SECURITIES AND EXCHANGE COMMISSION  
(Release No. 34-82801; File No. SR-OCC-2017-022)  

March 2, 2018  

Self-Regulatory Organizations; The Options Clearing Corporation; Order Instituting Proceedings to Determine Whether to Approve or Disapprove Proposed Rule Change Related to The Options Clearing Corporation’s Margin Methodology  

I. Introduction  


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February 20, 2018, the Commission has received one comment letter on the proposal contained in the Advance Notice. The Commission is publishing this order to institute proceedings pursuant to Section 19(b)(2)(B) of the Act to determine whether to approve or disapprove the Proposed Rule Change.

Institution of proceedings does not indicate that the Commission has reached any conclusions with respect to the Proposed Rule Change, nor does it mean that the Commission will ultimately disapprove the Proposed Rule Change. Rather, as discussed below, the Commission seeks additional input on the Proposed Rule Change and issues presented by the proposal.

II. Description of the Proposed Rule Change

**OCC’s Current Margin Methodology**

OCC’s margin methodology, the System for Theoretical Analysis and Numerical Simulations (“STANS”), calculates clearing member margin requirements. STANS utilizes

5 The comment period closed on December 26, 2017.

6 See letter from Michael Kitlas, dated November 28, 2017, to Eduardo A. Aleman, Assistant Secretary, Commission, available at https://www.sec.gov/comments/sr-occ-2017-022/occ2017022.htm (“Kitlas Letter”). After reviewing the Kitlas Letter, the Commission believes that it is nonresponsive to the Proposed Rule Change and therefore outside the scope of the proposal.

Since the proposal contained in the Proposed Rule Change was also filed as an Advance Notice, the Commission considered all public comments received on the proposal regardless of whether the comments were submitted on the Proposed Rule Change or the Advance Notice.


8 The description of the Proposed Rule Change is substantially excerpted from the Notice. See Notice, 82 FR at 57306-57313.

large-scale Monte Carlo simulations to forecast price and volatility movements in determining a clearing member’s margin requirement.\textsuperscript{10} The STANS margin requirement is calculated at the portfolio level of clearing member accounts with positions in marginable securities and consists of an estimate of a 99% expected shortfall\textsuperscript{11} over a two-day time horizon and an add-on margin charge for model risk (the concentration/dependence stress test charge).\textsuperscript{12} The STANS methodology is used to measure the exposure of portfolios of options and futures cleared by OCC and cash instruments in margin collateral.\textsuperscript{13}

A “risk factor” within OCC’s margin system may be defined as a product or attribute whose historical data is used to estimate and simulate the risk for an associated product.\textsuperscript{14} The majority of risk factors utilized in the STANS methodology are total returns on individual equity securities. Other risk factors considered include: returns on equity indexes; returns on implied volatility risk factors that are a set of nine chosen volatility pivots per product; changes in foreign exchange rates; securities underlying equity-based products; and changes in model parameters that sufficiently capture the model dynamics from a larger set of data.\textsuperscript{15}

\textsuperscript{10} See OCC Rule 601; see also Notice, 82 FR at 57307.
\textsuperscript{11} See Notice, 82 FR at 57307. The expected shortfall component is established as the estimated average of potential losses higher than the 99% value at risk threshold. See Notice, 82 FR at 57307, note 8.
\textsuperscript{13} See Notice, 82 FR at 57307.
\textsuperscript{14} Id.
\textsuperscript{15} Id.
Under OCC’s current margin methodology, OCC obtains monthly price data for most of its equity-based products from a third-party vendor. These data arrive around the second week of every month in arrears and require approximately four weeks for OCC to process prior to installing into OCC’s margin system. As a result, correlations and statistical parameters for risk factors at any point in time represent back-dated data and therefore may not be representative of the most recent market data. In the absence of daily updates, OCC employs an approach where one or more identified market proxies (or “scale-factors”) are used to incorporate day-to-day market volatility across all associated asset classes throughout. The scale-factor approach, however, assumes a perfect correlation of the volatilities between the security and its scale-factor, which gives little room to capture the idiosyncratic risk of a given security and which may be different from the broad market risk represented by the scale-factor.

