

Required fields are shown with yellow backgrounds and asterisks.

Filing by Investors' Exchange LLC  
Pursuant to Rule 19b-4 under the Securities Exchange Act of 1934

Initial *	Amendment *	Withdrawal	Section 19(b)(2) *	Section 19(b)(3)(A) *	Section 19(b)(3)(B) *
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
			Rule		
Pilot	Extension of Time Period for Commission Action *	Date Expires *	<input type="checkbox"/> 19b-4(f)(1)	<input type="checkbox"/> 19b-4(f)(4)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="checkbox"/> 19b-4(f)(2)	<input type="checkbox"/> 19b-4(f)(5)	
			<input type="checkbox"/> 19b-4(f)(3)	<input checked="" type="checkbox"/> 19b-4(f)(6)	

Notice of proposed change pursuant to the Payment, Clearing, and Settlement Act of 2010	Security-Based Swap Submission pursuant to the Securities Exchange Act of 1934
Section 806(e)(1) *	Section 806(e)(2) *
<input type="checkbox"/>	<input type="checkbox"/>
	Section 3C(b)(2) *
	<input type="checkbox"/>

Exhibit 2 Sent As Paper Document	Exhibit 3 Sent As Paper Document
<input type="checkbox"/>	<input type="checkbox"/>

**Description**

Provide a brief description of the action (limit 250 characters, required when Initial is checked \*).

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 crumbling quote exists.

**Contact Information**

Provide the name, telephone number, and e-mail address of the person on the staff of the self-regulatory organization prepared to respond to questions and comments on the action.

First Name \*  Last Name \*   
Title \*   
E-mail \*   
Telephone \*  Fax

**Signature**

Pursuant to the requirements of the Securities Exchange Act of 1934,

has duly caused this filing to be signed on its behalf by the undersigned thereunto duly authorized.

(Title \*)

Date    
By    
(Name \*)

NOTE: Clicking the button at right will digitally sign and lock this form. A digital signature is as legally binding as a physical signature, and once signed, this form cannot be changed.

SECURITIES AND EXCHANGE COMMISSION  
WASHINGTON, D.C. 20549

For complete Form 19b-4 instructions please refer to the EFFF website.

**Form 19b-4 Information \***

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The self-regulatory organization must provide all required information, presented in a clear and comprehensible manner, to enable the public to provide meaningful comment on the proposal and for the Commission to determine whether the proposal is consistent with the Act and applicable rules and regulations under the Act.

**Exhibit 1 - Notice of Proposed Rule Change \***

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The Notice section of this Form 19b-4 must comply with the guidelines for publication in the Federal Register as well as any requirements for electronic filing as published by the Commission (if applicable). The Office of the Federal Register (OFR) offers guidance on Federal Register publication requirements in the Federal Register Document Drafting Handbook, October 1998 Revision. For example, all references to the federal securities laws must include the corresponding cite to the United States Code in a footnote. All references to SEC rules must include the corresponding cite to the Code of Federal Regulations in a footnote. All references to Securities Exchange Act Releases must include the release number, release date, Federal Register cite, Federal Register date, and corresponding file number (e.g., SR-[SRO]-xx-xx). A material failure to comply with these guidelines will result in the proposed rule change being deemed not properly filed. See also Rule 0-3 under the Act (17 CFR 240.0-3)

**Exhibit 1A- Notice of Proposed Rule Change, Security-Based Swap Submission, or Advance Notice by Clearing Agencies \***

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The Notice section of this Form 19b-4 must comply with the guidelines for publication in the Federal Register as well as any requirements for electronic filing as published by the Commission (if applicable). The Office of the Federal Register (OFR) offers guidance on Federal Register publication requirements in the Federal Register Document Drafting Handbook, October 1998 Revision. For example, all references to the federal securities laws must include the corresponding cite to the United States Code in a footnote. All references to SEC rules must include the corresponding cite to the Code of Federal Regulations in a footnote. All references to Securities Exchange Act Releases must include the release number, release date, Federal Register cite, Federal Register date, and corresponding file number (e.g., SR-[SRO]-xx-xx). A material failure to comply with these guidelines will result in the proposed rule change, security-based swap submission, or advance notice being deemed not properly filed. See also Rule 0-3 under the Act (17 CFR 240.0-3)

**Exhibit 2 - Notices, Written Comments, Transcripts, Other Communications**

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Exhibit Sent As Paper Document

Copies of notices, written comments, transcripts, other communications. If such documents cannot be filed electronically in accordance with Instruction F, they shall be filed in accordance with Instruction G.

