

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. 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-NYSEArca-2019-30 and should be submitted on or before June 5, 2019.

For the Commission, by the Division of Trading and Markets, pursuant to delegated authority.⁹

Eduardo A. Aleman,
Deputy Secretary.

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SECURITIES AND EXCHANGE COMMISSION

[Release No. 34-85811; File No. SR-BX-2019-011]

Self-Regulatory Organizations; Nasdaq BX, Inc.; Notice of Filing of Proposed Rule Change To Make Permanent the Pilot Program for the Exchange's Retail Price Improvement Program, Which Is Set To Expire on June 30, 2019

May 9, 2019.

Pursuant to Section 19(b)(1) of the Securities Exchange Act of 1934 ("Act"),¹ and Rule 19b-4 thereunder,² notice is hereby given that on April 26, 2019 Nasdaq BX, Inc. ("BX" or "Exchange") filed with the Securities and Exchange Commission ("SEC" or "Commission") the proposed rule change as described in Items I, II, and III below, which Items have been prepared by the Exchange. 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

The Exchange proposes to make permanent the pilot program for the Exchange's Retail Price Improvement ("RPI") Program (the "Program" or "BX RPI Program"), which is set to expire the earlier of approval of the filing to make this rule permanent or June 30, 2019.

The text of the proposed rule change is available on the Exchange's website at <http://nasdaqbx.cchwallstreet.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 Exchange 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 statements may be examined at the places specified in Item IV below. The Exchange 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

The Exchange proposes to make permanent the Exchange's pilot RPI Program,³ currently scheduled to expire the earlier of approval of the filing to make this rule permanent or June 30, 2019.

Background

In November 2014, the Commission approved the RPI Program on a pilot basis.⁴ The Program is designed to

³ Securities Exchange Act Release No. 73702 (November 28, 2014), 79 FR 72049 (December 4, 2014) (SR-BX-2014-048) ("RPI Approval Order"). In addition to approving the RPI Program on a pilot basis, the Commission granted the Exchange's request for exemptive relief from Rule 612 of Regulation NMS, 17 CFR 242.612 ("Sub-Penny Rule"), which among other things prohibits a national securities exchange from accepting or ranking orders priced greater than \$1.00 per share in an increment smaller than \$0.01. See *id.* As part of this filing, and pursuant to the Exchange's separate written request, the Exchange also requests that the exemptive relief from the Sub-Penny Rule be made permanent. See Letter from Jeffrey S. Davis, Vice President and Deputy General Counsel, Nasdaq BX, Inc. to Eduardo A. Aleman, Deputy Secretary, Securities and Exchange Commission dated April 26, 2019.

⁴ See *id.*

attract retail order flow to the Exchange, and allow such order flow to receive potential price improvement. The Program is currently limited to trades occurring at prices equal to or greater than \$1.00 per share. Under the Program, a class of market participant called a Retail Member Organization ("RMO") is eligible to submit certain retail order flow ("Retail Orders")⁵ to the Exchange. BX members ("Members") are permitted to provide potential price improvement for Retail Orders in the form of non-displayed interest that is priced more aggressively than the Protected National Best Bid or Offer ("Protected NBBO").⁶

The Program was approved by the Commission on a pilot basis running one-year from the date of implementation.⁷ The Commission approved the Program on November 28, 2014.⁸ The Exchange implemented the Program on December 1, 2014 and the pilot has since been extended for a one-year period twice, as well as for a six-month period twice, with it now scheduled to expire the earlier of approval of the filing to make this rule permanent or June 30, 2019.⁹

Specifically, BX Rule 4780 will be amended to delete 4780(h) that says the Program is a pilot and that it is scheduled to expire the earlier of

⁵ A "Retail Order" is defined in BX Rule 4780(a)(2) by referencing BX Rule 4702, and BX Rule 4702(b)(6) says it is an order type with a non-display order attribute submitted to the Exchange by an RMO. A Retail Order must be an agency order, or riskless principal order that satisfies the criteria of FINRA Rule 5320.03. The Retail Order must reflect trading interest of a natural person with no change made to the terms of the underlying order of the natural person with respect to price (except in the case of a market order that is changed to a marketable limit order) or side of market and that does not originate from a trading algorithm or any other computerized methodology.

⁶ The term Protected Quotation is defined in Chapter XII, Sec. 1(19) and has the same meaning as is set forth in Regulation NMS Rule 600(b)(5)(8). The Protected NBBO is the best-priced protected bid and offer. Generally, the Protected NBBO and the national best bid and offer ("NBBO") will be the same. However, a market center is not required to route to the NBBO if that market center is subject to an exception under Regulation NMS Rule 611(b)(1) or if such NBBO is otherwise not available for an automatic execution. In such case, the Protected NBBO would be the best-priced protected bid or offer to which a market center must route interest pursuant to Regulation NMS Rule 611.

⁷ See RPI Approval Order, *supra* note 3 at 72053.

⁸ *Id.* at 72049.

⁹ See Securities Exchange Act Release No. 76490 (November 20, 2015), 80 FR 74165 (November 27, 2015) (SR-BX-2015-073); Securities Exchange Act Release No. 79446 (December 1, 2016), 81 FR 88290 (December 7, 2016) (SR-BX-2016-065); Securities Exchange Act Release No. 82192 (December 1, 2017), 82 FR 57809 (December 7, 2017) (SR-BX-2017-055); Securities Exchange Act Release No. 83539 (June 28, 2018), 83 FR 31203 (July 3, 2018) (SR-BX-2018-026); and Securities Exchange Act Release No. 84847 (Dec. 18, 2018), 83 FR 66326 (Dec. 26, 2018) (SR-BX-2018-063).

⁹ 17 CFR 200.30-3(a)(12).

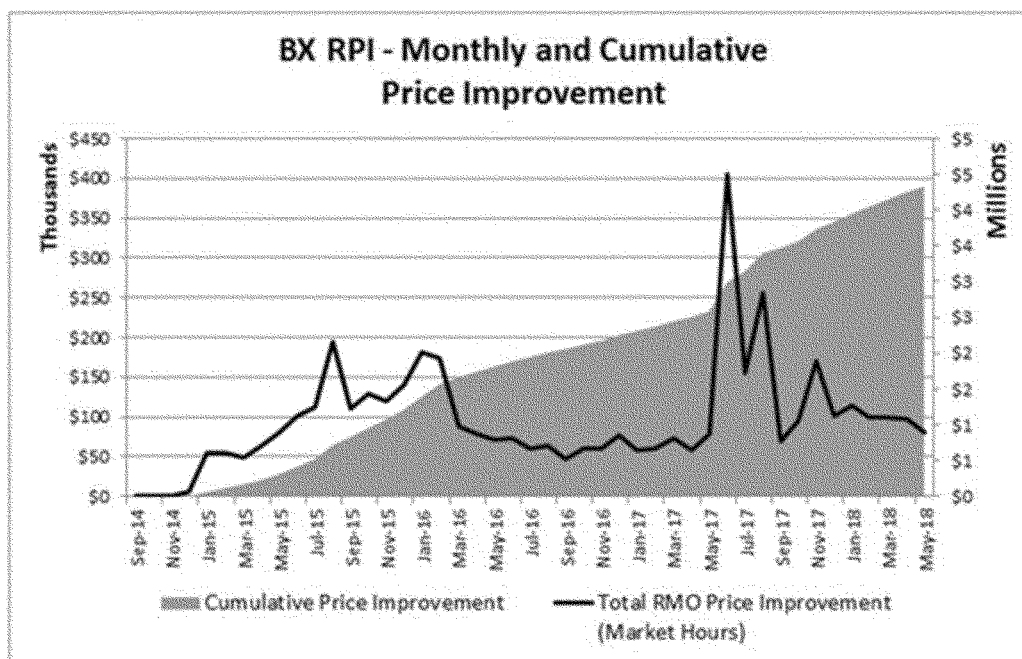
¹ 15 U.S.C. 78s(b)(1).

² 17 CFR 240.19b-4.

approval of the filing to make this rule permanent or June 30, 2019. [sic] BX Rule 4780(g) will be amended to include at the end of the subsection that the Program will be limited to securities whose Bid Price on the Exchange is greater than or equal to \$1.00 per share. [sic]¹⁰

The SEC approved the Program pilot, in part, because it concluded, “the Program is reasonably designed to benefit retail investors by providing price improvement to retail order flow.”¹¹ The Commission also found that “while the Program would treat retail order flow differently from order flow submitted by other market

participants, such segmentation would not be inconsistent with Section 6(b)(5) of the Act, which requires that the rules of an exchange are not designed to permit unfair discrimination.”¹² As the SEC acknowledged, the retail order segmentation was designed to create greater retail order flow competition and thereby increase



the amount of this flow to transparent and well-regulated exchanges. This would help to ensure that retail investors benefit from competitive price improvement that exchange-based liquidity providers provide.

As discussed below, the Exchange believes that the Program supports these conclusions. The Program does not harm retail investors. In fact, so far it has provided price improvement of more than \$4 million since inception to retail investors that they may not otherwise have received. As a result, the Exchange believes that it is therefore appropriate to make the pilot Program permanent.

Definitions

The Exchange adopted the following definitions under BX Rule 4780. First, the term “Retail Member Organization” (or “RMO”) is defined as a Member (or a division thereof) that has been approved by the Exchange to submit Retail Orders.

Second, the term “Retail Order” is defined by BX Rule 4702(b)(6)(A) as an order type with a non-display order attribute submitted to the Exchange by an RMO. A Retail Order must be an agency Order, or riskless principal Order that satisfies the criteria of FINRA Rule 5320.03. The Retail Order must reflect trading interest of a natural person with no change made to the terms of the underlying order of the natural person with respect to price (except in the case of a market order that is changed to a marketable limit order) or side of market and that does not originate from a trading algorithm or any other computerized methodology.¹³

The criteria set forth in FINRA Rule 5320.03 adds additional precision to the definition of “Retail Order” by clarifying that an RMO may enter Retail Orders on a riskless principal basis, provided that (i) the entry of such riskless principal orders meet the requirements of FINRA Rule 5320.03,

including that the RMO maintains supervisory systems to reconstruct, in a time-sequenced manner, all Retail Orders that are entered on a riskless principal basis; and (ii) the RMO submits a report, contemporaneously with the execution of the facilitated order, that identifies the trade as riskless principal.

The term “Retail Price Improving Order” or “RPI Order” or collectively “RPI interest” is defined as an Order Type with a Non-Display Order Attribute that is held on the Exchange Book in order to provide liquidity at a price at least \$0.001 better than the NBBO through a special execution process described in Rule 4780. An RPI Order may be entered in price increments of \$0.001. An RPI Order will be posted to the Exchange Book regardless of its price, but an RPI Order may execute only against a Retail Order, and only if its price is at least \$0.001 better than the NBBO.¹⁴ RPI orders can

¹⁰ The Commission notes that the Exchange is not proposing to delete Rule 4780(h) in its entirety. Under the proposed rule change, Rule 4780(h) will state, “The Program will be limited to securities whose Bid Price on the Exchange is greater than or

equal to \$1.00 per share.” Rule 4780(g) will remain unchanged under the proposed rule change.

¹¹ See RPI Approval Order, *supra* note 3 at 72051.

¹² *Id.*

¹³ See *supra* note 5.

¹⁴ Exchange systems prevent Retail Orders from interacting with RPI Orders if the RPI Order is not priced at least \$0.001 better than the Protected

be priced either as an explicitly priced limit order or implicitly priced as relative to the NBBO with an offset of at least \$0.001.

The price of an RPI Order with an offset is determined by a Member's entry of the following into the Exchange: (1) RPI buy or sell interest; (2) an offset from the Protected NBBO, if any; and (3) a ceiling or floor price. RPI Orders submitted with an offset are similar to other peg orders available to Members in that the order is tied or "pegged" to a certain price, and would have its price automatically set and adjusted upon changes in the Protected NBBO, both upon entry and any time thereafter. RPI sell or buy interest typically are entered to track the Protected NBBO, that is, RPI Orders typically are submitted with an offset. The offset is a predetermined amount by which the Member is willing to improve the Protected NBBO, subject to a ceiling or floor price. The ceiling or floor price is the amount above or below which the Member does not wish to trade. RPI Orders in their entirety (the buy or sell interest, the offset, and the ceiling or floor) will remain non-displayed. The Exchange also allows Members to enter RPI Orders that establish the exact limit price, which is similar to a non-displayed limit order currently accepted by the Exchange except the Exchange accepts sub-penny limit prices on RPI Orders in increments of \$0.001. The Exchange monitors whether RPI buy or sell interest, adjusted by any offset and subject to the ceiling or floor price, is eligible to interact with incoming Retail Orders.

Members and RMOs may enter odd lots, round lots or mixed lots as RPI Orders and as Retail Orders respectively. As discussed below, RPI Orders are ranked and allocated according to price and time of entry into the BX trading system ("System") consistent with BX Rule 4757 and therefore without regard to whether the size entered is an odd lot, round lot or mixed lot amount. Similarly, Retail Orders interact with RPI Orders and other price-improving orders available on the Exchange (e.g., non-displayed liquidity priced more aggressively than the NBBO)¹⁵ according to the Priority

NBBO. The Exchange notes, however, that price improvement of \$0.001 would be a minimum requirement and Members can enter RPI Orders that better the Protected NBBO by more than \$0.001. Exchange systems accept RPI Orders without a minimum price improvement value; however, such interest execute at its floor or ceiling price only if such floor or ceiling price is better than the Protected NBBO by \$0.001 or more.

¹⁵ Other price improving liquidity may include, but is not limited to: Booked non-displayed orders with a limit price that is more aggressive than the

and Allocation rules of the Program and without regard to whether they are odd lots, round lots or mixed lots. Finally, Retail Orders are designated as Type 1 or Type 2 without regard to the size of the order.

