets Index Futures	209.91	205.21	-2.24%
BAX TM —Three-Month Canadian Bankers' Acceptance Futures	93.53	92.92	-0.65%
CGB TM —Ten-Year Government of Canada Bond Futures	105.17	102.38	-2.65%
Fixed Income Security Buckets			
0-3 months-GoC-yields			0.0268%
3-6 months-GoC-yields			0.1060%
6-12 months-GoC-yields			0.1814%
1-2 years-GoC-yields			0.3710%
2-3 years-GoC-yields			0.4517%
3-5 years-GoC-yields			0.7702%
5-7 years-GoC-yields			0.6207%
7-10 years-GoC-yields			0.8582%
10-15 years-GoC-yields			1.0067%
15-20 years-GoC-yields			0.7665%
20-30 years-GoC-yields			0.5196%
0-5 years-Provincial-yields			-0.5813%
5-10 years-Provincial-yields			-2.6390%
10-20 years-Provincial-yields			-3.0077%

20-30 years Provincial yields			-3.4743%
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~~The procedure to value the size of the Clearing Fund and the contributions of each Clearing Member is performed every month. As previously mentioned, the consideration of the results of the different stress scenarios leads the Corporation to select a stress factor⁶. Therefore, the stress factor depends on Clearing Members' positions (risk profile of each Clearing Member) that vary every day, and the Margin Intervals. After selecting the stress factor, the Corporation monitors and controls the level of the Clearing Fund throughout the month.~~

⁶~~The stress factor generally has a value of 1.5, 2, 2.5 or 3. It is generally adjusted by 50% intervals.~~