**Exhibit 3 - Form, Report, or Questionnaire**

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Exhibit Sent As Paper Document

Copies of any form, report, or questionnaire that the self-regulatory organization proposes to use to help implement or operate the proposed rule change, or that is referred to by the proposed rule change.

**Exhibit 4 - Marked Copies**

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The full text shall be marked, in any convenient manner, to indicate additions to and deletions from the immediately preceding filing. The purpose of Exhibit 4 is to permit the staff to identify immediately the changes made from the text of the rule with which it has been working.

**Exhibit 5 - Proposed Rule Text**

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The self-regulatory organization may choose to attach as Exhibit 5 proposed changes to rule text in place of providing it in Item I and which may otherwise be more easily readable if provided separately from Form 19b-4. Exhibit 5 shall be considered part of the proposed rule change.

**Partial Amendment**

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If the self-regulatory organization is amending only part of the text of a lengthy proposed rule change, it may, with the Commission's permission, file only those portions of the text of the proposed rule change in which changes are being made if the filing (i.e. partial amendment) is clearly understandable on its face. Such partial amendment shall be clearly identified and marked to show deletions and additions.

1. Text of Proposed Rule Change

(a) Pursuant to the provisions of Section 19(b)(1) under the Securities Exchange Act of 1934 (“Act”),<sup>1</sup> and Rule 19b-4 thereunder,<sup>2</sup> Investors Exchange LLC (“IEX” or “Exchange”) is filing with the Securities and Exchange Commission (“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 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>3</sup>

A notice of the proposed rule change for publication in the Federal Register is attached hereto as Exhibit 1. The text of the proposed rule change is attached as Exhibit 5.

(b) The Exchange does not believe that the proposed rule change will have any direct effect, or any significant indirect effect, on any other Exchange rule in effect at the time of this filing.

(c) Not applicable.

2. Procedures of the Self-Regulatory Organization

Senior management has approved the proposed rule change pursuant to authority delegated to it by the Board of the Exchange. No further action is required under the Exchange’s governing documents. Therefore, the Exchange’s internal procedures with respect to the proposed rule change are complete.

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

<sup>2</sup> 17 CFR 240.19b-4.

<sup>3</sup> 17 CFR 240.19b-4(f)(6)(iii).

The persons on the Exchange staff prepared to respond to questions and comments on the proposed rule change are:

Claudia Crowley  
Chief Regulatory Officer  
Investors Exchange LLC  
646-343-2041

Sophia Lee  
General Counsel  
Investors Exchange LLC  
646-343-2040

3. Self-Regulatory Organization’s Statement on the Purpose of, and Statutory Basis for, the Proposed Rule Change

a. 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 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>4</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 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,

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<sup>4</sup> See, Rule 11.190(g).

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)  $N_{-1}$  = 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>5</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

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<sup>5</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.

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, Delta, EPos, ENeg, EPosPrev, and ENegPrev) and retiring four (4) variables (N-1, F-1, E, and D).<sup>6</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.

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<sup>6</sup> Two (2) of the existing variables (N and F) will be retained.

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 based on the spread of the Protected NBBO.<sup>7</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.

b. Statutory Basis

IEX believes that the proposed rule change is consistent with Section 6(b)<sup>8</sup> of the

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<sup>7</sup> The spread is defined in proposed paragraph (1)(D)(ii) as the Protected Best Offer minus Protected Best Bid.

<sup>8</sup> 15 U.S.C. 78f.

Act in general, and furthers the objectives of Section 6(b)(5) of the Act,<sup>9</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 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.

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<sup>9</sup> 15 U.S.C. 78f(b)(5).

4. 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>10</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.

5. 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.

6. Extension of Time Period for Commission Action

Not applicable.

7. Basis for Summary Effectiveness Pursuant to Section 19(b)(3) or for Accelerated Effectiveness Pursuant to Section 19(b)(2)

The Exchange has designated this rule filing as non-controversial under Section 19(b)(3)(A) of the Act<sup>11</sup> and paragraph (f)(6) of Rule 19b-4 thereunder.<sup>12</sup> The Exchange asserts that the proposed rule change: (1) will not significantly affect the protection of investors or the public interest, (2) will not impose any significant burden on competition, (3) and will not become operative for 30 days from the date on which it was filed, or such shorter time as the Commission may designate if consistent with the protection of

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

<sup>11</sup> 15 U.S.C. 78s(b)(3)(A).