RPI Orders interact with Retail Orders as follows. Assume a Member enters RPI sell interest with an offset of \$0.001 and a floor of \$10.10 while the Protected NBO is \$10.11. The RPI Order could interact with an incoming buy Retail Order at \$10.109. If, however, the Protected NBO was \$10.10, the RPI Order could not interact with the Retail Order because the price required to deliver the minimum \$0.001 price improvement (\$10.099) would violate the Member's floor of \$10.10. If a Member otherwise enters an offset greater than the minimum required price improvement and the offset would produce a price that would violate the Member's floor, the offset would be applied only to the extent that it respects the Member's floor. By way of illustration, assume RPI buy interest is entered with an offset of \$0.005 and a ceiling of \$10.112 while the Protected NBBO is at \$10.11. The RPI Order could interact with an incoming sell Retail Order at \$10.112, because it would produce the required price improvement without violating the Member's ceiling, but it could not interact above the \$10.112 ceiling. Finally, if a Member enters an RPI Order without an offset (i.e., an explicitly priced limit order), the RPI Order will interact with Retail Orders at the level of the Member's limit price as long as the minimum required price improvement is produced. Accordingly, if RPI sell interest is entered with a limit price of \$10.098 and no offset while the Protected NBBO is \$10.11, the RPI Order could interact with the Retail Order at \$10.098, producing \$0.012 of price improvement. The System will not cancel RPI interest when it is not eligible to interact with incoming Retail Orders; such RPI interest will remain in the System and may become eligible again to interact with Retail Orders depending on the Protected NBBO. RPI Orders are not accepted during halts.

then-current NBBO; midpoint-pegged orders (which are by definition non-displayed and priced more aggressively than the NBBO); non-displayed orders pegged to the NBBO with an aggressive offset, as defined in BX Rule 4780(a)(4) as Other Price Improving Contra-Side Interest. Orders that do not constitute other price improving liquidity include, but are not limited to: Orders with a time-in-force instruction of IOC; displayed orders; limit orders priced less aggressively than the NBBO.

RMO Qualifications and Approval Process

Under BX Rule 4780(b), any Member may qualify as an RMO if it conducts a retail business or routes retail orders on behalf of another broker-dealer. For purposes of BX Rule 4780, conducting a retail business shall include carrying retail customer accounts on a fully disclosed basis. Any Member that wishes to obtain RMO status is required to submit: (i) an application form; (ii) supporting documentation sufficient to demonstrate the retail nature and characteristics of the applicant's order flow¹⁶ and (iii) an attestation, in a form prescribed by the Exchange, that substantially all orders submitted by the Member as a Retail Order would meet the qualifications for such orders under proposed BX Rule 4780(b). The Exchange shall notify the applicant of its decision in writing.

An RMO is required to have written policies and procedures reasonably designed to assure that it will only designate orders as Retail Orders if all requirements of a Retail Order are met. Such written policies and procedures must require the Member to (i) exercise due diligence before entering a Retail Order to assure that entry as a Retail Order is in compliance with the requirements of this rule, and (ii) monitor whether orders entered as Retail Orders meet the applicable requirements. If the RMO represents Retail Orders from another broker-dealer customer, the RMO's supervisory procedures must be reasonably designed to assure that the orders it receives from such broker-dealer customer that it designates as Retail Orders meet the definition of a Retail Order. The RMO must (i) obtain an annual written representation, in a form acceptable to the Exchange, from each broker-dealer customer that sends it orders to be designated as Retail Orders that entry of such orders as Retail Orders will be in compliance with the requirements of this rule, and (ii) monitor whether its broker-dealer customers' Retail Order flow continues to meet the applicable requirements.¹⁷

¹⁶ For example, a prospective RMO could be required to provide sample marketing literature, website screenshots, other publicly disclosed materials describing the retail nature of their order flow, and such other documentation and information as the Exchange may require to obtain reasonable assurance that the applicant's order flow would meet the requirements of the Retail Order definition.

¹⁷ The Exchange or another self-regulatory organization on behalf of the Exchange will review an RMO's compliance with these requirements through an exam based review of the RMO's internal controls.

If the Exchange disapproves the application, the Exchange provides a written notice to the Member. The disapproved applicant could appeal the disapproval by the Exchange as provided in proposed BX Rule 4780(d), and/or reapply for RMO status 90 days after the disapproval notice is issued by the Exchange. An RMO also could voluntarily withdraw from such status at any time by giving written notice to the Exchange.

Failure of RMO To Abide by Retail Order Requirements

BX Rule 4780(c) addresses an RMO's failure to abide by Retail Order requirements. If an RMO designates orders submitted to the Exchange as Retail Orders and the Exchange determines, in its sole discretion, that those orders fail to meet any of the requirements of Retail Orders, the Exchange may disqualify a Member from its status as an RMO. When disqualification determinations are made, the Exchange provides a written disqualification notice to the Member. A disqualified RMO may appeal the disqualification as provided in proposed BX Rule 4780(d) and/or reapply for RMO status 90 days after the disqualification notice is issued by the Exchange.

Appeal of Disapproval or Disqualification

BX Rule 4780(d) provides appeal rights to Members. If a Member disputes the Exchange's decision to disapprove it as an RMO under BX Rule 4780(b) or disqualify it under BX Rule 4780(c), such Member ("appellant") may request, within five business days after notice of the decision is issued by the Exchange, that the Retail Price Improvement Program Panel ("RPI Panel") review the decision to determine if it was correct.

The RPI Panel consists of the Exchange's Chief Regulatory Officer ("CRO"), or a designee of the CRO, and two officers of the Exchange designated by the Chief Executive Officer of BX. The RPI Panel reviews the facts and render a decision within the time frame prescribed by the Exchange. The RPI Panel may overturn or modify an action taken by the Exchange and all determinations by the RPI Panel constitute final action by the Exchange on the matter at issue.

Retail Liquidity Identifier

Under BX Rule 4780(e), the Exchange disseminates an identifier when RPI interest priced at least \$0.001 better than the Exchange's Protected Bid or Protected Offer for a particular security

is available in the System ("Retail Liquidity Identifier"). The Retail Liquidity Identifier is disseminated through consolidated data streams (*i.e.*, pursuant to the Consolidated Tape Association Plan/Consolidated Quotation System, or CTA/CQS, for Tape A and Tape B securities, and The Nasdaq Stock Market, LLC ("Nasdaq") UTP Plan for Tape C securities) as well as through proprietary Exchange data feeds.¹⁸ The Retail Liquidity Identifier reflects the symbol and the side (buy or sell) of the RPI interest, but does not include the price or size of the RPI interest. In particular, CQS and UTP quoting outputs include a field for codes related to the Retail Liquidity Identifier. The codes indicate RPI interest that is priced better than the Exchange's Protected Bid or Protected Offer by at least the minimum level of price improvement as required by the Program.

Retail Order Designations

Under BX Rule 4780(f), an RMO can designate how a Retail Order interacts with available contra-side interest as provided in Rule 4702.

A Type 1-designated Retail Order will attempt to execute against RPI Orders and any other orders on the Exchange Book with a price that is (i) equal to or better than the price of the Type-1 Retail Order and (ii) at least \$0.001 better than the NBBO. A Type-1 Retail Order is not routable and will thereafter be cancelled.

A Type 2-designated Retail Order will first attempt to execute against RPI Orders and any other orders on the Exchange Book with a price that is (i) equal to or better than the price of the Type-2 Retail Order and (ii) at least \$0.001 better than the NBBO and will then attempt to execute against any other order on the Exchange Book with a price that is equal to or better than the price of the Type-2 Retail Order, unless such executions would trade through a Protected Quotation. A Type-2 Retail Order may be designated as routable.

Priority and Order Allocation

Under BX Rule 4780(g), competing RPI Orders in the same security are ranked and allocated according to price then time of entry into the System. Executions occur in price/time priority in accordance with BX Rule 4757. Any

remaining unexecuted RPI interest remain available to interact with other incoming Retail Orders if such interest is at an eligible price. Any remaining unexecuted portion of the Retail Order will cancel or execute in accordance with BX Rule 4780(f). The following example illustrates this method:

- Protected NBBO for security ABC is \$10.00–\$10.05
- Member 1 enters an RPI Order to buy ABC at \$10.015 for 500
- Member 2 then enters an RPI Order to buy ABC at \$10.02 for 500
- Member 3 then enters an RPI Order to buy ABC at \$10.035 for 500

An incoming Retail Order to sell 1,000 shares of ABC for \$10.00 executes first against Member 3's bid for 500 at \$10.035, because it is the best-priced bid, then against Member 2's bid for 500 at \$10.02, because it is the next best-priced bid. Member 1 is not filled because the entire size of the Retail Order to sell 1,000 is depleted. The Retail Order executes against RPI Orders in price/time priority.

However, assume the same facts above, except that Member 2's RPI Order to buy ABC at \$10.02 is for 100. The incoming Retail Order to sell 1,000 executes first against Member 3's bid for 500 at \$10.035, because it is the best-priced bid, then against Member 2's bid for 100 at \$10.02, because it is the next best-priced bid. Member 1 then receives an execution for 400 of its bid for 500 at \$10.015, at which point the entire size of the Retail Order to sell 1,000 is depleted.

As a final example, assume the same facts as above, except that Member 3's order was not an RPI Order to buy ABC at \$10.035, but rather, a non-displayed order to buy ABC at \$10.03. The result would be similar to the result immediately above, in that the incoming Retail Order to sell 1,000 executes first against Member 3's bid for 500 at \$10.03, because it is the best-priced bid, then against Member 2's bid for 100 at \$10.02, because it is the next best priced bid. Member 1 then receives an execution for 400 of its bid for 500 at \$10.015, at which point the entire size of the Retail Order to sell 1,000 is depleted.

All Regulation NMS securities traded on the Exchange are eligible for inclusion in the RPI Program. The Exchange limits the Program to trades occurring at prices equal to or greater than \$1.00 per share. Toward that end, Exchange trade validation systems prevent the interaction of RPI buy or sell interest (adjusted by any offset) and Retail Orders at a price below \$1.00 per

¹⁸ The Exchange notes that the Retail Liquidity Identifier for Tape A and Tape B securities are disseminated pursuant to the CTA/CQS Plan. The identifier is also available through the consolidated public market data stream for Tape C securities. The processor for the Nasdaq UTP quotation stream disseminates the Retail Liquidity Identifier and analogous identifiers from other market centers that operate programs similar to the RPI Program.

share.¹⁹ For example, if there is RPI buy interest tracking the Protected NBB at \$0.99 with an offset of \$0.001 and a ceiling of \$1.02, Exchange trade validation systems would prevent the execution of the RPI Order at \$0.991 with a sell Retail Order with a limit of \$0.99. However, if the Retail Order was Type 2 as defined the Program,²⁰ it would be able to interact at \$0.99 with liquidity outside the Program in the Exchange's order book. In addition to facilitating an orderly²¹ and operationally intuitive program, the Exchange believes that limiting the Program to trades equal to or greater than \$1.00 per share enabled it better to focus its efforts to monitor price competition and to assess any indications that data disseminated under the Program is potentially disadvantaging retail orders. As part of that review, the Exchange produced data throughout the pilot, which included statistics about participation, the frequency and level of price improvement provided by the Program, and any effects on the broader market structure.

Rationale for Making the Program Pilot Permanent

The Exchange established the RPI Program in an attempt to attract retail order flow to the Exchange by providing an opportunity price improvement to such order flow. The Exchange believes that the Program promotes transparent

competition for retail order flow by allowing Exchange members to submit RPI Orders²² to interact with Retail Orders. BX also believes that such competition promotes efficiency by facilitating the price discovery process and generating additional investor interest in trading securities, thereby promoting capital formation and retail investment opportunities. The Program will continue to be limited to trades occurring at prices equal to or greater than \$1.00 per share.

The Exchange believes, in accordance with its filing establishing the pilot Program, which BX did "produce data throughout the pilot, which will include statistics about participation, the frequency and level of price improvement provided by the Program, and any effects on the broader market structure."²³ The Exchange has fulfilled this obligation through the reports and assessments it has submitted to the Commission since the implementation of the pilot Program.

The SEC stated in the RPI Approval Order that the Program could promote competition for retail order flow among execution venues, and that this could benefit retail investors by creating additional well-regulated and transparent price improvement opportunities for marketable retail order flow, most of which is currently executed in the Over-the-Counter ("OTC") markets without ever reaching a public exchange.²⁴ The Exchange

believes that the Program does not harm retail investors and so far has provided price improvement of more than \$4 million since inception to retail investors that they may not otherwise have received. The data demonstrates that the Program has continued to grow over time and the Exchange has not detected any negative impact to market quality. The Exchange also has not received any complaints or negative feedback concerning the Program.

As seen in the table below, RMO orders and shares executed have continued to rise since the introduction of the Program in December 2014. RMO executed share volume on BX accounted for 0.05% of total consolidated volume in eligible U.S. listed securities in Q4 2017. Despite its size relative to total consolidated trading, however, the Program has continued to provide some price improvement to RMO orders each month with total price improvement during market hours from the start of the Program through May 2018 totaling over \$4.3 million.

Retail orders are routed by sophisticated brokers using systems that seek the highest fill rates and amounts of price improvement. These brokers have many choices of execution venues for retail orders. When they choose to route to the Program, they have determined that it is the best opportunity for fill rate and price improvement at that time.

Month	Total RMO orders (market hours)	RMO shares executed (market hours)	Total RMO price improvement (market hours)
Sep-14	0	0	\$0
Oct-14	0	0	0
Nov-14	0	0	0
Dec-14	4,003	521,587	6,572
Jan-15	66,903	9,723,791	55,480
Feb-15	71,204	12,948,664	54,769
Mar-15	62,216	10,818,042	49,232
Apr-15	75,558	12,121,577	63,247
May-15	98,859	16,723,281	81,268
Jun-15	116,570	20,341,305	100,520
Jul-15	133,917	22,310,364	111,657
Aug-15	192,546	30,011,636	194,706
Sep-15	141,496	23,199,937	110,415
Oct-15	148,414	25,745,772	128,838
Nov-15	123,267	20,788,967	120,037
Dec-15	145,022	24,414,783	140,444

¹⁹ As discussed above, the price of an RPI is determined by a Member's entry of buy or sell interest, an offset (if any) and a ceiling or floor price. RPI sell or buy interest typically tracks the Protected NBBO.

²⁰ Type 2 Retail Orders are treated as IOC orders that execute against displayed and non-displayed liquidity in the Exchange's order book where there is no available liquidity in the Program. Type 2 Retail Orders can either be designated as eligible for routing or as non-routable, as described above.

