

SECURITIES AND EXCHANGE COMMISSION  
(Release No. 34-73749; File No. SR-OCC-2014-810)

December 5, 2014

Self-Regulatory Organizations; The Options Clearing Corporation; Notice of Filing of Advance Notice Concerning Modifications to Back Testing Procedures in Order to Enhance Monitoring of Margin Coverage and Model Risk Exposure

Pursuant to Section 806(e)(1) of Title VIII of the Dodd-Frank Wall Street Reform and Consumer Protection Act entitled the Payment, Clearing, and Settlement Supervision Act of 2010<sup>1</sup> (“Payment, Clearing and Settlement Supervision Act”) and Rule 19b-4(n)(1)(i) under the Securities Exchange Act of 1934<sup>2</sup> notice is hereby given that on November 13, 2014, The Options Clearing Corporation (“OCC”) filed with the Securities and Exchange Commission (“Commission”) the advance notice as described in Items I and II below, which Items have been prepared by OCC.<sup>3</sup> The Commission is publishing this notice to solicit comments on the advance notice from interested persons.

I. Clearing Agency’s Statement of the Terms of Substance of the Advance Notice

This advance notice is filed by OCC in connection with a proposed change to its operations (the “Change”) in the form of modifications to its back testing procedures in order to enhance its monitoring of margin coverage and model risk exposure.

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<sup>1</sup> 12 U.S.C. 5465(e)(1).

<sup>2</sup> 17 CFR 240.19b-4(n)(1)(i).

<sup>3</sup> OCC initially filed a similar advance notice on October 31, 2014, as File No. SR-OCC-2014-808. However to correct certain errors in that filing relating to two backtesting program tests, OCC withdrew it and made a new filing (File No. SR-OCC-2014-810) on November 13, 2014.

II. Clearing Agency's Statement of the Purpose of, and Statutory Basis for, the Advance Notice

In its filing with the Commission, OCC included statements concerning the purpose of and basis for the advance notice and discussed any comments it received on the advance notice. The text of these statements may be examined at the places specified in Item IV below. OCC has prepared summaries, set forth in sections (A) and (B) below, of the most significant aspects of these statements.

(A) Clearing Agency's Statement on Comments on the Advance Notice Received from Members, Participants or Others

Written comments on the advance notice were not and are not intended to be solicited with respect to the advance notice and none have been received.

(B) Advance Notices Filed Pursuant to Section 806(e) of the Payment, Clearing and Settlement Supervision Act

***Description of Change***

The proposed Change would modify OCC's back testing procedures in order to enhance its monitoring of margin coverage and model risk exposure. Such monitoring would allow OCC to identify and make improvements to its margin methodology and enhance OCC's ability to manage risk.

OCC has implemented back testing procedures in order to test its methodology for determining the amount of margin to collect from clearing members and validate the assumptions and mechanisms inherent in its methodology and to make any necessary changes to the methodology. Each trading day, OCC estimates the risk on accounts and uses this estimate as a basis for each account's margin charge. On the following business day, OCC's back tests compare an account's observed profit and loss ("P&L") with the

prior day's estimated risk using a variety of analytical and statistical tools. These daily tests measure the performance of the account's risk measures, and therefore, also measure the performance of OCC's underlying methodology for calculating these measures. OCC's back testing program enables OCC to assess performance of its margining systems and determine whether financial risks are adequately or inadequately captured by the quantitative models in use.

Currently, OCC employs the "traffic light" test published by the Basel Committee on Banking Supervision in 1996 (the "Traffic Light Test").<sup>4</sup> In conducting the Traffic Light Test, OCC determines the actual number of instances in which the realized loss on an account exceeded the margin, known as an "exceedance," over an observation period of one year. The number of exceedances during the observation period is compared against the number of expected exceedances that are independent and identically distributed over time. OCC will employ an enhanced version of the Traffic Light Test that takes into account the dependency of exceedances between accounts.

OCC has conducted daily back testing of margin accounts since 2006. OCC's staff analyzes the exceedances and makes monthly reports to OCC's Enterprise Risk Management Committee ("ERMC").<sup>5</sup> The reports to the ERMC include pertinent conclusions based on results from the full set of back tests. When back testing reveals the potential opportunity for remediation of OCC's margin methodology, OCC

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<sup>4</sup> See, "Supervisory Framework for the Use of 'Backtesting' in Conjunction with Internal Model Approach to Market Risk Capital Requirement." Located at <http://www.bis.org/publ/bcbs22.htm>

<sup>5</sup> The Enterprise Risk Management Committee is chaired by the Chief Risk Officer, and consists of the Executive Chairman, Chief Operations Officer, General Counsel, Chief Information Officer, Chief Audit Executive, the Chief Compliance Officer and other members as determined by the Chair.

undertakes a root cause analysis to determine the cause of any issues. Any significant failures of OCC's methodology lead to OCC undertaking a model improvement project designed to correct the problems.