In addition, OCC imposes a floor on volatility estimates for its equity-based products using a 500-day look back period.

OCC believes that using monthly price data, coupled with the dependency of margins on scale-factors and the volatility floor can result in imprecise changes in margins charged to

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16 Id.  
17 Id.  
18 Id.  
19 Id.  
20 Id.  
21 See Notice, 82 FR at 57307-57308.  
In risk management, it is a common practice to establish a floor for volatility at a certain level in order to protect against procyclicality in the model. See Notice, 82 FR at 57307-57308, note 14.
clearing members, specifically across periods of heavy volatility when the correlation between the risk factor and a scale-factor fluctuate.\(^{22}\)

OCC’s current methodology for estimating covariance and correlations between risk factors relies on the same monthly data described above, resulting in a similar lag time between updates.\(^ {23}\) In addition, correlation estimates are based off historical returns series, with estimates between a pair of risk factors being highly sensitive to the volatility of either risk factor in the chosen pair.\(^ {24}\) Accordingly, OCC believes that the current approach results in potentially less stable correlation estimates that may not be representative of current market conditions.\(^ {25}\)

In addition, under OCC’s existing margin methodology, theoretical price scenarios for “defaulting securities”\(^ {26}\) are simulated using uncorrelated return scenarios with an average zero return and a pre-specified volatility called “default variance.”\(^ {27}\) The default variance is estimated as the average of the top 25 percent quantile of the conditional variances of all securities.\(^ {28}\) As a result, OCC believes that these default estimates may be impacted by extremely illiquid securities with discontinuous data.\(^ {29}\) In addition, OCC believes that the default variance (and the associated scale-factors used to scale up volatility) is also subject to sudden jumps with the monthly simulation installations across successive months because it is derived from monthly

\(^{22}\) See Notice, 82 FR at 57308.

\(^{23}\) Id.

\(^{24}\) Id.

\(^{25}\) Id.

\(^{26}\) Within the context of OCC’s margin system, securities that do not have enough historical data for calibration are classified as “defaulting securities.” See Notice, 82 FR at 57308, note 15.

\(^{27}\) See Notice, 82 FR at 57308.

\(^{28}\) Id.

\(^{29}\) Id.
data updates, as opposed to daily updates, which are prone to wider fluctuations and are subject to adjustments using scale-factors.\textsuperscript{30}

**Proposed Changes to Current Margin Methodology**\textsuperscript{31}

1. **Daily Updates of Price Data**

   OCC proposes to introduce daily updates for price data for equity products, including daily corporate action-adjusted returns of equities, Exchange Traded Funds ("ETFs"), Exchange Traded Notes ("ETNs") and certain indexes.\textsuperscript{32} OCC believes that the proposed change would help ensure that OCC’s margin methodology is reliant on data that is more representative of current market conditions, thereby resulting in more accurate and responsive margin requirements.\textsuperscript{33} In addition, OCC believes that the introduction of daily price updates would enable OCC’s margin methodology to better capture both market and idiosyncratic risk by allowing for daily updates to the parameters associated with the econometric model (discussed below) that captures the risk associated with a particular product, and therefore help ensure that OCC’s margin requirements are based on more current market conditions.\textsuperscript{34} As a result, OCC would also reduce its reliance on the use of scale-factors to incorporate day-to-day market

\textsuperscript{30} Id.
\textsuperscript{31} In addition to the proposed methodology changes described herein, OCC also would make some clarifying and clean-up changes, unrelated to the proposed changes described above, to update its margin methodology to reflect existing practices for the daily calibration of seasonal and non-seasonal energy models and the removal of methodology language for certain products that are no longer cleared by OCC.  See Notice, 82 FR at 57308, note 17.
\textsuperscript{32} See Notice, 82 FR at 57308.
\textsuperscript{33} Id.
\textsuperscript{34} Id.
volatility, which OCC believes give little room to capture the idiosyncratic risk of a given
security and which may be different from the broad market risk represented by the scale-factor. 35