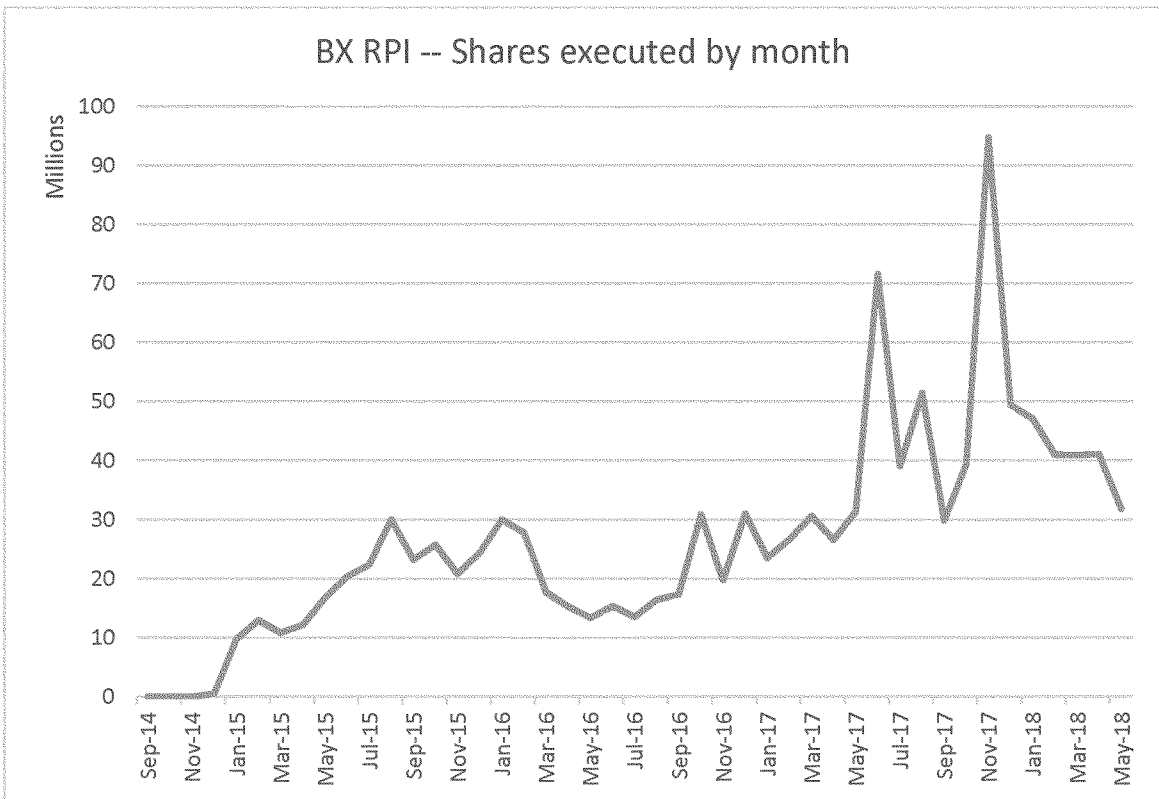
²¹ Given the proposed limitation, the Program would have no impact on the minimum pricing increment for orders priced less than \$1.00 and therefore no effect on the potential of markets executing those orders to lock or cross. In addition, the non-displayed nature of the liquidity in the Program simply has no potential to disrupt displayed, protected quotes. In any event, the Program would do nothing to change the obligation of exchanges to avoid and reconcile locked and crossed markets under NMS Rule 610(d).

²² A Retail Price Improvement Order is defined in BX Rule 4780(a)(3) by referencing BX Rule 4702 and BX Rule 4702(b)(5) says that it is as an order type with a non-display order attribute that is held on the Exchange Book in order to provide liquidity at a price at least \$0.001 better than the NBBO through a special execution process described in Rule 4780.

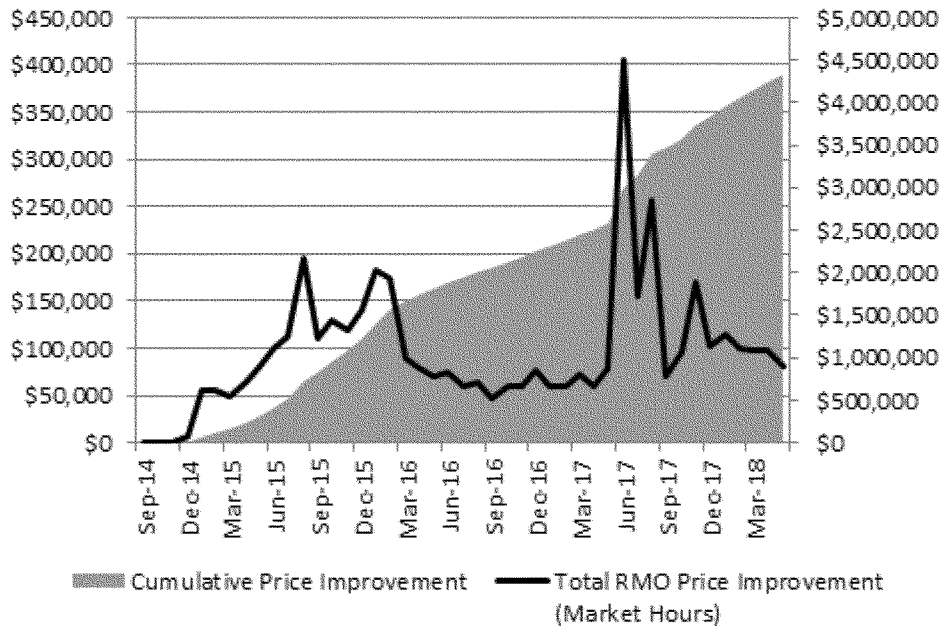
²³ See Securities Exchange Act Release No. 73410 (October 23, 2014), 79 FR 64447 at 64450 (SR-BX-2014-048).

²⁴ RPI Approval Order, 79 FR at 72053.

Month	Total RMO orders (market hours)	RMO shares executed (market hours)	Total RMO price improvement (market hours)
Jan-16	162,025	30,010,815	181,781
Feb-16	135,409	27,794,644	173,988
Mar-16	93,729	17,688,230	88,900
Apr-16	82,819	15,269,513	78,241
May-16	70,192	13,336,738	71,145
Jun-16	76,092	15,356,152	74,035
Jul-16	65,121	13,532,803	59,305
Aug-16	78,611	16,412,113	64,231
Sep-16	84,240	17,368,907	46,792
Oct-16	146,207	30,827,361	60,624
Nov-16	103,046	19,744,407	60,391
Dec-16	168,638	31,003,843	76,025
Jan-17	140,203	23,474,999	58,887
Feb-17	139,447	26,643,083	59,372
Mar-17	161,154	30,595,963	73,250
Apr-17	126,665	26,587,486	59,141
May-17	143,927	31,368,371	78,979
Jun-17	332,266	71,569,426	405,933
Jul-17	210,309	39,061,892	155,669
Aug-17	266,762	51,442,492	255,999
Sep-17	154,846	29,831,646	69,634
Oct-17	205,399	39,409,251	95,051
Nov-17	370,064	94,703,209	169,738
Dec-17	219,528	49,424,240	102,082
Jan-18	248,419	47,080,453	113,956
Feb-18	263,576	40,979,066	100,148
Mar-18	597,460	40,896,277	98,779
Apr-18	1,095,396	41,067,806	97,015
May-18	1,031,527	31,843,167	81,199
Total	8,353,052	1,193,994,059	4,327,477



Monthly and Cumulative Price Improvement



The table below shows that between April 2017 and May 2018, roughly 50% of RMO orders were for 100 shares or less and around 70% of orders were for 300 shares or less. Larger orders of 7,500 shares or more accounted for

approximately 2%, ranging from 0.62% to 3.09%. Although large order were a small percentage of total orders, they make up a significant portion of total shares ordered, ranging from 21.11% to 46.22%. Orders of 300 shares or less,

which accounted for the vast majority of total RMO orders, accounted for only between 4.81% and 15.38% of total shares ordered.

DISTRIBUTION OF RMO ORDERS BY ORDER SIZE

Month	<=100 (percent)	101-300 (percent)	301-500 (percent)	501-1,000 (percent)	1,001-2,000 (percent)	2,001-4,000 (percent)	4,001-7,500 (percent)	7,500-15,000 (percent)	>15,000 (percent)
Apr-17	49.50	18.53	8.67	9.47	5.69	3.84	2.24	1.38	0.69
May-17	46.55	23.79	8.25	8.42	5.26	3.71	2.12	1.29	0.62
Jun-17	59.60	13.26	6.62	7.91	4.75	3.48	2.36	1.52	0.51
Jul-17	57.30	14.61	7.32	8.50	5.17	3.28	2.00	1.19	0.65
Aug-17	56.38	15.19	7.54	8.49	5.23	3.41	1.91	1.22	0.63
Sep-17	53.16	16.29	7.69	8.79	5.71	4.05	2.22	1.38	0.70
Oct-17	54.28	16.00	7.46	8.65	5.64	3.84	2.15	1.33	0.66
Nov-17	47.76	15.30	8.19	10.23	7.38	5.10	2.95	2.04	1.06
Dec-17	48.66	15.30	8.27	10.34	6.99	4.82	2.79	1.87	0.98
Jan-18	53.60	14.93	7.73	9.20	5.98	4.04	2.28	1.53	0.71
Feb-18	58.44	14.58	7.14	8.02	4.93	3.29	1.91	1.14	0.55
Mar-18	55.29	17.97	8.63	8.38	5.12	2.64	1.07	0.61	0.28
Apr-18	54.52	19.12	9.04	8.31	5.02	2.50	0.87	0.42	0.19
May-18	50.44	20.21	9.89	9.10	5.77	2.88	0.96	0.50	0.26

DISTRIBUTION OF RMO SHARES ORDERED BY ORDER SIZE

Month	<=100 (percent)	101-300 (percent)	301-500 (percent)	501-1,000 (percent)	1,001-2,000 (percent)	2,001-4,000 (percent)	4,001-7,500 (percent)	7,500-15,000 (percent)	>15,000 (percent)
Apr-17	3.04	4.63	4.42	8.78	10.06	12.89	13.89	16.06	26.23
May-17	3.28	6.49	4.49	8.34	9.98	13.38	14.28	16.05	23.71
Jun-17	2.47	3.78	3.95	8.89	10.15	13.74	17.06	20.07	19.88
Jul-17	2.82	4.20	4.36	9.31	10.78	12.94	14.44	16.47	24.67
Aug-17	2.80	4.28	4.42	9.21	10.84	13.21	13.55	16.63	25.08
Sep-17	2.88	4.16	3.98	8.36	10.50	14.04	14.17	16.78	25.14
Oct-17	2.89	4.31	4.09	8.73	11.02	14.04	14.49	17.11	23.32
Nov-17	1.80	3.01	3.26	7.48	10.45	13.51	14.27	18.89	27.33
Dec-17	2.00	3.17	3.48	8.02	10.45	13.46	14.18	18.35	26.91

DISTRIBUTION OF RMO SHARES ORDERED BY ORDER SIZE—Continued

Month	<=100 (percent)	101–300 (percent)	301–500 (percent)	501–1,000 (percent)	1,001–2,000 (percent)	2,001–4,000 (percent)	4,001–7,500 (percent)	7,500–15,000 (percent)	>15,000 (percent)
Jan–18	2.50	3.78	4.01	8.82	11.05	13.94	14.30	18.35	23.26
Feb–18	3.25	4.52	4.52	9.34	11.08	13.87	14.53	16.86	22.02
Mar–18	5.73	6.96	6.80	12.44	14.90	14.65	11.00	12.34	15.17
Apr–18	7.27	8.11	7.84	13.68	16.23	15.46	10.29	9.51	11.61
May–18	6.31	7.54	7.50	13.09	16.40	15.66	10.00	9.80	13.70

DISTRIBUTION OF RMO SHARES EXECUTED BY ORDER SIZE

Month	<=100 (percent)	101–300 (percent)	301–500 (percent)	501–1,000 (percent)	1,001–2,000 (percent)	2,001–4,000 (percent)	4,001–7,500 (percent)	7,500–15,000 (percent)	>15,000 (percent)
Apr–17	11.39	15.32	11.28	16.25	12.77	10.87	9.27	9.25	3.61
May–17	10.86	20.10	10.47	13.77	11.37	10.58	8.96	9.44	4.45
Jun–17	7.65	10.05	8.48	14.31	11.28	11.85	12.00	18.69	5.68
Jul–17	10.07	12.67	10.18	15.57	12.94	11.79	9.97	10.27	6.56
Aug–17	9.93	12.98	10.89	17.05	14.16	11.94	9.38	8.23	5.45
Sep–17	11.36	13.46	10.12	16.01	13.80	13.07	8.60	8.61	4.97
Oct–17	10.83	13.37	10.07	16.40	14.46	12.48	9.47	7.96	4.96
Nov–17	7.04	10.64	10.14	19.81	18.19	13.96	9.04	7.10	4.09
Dec–17	8.25	11.27	10.37	19.49	17.05	13.33	8.82	7.13	4.28
Jan–18	9.93	12.43	10.92	19.37	16.07	12.66	8.49	6.49	3.64
Feb–18	12.63	14.31	11.81	19.45	15.07	11.22	6.81	5.55	3.16
Mar–18	13.92	15.35	11.92	19.14	14.77	10.05	6.35	5.49	3.00
Apr–18	14.81	15.76	11.86	18.35	13.47	10.21	6.75	5.41	3.39
May–18	13.65	15.78	12.38	18.77	13.92	10.57	6.25	5.27	3.40

The table below shows the average and median sizes of RMO removing orders.

AVERAGE AND MEDIAN RMO SIZES

Year	RMO taking order size	
	Avg	Median
Apr–17	863	111
May–17	802	180
Jun–17	743	82
Jul–17	739	100
Aug–17	753	100
Sep–17	841	100
Oct–17	793	100
Nov–17	1,103	150
Dec–17	1,044	132
Jan–18	844	100
Feb–18	690	100
Mar–18	512	100
Apr–18	454	100
May–18	517	100

The data provided by the Exchange describes a valuable service that delivers some price improvement in a transparent and well-regulated environment. The Program represents just a fraction of retail orders, most of which are executed off-exchange by a wide range of order handling services that have considerably more market share and which operate pursuant to different rules and regulatory requirements. BX found no data or received any customer feedback that indicated any negative impact of the

Program on overall market quality or for retail investors.

As discussed herein, the Program is a minor participant in the overall market to price improve marketable retail order flow. As the Exchange has noted, although participation was low, retail investors that participated in the Program received price improvement on their orders, which was one of the stated goals of the Program. The Exchange, therefore, believes that this pilot data supports making the Program permanent.

As discussed more fully below, the reports and assessments provided by the Exchange to the SEC have covered (i) the economic impact of the Program on the entire market; (ii) the economic impact of the Program on execution quality; (iii) whether only eligible participants are accessing Program liquidity; (iv) whether the Program is attracting retail participants; (v) the net benefits of the Program on participants; (vi) the overall success in achieving intended benefits; and (vii) whether the Program can be improved.