OCC has analyzed its back testing program and identified several enhancements to the program. The following section details the nature of the proposed enhancements.<sup>6</sup>

1. *Proposed Enhancement of and Increase in Statistical Tests*

The proposed changes would enhance existing statistical tests and add three new statistical tests. The first proposed change to OCC's back testing program is that OCC proposes to enhance the Traffic Light Test so that it may be applied to exceedances across all of OCC's margin accounts. Given that exceedances are not independent across margin accounts, OCC will enhance this test so that it will produce a single numerical output that measures aggregation across margin accounts.

In addition to the enhanced Traffic Light Test, OCC will implement other industry standard tests based on exceedances in order to provide a more comprehensive set of tests. The second proposed change to OCC's back testing program is that OCC will add the Kupiec Test,<sup>7</sup> which is a new proportion of failures test that compares the actual number of exceedances with the number that would be expected in light of the confidence level associated with the calculation of margin. For example, when calculating margin with a confidence level of 99%, the number of exceedances is expected to be 1% of the total observations, *i.e.*, the P&Ls for all accounts for all days during the measurement period. If the actual number of exceedances is near the expected

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<sup>6</sup> The relevant systems changes are scheduled to be installed on December 5, 2014.

<sup>7</sup> See, Kupiec, P. "Techniques for Verifying the Accuracy of Risk Management Models," *Journal of Derivatives*, v3, P73-84. (1995).

number, this is an indication that the calculated margin requirements are accurate estimates of the accounts' estimated losses.

The third proposed change to OCC's back testing program is that OCC will add the Christoffersen Independence Test,<sup>8</sup> which is a new statistical test that measures the extent to which exceedances are independent of each other. Specifically, if OCC's margin models are correctly assessing risk, the probability of an exceedance occurring at any two points in time should be the same as the probability of an exceedance occurring at either point in time, individually, without the exceedance occurring at the other point in time. The fourth proposed change to OCC's back testing program is a new test, the Probtile test, that compares the distribution of the daily observed P&L to the daily forecasted P&L distribution. If the distribution of P&L movement ratios approximates a uniform random distribution, this is an indication that OCC's margin models are providing accurate forecasts of potential losses in an account. Combined, these new statistical tests will provide OCC with the pertinent information necessary to evaluate the effectiveness of its models in determining margin coverage.

## *2. Proposed Data Set Changes*

OCC proposes to enhance the data sets being back tested to allow for testing against various assumed portfolio and market data scenarios, in addition to the performance of actual portfolios against actual, current market conditions. First, OCC would back test hypothetical portfolios, allowing for the design and monitoring of portfolios that have magnified sensitivities to particular aspects of the models used in the

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<sup>8</sup> See, Christoffersen, Peter, "Evaluating Interval Forecasts." *International Economic Review*, 39 (4), 841-862. (1998).

margin computations. Back testing against hypothetical portfolios would provide a more comprehensive insight into the adequacy of the underlying model assumptions under market conditions prevailing in the back test observation periods.

Under the second data set enhancement, OCC would back test current accounts against earlier observation periods. Currently, accounts are “frozen” by assuming that the time to maturity and the degree to which options are in-the-money or out-of-the-money remain constant during the chosen observation period. The market data observed over the observation period is used to generate the margin forecasts and P&L. Under the enhancement, observation periods would be chosen to reflect special market conditions, which is useful because even though margin coverage might be adequate in the current environment, margin coverage could be inadequate under stressed conditions, such as periods of high volatility. The ability to select specific observation periods would not limit the back testing to the current environments but rather would highlight performance of margin coverage and model performance in market scenarios other than prevailing market conditions.

### *3. Proposed Forecast Horizons Changes*

Currently, OCC conducts back testing using a one-day time horizon, which means that it compares calculated margin with realized profit and losses that occur on the business day following the calculation. OCC’s margin calculations assume that positions would be liquidated over a two-day period. This test, therefore, compares two-day margin numbers to a one-day profit and loss calculation. OCC’s existing back testing methodology makes adjustments in its testing to account for the difference between the two-day liquidation period used in its margin calculation and the one-day horizon used in

the profit and loss calculation. OCC intends to revise its back testing methodology to take into account losses over a two-day time horizon, without such adjustments, which would match the two-day liquidation period used in the margin calculation. OCC therefore proposes to implement functionality into its back testing system to conduct a two-day time horizon back test, which will compare calculated margin against a two-day profit and loss calculation. OCC also proposes to revise its back testing methodology to compare one-day margin calculations against one-day profit and loss calculations, and will implement system functionality for such a test. Issues identified in any of these back tests will be reported to the ERMC. OCC believes that its adoption of the additional forecast horizons tests will allow it to have a more accurate view of the sufficiency of its margin methodology.

#### *4. Proposed Root Cause Analysis Changes*

The proposed Change will improve OCC's ability to conduct root cause analyses by providing OCC's back testing staff with additional, automated, investigation tools. Currently, and when necessary, OCC's back test staff conducts investigations in order to identify the root cause exceedances. The investigation itself is a manual process that is dependent upon the facts and circumstances pertaining to a given exceedance. OCC is now proposing to make system modifications that will provide OCC's back testing staff with addition tools that will facilitate such investigations. Specifically, OCC proposes to add system functionality that will show attribution of losses due to underlying price movements and implied volatility movements. Further, under the improvements OCC would be able to incorporate hypothetical accounts and positions into the tests and would be able to identify risk factors that move above or below the projected values. These

changes will improve OCC's ability to conduct investigations that identify the root cause of exceedances, which will in turn lead to improving OCC's back testing methodology and its margin coverage.