2. Proposed Enhancements to the Econometric Model

OCC is proposing the following enhancements to its econometric model for calculating
statistical parameters for all qualifying risk factors that reflect the most recent data obtained: 36

i. Daily Updates for Statistical Parameters

Under the proposal, the statistical parameters for the model would be updated on a daily
basis using the new daily price data obtained by OCC from a reliable third-party (as described
above). 37 As a result, OCC would no longer need to rely on scale-factors to approximate day-to-
day market volatility for equity-based products. 38 OCC believes that calibrating statistical
parameters on a daily basis would allow OCC to calculate more accurate margin requirements
that represent the most recent market data. 39

ii. Proposed Enhancements to Capture Asymmetry in Conditional Variance

The current approach for forecasting the conditional variance for a given risk factor does
not consider the asymmetric volatility phenomenon observed in financial markets (also called the
“leverage effect”) where volatility is more sensitive and reactive to market downturns. 40 Under
the proposal, OCC would amend its econometric model to include new features (i.e.,

35 Id.

36 See Notice, 82 FR at 57308-57309.

37 See Notice, 82 FR at 57309. OCC notes that this change would apply to most risk factors
with the exception of certain equity indexes, Treasury securities, and energy futures
products, which are already updated on a daily basis. See Notice, 82 FR 57309, at note
18.

38 See Notice, 82 FR at 57309.

39 Id.

40 Id.
incorporating asymmetry into its forecast volatility) designed to allow the conditional volatility forecast to be more sensitive to market downturns and thereby capture the most significant dynamics of the relationship between price and volatility observed in financial markets. OCC believes the proposed enhancement would result in more accurate and responsive margin requirements, particularly in market downturns.

iii. **Proposed Change in Statistical Distribution**

OCC also proposes to change the statistical distribution used to model the returns of equity prices. OCC’s current methodology uses a fat tailed distribution to model returns; however, price scenarios generated using very large log-return scenarios (positive) that follow this distribution can approach infinity and could potentially result in excessively large price jumps, a known limitation of this distribution. Under the proposal, OCC would adopt a more defined distribution (Standardized Normal Reciprocal Inverse Gaussian or NRIG) for modeling returns, which OCC believes would more appropriately simulate future returns based on the historical price data for the products in question and allows for more appropriate modeling of fat tails. As a result, OCC believes that the proposed change would lead to more consistent treatment of log returns both on the upside as well as downside of the distribution.

iv. **Second Day Volatility Forecast**

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41 Id.

42 Id.

43 A data set with a “fat tail” is one in which extreme price returns have a higher probability of occurrence than would be the case in a normal distribution. See Notice, 82 FR at 57309, note 21.

44 See Notice, 82 FR at 57309.

45 Id.

46 Id.

47 Id.
OCC further proposes to introduce a second-day forecast for volatility into the econometric model to estimate the two-day scenario distributions for risk factors.\textsuperscript{48} Under the current methodology, OCC typically uses a two-day horizon to determine its risk exposure to a given portfolio.\textsuperscript{49} This is done by simulating 10,000 theoretical price scenarios for the two-day horizon using a one-day forecast conditional variance; the value at risk and expected shortfall components of the margin requirement are then determined from the simulated profit/loss distributions.\textsuperscript{50} These one-day and two-day returns scenarios are both simulated using the one-day forecast conditional variance estimate.\textsuperscript{51} OCC believes that this could lead to a risk factor’s coverage differing substantially on volatile trading days.\textsuperscript{52} As a result, OCC proposes to introduce a second-day forecast variance for all equity-based risk factors.\textsuperscript{53} The second-day conditional variance forecast would be estimated for each of the 10,000 Monte Carlo returns scenarios, resulting in more accurately estimated two-day scenario distributions, and therefore more accurate and responsive margin requirements.\textsuperscript{54}

v. Anti-Procyclical Floor for Volatility Estimates

In addition, OCC proposes to modify its floor for volatility estimates. OCC currently imposes a floor on volatility estimates for its equity-based products using a 500-day look back

\textsuperscript{48} Id. This proposed change would not apply to STANS implied volatility scenario risk factors. For those risk factors, OCC’s existing methodology would continue to apply. See Notice, 82 FR at 57309, note 23.

