

SECURITIES AND EXCHANGE COMMISSION  
(Release No. 34-80202; File No. SR-IEX-2017-06)

March 10, 2017

Self-Regulatory Organizations; Investors Exchange LLC; Notice of Filing and Immediate Effectiveness of Proposed Rule Change to Amend Rule 11.190(g) to Modify the Quote Instability Coefficients and Quote Instability Threshold Included in the Quote Instability Calculation Specified in Subparagraph (g)(1) for Purposes of Determining Whether a Crumbling Quote Exists

Pursuant to Section 19(b)(1)<sup>1</sup> of the Securities Exchange Act of 1934<sup>2</sup> and Rule 19b-4 thereunder,<sup>3</sup> notice is hereby given that, on February 28, 2017, the Investors Exchange LLC filed with the Securities and Exchange Commission (“Commission”) the proposed rule change as described in Items I and II below, which Items have been prepared by the self-regulatory organization. The Commission is publishing this notice to solicit comments on the proposed rule change from interested persons.

I. Self-Regulatory Organization’s Statement of the Terms of Substance of the Proposed Rule Change

Pursuant to the provisions of Section 19(b)(1) under the Securities Exchange Act of 1934 (“Act”),<sup>4</sup> and Rule 19b-4 thereunder,<sup>5</sup> Investors Exchange LLC (“IEX” or “Exchange”) is filing with the Commission a proposed rule change to amend Rule 11.190(g) to incrementally optimize and enhance the effectiveness of the quote instability calculation in determining whether a

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<sup>1</sup> 15 U.S.C. 78s(b)(1).

<sup>2</sup> 15 U.S.C. 78a.

<sup>3</sup> 17 CFR 240.19b-4.

<sup>4</sup> 15 U.S.C. 78s(b)(1).

<sup>5</sup> 17 CFR 240.19b-4.

crumbling quote exists. The Exchange has designated this proposal as non-controversial and provided the Commission with the notice required by Rule 19b-4(f)(6)(iii) under the Act.<sup>6</sup>

The text of the proposed rule change is available at the Exchange's website at [www.iextrading.com](http://www.iextrading.com), at the principal office of the Exchange, and at the Commission's Public Reference Room.

## II. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

In its filing with the Commission, the self-regulatory organization included statements concerning the purpose of and basis for the proposed rule change and discussed any comments it received on the proposed rule change. The text of these statement may be examined at the places specified in Item IV below. The self-regulatory organization has prepared summaries, set forth in Sections A, B, and C below, of the most significant aspects of such statements.

### A. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

#### 1. Purpose

##### Overview

The purpose of the proposed rule change is to amend Rule 11.190(g) to modify the quote instability coefficients and quote instability threshold included in the quote instability calculation specified in subparagraph (g)(1) for purposes of determining whether a crumbling quote exists. When the Exchange determines that the quote in a particular security is crumbling from the national best bid, as comprised of Protected Quotations ("Protected NBB"), Discretionary Peg buy orders are restricted from exercising price discretion to trade against interest above the NBB. Similarly, when the Exchange determines that the quote in a particular security is crumbling

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<sup>6</sup> 17 CFR 240.19b-4(f)(6)(iii).

from the national best offer, as comprised of Protected Quotations (“Protected NBO” and collectively with the Protected NBB the “Protected NBBO”), Discretionary Peg sell orders are restricted from exercising price discretion to trade against interest below the NBO.

#### Discretionary Peg Order

The manner in which Discretionary Peg orders operate is described in Rule 11.190(b)(10). Specifically, a Discretionary Peg order is a non-displayed, pegged order that upon entry into the System, the price of the order is automatically adjusted by the System to be equal to the less aggressive of the Midpoint Price or the order’s limit price, if any. When unexecuted shares of such order are posted to the Order Book, the price of the order is automatically adjusted by the System to be equal to and ranked at the less aggressive of the primary quote or the order’s limit price and is automatically adjusted by the System in response to changes in the NBB (NBO) for buy (sell) orders up (down) to the order’s limit price, if any. In order to meet the limit price of active orders on the Order Book, a Discretionary Peg order will exercise the least amount of price discretion necessary from the Discretionary Peg order’s resting price to its discretionary price (defined as the less aggressive of the Midpoint Price or the Discretionary Peg order’s limit price, if any), except during periods of quote instability (*i.e.*, when a crumbling quote exists) as defined in paragraph Rule 11.190(g).