1. Economic Impact of the RPI Program on the Entire Market

The following table illustrates the level of volume done through the Program relative to consolidated volume. The columns labeled 'Daily Results' show the distribution of the percentage of RPI to consolidated volume for all stock/date combinations during 2017–2018. Only stock/date

combinations with positive consolidated volume are represented. The table shows that the overwhelming number of stock/date combinations are those in which BX RPI volume was less than 0.01% of consolidated volume. In most of these cases, BX RPI volume was zero. In only a comparative handful of cases does the percentage amount to a substantial portion of the security's volume.

The columns labeled 'Two-Year Aggregate' present results for stocks summed over the entire two-year period (sum of RPI Program volume to sum of consolidated volume). Only stocks listed during the entire two years are represented. Virtually all stocks have RPI volume less than 0.5% of consolidated volume.

Distribution	Daily results		Two-year aggregate	
	Count	Percentage	Count	Percentage
>50%	22	0.0005	0	0.0000
25%–50%	44	0.0011	0	0.0000
10%–25%	368	0.0090	0	0.0000
5%–10%	1,444	0.0355	0	0.0000
1%–5%	25,730	0.6321	0	0.0000
0.75%–1%	11,835	0.2907	4	0.0542
0.50%–0.75%	22,413	0.5506	10	0.1354
0.25%–0.50%	56,130	1.3789	91	1.2321
0.10%–0.25%	111,937	2.7499	559	7.5684
0.05%–0.10%	105,651	2.5955	951	12.8757
0.01%–0.05%	220,649	5.4206	3,181	43.0680
<0.01%	3,514,320	86.3354	2,590	35.0663

Difference in Difference Analysis

The aim of this analysis was to compare the values of a set of general market metrics prior to the December 2014 introduction of the Program to those prevailing after. The Exchange follows what is commonly termed the 'difference-in-difference' approach ("DnD"). A DnD analysis involves identifying a group of subjects (stocks in this case) that receive a given 'treatment.' In this case, the 'treatment' is the introduction of the BX RPI Program. The Exchange would then observe the change (difference) in a set of empirical indicia of market quality, before and after Program introduction. The analysis is enhanced by observing the intertemporal change in the same indicia for a set of stocks that *did not* receive the treatment. The non-treated stocks would serve as 'controls.' The impact of the Program could therefore be assessed by comparing the pre/post changes in the treated stocks with those from the control stocks, hence the difference in differences. Observed changes in the control stocks would account for environmental effects, such as changes in general market volatility, that are unrelated to the introduction of the BX RPI Program.

The RPI introduction in December 2014 applied to all stocks traded on BX. Thus, control stocks in the strict sense are not available. The Exchange applies therefore a fallback approach, in which it identifies stocks with relatively high levels of RPI participation and use these as the 'treatment' stocks. Those for

which Program participation was light serve as the 'control' stocks. The approach suffers from the limitation that Program participation is a determined by endogenous choice. It is possible that stocks with high levels of participation are systematically different from those with low participation. That is, the controls may be different from the treated stocks in important ways. With this caveat in mind, it is nevertheless of interest to see differences in outcomes between the two groups of stocks.

While the treatment and control stocks differ substantially in terms of RPI participation, the validity of the DnD analysis is enhanced to the extent that the two groups are otherwise as similar to each other as possible. To achieve this objective, the Exchange first breaks its analysis into two parts: One dealing with active securities, the other with less active securities. The Exchange's set of active securities are those with consolidated average daily volume ("CADV") of 500,000 shares or more both before and after Program introduction. The less active group have CADV between 50,000 and 500,000 shares both before and after Program introduction. Then, within each volume grouping, the Exchange conducts a 'matched pairs' process to identify a smaller set of treatment and control groups that are as close to each other as possible across three dimensions: Consolidated average daily share volume, average price, and average time-weighted quoted NBBO dollar spread. The values of these variables

prior to Program introduction were used.

Data from the pre-treatment period was obtained from trading during the three months of September through November 2014. The Exchange looks at two post-treatment periods. The first is based on trading from January through December 2015. The second is based on trading from the two years from January 2017 through December 2018. Note that December 2014, the month of Program introduction, is not used. Further, the Exchange excluded data from trading days when the Exchange closed early (such as the day after Thanksgiving) from the analysis.

The overall set of four DnD analyses can be represented and hereafter labeled as follows:

CADV	Post-period dates	
	2015	2018
500,000 or more	I	III
Between 50,000 and 500,000.	II	IV

For each of the four DnD analyses, the specific matched-pairs process employed the following steps:

1. Daily averages for a set of variables are computed for each stock (excluding preferred stocks and warrants) listed on Nasdaq or NYSE for the appropriate pre/post time frames. For the 2017–2018 post-period, stocks trading with a nickel tick size pursuant to the Tick Size Pilot were excluded.

2. The initial universe of stocks are identified as having, in the post period, the appropriate CADV, an average share price greater than \$2, positive average daily BX share volume, and being listed during at least 80% of the designated time frame. To exclude stocks that may have experienced stock splits or other extreme price movement, stocks with the 95th and 5th percentile of daily price within the period differed by more than a factor of two were excluded.

3. These stocks are ranked on the percentage of consolidated volume that was done in the Program (in the post period). Selection of the treatment stocks starts with the top 100 stocks in terms of post-introduction RPI Program volume as percentage of consolidated volume for the stock.

4. Pre-period data for the provisional treatment stocks is obtained. During the pre-period, the treatment stocks must also have the appropriate CADV level, an average price greater than \$2, positive BX share volume, listed during the entire pre-period, and not have experienced extreme price movement (measured as described in condition 2 above). This process will generally result in fewer than 100 remaining treatment candidates.

5. The candidate control stocks are selected from those with low RPI Program volume as a percentage of consolidated volume. For the two high-volume analyses (I. and III.), the control stocks were selected from stocks whose RPI volume percentage was less than one-tenth that of the lowest RPI

percentage from the treatment stocks. For the lower-volume analyses (II. and IV.), the control stocks were selected from stocks whose RPI volume percentage was less than one-fifth that of the lowest RPI percentage from the treatment stocks. This change was made to ensure a sufficient number of control stocks.

6. The control stocks must also have similar restrictions to the treatment stocks in both pre- and post-periods: CADV in the appropriate range, price greater than \$2, positive BX volume, sufficient presence, and no extreme price movements during the period.

7. Each treatment stock was compared with each candidate control stock. Using pre-period data, a discrepancy score was computed as:

$$Score = Abs \left(\log \left(\frac{CADV_{Tr}}{CADV_{Cn}} \right) \right) + Abs \left(\log \left(\frac{Price_{Tr}}{Price_{Cn}} \right) \right) + Abs \left(\log \left(\frac{Sprd_{Tr}}{Sprd_{Cn}} \right) \right),$$

where the subscripts *Tr* and *Cn* refer to Treatment and Control values of the indicated variable. In words, the score is the sum of the absolute value of the percentage differences in the indicated values. The lower the score, the closer the match.

8. Each treatment stock was paired with the best possible match, subject to the constraint that a given control stock could be used only once (often termed 'sampling without replacement').

9. Finally, only stock pairs with reasonable discrepancy scores were retained, recognizing the trade-off between quality of the matches and the resulting sample size. For the high-volume/2015 analysis (I.) the discrepancy scores were 1.2 or lower. For the low-volume/2015 analysis (II.), the larger set of control stocks led to an upper bound of 0.6 for the discrepancy score. For both analyses with 2017–18 as the post period (III. and IV.) an upper bound of 2.0 was used, due to a smaller set of potential control stocks.

Once a set of matched pairs was determined for a given analysis, the Exchange computed the DnD result using a standard linear regression framework. A DnD regression model can be expressed as:

$$\gamma_{it} = \alpha + \beta_1 D_{Grp} + \beta_2 D_{Prd} + \beta_3 D_{Grp} \times D_{Prd} + \epsilon_{it}$$

where γ_{it} represents the metric of interest for stock *i* in time period *t* (pre or post). The 'dummy' variables D_{Grp} and D_{Prd} are constructed such that $D_{Grp} = 1$ when stock *i* is a treatment stock, and zero otherwise. Variable D_{Prd} has value = 1 when the observation is from the post period, zero otherwise. The coefficient β_3 of the interaction term represents the

DnD result. Standard regression software provides both the estimated coefficient as well as its standard error and t-statistic. The level of statistical significance can be assessed using the t-statistic.

The Exchange considered eight metrics of interest, all of which were computed during standard 9:30 a.m.–4:00 p.m. (Eastern time) trading hours:

- The time-weighted NBBO quoted spread, measured in dollars;
- The time-weighted NBBO relative (to the bid-ask midpoint) quoted spread, measured in basis points;
- The trade-weighted effective spread of all trades done on BX, measured in dollars;
- The trade-weighted relative effective spread of all trades done on BX, measured in basis points;
- As a measure of short-term volatility, the average high/low range of consolidated trade prices during 5-minute windows. The daily high/low range measure is divided by the VWAP each day to yield a metric measured in percent;
- As another measure of short-term volatility, the average absolute change in consolidated trade-to-trade price changes. The trade-to-trade measure is divided by the VWAP each day to yield a metric measured in percent;
- The average share volume market share of TRF volume, including auctions and all trading hours; and
- The average share volume market share of BX volume, including auctions and all trading hours.

In assessing the results of the DnD analysis, two caveats are worth bearing

in mind. As shown above, BX RPI volume represents a very small fraction of consolidated volume. Further, the Program was introduced at a time when similar exchange-based retail programs were already in place. Among those programs was Nasdaq's retail program, which was discontinued at the time the BX RPI Program was introduced. To a large extent, the BX RPI volume replaced that of Nasdaq.

It is also important to recognize that much, if not most, marketable retail order flow is routed to off-exchange market makers. For example, the Exchange examined Rule 606 disclosures from four prominent retail brokerages: E-Trade, TD Ameritrade, Charles Schwab, and Fidelity. For securities listed on the New York Stock Exchange LLC ("NYSE") in the fourth quarter of 2018, only Fidelity reported routing any market orders to exchanges, and its total exchange percentage was only 2.1%. This practice of routing retail marketable orders to off-exchange venues has been in place for a long time, both before and after the introduction of the Program.

Combining the smallness of the Program, the concurrent discontinuation of the Nasdaq retail program, and the continuing prevalence of off-exchange trading of retail orders, the incremental impact of the Program on market quality generally would not be expected to be large.

A second caveat stems from the way that the treatment and control groups are created. The Exchange observes that some types of stocks have higher BX RPI Program usage than others. For example,

consider Nasdaq- and NYSE-listed securities trading in 2015 with CADV greater than 500,000 shares (a sample of 1,737 stocks, used in analysis I.). The Exchange found the following concerning the percentage of BX RPI volume relative to consolidated volume:

Avg CADV of stock	RPI/consol. (percent)
500,000–1,000,000	0.026
1,000,000–10,000,000	0.015
10,000,000+	0.010

Avg price level	RPI/consol. (percent)
Less than \$100	0.017
\$100–\$200	0.032
\$200–\$500	0.074
\$500+	0.127

This sample shows higher Program percentages for less-active stocks, and much higher percentages for higher-priced stocks. This suggests that RPI usage across stocks does not randomly vary, but is driven by certain stock characteristics, some of which may not be directly observable.

As noted above, Rule 606 disclosures show that the majority of retail market orders are routed off-exchange for execution. BX RPI activity is therefore itself somewhat anomalous in the first place. Why some retail flow reaches exchanges via the Program (or that of similar exchange programs), and why it varies across stocks is not clear.

Since treatment and control stocks are determined on the basis of observed RPI usage—resulting from participant choice—they may be different in important ways. The DnD study attempts to take into account differences

in average share volume, price, and spread in the pre-period. If, however, the two groups of stocks are nevertheless still not properly fully matched, it is possible that results drawn from the DnD may be spurious. ‘Spurious’ in this context means a result that is robust statistically, but nevertheless does not indicate the impact of the intended factor. In other words, a spurious result is caused by some extraneous factor.

Matching Summary

The full set of matched pairs data for each of the four analyses will be provided below, but the following table provides summary information. Shown are the number of matched pairs, and sample averages for the three matching variables. Also shown is the average of the discrepancy score used in the matching process.

MATCHED PAIRS AVERAGES

Analysis	N	Treatment				Control				
		RMO (percent)	ADV	Price	Spread	RMO (percent)	ADV	Price	Spread	Score
I	44	0.0763	1,478,796	\$50.79	\$0.039	0.0033	1,464,376	\$48.28	\$0.031	0.492
II	71	0.1534	156,902	26.92	0.062	0.0123	157,105	27.22	0.064	0.264
III	41	0.0531	4,325,804	35.51	0.029	0.0023	3,329,018	38.94	0.019	0.812
IV	49	0.0889	166,435	19.37	0.051	0.0082	179,551	23.95	0.046	0.684

The table again illustrates the low level of Program participation, even for the treatment stocks. The RMO percentages are especially low for the higher volume samples (I and III). As intended, the RMO percentages for the control stocks are much lower still, averaging at least an order of magnitude lower than the treatment stocks.

Other than these differences, the pairs exhibit strong average similarity in terms of the values of the pre-period matching variables. It can be seen that

the average quality of matches is lower for the samples using 2017–18 as the post period (III and IV). As noted above, the maximum allowable discrepancy score was increased for these samples, needed to provide for a sample size similar to those of samples I and II.

Regression Results

The following table provides the estimated coefficients for the DnD regressions for the indicated market indicator and sample. In addition to the

estimated coefficient, the t-statistic is provided. This statistic can be used to gauge the statistical significance of the coefficient—the confidence that the true value of the coefficient is different than zero. The t-statistics are accompanied, as appropriate, with a set of asterisks indicating the associated level of significance: * = 10%, ** = 5%, and *** = 1%.

It is useful to compare the results across the four samples to assess their consistency.