\textsuperscript{49} See Notice, 82 FR at 57309.

\textsuperscript{50} Id.

\textsuperscript{51} Id.

\textsuperscript{52} Id.

\textsuperscript{53} Id.

\textsuperscript{54} Id.
period. Under the proposal, OCC would extend this look back period to 10 years (2520 days) in the enhanced model and apply this floor to volatility estimates for other products (excluding implied volatility risk factor scenarios). OCC believes that using a longer 10-year look back period will help ensure that OCC captures sufficient historical events/market shocks in the calculation of its anti-procyclical floor.

3. Proposed Enhancements to Correlation Estimates

As described above, OCC’s current methodology for estimating covariance and correlations between risk factors relies on the same monthly price data feeding the econometric model, resulting in a similar lag time between updates. In addition, correlation estimates are based off historical returns series, with estimates between a pair of risk factors being highly sensitive to the volatility of either risk factor in the chosen pair. The current approach therefore results in correlation estimates being sensitive to volatile historical data.

In order to address these limitations, OCC proposes to enhance its methodology for calculating correlation estimates by moving to a daily process for updating correlations (with a minimum of one-week’s lag) to help ensure clearing member account margins are more current and thus more accurate. Moreover, OCC proposes to enhance its approach to modeling correlation estimates by de-volatizing the returns series to estimate the correlations. Under

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55 Id.  
56 Id.  
57 Id.  
58 See Notice, 82 FR at 57310.  
59 Id.  
60 Id.  
61 Id.  
62 Id.
the proposed approach, OCC would first consider the returns excess of the mean (i.e., the average estimated from historical data sample) and then further scale them by the corresponding estimated conditional variances. OCC believes that using de-volatized returns would lead to normalizing returns across a variety of asset classes and make the correlation estimator less sensitive to sudden market jumps and therefore more stable.

4. Defaulting Securities Methodology

Under the proposal, OCC would enhance its methodology for estimating the defaulting variance in its model. OCC’s margin system is dependent on market data to determine clearing member margin requirements. Securities that do not have enough historical data are classified as to be a “defaulting security” within OCC systems. As noted above, within current STANS systems, the theoretical price scenarios for defaulting securities are simulated using uncorrelated return scenarios with a zero mean and a default variance, with the default variance being estimated as the average of the top 25 percent quantile of the conditional variances of all securities. As a result, these default estimates may be impacted by extremely illiquid securities with discontinuous data. In addition, the default variance (and the associated scale-factors used to scale up volatility) is also subject to sudden jumps with the monthly simulation installations

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63 Id.
64 Id.
65 Id.
66 Id.
67 Id.
68 Id.
69 Id.
70 Id.
across volatile months.\textsuperscript{71} To mitigate these concerns, OCC proposes to: (i) use only optionable equity securities to estimate the defaulting variance; (ii) use a shorter time series to enable calibration of the model for all securities; and (iii) simulate default correlations with the driver Russell 2000 index ("RUT").\textsuperscript{72}

i.  Proposed Modifications to Securities and Quantile Used in Estimation.