***Anticipated Effect on and Management of Risk***

OCC believes the proposed Change to its back testing procedures would reduce the level of risk presented by OCC because it would enhance OCC's back testing by providing it with more tools to identify gaps in its margin methodology and develop corrective changes thereto.<sup>9</sup> For example, enhanced and increased statistical testing would provide additional information about the adequacy of margin coverage and thus strengthen the assessment of margin and model performance. Changes to data sets would include hypothetical portfolios and earlier observation periods would allow testing of margin coverage under a greater variety of market conditions. Modifying the tests to take into account losses over a two-day period would increase the accuracy of the testing because this two-period matches the assumed liquidation period used in the margin calculations. OCC would also be able to more accurately determine the root cause of exceedances, while rejecting results that incorrectly suggest a needed improvement in its margin methodology, and then would be able to narrowly tailor solutions to the identified root causes. Ultimately, by allowing OCC to more readily and precisely identify gaps in its margin methodology, the Change will reduce risk to OCC and the markets that it serves.

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<sup>9</sup> Depending on the nature of a proposed change, it may be necessary for OCC to file a proposed rule change filing or advance notice filing with the Commission.

### ***Consistency with the Payment, Clearing and Settlement Supervision Act***

The Change is consistent with Section 805(b)(1) of Payment, Clearing and Settlement Supervision Act because it promotes robust risk management.<sup>10</sup> OCC's receipt of margin from its clearing members protects OCC and market participants from risks presented by the markets OCC serves. OCC uses back testing in order to evaluate the sufficiency and adequacy of the amount of margin it collects from its clearing members. As described above, the Change will provide OCC will [sic] additional tools to identify gaps in its margin methodology. Such identification process will lead to improvements to OCC margin models thereby promoting robust risk management.

#### **III. Date of Effectiveness of the Advance Notice and Timing for Commission Action**

The proposed change may be implemented if the Commission does not object to the proposed change within 60 days of the later of (i) the date that the Commission receives the notice of proposed change, or (ii) the date the Commission receives any further information it requests for consideration of the notice. The clearing agency shall not implement the proposed change if the Commission has any objection to the proposed change.

The Commission may extend the period for review by an additional 60 days if the proposed change raises novel or complex issues, subject to the Commission providing the clearing agency with prompt written notice of the extension. A proposed change may be implemented in less than 60 days from the date the advance noticed is filed, or the date further information requested by the Commission is received, if the Commission notifies the clearing agency in writing that it does not object to the proposed change and

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<sup>10</sup> 12 U.S.C. 5465(b)(1).

authorizes the clearing agency to implement the proposed change on an earlier date, subject to any conditions imposed by the Commission.

The clearing agency shall post notice on its website of proposed changes that are implemented.

#### IV. Solicitation of Comments

Interested persons are invited to submit written data, views and arguments concerning the foregoing, including whether the proposed change, is consistent with the Payment, Clearing and Settlement Supervision Act. Comments may be submitted by any of the following methods:

##### Electronic Comments:

- Use the Commission's Internet comment form (<http://www.sec.gov/rules/sro.shtml>); or
- Send an e-mail to [rule-comments@sec.gov](mailto:rule-comments@sec.gov). Please include File Number SR-OCC-2014-810 on the subject line.

##### Paper Comments:

- Send paper comments in triplicate to Secretary, Securities and Exchange Commission, 100 F Street, NE, Washington, DC 20549-1090.

All submissions should refer to File Number SR-OCC-2014-810. This file number should be included on the subject line if e-mail is used. To help the Commission process and review your comments more efficiently, please use only one method. The Commission will post all comments on the Commission's Internet website (<http://www.sec.gov/rules/sro.shtml>). Copies of the submission, all subsequent amendments, all written statements with respect to the advance notice that are filed with

the Commission, and all written communications relating to the advance notice between the Commission and any person, other than those that may be withheld from the public in accordance with the provisions of 5 U.S.C. 552, will be available for website viewing and printing in the Commission's Public Reference Room, 100 F Street, NE, Washington, DC 20549 on official business days between the hours of 10:00 am and 3:00 pm. Copies of the filing also will be available for inspection and copying at the principal office of OCC and on OCC's website

[http://www.theocc.com/components/docs/legal/rules\\_and\\_bylaws/sr\\_occ\\_14\\_810.pdf](http://www.theocc.com/components/docs/legal/rules_and_bylaws/sr_occ_14_810.pdf)

All comments received will be posted without change; the Commission does not edit personal identifying information from submissions. You should submit only information that you wish to make available publicly. All submissions should refer to File Number SR-OCC-2014-810 and should be submitted on or before [insert date 21 days from publication in the Federal Register].

By the Commission.

Kevin M. O'Neill  
Deputy Secretary