ANALYSIS SAMPLE

	I.		II.		III.		IV.	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
NBBO Spreads:								
Dollar	\$0.018	*** 3.16	\$0.011	0.93	–\$0.003	–0.31	–\$0.030	* –1.91
bps	1.52	0.89	4.38	0.99	1.66	0.73	7.27	0.97
BX Effective Spreads:								
Dollar	\$0.014	*** 4.31	\$0.008	1.32	–\$0.001	–0.32	–\$0.008	–1.45
bps	1.84	1.65	3.65	1.06	1.78	0.99	8.75	* 1.79
Volatility:								
Hi-Lo Range	–0.001%	–0.02	0.008%	0.38	–0.014%	–0.41	–0.022%	–0.78
Trade-to-Trade	0.003%	0.99	0.009%	1.03	0.004%	1.19	0.023%	1.49
Market Share Change:								
TRF	2.86%	1.36	0.58%	0.24	3.13%	1.87*	1.75%	0.50
BX	0.31%	** 2.23	0.42%	** 2.02	–0.56%	*** –2.7	–0.16%	–0.56

Spreads

Four spread measures are analyzed: NBBO quoted spreads and BX effective spreads, expressed in dollar and bps terms. The table above shows substantial consistency between the NBBO quoted and BX effective spread results across all samples.

Sample I indicates increases in dollar quoted and effective spreads of about 1½ cents. The results are statistically significant. Relative (bps) spreads also increased about 1½ basis points. The bps spread results do not meet the standards of statistical significance, however. Compared to Sample I, Sample II shows increases in dollar spreads of about the same amount and increases in bps spreads of a higher amount, likely due to the fact that the Sample II stocks tend to have lower share prices. None of the Sample II spread increases meet the standard of statistical significance, however. Both samples III and IV show small decreases in dollar spreads and increases in relative spreads. None of the results

from sample III are statistically significant. From sample IV, one of the dollar spread decreases and one of the relative spread increases indicate marginal statistical significance.

Overall, the Exchange does not see sufficient consistency across the four samples to conclude that the introduction of the Program caused spreads to widen.

Volatility

Compared to the spread results, results on short-term volatility are easier to characterize. Across the two metrics and four samples, there is no evidence of a systematic increase or decrease in volatility, some estimates are positive, some negative, and none meet the standards of statistical significance.

Market Share

The market share coefficients are expressed in market share points. For example, a value of 1% means that market share increased by one point (e.g., 30% to 31%). The nearer-term samples I and II suggest statistically

significant increases in BX market share of about one-third of a point. This increase may be partially reflective of the transfer of Nasdaq's retail program to BX. The more distant-term samples III and IV show, however, declines in BX share. The regressions on TRF share all produce positive coefficients, though only one has any level of statistical significance. Collectively, it can be safely stated that the introduction of the BX RPI program did not work towards decreasing TRF share. More likely what the results tell us is that the treatment stocks with relatively high RMO volume also had high levels of retail interest generally. As noted above, most retail flow is executed off exchange, hence the increase in TRF share.

I. Active Stocks (CADV > 500,000) and Post-Period = 2015

For this sample, there were 44 matched pairs that emerged from this process. The pairs, along with values of selected variables, pre- and post-Program introduction, are shown as follows:

TABLE 1A—RETAIL PROGRAM MATCHED SAMPLE CADV >500,000

[Sep–Nov 2014]

Treatment stocks					Control stocks				
Symbol	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)	Symbol	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)
ACAD	1,301,549	\$26.71	\$0.035	13.20	RSPP	1,006,435	\$25.41	\$0.042	16.44
AFSI	963,827	45.37	0.058	12.53	CNW	1,035,534	47.10	0.027	5.85
ALK	1,421,387	48.80	0.025	5.26	AER	1,420,894	42.73	0.025	5.80
AVGO	2,296,967	84.93	0.042	4.94	DLPH	2,274,323	67.10	0.022	3.28
BDX	1,544,016	122.52	0.039	3.22	SIAL	1,139,858	128.25	0.034	2.81
CAMP	712,958	18.53	0.027	14.71	MIK	633,004	18.48	0.032	17.24
CELG	4,941,261	98.16	0.034	3.52	LYB	5,063,747	98.75	0.028	2.90
CI	1,621,670	95.17	0.033	3.45	MJN	1,416,148	98.05	0.033	3.41
CLX	1,176,737	96.35	0.027	2.77	DTE	1,145,735	78.91	0.024	3.04
COST	2,068,993	130.14	0.031	2.38	ITW	1,952,683	88.27	0.018	2.10
CRZO	1,162,062	51.73	0.069	13.56	JAH	1,115,067	61.48	0.032	5.17
DXCM	639,488	44.44	0.052	11.72	KMT	650,995	40.82	0.029	7.10
ENLK	737,216	30.01	0.050	16.82	MYGN	756,758	36.29	0.054	14.74
FSC	1,199,762	9.10	0.010	11.20	EXG	1,043,356	9.97	0.010	10.18
FSLR	2,507,147	59.85	0.040	6.73	CAM	2,841,939	62.83	0.025	4.05
IBKR	507,360	25.51	0.024	9.42	WERN	542,473	26.12	0.022	8.38
ICLR	582,300	54.93	0.051	9.34	SLH	582,309	55.54	0.042	7.47
ISIS	2,304,953	42.90	0.050	11.87	DO	2,028,802	37.29	0.026	6.93
JACK	550,619	67.89	0.057	8.37	REG	509,779	57.69	0.031	5.39
LAZ	704,069	50.59	0.045	9.02	HDB	834,887	49.84	0.025	5.12
MANH	512,845	35.01	0.037	10.67	MR	610,957	30.32	0.030	9.83
MHK	737,514	139.12	0.084	6.08	SLG	788,370	109.07	0.057	5.28
MNST	1,194,231	96.92	0.051	5.33	EQT	1,625,380	91.54	0.059	6.48
NXPI	4,256,770	68.85	0.031	4.48	CCI	3,275,501	80.56	0.024	2.93
NYMT	1,596,486	7.76	0.010	12.98	PMCS	1,483,102	7.49	0.011	14.09
OLED	709,659	31.24	0.045	14.50	FET	713,162	28.85	0.033	11.66
PSEC	3,891,913	9.79	0.010	10.25	SLM	4,532,083	9.17	0.010	11.09
Q	739,497	56.41	0.039	6.96	OIS	913,560	59.56	0.048	7.97
RMTI	677,364	9.70	0.031	32.18	COUP	770,002	14.10	0.031	22.28
SINA	1,550,979	41.43	0.036	8.79	YFP	1,668,599	33.94	0.031	9.11
SKYW	558,570	9.63	0.018	19.30	BEL	504,230	11.61	0.018	15.88
SMCI	520,354	28.97	0.044	15.62	SERV	594,059	24.05	0.038	15.87
SNCR	615,801	45.95	0.068	14.76	LTRPA	688,159	30.63	0.069	22.17
SPLK	2,740,926	60.05	0.054	9.13	FTI	2,360,200	54.47	0.024	4.39
SWKS	4,301,104	56.96	0.024	4.33	NOV	4,357,777	75.03	0.023	3.04
TASR	3,094,977	17.08	0.017	9.88	LPI	3,200,381	19.98	0.016	8.34

TABLE 1A—RETAIL PROGRAM MATCHED SAMPLE CADV >500,000—Continued
[Sep–Nov 2014]

Treatment stocks					Control stocks				
Symbol	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)	Symbol	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)
TGTX	509,492	11.16	0.036	32.33	MEG	592,554	14.46	0.028	19.67
TSCO	1,270,325	66.28	0.031	4.66	FLS	1,201,366	68.85	0.033	4.74
TUP	527,236	68.49	0.044	6.47	KRC	535,203	63.70	0.037	5.78
UA	2,678,432	67.54	0.032	4.80	NBL	2,781,689	61.96	0.025	4.08
UBNT	1,115,056	36.37	0.051	14.34	ERJ	1,106,399	37.84	0.021	5.52
VDSI	851,633	21.13	0.035	17.03	LQ	827,960	19.86	0.025	12.65
YRCW	750,968	20.65	0.036	17.55	STAY	627,766	21.90	0.029	13.44
ZLTQ	720,533	24.55	0.041	16.88	CTLT	679,346	24.50	0.045	18.20
Avg	1,478,796	50.79	0.039	10.76	Avg	1,464,376	48.28	0.031	8.91

TABLE 1B—RETAIL PROGRAM MATCHED SAMPLE CADV >500,000
[2015]

Treatment stocks							Control stocks						
Symbol	RMO % BX	RMO % Ind	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)	Symbol	RMO % BX	RMO % Ind	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)
ACAD	3.07	0.06	1,448,310	\$37.47	\$0.050	13.46	RSPP	0.04	0.00	1,491,504	\$26.31	\$0.037	14.38
AFSI	2.13	0.06	563,733	60.48	0.061	10.07	CNW	0.22	0.00	1,314,088	42.22	0.025	6.04
ALK	3.21	0.07	1,387,460	71.24	0.047	6.49	AER	0.28	0.00	2,093,683	43.92	0.022	4.96
AVGO	2.24	0.06	3,166,689	125.32	0.077	6.18	DLPH	0.20	0.00	2,148,818	80.26	0.033	4.11
BDX	3.08	0.08	1,115,839	143.84	0.065	4.51	SIAL	0.10	0.00	1,009,690	138.89	0.015	1.10
CAMP	3.90	0.07	511,751	18.28	0.028	15.24	MIK	0.17	0.00	769,285	25.40	0.030	11.79
CELG	3.98	0.08	5,171,549	118.39	0.059	4.96	LYB	0.25	0.00	3,973,998	91.43	0.037	4.11
CI	3.06	0.08	2,008,125	134.28	0.073	5.40	MJN	0.21	0.00	1,810,637	89.46	0.038	4.21
CLX	3.17	0.08	891,999	113.19	0.048	4.24	DTE	0.27	0.01	1,090,860	80.57	0.030	3.67
COST	2.32	0.05	2,150,134	147.70	0.051	3.44	ITW	0.16	0.00	1,750,442	92.38	0.025	2.76
CRZO	2.40	0.06	1,330,366	42.86	0.055	13.12	JAH	0.35	0.01	2,179,212	51.58	0.021	4.17
DXCM	2.90	0.08	843,867	75.80	0.094	12.13	KMT	0.29	0.00	940,811	31.32	0.026	8.52
ENLK	2.54	0.06	771,866	21.79	0.047	22.55	MYGN	0.15	0.00	830,603	36.81	0.052	13.95
FSC	2.17	0.06	1,166,959	6.75	0.010	15.32	EXG	0.22	0.00	798,806	9.47	0.010	10.76
FSLR	4.17	0.06	2,388,265	52.34	0.034	6.49	CAM	0.17	0.00	3,147,765	54.73	0.021	3.96
IBKR	4.22	0.09	565,525	37.70	0.037	9.90	WERN	0.31	0.01	706,866	28.13	0.023	8.33
ICLR	2.14	0.08	504,514	69.04	0.108	15.63	SLH	0.23	0.00	1,070,428	50.40	0.034	7.00
ISIS	3.14	0.06	2,342,444	59.10	0.065	11.39	DO	0.29	0.00	2,342,540	26.18	0.023	8.44
JACK	2.34	0.07	633,677	85.40	0.092	10.94	REG	0.10	0.00	580,153	64.77	0.039	6.05
LAZ	3.93	0.10	859,575	50.54	0.053	10.52	HDB	0.29	0.01	914,212	59.33	0.034	5.74
MANH	3.77	0.10	539,552	59.23	0.077	12.82	MR	0.21	0.00	623,598	27.00	0.025	9.47
MHK	3.17	0.09	689,602	187.12	0.182	9.68	SLG	0.12	0.00	702,818	118.81	0.088	7.49
MNST	2.37	0.07	1,228,688	136.21	0.105	7.65	EQT	0.18	0.00	1,556,329	75.25	0.055	7.45
NXPI	2.55	0.06	3,865,611	91.55	0.052	5.71	CCI	0.30	0.01	2,336,521	83.67	0.025	2.97
NYMT	3.82	0.07	1,196,276	7.05	0.010	14.71	PMCS	0.13	0.00	3,442,623	9.05	0.010	12.01
OLED	6.59	0.14	658,991	42.93	0.063	14.81	FET	0.17	0.00	1,113,426	17.10	0.022	13.33
PSEC	3.80	0.07	2,747,484	7.81	0.010	12.96	SLM	0.06	0.00	3,593,895	8.77	0.010	12.01
Q	3.25	0.08	746,869	68.71	0.048	6.98	OIS	0.07	0.00	1,109,903	35.88	0.037	10.89
RMTI	4.62	0.07	726,795	11.47	0.031	27.33	COUP	0.05	0.00	689,630	11.56	0.024	20.81
SINA	3.74	0.06	1,351,205	42.49	0.041	9.53	YPF	0.28	0.00	1,301,107	23.91	0.024	10.05
SKYW	4.56	0.08	540,128	16.11	0.027	17.05	BEL	0.05	0.00	520,858	11.45	0.015	13.50
SMCI	4.34	0.10	623,673	30.57	0.044	14.48	SERV	0.09	0.00	1,084,056	34.47	0.027	7.96
SNCR	3.23	0.08	531,811	42.90	0.066	15.60	LTRPA	0.04	0.00	570,674	29.05	0.034	11.75
SPLK	3.13	0.07	1,908,069	62.58	0.053	8.53	FTI	0.08	0.00	3,385,051	36.74	0.016	4.52
SWKS	7.33	0.13	4,040,788	89.48	0.047	5.24	NOV	0.26	0.00	5,929,343	45.85	0.015	3.23
TASR	4.96	0.06	2,066,379	25.79	0.022	8.55	LPI	0.34	0.00	3,845,352	11.60	0.013	11.79
TGTX	7.27	0.12	597,807	14.62	0.042	29.22	MEG	0.26	0.00	1,314,175	15.20	0.017	11.22
TSCO	4.01	0.10	942,912	87.47	0.063	7.18	FLS	0.33	0.00	1,488,778	50.86	0.025	4.96
TUP	3.09	0.07	583,728	61.66	0.054	8.90	KRC	0.16	0.00	567,612	69.92	0.051	7.33
UA	5.23	0.09	2,652,795	85.27	0.038	4.39	NBL	0.21	0.00	4,862,641	40.75	0.017	4.21
UBNT	3.42	0.06	664,805	31.72	0.048	14.89	ERJ	0.13	0.00	979,065	30.32	0.017	5.58
VDSI	5.87	0.08	1,258,250	22.45	0.037	17.11	LQ	0.09	0.00	1,511,426	20.36	0.014	6.87
YRCW	3.30	0.06	640,874	16.21	0.028	17.65	STAY	0.31	0.01	520,061	18.89	0.028	14.43
ZLTQ	2.71	0.06	598,245	31.73	0.055	17.10	CTLT	0.18	0.00	718,026	28.92	0.040	14.02
Avg	3.64	0.08	1,391,454	62.38	0.054	11.59	Avg	0.19	0.00	1,698,440	44.98	0.028	8.22