<sup>12</sup> 17 CFR 240.19b-4(f)(6).

investors and the public interest. In addition, the Exchange provided the Commission with written notice of its intent to file the proposed rule change, along with a brief description and text of the proposed rule change, at least five business days prior to the date of filing.<sup>13</sup>

The Exchange believes that the proposed rule change meets the criteria of subparagraph (f)(6) of Rule 19b-4<sup>14</sup> because it would not significantly affect the protection of investors or the public interest; rather, the proposed rule change will benefit investors because it is designed to enhance the accuracy of the quote instability calculation and protect Members that enter Discretionary Peg orders from unfavorable executions when the market is moving against the order (i.e., lower for a buy order and higher for a sell order). The proposed rule change will merely revise the fixed formula specified in Rule 11.190(g) for predicting a crumbling quote, and as contemplated by the rule. In this regard, the proposed changes are intended to optimize the quote instability equation contained in the discretionary peg order type rule, and are not intended to materially change the operation of the rule or introduce new functionality. Rather, the Exchange intends the proposed changes to increase the ability of the discretionary peg order type to meet its stated objectives as reflected in the Exchange's rule. IEX notes that an Exchange rule change revising the quote instability calculation specified in Rule 11.190(g) previously became effective.<sup>15</sup> As such, the Exchange does not believe the proposal raises any new or novel issues not already considered by the Commission. Accordingly, the Exchange believes that the proposed rule change is noncontroversial

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<sup>13</sup> 17 CFR 240.19b-4(f)(6)(iii).

<sup>14</sup> 17 CFR 240.19b-4(f)(6).

<sup>15</sup> See Release No. 34-78510 (August 9, 2016), 81 FR 54166 (August 15, 2016).

and satisfies the requirements of Rule 19b-4(f)(6)<sup>16</sup>.

Furthermore, Rule 19b-4(f)(6) requires a self-regulatory organization to give the Commission written notice of its intent to file 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. The Exchange has satisfied this requirement.

The Exchange respectfully requests that the Commission waive the 30-day operative delay period after which a proposed rule change under Rule 19b-4(f)(6) becomes effective. The proposed rule change will merely revise the fixed formula specified in Rule 11.190(g) for predicting a crumbling quote, and as contemplated by the rule. Waiver of the operative delay is, therefore, consistent with the protection of investors and the public interest because it will allow the Exchange to implement the proposed rule change upon effectiveness of the proposed rule change, thus enabling the Exchange to provide the contemplated protections to Members entering Discretionary Peg orders at such time. 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.

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: (i) necessary or appropriate in the public interest; (ii) for the protection of investors; or (iii) 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.

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

8. Proposed Rule Change Based on the Rules of Another Self-Regulatory Organization or of the Commission

The proposed rule change is not based on the rules of another self-regulatory organization or of the Commission.

9. Security-Based Swap Submissions Filed Pursuant to Section 3 C of the Act

Not applicable.

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

Not applicable.

11. Exhibits

Exhibit 1 – Form of Notice of the Proposed Rule Change for Publication in the Federal Register.

Exhibit 5 – Text of Proposed Rule Change.



## EXHIBIT 1

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

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 (the “Act”)<sup>2</sup> and Rule 19b-4 thereunder,<sup>3</sup> notice is hereby given that, on (date), the Investors Exchange LLC (“IEX” or the “Exchange”) filed with the Securities and Exchange Commission (the “Commission”) the proposed rule change as described in Items I, II and III 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 crumbling quote exists. The Exchange has

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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.

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 the 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 the 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

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

Exchange determines that the quote in a particular security is crumbling 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-

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

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 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)  $N_{-1}$  = 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

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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

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, 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

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Protected Quotations on the Protected NBO than the Protected NBB for buy orders or more Protected Quotations on the Protected NBO for sell orders.

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



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 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

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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.

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 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

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

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

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.

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

The Exchange has designated this rule filing as non-controversial under Section 19(b)(3)(A)<sup>14</sup> of the Act and Rule 19b-4(f)(6)<sup>15</sup> thereunder. Because the 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

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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).

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

<sup>15</sup> 17 CFR 240.19b-4(f)(6).

designate, it has become effective pursuant to Section 19(b)(3)(A) of the Act and Rule 19b-4(f)(6) thereunder.

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 to the extent necessary so that the proposal may become operative at the time of the launch of its operation as a national securities exchange.

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 under Section 19(b)(2)(B)<sup>18</sup> of the Act to determine whether the proposed rule change 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:

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

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

<sup>18</sup> 15 U.S.C. 78s(b)(2)(B).