In determining whether a crumbling quote exists, the Exchange utilizes real time relative quoting activity of Protected Quotations (not including quotations of the Exchange) and a proprietary mathematical calculation (the “quote instability calculation”) to assess the probability of an imminent change to the current Protected NBB to a lower price or Protected NBO to a higher price for a particular security (“quote instability factor”). When the quoting activity meets predefined criteria and the quote instability factor calculated is greater than the

Exchange's defined threshold ("quote instability threshold"), the System treats the quote as not stable ("quote instability" or a "crumbling quote"). During all other times, the quote is considered stable ("quote stability"). The System independently assesses the stability of the Protected NBB and Protected NBO for each security.

When the System determines that a quote, either the Protected NBB or the Protected NBO, is unstable, the determination remains in effect at that price level for two (2) milliseconds. The System will only treat one side of the Protected NBBO as unstable in a particular security at any given time.<sup>7</sup> By not permitting resting Discretionary Peg orders to execute at a price that is more aggressive than the near-side protected NBB or NBO (as applicable) during periods of quote instability, the Exchange System is intended to attempt to protect such orders from unfavorable executions when the market is moving against them. Once the market has moved and the Exchange System deems the near-side Protected NBB or NBO (as applicable) to be stable (pursuant to a pre-determined, objective set of conditions as described below), Discretionary Peg orders are permitted to exercise discretion up to (for buy orders) or down to (for sell orders) the midpoint of the NBBO in order to meet the limit price of active orders on the order book and thereby potentially provide price improvement to such active orders.

Quote stability or instability (also referred to as a crumbling quote) is an assessment that the Exchange System makes on a real-time basis, based on a pre-determined, objective set of conditions specified in Rule 11.190(g)(1). Specifically, quote instability, or the presence of a crumbling quote, is determined by the System when the following factors occur:

- (A) the Protected NBB and Protected NBO are the same as the Protected NBB and Protected NBO one (1) millisecond ago; and
- (B) the Protected NBBO spread is less than or equal to the thirty (30) day median

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<sup>7</sup> See, Rule 11.190(g).

Protected NBBO spread during the Regular Market Session; and

(C) there are more Protected Quotations on the far side, i.e. more Protected Quotations on the Protected NBO than the Protected NBB for buy orders, or more Protected Quotations on the Protected NBB than the Protected NBO for sell orders; and

(D) the quote instability factor result from the quote stability calculation is greater than the defined quote instability threshold.

(i) Quote Instability Factor. The Exchange's proprietary quote stability calculation used to determine the current quote instability factor is defined by the following formula that utilizes the quote stability coefficients and quote stability variables defined below:

$$1 / (1 + e^{- (C_0 + C_1 * N + C_2 * F + C_3 * N_{-1} + C_4 * F_{-1} + C_5 * E + C_6 * D)})$$

(a) Quote Stability Coefficients. The Exchange utilizes the values below for the quote stability coefficients.

(1)  $C_0 = -1.3493$

(2)  $C_1 = -1.1409$

(3)  $C_2 = 0.2671$

(4)  $C_3 = 0.5141$

(5)  $C_4 = -0.1970$

(6)  $C_5 = 0.1347$

(7)  $C_6 = 0.6862$

(b) Quote Stability Variables. The Exchange utilizes the quote stability variables defined below to calculate the current quote instability factor.

(1) N = the number of Protected Quotations on the near side of the market, i.e. Protected NBB for buy orders and Protected NBO for sell orders.