II. Less Active Stocks (CADV Between 50,000 and 500,000) and Post-Period = 2015

process. The pairs, along with values of the matching variables (pre-period), are shown as follows:

For this sample, there were 71 matched pairs that emerged from the

TABLE 2A—RETAIL PROGRAM MATCHED SAMPLE >50,000 AND <500,000
[Sep–Nov 2014]

Treatment stocks					Control stocks				
Symbol	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)	Symbol	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)
AB	257,695	\$26.20	\$0.052	19.81	TBI	218,856	\$25.33	\$0.047	18.60
ACET	201,593	20.49	0.053	26.13	DFRG	213,718	21.87	0.052	23.95
ADC	65,799	29.22	0.072	24.58	ORA	66,867	27.55	0.069	25.05
AFOP	354,650	13.00	0.027	20.64	LQDT	343,166	12.97	0.025	18.91
ALDW	190,282	18.43	0.050	27.26	NEWP	171,264	17.79	0.044	24.54
APU	310,097	45.68	0.046	10.16	WST	306,905	46.65	0.050	10.72
ARII	258,499	70.06	0.171	24.73	AXE	240,764	85.14	0.162	19.11
AVAV	259,080	29.89	0.052	17.50	MBFI	282,952	29.29	0.047	16.12
BEAT	222,665	7.49	0.025	34.28	SPWH	227,710	6.86	0.025	35.76
BIP	218,853	39.85	0.051	12.70	ALE	229,126	48.74	0.049	10.09
BOI	103,890	16.93	0.030	17.74	MMD	101,908	17.74	0.034	18.95
BSTC	51,863	36.16	0.264	73.16	OPB	51,453	29.37	0.201	67.86
BTO	57,833	22.56	0.038	17.08	EMF	59,607	17.77	0.041	23.11
CLFD	75,466	13.16	0.069	52.54	ZPIN	91,340	13.90	0.089	64.59
CLMS	110,782	12.66	0.037	28.97	MHG	111,804	13.89	0.033	23.75
CLMT	313,715	27.57	0.063	23.09	MRKT	401,812	23.98	0.059	24.76
CMP	259,246	86.79	0.108	12.46	SPB	235,834	88.42	0.106	12.00
CODI	217,722	17.82	0.036	20.41	HZO	176,311	17.93	0.036	20.33
CSCD	110,524	10.99	0.056	51.94	UNTD	127,615	11.83	0.046	38.70
CTT	223,611	11.18	0.022	19.48	FLY	205,417	12.99	0.022	17.28
CUI	78,138	7.18	0.045	63.45	CRCM	98,265	8.40	0.047	56.22
CVTI	219,409	18.92	0.076	41.35	KANG	277,438	18.93	0.074	39.12
DBL	78,900	23.75	0.044	18.48	KIO	74,822	17.56	0.043	24.31
EDF	65,045	18.69	0.053	28.45	BCA	71,870	19.26	0.055	28.43
EPAM	395,347	43.65	0.063	14.35	HIBB	415,031	44.48	0.062	13.90
ETB	60,457	15.78	0.023	14.75	ZF	53,909	15.10	0.022	14.95
EZCH	158,140	22.41	0.058	25.94	CMRE	173,076	21.06	0.057	23.49
FDUS	68,041	17.12	0.061	35.44	OKSB	58,803	16.97	0.066	38.50
FGP	160,267	27.28	0.060	22.18	IBOC	172,092	26.03	0.060	23.28
FNHC	271,398	27.32	0.079	28.80	WMS	260,316	21.05	0.066	31.32
GLAD	128,184	9.02	0.026	28.43	IRR	101,145	9.95	0.026	25.71
GLRE	136,838	32.52	0.059	18.18	STC	120,951	32.12	0.061	19.03
GNCMA	193,608	11.39	0.026	22.57	PGI	204,861	11.66	0.025	21.87
GOOD	112,763	17.57	0.031	17.67	CPF	114,830	18.46	0.031	16.70
GSIG	72,335	12.22	0.049	40.42	XOXO	67,052	12.46	0.049	40.03
GSL	66,072	3.78	0.031	85.13	CO	68,003	4.99	0.030	59.74
GSVC	139,253	10.14	0.034	33.84	ICD	135,638	9.33	0.038	43.28
HII	283,916	103.19	0.102	9.93	TFX	243,588	110.37	0.132	12.05
HIIQ	96,520	10.25	0.090	88.44	EDN	94,386	11.67	0.104	89.69
HQH	162,147	29.19	0.042	14.44	COLB	204,528	26.38	0.045	17.12
HQL	103,968	22.85	0.040	17.48	CTY	93,639	23.60	0.036	15.29
IGOV	69,992	99.56	0.179	17.99	KOF	62,191	102.39	0.183	17.93
IXYS	141,164	11.00	0.036	32.65	BPI	133,490	11.62	0.027	23.09
LDP	70,450	24.46	0.048	19.73	DFP	64,754	22.87	0.048	20.82
MAIN	202,931	31.39	0.039	12.33	MLI	201,430	30.24	0.039	13.07
NDP	93,945	24.11	0.067	28.08	ABCB	105,401	23.68	0.070	29.89
NNBR	157,009	24.33	0.074	30.40	CVT	193,466	25.67	0.069	26.96
NTWK	78,357	3.40	0.028	84.86	FCSC	68,500	2.82	0.035	122.37
ORBK	134,253	15.36	0.034	22.01	AHP	142,241	16.22	0.034	20.99
OXLC	80,719	15.90	0.045	28.60	CTS	82,703	17.22	0.044	25.67
PATK	65,356	42.36	0.198	46.71	VRTV	64,527	46.69	0.243	52.21
PEO	103,616	27.93	0.050	18.13	LADR	97,465	18.89	0.057	30.07
PGP	131,368	23.08	0.086	37.58	EXLS	133,974	26.59	0.078	29.49
PICO	71,762	20.61	0.069	33.51	VVI	79,994	22.39	0.065	28.97
PLOW	205,124	20.54	0.035	17.05	CSU	217,750	22.23	0.035	15.69
RDI	69,021	9.43	0.045	48.22	CNCO	75,311	8.59	0.050	59.16
RM	193,431	16.19	0.048	29.46	DL	202,788	14.91	0.053	36.12
RNST	67,326	28.53	0.100	35.11	FBRC	65,432	26.48	0.125	47.49
SIGI	144,844	24.23	0.046	19.12	CCU	144,842	21.38	0.044	20.58
SOCL	122,280	19.37	0.029	15.22	PCN	121,440	16.22	0.027	16.49
SPH	166,532	44.68	0.092	20.53	CCMP	152,708	44.34	0.100	22.72

TABLE 2B—RETAIL PROGRAM MATCHED SAMPLE CADV >50,000 AND <500,000—Continued
[2015]

Treatment stocks							Control stocks						
Symbol	RMO % BX	RMO % Ind	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)	Symbol	RMO % BX	RMO % Ind	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)
PICO	8.54	0.24	106,325	14.10	0.052	37.85	VVI	0.58	0.019	88,074	28.13	0.073	26.07
PLOW	3.71	0.11	129,709	21.61	0.056	25.71	CSU	0.42	0.011	211,558	23.61	0.047	20.09
RDI	8.49	0.24	56,701	13.43	0.062	45.66	CNCO	0.46	0.003	83,811	6.80	0.041	61.30
RM	4.55	0.12	91,913	16.20	0.067	39.49	DL	0.28	0.009	126,155	15.56	0.073	47.88
RNST	5.29	0.13	148,755	31.50	0.067	21.21	FBRC	0.33	0.009	50,866	22.22	0.130	59.07
SIGI	4.57	0.12	212,634	30.13	0.053	17.68	CCU	0.34	0.007	138,285	21.45	0.048	22.78
SOCL	10.32	0.24	88,315	19.22	0.051	26.48	PCN	3.92	0.018	108,881	14.36	0.022	15.23
SPH	6.54	0.15	208,257	38.56	0.099	25.93	CCMP	0.52	0.018	145,234	45.64	0.111	24.49
STON	4.23	0.13	160,946	28.62	0.092	32.56	FTGC	0.23	0.003	134,541	23.49	0.053	22.65
TCP	4.12	0.14	171,426	58.19	0.292	52.28	REX	0.40	0.014	162,351	57.40	0.192	33.82
TSYS	3.48	0.11	375,242	3.64	0.014	40.50	NWY	1.34	0.009	94,970	2.45	0.017	71.30
TYG	8.09	0.17	279,394	36.74	0.075	21.32	RLI	0.55	0.020	139,447	53.38	0.113	21.01
TZOO	5.83	0.15	124,874	10.07	0.042	42.08	TRNO	0.37	0.010	178,560	21.55	0.048	22.62
USAC	9.30	0.20	130,583	18.40	0.106	57.48	FCB	0.77	0.019	217,494	30.48	0.061	20.50
VCIT	4.89	0.12	451,992	85.91	0.053	6.15	IT	0.61	0.016	406,922	85.95	0.081	9.42
VICR	7.09	0.18	56,688	11.89	0.070	62.03	MODN	1.11	0.019	91,268	11.19	0.041	36.74
VNQI	13.04	0.33	374,913	54.84	0.055	10.17	TTC	0.63	0.019	265,760	69.75	0.082	11.78
WLDN	9.82	0.23	77,911	12.01	0.064	54.70	CTRE	0.12	0.003	227,593	12.27	0.042	34.08
Avg	7.81	0.15	160,108	26.98	0.075	34.20	Avg	0.68	0.01	183,525	27.80	0.066	29.96

III. Active Stocks (CADV > 500,000) and Post-Period = 2017–2018

For this sample, there were 41 matched pairs that emerged from the

process. The pairs, along with values of the matching variables (pre-period), are shown as follows:

TABLE 3A—RETAIL PROGRAM MATCHED SAMPLE CADV >500,000
[Sep–Nov 2014]

Treatment stocks					Control stocks				
Symbol	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)	Symbol	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)
AA	19,848,728	\$16.29	\$0.010	6.17	ITUB	15,391,611	\$15.06	\$0.010	6.70
AG	1,868,134	7.10	0.010	15.21	CUZ	1,707,347	12.49	0.010	8.27
AINV	1,804,765	8.30	0.010	12.24	BVN	1,783,634	11.21	0.011	10.10
AMBA	2,103,392	42.35	0.062	14.79	PLD	2,692,357	39.81	0.011	2.90
APO	1,356,506	23.15	0.021	9.23	BRX	1,278,575	23.37	0.017	7.12
AXAS	2,961,152	4.58	0.010	22.80	CIG	5,661,208	6.35	0.010	16.10
BCRX	1,244,583	11.27	0.021	18.89	CLI	899,677	19.58	0.016	8.08
BUD	1,367,716	110.28	0.030	2.76	TOT	1,409,344	60.36	0.023	3.83
BX	4,891,093	31.38	0.014	4.46	COG	6,157,960	32.25	0.012	3.76
CLNE	1,664,000	7.39	0.012	16.09	DRH	1,577,838	13.54	0.010	7.59
CMCM	892,660	20.49	0.057	27.49	MDU	1,080,599	27.56	0.019	6.71
CSIQ	3,978,563	32.55	0.034	10.54	CNQ	4,352,711	37.08	0.012	3.35
DO	2,028,802	37.29	0.026	6.93	HCP	2,538,605	42.25	0.012	2.73
DSX	726,289	8.85	0.012	14.11	FNB	879,836	12.44	0.010	8.36
F	34,678,316	15.13	0.010	6.65	FOXA	13,032,567	34.41	0.010	2.95
FEYE	8,234,032	31.44	0.022	7.22	HST	6,716,845	22.14	0.010	4.62
FNSR	2,320,485	16.88	0.012	7.33	TPH	2,159,710	13.94	0.012	8.68
GME	2,808,482	41.86	0.018	4.25	SNY	2,182,012	51.81	0.018	3.45
GNW	9,907,097	12.24	0.010	8.49	SAN	10,583,634	9.09	0.010	11.05
GRPN	16,296,242	6.85	0.010	14.75	SLM	4,532,083	9.17	0.010	11.09
HAIN	566,626	103.28	0.083	8.09	SLG	788,370	109.07	0.057	5.28
HALO	1,250,394	9.12	0.011	12.49	HTA	1,419,408	12.29	0.010	8.48
IRBT	712,902	33.02	0.045	13.54	LHO	859,601	36.72	0.018	5.05
JWN	1,472,964	70.84	0.025	3.49	ETR	1,607,873	79.55	0.025	3.10
LSCC	1,168,221	6.88	0.011	15.53	RPAI	1,047,067	15.36	0.011	6.95
LYG	3,517,062	4.88	0.010	20.51	GGB	7,013,600	4.81	0.010	21.01
MMP	839,403	82.37	0.094	11.51	AVB	926,288	150.78	0.072	4.79
NOK	18,264,234	8.24	0.010	12.15	BBD	11,667,774	15.32	0.010	6.59
O	2,027,017	44.15	0.014	3.16	NI	2,220,002	40.72	0.013	3.30
OHI	1,490,422	36.76	0.013	3.43	AIV	1,214,436	34.32	0.013	3.71
RCII	819,241	30.46	0.024	7.91	RLJ	735,277	30.37	0.016	5.38
SINA	1,550,979	41.43	0.036	8.79	IBN	1,251,526	54.07	0.024	4.51
SNE	3,075,849	18.86	0.010	5.40	DRE	2,595,753	18.25	0.010	5.62
SPWR	2,347,451	32.45	0.025	7.78	FTI	2,360,200	54.47	0.024	4.39
STX	2,989,069	59.38	0.022	3.76	NBL	2,781,689	61.96	0.025	4.08

TABLE 3A—RETAIL PROGRAM MATCHED SAMPLE CADV >500,000—Continued
[Sep–Nov 2014]

Treatment stocks					Control stocks				
Symbol	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)	Symbol	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)
SYNA	1,066,414	71.57	0.092	12.64	CPT	642,738	72.84	0.031	4.31
TERP	626,425	28.72	0.080	27.81	HR	601,104	25.09	0.015	6.18
UA	2,678,432	67.54	0.032	4.80	EQR	2,303,635	66.21	0.018	2.77
ULTA	1,061,441	116.53	0.092	7.86	BXP	890,862	121.67	0.066	5.45
WPC	525,756	66.30	0.034	5.07	KRC	535,203	63.70	0.037	5.78
X	8,326,606	37.65	0.015	4.14	EXC	6,409,198	34.91	0.011	3.02
Avg	4,325,804	35.51	0.029	10.49	Avg	3,329,018	38.94	0.019	6.27