Under the proposal, only optionable equity securities, which are typically more liquid, would be considered while estimating the default variance.\textsuperscript{73} This limitation would eliminate from the estimation almost all illiquid securities with discontinuous data that could contribute to high conditional variance estimates and thus a high default variance.\textsuperscript{74} In addition, OCC proposes to estimate the default variance as the lowest estimate of the top 10 percent of the floored conditional variance across the risk factors.\textsuperscript{75} OCC believes that this change in methodology would help ensure that while the estimate is aggressive it is also robust to the presence of outliers caused by a few extremely volatile securities that influence the location parameter of a distribution.\textsuperscript{76} Moreover, as a consequence of the daily updates described above, the default variances would change daily and there would be no scale-factor to amplify the effect of the variance on risk factor coverage.\textsuperscript{77}

ii.  Proposed Change in Time Series

\textsuperscript{71} Id.  
\textsuperscript{72} Id.  
\textsuperscript{73} Id.  
\textsuperscript{74} Id.  
\textsuperscript{75} Id.  
\textsuperscript{76} Id.  
\textsuperscript{77} Id.
Under the proposal, OCC would use a shorter time series to enable calibration of the model for all securities.\textsuperscript{78} Currently, OCC does not calibrate parameters for defaulting securities that have historical data of less than two years.\textsuperscript{79} OCC is proposing to shorten this time period to around 6 months (180 days) to enable calibration of the model for all securities within OCC systems.\textsuperscript{80} OCC believes that this shorter time series is sufficient to produce stable calibrated parameters.\textsuperscript{81}

iii. Proposed Default Correlation

Under the proposal, returns scenarios for defaulting securities\textsuperscript{82} would be simulated using a default correlation with the driver RUT.\textsuperscript{83} The default correlation of the RUT index is roughly equal to the median of all positively correlated securities with the index.\textsuperscript{84} Since 90\% of the risk factors in OCC systems correlate positively to the RUT index, OCC would only consider those risk factors to determine the median.\textsuperscript{85} OCC believes that the median of the correlation distribution has been steady over a number of simulations and is therefore proposing that it

\begin{itemize}
  \item \textsuperscript{78} Id.
  \item \textsuperscript{79} Id.
  \item \textsuperscript{80} Id.
  \item \textsuperscript{81} Id.
  \item \textsuperscript{82} See supra note 25.
  \item \textsuperscript{83} See Notice, 82 FR at 57310. OCC notes that, in certain limited circumstances where there are reasonable grounds backed by the existing return history to support an alternative approach in which the returns are strongly correlated with those of an existing risk factor (a “proxy”) with a full price history, the margin methodology allows OCC’s Financial Risk Management staff to construct a “conditional” simulation to override any default treatment that would have otherwise been applied to the defaulting security. See Notice, 82 FR at 57310, note 26.
  \item \textsuperscript{84} See Notice, 82 FR at 57310.
  \item \textsuperscript{85} Id.
\end{itemize}
replace the current methodology of simulating uncorrelated scenarios, which OCC believes is not a realistic approach.  

III. Proceedings to Determine Whether to Approve or Disapprove the Proposed Rule Change and Grounds for Disapproval Under Consideration

The Commission is instituting proceedings pursuant to Section 19(b)(2)(B) of the Act to determine whether the Proposed Rule Change should be approved or disapproved. Institution of proceedings is appropriate at this time in view of the legal and policy issues raised by the Proposed Rule Change. As noted above, institution of proceedings does not indicate that the Commission has reached any conclusions with respect to any of the issues involved. Rather, the Commission seeks and encourages interested persons to comment on the Proposed Rule Change and provide arguments to support the Commission’s analysis as to whether to approve or disapprove the proposal.