(2) F = the number of Protected Quotations on the far side of the market, i.e. Protected NBO for buy orders and Protected NBB for sell orders.

(3) N<sub>-1</sub> = the number of Protected Quotations on the near side of the market one (1) millisecond ago.

- (4)  $F_{-1}$  = the number of Protected Quotations on the far side of the market one (1) millisecond ago.
- (5)  $E$  = a Boolean indicator that equals 1 if the last two quotation updates have been quotations of protected markets moving away from the near side of the market on the same side of the market and at the same price.
- (6)  $D$  = the number of these three (3) venues that moved away from the near side of the market on the same side of the market and at the same price in the prior one (1) millisecond: XNGS, EDGX, BATS.

(ii) Quote Instability Threshold. The Exchange utilizes a quote instability threshold of 0.6.

Rule 11.190(g)(1)(D)(iii) provides that the Exchange reserves the right to modify the quote instability coefficients or quote instability threshold at any time, subject to a filing of a proposed rule change with the SEC. The Exchange is proposing such changes in this rule filing.

Changes to quote instability coefficients and quote instability threshold

IEX conducted an analysis of the effectiveness of the existing factors in predicting whether a crumbling quote would occur, by reviewing randomly selected market data from November 2016 through mid-February 2017. The results of the analysis were verified by reviewing randomly selected market data from January and mid-February 2017. Based on this analysis, the Exchange has determined that further optimization of the existing factors would incrementally increase the accuracy of the formula in predicting whether a crumbling quote will occur. The following describes the proposed changes:

1. Rule 11.190(g) states that the Exchange utilizes real time relative quoting activity of Protected Quotations, not including IEX protected quotations, in the quote instability calculation. As proposed, the Exchange is proposing to include the protection quotations of the following exchanges in the quote instability calculation: New York Stock

Exchange, NYSE Arca, Nasdaq BX, Bats BZX Exchange, Bats BYX Exchange, Bats EDGX Exchange, and Bats EDGA Exchange. In connection with our analysis of market data, as described above, the Exchange considered several different permutations of which exchanges to include in the model. The research identified that using the Protected Quotations of these specific eight exchanges in the aggregate resulted in the greatest predictive power of all permutations of exchanges assessed for determining a crumbling quote.

2. The Exchange proposes to simplify the crumbling quote calculation specified in Rule 11.190(g)(1) by eliminating the three (3) preconditions related to the stability and ratio of the protected national best bid and offer (“NBBO”),<sup>8</sup> and base the determination solely on whether the quote instability factor result from the quote stability calculation is greater than the defined quote instability threshold. Based on our analysis of market data, as described above, the Exchange believes that the simplification would incrementally increase the accuracy of the formula in predicting a crumbling quote by expanding the scope of the model to additional situations where a crumbling quote exists in the absence of the pre-conditions.
3. The Exchange proposes to revise the quote stability variables currently specified in subparagraph (1)(D)(i)(b) of Rule 11.190(g) by adding seven (7) new variables (NC, FC,

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<sup>8</sup> Currently IEX Rule 11.190(g)(1) provides that in determining whether a crumbling quote exists the following other factors will be considered: the Protected NBB and Protected NBO are the same as the Protected NBB and Protected NBO one (1) millisecond ago, the Protected NBBO spread is less than or equal to the thirty (30) day median Protected NBBO spread during the Regular Market Session, and there are more Protected Quotations on the far side, i.e., more Protected Quotations on the Protected NBO than the Protected NBB for buy orders or more Protected Quotations on the Protected NBO for sell orders.