- Use the Commission's Internet comment form (<http://www.sec.gov/rules/sro.shtml>); or
- Send an email to [rule-comments@sec.gov](mailto:rule-comments@sec.gov). Please include File Number SR-IEX-2017-06 on the subject line.

Paper Comments:

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

All submissions should refer to File Number SR-IEX-2017-06. This file number should be included in the subject line if email 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 Section, 100 F Street, NE, Washington, DC 20549-1090. Copies of the filing will also be available for inspection and copying at the IEX's principal office and on its Internet website at [www.iextrading.com](http://www.iextrading.com). 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>

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

## Exhibit 5 – Text of Proposed Rule Change

Proposed new language is underlined; proposed deletions are in brackets.

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## Rule 11.190. Orders and Modifiers

(a) through (f) No change

(g) Quote Stability. The Exchange utilizes real time relative quoting activity of Protected Quotations 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. References in this Rule to “Protected Quotations”, “Protected NBB”, “Protected NBO” and “Protected NBBO” herein [do not include quotations of the Exchange] include quotations from the following exchanges: XNYS, ARCX, XNGS, XBOS, BATS, BATY, EDGX, EDGA.

(1) Crumbling Quote. When the System determines 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. Quote instability or a crumbling quote is determined by the System when [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 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

the quote instability factor result from the quote stability calculation is greater than the defined quote instability threshold.]

(A[D]) T[t]he 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:

$$\frac{1/(1 + e^{-(C_0 + C_1 * N + C_2 * F + C_3 * N_{-1} + C_4 * F_{-1} + C_5 * E + C_6 * D)})}{1/(1 + e^{-(C_0 + C_1 * N + C_2 * F + C_3 * NC_{-1} + C_4 * FC_{-1} + C_5 * EPos + C_6 * ENeg + C_7 * EPosPrev + C_8 * ENegPrev + C_9 * Delta)})}$$

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

(1)  $C_0 = [-1.3493] \underline{-1.2867}$

(2)  $C_1 = [-1.1409] \underline{-0.7030}$

(3)  $C_2 = [0.2671] \underline{0.0143}$

(4)  $C_3 = [0.5141] \underline{-0.2170}$

(5)  $C_4 = [-0.1970] \underline{0.1526}$

(6)  $C_5 = [0.1347] \underline{-0.4771}$

(7)  $C_6 = [0.6862] \underline{0.8703}$

(8)  $C_7 = \underline{0.1830}$

(9)  $C_8 = \underline{0.5122}$

(10)  $C_9 = \underline{0.4645}$

(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)  $N_{-1}$  = 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.]

(3)  $NC$  = the number of Protected Quotations on the near side of the market minus the maximum number of Protected Quotations on the near side at any point since one (1) millisecond ago or the most recent PBBO change, whichever happened more recently.

(4)  $FC$  = the number of Protected Quotations on the far side of the market minus the minimum number of Protected Quotations on the far side at any point since one (1) millisecond ago or the most recent PBBO change, whichever happened more recently.

(5)  $E_{Pos}$  = a Boolean indicator that equals 1 if the most recent quotation update was a quotation of a protected market joining the near side of the market at the same price.

(6)  $E_{Neg}$  = a Boolean indicator that equals 1 if the most recent quotation update was a quotation of a protected market moving away from the near side of market that was previously at the same price.

- (7) EPosPrev = a Boolean indicator that equals 1 if the second most recent quotation update was a quotation of a protected market joining the near side of the market at the same price AND the second most recent quotation update occurred since one (1) millisecond ago or the most recent PBBO change, whichever happened more recently.
- (8) ENegPrev = a Boolean indicator that equals 1 if the second most recent quotation update was a quotation of a protected market moving away from the near side of market that was previously at the same price AND the second most recent quotation update occurred since one (1) millisecond ago or the most recent PBBO change, whichever happened more recently.
- (9) Delta = 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 were at the same price at any point since one (1) millisecond ago or the most recent PBBO change, whichever happened more recently: XNGS, EDGX, BATS.
- (ii) Quote Instability Threshold. The Exchange utilizes a quote instability threshold of [0.6] 0.39 for securities whose current spread is less than or equal to \$0.01; 0.45 for securities for which the current spread (i.e., the Protected Best Offer minus Protected Best Bid) is greater than \$0.01 and less than or equal to \$0.02; 0.51 for securities for which the current spread is greater than \$0.02 and less than or equal to \$0.03; and 0.39 for securities for which the current spread is greater than \$0.03.
- (iii) 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.

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