TABLE 3B—RETAIL PROGRAM MATCHED SAMPLE CADV >500,000
[2017–2018]

Treatment stocks							Control stocks						
Symbol	RMO % BX	RMO % Ind	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)	Symbol	RMO % BX	RMO % Ind	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)
AA	1.30	0.04	4,075,295	\$41.33	\$0.022	5.27	ITUB	0.04	0.001	12,139,536	\$12.55	\$0.010	8.11
AG	1.71	0.04	3,361,556	7.04	0.010	14.70	CUZ	0.02	0.001	3,842,736	8.86	0.010	11.51
AINV	1.93	0.06	865,116	6.18	0.011	17.22	BVN	0.02	0.001	1,343,091	13.68	0.012	8.61
AMBA	3.68	0.10	1,006,023	48.50	0.062	12.93	PLD	0.09	0.004	2,672,000	61.33	0.018	2.88
APO	1.38	0.04	1,098,761	29.62	0.030	9.93	BRX	0.07	0.003	3,076,634	18.10	0.011	5.96
AXAS	1.33	0.04	1,492,938	2.15	0.010	48.85	CIG	0.11	0.003	4,402,939	2.48	0.010	41.72
BCRX	1.86	0.06	1,176,068	6.02	0.013	21.42	CLI	0.07	0.003	593,039	22.59	0.019	8.24
BUD	1.22	0.04	1,764,121	105.16	0.032	3.12	TOT	0.09	0.002	1,764,192	55.96	0.012	2.08
BX	2.61	0.05	4,550,664	32.76	0.013	3.94	COG	0.10	0.003	6,100,394	24.46	0.011	4.34
CLNE	1.31	0.04	1,346,149	2.36	0.010	45.01	DRH	0.01	0.000	2,300,351	11.21	0.010	9.17
CMCM	1.85	0.05	1,059,402	10.70	0.023	21.69	MDU	0.06	0.003	842,527	27.03	0.014	5.05
CSIQ	4.27	0.13	1,025,349	14.98	0.021	13.76	CNQ	0.11	0.003	2,808,082	32.12	0.010	3.28
DO	1.05	0.04	2,326,499	15.80	0.013	8.14	HCP	0.08	0.003	3,666,607	27.46	0.011	3.94
DSX	2.44	0.06	589,433	4.02	0.012	29.70	FNB	0.09	0.004	2,706,799	13.63	0.010	7.60
F	1.77	0.05	40,375,950	11.11	0.010	9.11	FOXA	0.13	0.003	10,396,614	35.77	0.010	3.02
FEYE	1.96	0.05	4,768,737	15.54	0.010	6.81	HST	0.03	0.001	6,942,056	19.29	0.010	5.28
FNSR	2.49	0.06	3,459,073	21.85	0.015	6.74	TPH	0.08	0.003	1,937,468	14.46	0.011	7.61
GME	1.35	0.04	3,433,058	18.21	0.011	6.34	SNY	0.05	0.001	1,609,403	44.08	0.011	2.51
GNW	1.76	0.04	4,516,565	3.75	0.010	27.39	SAN	0.10	0.002	6,841,859	6.04	0.010	16.83
GRPN	1.16	0.04	8,719,062	4.22	0.010	24.46	SLM	0.08	0.003	3,172,237	11.18	0.010	9.37
HAIN	1.33	0.04	1,583,844	33.81	0.023	6.98	SLG	0.05	0.002	803,572	100.37	0.074	7.37
HALO	1.60	0.05	1,125,888	16.21	0.021	12.87	HTA	0.06	0.003	1,542,950	28.57	0.013	4.41
IRBT	2.76	0.07	906,753	79.44	0.114	14.03	LHO	0.07	0.003	1,633,753	30.43	0.015	5.08
JWN	1.13	0.04	2,630,160	49.12	0.029	5.96	ETR	0.08	0.003	1,375,231	79.52	0.032	3.97
LSCC	1.27	0.04	983,954	6.48	0.011	16.82	RPAI	0.05	0.002	1,794,420	12.83	0.010	8.10
LYG	1.86	0.06	6,256,365	3.44	0.010	29.36	GGB	0.09	0.002	9,702,367	3.88	0.010	26.36
MMP	1.37	0.05	830,180	69.21	0.060	8.74	AVB	0.08	0.003	680,029	178.52	0.138	7.73
NOK	3.01	0.08	14,759,305	5.62	0.010	17.95	BBD	0.03	0.001	11,438,559	9.63	0.010	10.66
O	1.09	0.04	1,910,582	56.53	0.021	3.69	NI	0.08	0.003	3,013,746	25.14	0.011	4.20
OHI	1.17	0.04	2,090,596	30.98	0.012	3.77	AIV	0.04	0.002	1,089,725	43.30	0.021	4.90
RCII	1.90	0.07	1,785,282	11.67	0.012	10.61	RLJ	0.04	0.002	1,419,592	21.45	0.012	5.44
SINA	2.01	0.07	980,389	88.41	0.105	11.94	IBN	0.07	0.002	7,497,988	9.05	0.010	11.20
SNE	1.21	0.04	983,669	44.35	0.016	3.55	DRE	0.02	0.001	2,533,025	27.60	0.011	3.89
SPWR	3.72	0.10	2,639,031	7.70	0.011	13.99	FTI	0.11	0.003	3,833,234	29.62	0.010	3.52
STX	1.33	0.04	4,569,307	45.84	0.017	3.69	NBL	0.10	0.003	5,080,490	30.49	0.011	3.66
SYNA	1.26	0.04	798,985	45.96	0.064	14.12	CPT	0.07	0.003	589,346	87.99	0.068	7.76
TERP	0.92	0.04	582,896	11.83	0.015	12.75	HR	0.05	0.002	835,377	30.63	0.017	5.58
UA	2.66	0.06	4,079,322	17.47	0.011	6.29	EQR	0.05	0.002	1,868,111	64.58	0.023	3.62
ULTA	1.29	0.04	1,064,638	251.09	0.229	9.18	BXP	0.06	0.003	731,983	124.60	0.097	7.86
WPC	1.41	0.05	521,446	65.49	0.049	7.57	KRC	0.04	0.002	552,027	72.00	0.060	8.31
X	2.61	0.04	13,020,309	30.64	0.012	4.06	EXC	0.05	0.002	5,496,241	39.40	0.010	2.66
Avg	1.84	0.05	3,783,237	33.48	0.029	13.52	Avg	0.07	0.00	3,479,764	36.88	0.022	7.64

IV. Less Active Stocks (CADV Between 50,000 and 500,000) and Post-Period = 2017–2018

For this sample, there were 49 matched pairs that emerged from the

process. The pairs, along with values of the matching variables (pre-period), are shown as follows:

TABLE 4A—RETAIL PROGRAM MATCHED SAMPLE >50,000 AND <500,000 CADV
[Sep–Nov 2014]

Treatment stocks					Control stocks				
Symbol	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)	Symbol	ADV	Avg price	Avg sprd (\$)	Avg sprd (bps)
AI	380,780	\$26.88	\$0.020	7.45	DSL	361,600	\$21.43	\$0.022	10.36
ANIK	240,282	39.38	0.089	22.92	WABC	223,670	48.09	0.083	17.22
APU	310,097	45.68	0.046	10.16	WST	306,905	46.65	0.050	10.72
AUDC	153,063	4.91	0.022	45.54	RVT	191,392	14.93	0.020	13.56
BLX	130,799	32.10	0.060	18.85	STC	120,951	32.12	0.061	19.03
COHU	104,702	11.53	0.044	38.27	CSGS	157,547	26.18	0.047	18.17
DBL	78,900	23.75	0.044	18.48	TRNO	82,554	20.20	0.053	26.35
DMB	55,155	11.99	0.023	19.20	CHT	77,541	30.23	0.032	10.48
DSM	126,484	8.06	0.014	16.91	FRA	131,349	13.84	0.013	9.68
FDUS	68,041	17.12	0.061	35.44	LION	76,072	14.50	0.082	57.41
FRSH	132,657	9.45	0.068	71.68	CBU	127,820	35.74	0.063	17.62
GAIN	110,718	7.34	0.015	20.05	EOS	144,318	13.72	0.015	11.22
GASS	155,935	8.44	0.028	33.44	CENTA	144,524	8.25	0.032	39.17
GBDC	188,201	16.89	0.029	16.92	NCI	176,055	14.60	0.028	19.24
GLAD	128,184	9.02	0.026	28.43	TI	159,450	11.04	0.020	17.79
GMLP	163,282	35.15	0.146	41.52	UMBF	157,424	56.89	0.146	25.85
GOOD	112,763	17.57	0.031	17.67	CPF	114,830	18.46	0.031	16.70
GSVC	139,253	10.14	0.034	33.84	NBHC	160,159	19.39	0.035	18.25
HTGC	341,319	15.10	0.019	12.93	NFBK	271,599	13.78	0.019	13.77
IEP	129,299	105.09	0.255	24.34	LANC	127,008	88.16	0.207	23.53
KCAP	302,537	7.93	0.016	19.82	ETJ	306,544	11.54	0.015	13.14
LRAD	234,963	2.87	0.020	71.58	MFG	335,904	3.60	0.010	28.25
MAGS	352,530	4.58	0.052	114.83	RTRX	445,328	10.50	0.043	40.96
MAIN	202,931	31.39	0.039	12.33	MLI	201,430	30.24	0.039	13.07
MUA	52,623	13.29	0.023	17.06	GHY	173,681	16.48	0.020	12.16
MUE	65,631	13.24	0.017	13.04	ISF	67,500	25.39	0.019	7.65
NANO	111,903	14.88	0.051	34.61	MG	120,243	18.37	0.049	26.63
NDP	93,945	24.11	0.067	28.08	THR	115,353	24.59	0.057	23.42
NEP	188,649	34.86	0.185	53.54	PLXS	171,711	38.76	0.084	21.71
OIA	93,055	6.77	0.013	19.36	AWP	257,107	6.89	0.011	15.68
PBT	145,410	12.85	0.030	23.84	DAKT	171,820	12.89	0.031	24.21
PCK	59,924	9.45	0.024	25.50	ETV	207,431	14.89	0.019	12.73
PFLT	67,807	14.02	0.045	31.98	DGRW	66,466	29.59	0.043	14.58
PFMT	311,460	8.16	0.025	30.92	FSS	280,570	14.16	0.024	16.88
PGP	131,368	23.08	0.086	37.58	EXLS	133,974	26.59	0.078	29.49
PMF	58,501	14.07	0.025	17.56	SKYY	66,651	27.35	0.035	12.85
PMX	73,074	10.85	0.020	18.60	CII	136,940	14.78	0.016	11.17
SDLP	456,457	28.00	0.075	26.78	FUL	468,387	42.02	0.049	11.58
SHLO	50,103	16.93	0.107	63.20	UFCS	56,599	29.25	0.125	42.48
SJT	96,558	18.27	0.062	34.17	GRAM	92,291	14.22	0.057	40.66
SLRC	214,437	18.95	0.025	13.39	PFS	201,034	17.16	0.023	13.22
SPH	166,532	44.68	0.092	20.53	CNMD	162,637	40.04	0.086	21.35
TCPC	332,634	16.60	0.028	16.75	NFJ	271,825	17.73	0.027	15.41
TOUR	318,343	17.36	0.073	42.30	SYKE	253,700	21.34	0.040	18.74
TS LX	138,306	16.95	0.043	25.68	FBC	136,538	16.29	0.038	23.25
VOC	132,226	11.27	0.041	38.08	CCU	144,842	21.38	0.044	20.58
WBK	174,452	29.49	0.034	11.61	IFGL	147,189	30.54	0.034	11.29
WLDN	180,819	13.99	0.061	43.65	FTGC	169,252	29.57	0.057	19.47
WSR	98,234	14.57	0.031	21.33	SOCL	122,280	19.37	0.029	15.22
Avg	166,435	19.37	0.051	29.83	Avg	179,551	23.95	0.046	19.88

TABLE 4B—RETAIL PROGRAM MATCHED SAMPLE CADV >50,000 AND <500,000
[2017–2018]

Treatment stocks							Control stocks						
Symbol	RMO % BX	RMO % Ind	ADV	Avg Price	Avg Sprd (\$)	Avg Sprd (bps)	Symbol	RMO % BX	RMO % Ind	ADV	Avg Price	Avg Sprd (\$)	Avg Sprd (bps)
AI	2.45	0.06	458,637	\$11.93	\$0.012	9.87	DSL	0.85	0.011	373,997	\$20.14	\$0.015	7.60
ANIK	2.03	0.06	123,465	46.77	0.191	40.89	WABC	0.33	0.010	100,762	57.73	0.231	40.12
APU	3.36	0.08	237,312	42.89	0.077	17.90	WST	0.29	0.010	367,026	96.31	0.129	13.20
AUDC	1.72	0.06	117,591	7.79	0.032	42.65	RVT	0.55	0.008	288,150	15.18	0.017	11.22
BLX	2.13	0.08	130,009	26.09	0.056	21.57	STC	0.16	0.006	157,476	42.53	0.090	21.17
COHU	2.33	0.09	284,253	20.78	0.049	24.11	CSGS	0.10	0.004	197,396	40.89	0.083	20.47
DBL	4.52	0.07	74,432	22.32	0.049	21.63	TRNO	0.11	0.005	345,017	34.66	0.034	10.00
DMB	9.72	0.07	58,671	12.71	0.021	16.46	CHT	0.15	0.007	148,554	35.08	0.025	7.01
DSM	5.07	0.07	113,155	7.98	0.013	16.39	FRA	0.54	0.010	163,372	14.05	0.013	9.26

TABLE 4B—RETAIL PROGRAM MATCHED SAMPLE CADV >50,000 AND <500,000—Continued
[2017–2018]