Delta, EPos, ENeg, EPosPrev, and ENegPrev) and retiring four (4) variables (N-1, F-1, E, and D).<sup>9</sup> Specifically, based on our analysis of market data, as described above, the Exchange identified that considering the maximum change over the course of the previous millisecond up to the most recent Protected NBBO change was a more accurate indicator of a crumbling quote than simply looking at the absolute state of the market one millisecond previously. The replacement of N-1, F-1, and D with NC, FC, and Delta, respectively, reflects this finding. Additionally, we found that looking at the previous two quote changes on a more granular basis (specifically, looking at whether each of the last two events individually was a quote dropping off the near side or joining the near side, rather than whether both of the last two events dropped off the near side) was a more accurate indicator of a crumbling quote than a simple boolean factor indicating whether both of the last two events were quotes dropping off the inside. Replacing E with 4 separate factors – EPos, ENeg, EPosPrev, and ENegPrev – reflects this finding.

4. The Quote Stability Coefficients specified in subparagraph (1)(D)(i) of Rule 11.190(g) are proposed to be modified to take into account the recent market data analysis, as well as the changes to the quote stability variables as described above. Specifically, as proposed the seven (7) existing coefficients will be modified and three (3) new coefficients will be added. The Exchange believes that the modifications, as proposed, will increase the accuracy of the quote instability calculation.
5. The Exchange proposes to modify and re-optimize the Quote Instability Threshold specified in subparagraph (1)(D)(ii) of Rule 11.190(g) based on the recent market data analysis and the new quote stability variables. Specifically, the threshold size would vary

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<sup>9</sup> Two (2) of the existing variables (N and F) will be retained.



based on the spread of the Protected NBBO.<sup>10</sup> Based on its data analysis, as described above, the Exchange concluded that tiering the threshold would reduce the rate of false positives. Consequently, the Exchange believes that the modifications, as proposed, will increase the accuracy of the quote instability calculation.

6. Finally, the Exchange proposes conforming numbering changes to Rule 11.190(g) to reflect elimination of the three (3) preconditions for the crumbling quote calculation specified in Rule 11.190(g)(1) as described above.

The Exchange will announce the implementation date of the proposed rule change by Trader Notice at least five business days in advance of such implementation date and within 90 days of effectiveness of this proposed rule change.

## 2. Statutory Basis

IEX believes that the proposed rule change is consistent with Section 6(b)<sup>11</sup> of the Act in general, and furthers the objectives of Section 6(b)(5) of the Act,<sup>12</sup> in particular, in that it is designed to prevent fraudulent and manipulative acts and practices, to promote just and equitable principles of trade, to foster cooperation and coordination with persons engaged in facilitating transactions in securities, to remove impediments to and perfect the mechanism of a free and open market and a national market system and, in general, to protect investors and the public interest. Specifically, and as discussed above, the proposal is designed to optimize and enhance the effectiveness of the quote instability calculation in determining whether a crumbling quote exists. The Exchange believes that the proposed changes are designed to protect investors and

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<sup>10</sup> The spread is defined in proposed paragraph (1)(D)(ii) as the Protected Best Offer minus Protected Best Bid.

<sup>11</sup> 15 U.S.C. 78f.

<sup>12</sup> 15 U.S.C. 78f(b)(5).

the public interest by enhancing the accuracy of the Exchange's quote instability calculation in determining whether a crumbling quote exists thereby preventing Discretionary Peg orders from trading at prices more aggressive than the near side of the market (NBB for buy orders, NBO for sell orders) to protect such orders from unfavorable executions when the market appears to be moving against them. As discussed in the Purpose section, each of the proposed changes are based on the Exchange's analysis of market data, which supports that, in the aggregate and individually, the proposed changes would increase the accuracy of the Exchange's quote instability calculation.

As proposed, the new quote instability calculation will continue to be a fixed formula specified transparently in IEX's rules. The Exchange is not proposing to add any new functionality, but merely to revise the fixed formula based on market data analysis designed to increase the accuracy of the formula in predicting a crumbling quote, and as contemplated by the rule.

B. Self-Regulatory Organization's Statement on Burden on Competition

IEX does not believe that the proposed rule change will result in any burden on competition that is not necessary or appropriate in furtherance of the purposes of the Act. The proposed change will apply equally to all IEX Members. The Commission has already considered the Exchange's Discretionary Peg order type in connection with its grant of IEX's application for registration as a national securities exchange under Sections 6 and 19 of the Act.<sup>13</sup> The proposed rule change is designed to merely enhance the accuracy of the quote instability calculation specified in Rule 11.190(g); therefore, no new burdens are being proposed.