Pursuant to Section 19(b)(2)(B) of the Act, the Commission is providing notice of the grounds for disapproval under consideration. The Commission is instituting proceedings to allow for additional analysis of, and input from, commenters with respect to the Proposed Rule Change’s consistency with the Act and the rules thereunder. Specifically, the Commission believes that the Proposed Rule Change raises questions as to whether the proposal is consistent with (i) Section 17A(b)(3)(F) of Act, which requires that the rules of a clearing agency be designed to, among other things, assure the safeguarding of securities and funds which are in the

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86 Id.
87 15 U.S.C. 78s(b)(2)(B) (providing that proceedings to determine whether to disapprove a proposed rule change must be concluded within 180 days of the date of publication of notice of the filing of the proposed rule change. The time for conclusion of the proceedings may be extended for up to an additional 60 days if the Commission finds good cause for such extension and publishes its reasons for so finding or if the self-regulatory organization consents to the extension).
custody or control of the clearing agency or for which it is responsible;\(^89\) (ii) Rules 17Ad-22(b)(1) and (b)(2) under the Act, which require a registered clearing agency that performs central counterparty services establish, implement, maintain and enforce written policies and procedures reasonably designed to, in part: (1) measure its credit exposures to its participants at least once a day and limit its exposures to potential losses from defaults by its participants under normal market conditions so that the operations of the clearing agency would not be disrupted and non-defaulting participants would not be exposed to losses that they cannot anticipate or control; and (2) use margin requirements to limit its credit exposures to participants under normal market conditions and use risk-based models and parameters to set margin requirements;\(^90\) and (iii) Rule 17Ad-22(e)(6) under the Act, which requires OCC to establish, implement, maintain and enforce written policies and procedures reasonably designed to cover its credit exposures to its participants by establishing a risk-based margin system that, among other things: (i) considers, and produces margin levels commensurate with, the risks and particular attributes of each relevant product, portfolio, and market; (ii) calculates margin sufficient to cover its potential future exposure to participants in the interval between the last margin collection and the close out of positions following a participant default; and (iii) uses reliable sources of timely price data and uses procedures and sound valuation models for addressing circumstances in which pricing data are not readily available or reliable.\(^91\)

IV. Request for Written Comments

The Commission requests that interested persons provide written submissions of their views, data, and arguments with respect to the issues raised by the Proposed Rule Change. In

\(^90\) 17 CFR 240.17Ad-22(b)(1) and (2).
\(^91\) 17 CFR 240.17Ad-22(e)(6).
particular, the Commission invites the written views of interested persons concerning whether the Proposed Rule Change is inconsistent with Section 17A(b)(3)(F) of the Act\(^{92}\) and Rules 17Ad-22(b)(1)-(2)\(^{93}\) and 17Ad-22(e)(6)\(^{94}\) under the Act, or any other provision of the Act or rules and regulations thereunder.

Although there do not appear to be any issues relevant to approval or disapproval that would be facilitated by an oral presentation of views, data, and arguments, the Commission will consider, pursuant to Rule 19b-4, any request for an opportunity to make an oral presentation.\(^{95}\)

Interested persons are invited to submit written data, views, and arguments regarding whether the Proposed Rule Change should be approved or disapproved on or before [insert date 21 days from publication in the Federal Register]. Any person who wishes to file a rebuttal to any other person’s submission must file that rebuttal on or before [insert date 35 days from publication in the Federal Register]. 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. Please include File Number SR-OCC-2017-022 on the subject line.


\(^{93}\) 17 CFR 240.17Ad-22(b)(1)-(2).

\(^{94}\) 17 CFR 240.17Ad-22(e)(6)

Paper comments:

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

All submissions should refer to File Number SR-OCC-2017-022. 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 Proposed Rule Change that are filed with the Commission, and all written communications relating to the Proposed Rule Change 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 a.m. and 3:00 p.m. Copies of such filing also will be available for inspection and copying at the principle office of OCC. All comments received will be posted without change. Persons submitting comments are cautioned that we do not redact or edit personal identifying information from comment submissions. You should submit only information that you wish to make available publicly.
All submissions should refer to File Number SR-OCC-2017-022 and should be submitted on or before [insert date 21 days from publication in the Federal Register]. If comments are received, any rebuttal comments should be submitted on or before [insert date 35 days from publication in the Federal Register].

For the Commission, by the Division of Trading and Markets, pursuant to delegated authority. 96

Robert W. Errett
Deputy Secretary

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