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<sup>13</sup> See Securities Exchange Act Release No. 34-78101 (June 17, 2016), 81 FR 41142 (June 23, 2016) (File No. 10-222).

C. Self-Regulatory Organization's Statement on Comments on the Proposed Rule Change Received from Members, Participants, or Others

Written comments were neither solicited nor received.

III. Date of Effectiveness of the Proposed Rule Change and Timing for Commission Action

Because the foregoing proposed rule change does not: (i) significantly affect the protection of investors or the public interest; (ii) impose any significant burden on competition; and (iii) become operative for 30 days from the date on which it was filed, or such shorter time as the Commission may designate, it has become effective pursuant to Section 19(b)(3)(A) of the Act<sup>14</sup> and Rule 19b-4(f)(6) thereunder.<sup>15</sup>

A proposed rule change filed under Rule 19b-4(f)(6)<sup>16</sup> normally does not become operative prior to 30 days after the date of the filing. However, pursuant to Rule 19b-4(f)(6)(iii),<sup>17</sup> the Commission may designate a shorter time if such action is consistent with the protection of investors and the public interest. The Exchange has asked the Commission to waive the 30-day operative delay. The Exchange stated that the proposed rule change is designed to optimize the fixed quote instability equation contained in the rule without introducing new functionality or materially changing the operation of the current functionality in a manner not contemplated by the rule. The Exchange believes that its proposal will operate to protect Members that enter Discretionary Peg orders from unfavorable executions when the market is moving against such orders, and noted that waiver of the operative delay would allow

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<sup>14</sup> 15 U.S.C. 78s(b)(3)(A).

<sup>15</sup> 17 CFR 240.19b-4(f)(6). As required under Rule 19b-4(f)(6)(iii), IEX provided the Commission with written notice of its intent to file the proposed rule change, along with a brief description and the text of the proposed rule change, at least five business days prior to the date of filing of the proposed rule change, or such shorter time as designated by the Commission.

<sup>16</sup> 17 CFR 240.19b-4(f)(6).

<sup>17</sup> 17 CFR 240.19b-4(f)(6)(iii).

the Exchange to implement the optimized formula without delay. As the Exchange's proposal is intended to further refine the ability of the discretionary peg order type to meet its stated objectives as reflected in the Exchange's rule, the Commission believes that waiver of the operative delay is consistent with the protection of investors and the public interest. Therefore, the Commission hereby waives the operative delay and designates the proposed rule change operative upon filing.<sup>18</sup>

At any time within 60 days of the filing of the proposed rule change, the Commission summarily may temporarily suspend such rule change if it appears to the Commission that such action is necessary or appropriate in the public interest, for the protection of investors, or otherwise in furtherance of the purposes of the Act. If the Commission takes such action, the Commission shall institute proceedings to determine whether the proposed rule should be approved or disapproved.

#### IV. Solicitation of Comments

Interested persons are invited to submit written data, views and arguments concerning the foregoing, including whether the proposed rule change is consistent with the 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 SR-IEEX-2017-06 on the subject line.

##### Paper Comments:

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<sup>18</sup> For purposes only of waiving the 30-day operative delay, the Commission has also considered the proposed rule's impact on efficiency, competition, and capital formation. See 15 U.S.C. 78c(f).

- 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-IEEX-2017-06. 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 the filing also will be available for inspection and copying at the principal office of the Exchange. 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-IEX-2017-06 and should be submitted on or before [insert date 21 days from publication in the Federal Register].

For the Commission, by the Division of Trading and Markets, pursuant to delegated authority.<sup>19</sup>

Eduardo A. Aleman  
Assistant Secretary

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<sup>19</sup> 17 CFR 200.30-3(a)(12).