Treatment stocks							Control stocks						
Symbol	RMO % BX	RMO % Ind	ADV	Avg Price	Avg Sprd (\$)	Avg Sprd (bps)	Symbol	RMO % BX	RMO % Ind	ADV	Avg Price	Avg Sprd (\$)	Avg Sprd (bps)
FDUS	3.45	0.09	97,448	15.30	0.044	28.40	LION	0.26	0.011	109,864	23.17	0.074	32.01
FRSH	3.36	0.08	110,611	5.09	0.044	86.28	CBU	0.23	0.007	243,704	57.33	0.103	18.12
GAIN	3.01	0.08	172,450	10.23	0.019	18.48	EOS	0.66	0.009	131,800	15.50	0.022	14.38
GASS	4.18	0.06	57,778	3.70	0.035	94.13	CENTA	0.16	0.007	234,333	34.78	0.075	21.63
GBDC	3.77	0.10	211,753	18.77	0.023	12.44	NCI	0.22	0.009	296,999	21.09	0.027	13.06
GLAD	2.68	0.07	134,680	9.33	0.020	21.33	TI	0.18	0.003	149,165	8.43	0.020	23.55
GMLP	2.77	0.08	357,537	19.24	0.039	20.40	UMBF	0.32	0.009	222,813	73.14	0.177	24.31
GOOD	2.19	0.09	152,848	19.98	0.037	18.77	CPF	0.21	0.008	139,636	29.65	0.060	20.33
GSVC	6.04	0.15	137,911	6.04	0.030	51.88	NBHC	0.13	0.005	139,900	34.36	0.070	20.52
HTGC	3.95	0.10	476,844	13.11	0.012	9.55	NFBK	0.20	0.008	99,333	16.56	0.047	28.86
IEP	8.34	0.13	100,497	59.83	0.232	38.77	LANC	0.33	0.010	105,903	134.53	0.506	37.19
KCAP	11.65	0.18	117,403	3.41	0.017	49.08	ETJ	0.43	0.008	276,325	9.37	0.013	13.59
LRAD	11.15	0.13	60,046	2.17	0.032	152.85	MFG	0.13	0.005	367,028	3.57	0.010	28.38
MAGS	6.89	0.12	59,713	5.48	0.055	103.25	RTRX	0.13	0.005	334,303	23.33	0.066	28.37
MAIN	4.44	0.13	245,561	38.49	0.032	8.32	MLI	0.29	0.010	207,388	31.27	0.053	17.02
MUA	12.42	0.07	55,118	14.03	0.027	19.28	GHY	0.50	0.011	169,952	14.32	0.013	9.08
MUE	5.46	0.06	63,559	12.96	0.020	15.65	ISF	1.87	0.011	60,764	25.70	0.024	9.32
NANO	3.12	0.11	251,457	29.99	0.067	22.73	MG	0.12	0.006	71,628	20.70	0.082	40.44
NDP	4.23	0.07	75,449	13.12	0.051	39.75	THR	0.17	0.008	123,398	21.67	0.057	25.99
NEP	3.02	0.09	255,681	40.17	0.093	23.05	PLXS	0.30	0.010	174,481	57.60	0.125	21.74
OIA	16.93	0.10	73,578	7.67	0.017	22.76	AWP	0.69	0.012	402,327	6.15	0.011	17.48
PBT	4.83	0.10	100,106	8.91	0.033	37.49	DAKT	0.20	0.010	173,399	9.13	0.023	25.10
PCK	18.47	0.07	71,701	9.15	0.021	23.21	ETV	0.49	0.008	205,388	15.31	0.016	10.33
PFLT	3.58	0.11	197,419	13.65	0.020	14.98	DGRW	0.09	0.002	226,271	39.48	0.016	3.99
PFMT	8.21	0.07	68,953	2.11	0.054	265.29	FSS	0.24	0.008	271,757	20.34	0.032	15.75
PGP	6.66	0.07	65,178	15.61	0.071	46.24	EXLS	0.26	0.009	149,278	56.40	0.142	24.91
PMF	8.46	0.07	79,512	13.26	0.024	18.20	SKYY	0.42	0.008	219,272	46.15	0.032	7.24
PMX	14.86	0.06	65,449	11.50	0.019	16.19	CII	0.61	0.010	130,256	15.59	0.018	11.60
SDLP	6.34	0.09	377,760	3.42	0.017	50.24	FUL	0.31	0.012	362,459	51.90	0.062	12.11
SHLO	1.77	0.06	135,927	9.68	0.058	60.99	UFCS	0.36	0.012	76,492	47.53	0.233	48.58
SJT	5.54	0.10	186,679	6.96	0.028	40.45	GRAM	0.41	0.008	236,863	3.44	0.044	134.58
SLRC	2.38	0.09	103,705	21.28	0.040	18.90	PFS	0.18	0.007	184,245	25.94	0.043	16.64
SPH	5.60	0.15	279,196	24.42	0.046	18.83	CNMD	0.36	0.012	154,890	58.57	0.184	31.64
TCPG	4.35	0.11	227,052	15.54	0.019	11.89	NFJ	0.46	0.007	264,566	12.95	0.014	10.78
TOUR	1.30	0.07	200,307	7.59	0.031	43.03	SYKE	0.17	0.007	155,555	29.58	0.075	25.34
TSLX	2.64	0.08	244,727	19.71	0.022	11.23	FBC	0.23	0.008	249,281	32.55	0.052	16.08
VOC	12.82	0.11	56,733	4.58	0.042	92.38	CCU	0.17	0.008	182,729	26.46	0.053	19.89
WBK	1.96	0.07	265,250	23.11	0.017	7.36	IFGL	0.04	0.001	110,807	28.91	0.028	9.67
WLDN	3.13	0.10	91,458	29.62	0.155	52.79	FTGC	0.35	0.007	92,367	20.22	0.031	15.42
WSR	1.66	0.07	363,836	12.96	0.019	15.03	SOCL	0.55	0.011	63,186	31.00	0.075	24.28
Avg	5.53	0.09	164,212	16.33	0.045	39.05	Avg	0.34	0.008	198,201	32.45	0.070	21.82

2. Economic Impact of the BX RPI Program on Execution Quality

To assess the execution quality of the Program, BX focused on symbol-day combinations when during market hours: (i) An RMO execution occurred on BX, (ii) a non-RMO execution occurred on BX, and (iii) a tape-eligible trade occurred on BX. Symbol day combinations are aggregated to overall daily statistics by either a simple average or by volume weighting by RMO executed volume during market hours.²⁵ This results in the number and identity of symbols captured in each daily average changing from day to day. Using this data, the Exchange examined whether the economic outcomes for RMO trades differs from non-RMO trades and/or all trades.

²⁵ Both RMO and non-RMO execution quality values are weighted by RMO volume and a very small number of extreme outlier symbol-day stats have been removed from the analysis.

When comparing average price improvement for RMO and non-RMO executions for a subset of 100 stocks with the largest number of RMO shares executed, the price improvement seen in RMO and non-RMO trades is comparable over the life of the Program. When volume weighting the average price improvement by RMO volume to emphasize those stock/day combinations with the highest volume traded in RMO, average price improvement on BX for both RMO and non-RMO trades appear generally comparable over time, with RMO price improvement generally beating non-RMO. Note that this price improvement measure does not take rebates into account.

In the subset of active RMO symbols, RMO volume-weighted effective and realized spreads for RMO and all executions, which includes RMO executions, are generally comparable throughout the duration of the Program.

Similar to regular, liquidity-taking orders on BX, the Program offers inverted pricing where RMO orders receive a rebate (on top of the price improvement they receive) when executing against RPI liquidity, while there is a fee associated with RPI orders which post non-displayed, price-improving liquidity. RPI orders are charged \$0.0025 per share. Retail Orders currently receive a rebate of \$0.0021 per share when executing against RPI liquidity, a rebate of \$0.0000 per share when executing against other hidden, price-improving liquidity, and a rebate of \$0.0017 per share when executing against other displayed liquidity on the BX book.

3. Are Only Eligible Participants Accessing Program Liquidity

Only RMOs that have been approved by BX can enter RMO orders that access the Program liquidity, and the System does not allow non-RMO orders to access RPI providing orders. The System

does not allow non-RMO orders to access RPI providing orders. BX Rule 4780(c) enables BX at its sole discretion to disqualify RMO members that submit orders that fail to meet any of the requirements of the rule.

4. Is the Program Attracting Retail Participation

The Program has attracted some retail orders to the Exchange and participation in the Program has continued to increase over time. The Exchange believes that the Program provided tangible price improvement and transparency to retail investors through a competitive pricing process.

Brokers route retail orders to a wide range of different trading systems. The Program offers a transparent and well-regulated option providing competition and price improvement. BX believes that it has achieved its goal of attracting retail order flow to BX and, as stated above, it has resulted in a significant price improvement to retail investors through a competitive pricing process. The Exchange also has not detected any negative impact to market quality or to

retail investors as the Program has continued to grow over time.

On average, an RMO execution continues to get more price improvement than the minimum \$0.001 price improvement required of an RPI liquidity-providing order in the Program, and over time the price improvement seen on BX in non-RMO orders does not appear to be negatively impacted by the introduction of the Program.

5. Net Benefits of the Program on Participants

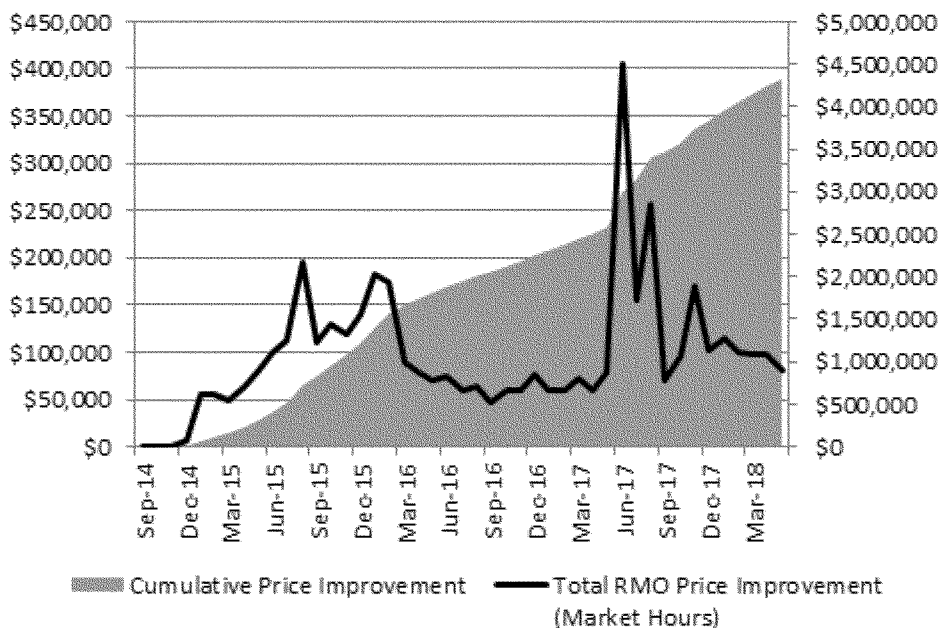
The Exchange believes that the Program through retail order segmentation does create greater retail order flow competition and thereby increases the amount of this flow to BX. This helps to ensure that retail investors benefit from the price improvement that liquidity providers are willing to provide. The Program promotes competition for retail order flow by allowing Exchange members to submit RPI Orders to interact with Retail Orders. Such competition promotes efficiency by facilitating the price discovery process and generating

additional investor interest in trading securities, thereby promoting capital formation.

The Program also promotes competition for retail order flow among execution venues, and this benefits retail investors by creating additional price improvement opportunities for marketable retail order flow, most of which is currently executed in the OTC markets without ever reaching a public exchange. The Exchange believes that it has achieved its goal of attracting retail order flow to BX, and has resulted in price improvement to retail investors through a competitive pricing process. The data also demonstrates that the Program has continued to grow over time and the Exchange has not detected any negative impact to market quality or to retail investors.

The price improvement chart below demonstrates retail firms have received price improvement through their use of the Program that they otherwise may not have received. This is a net benefit to the retail firms as well as the firms who are able to compete to interact with the retail firms.

Monthly and Cumulative Price Improvement



6. Overall Success in Achieving Intended Benefits

The Program has demonstrated the effectiveness of a transparent, on-exchange retail order price improvement functionality, and while

small relative to total consolidated volume, has achieved its goals of attracting retail order flow and providing those orders with price improvement totaling tens of thousands of dollars each month.

The Program provides additional competition to the handling of retail orders. The added opportunity for price improvement provides pressure on other more established venues to increase the price improvement that they provide. By doing this, the

Exchange believes that the Program may have a greater positive effect than the market share would directly indicate.

Can the Program Be Improved

The Program provides a transparent, well-regulated, and competitive venue for retail orders to receive price improvement. The size of the Program is somewhat limited by the rules that prevent BX from matching features offered by non-exchange trading venues. Nonetheless, the Exchange believes the Program is worthwhile and it will continue to look for ways to further innovate and improve the Program. The Exchange believes that making the pilot permanent is appropriate and through this filing seeks to make permanent the current operation of the Program.

Conclusion

In conclusion, the Exchange notes the Program provided opportunities for retail investors to get significant price improvement on an exchange where they otherwise would not have had the opportunity to do so. The Exchange believes the Program did not have a negative impact on the market quality as evidenced by the lack of consistent statistical evidence of an impact and the small size of the Program.

Accordingly, the Exchange believes that the pilot Program's rules, as amended, should be made permanent. Additionally, the Exchange notes that the proposed change is not otherwise intended to address any other issues and the Exchange is not aware of any problems that member organizations would have in complying with the proposed rule change.

2. Statutory Basis

The Exchange believes that the proposed rule change is consistent with the provisions of Section 6 of the Act,²⁶ in general, and with Section 6(b)(5) of the Act,²⁷ in particular, in that it is designed to promote just and equitable principles of trade, 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 and not to permit unfair discrimination between customers, issuers, brokers, or dealers.

The Exchange believes that making the pilot Program permanent is consistent with these principles because the Program is reasonably designed to attract retail order flow to the exchange environment, while helping to ensure that retail investors benefit from the

better price that liquidity providers are willing to give their orders. During the pilot period, BX has provided data and analysis to the Commission, and this data and analysis, as well as the further analysis in this filing, shows that the Program has operated as intended and is consistent with the Act. The data and analysis provided to the Commission staff demonstrates that the Program provided tangible price improvement to retail investors through a competitive pricing process unavailable in non-exchange venues and otherwise had an insignificant impact on the marketplace. Making the Program permanent would encourage the additional utilization of, and interaction with, the Exchange and provide retail customers with an additional venue for price discovery, liquidity, competitive quotes, and price improvement.

Additionally, the Exchange believes the proposed rule change is designed to facilitate transactions in securities and to remove impediments to, and perfect the mechanisms of, a free and open market and a national market system because the competition promoted by the Program facilitates the price discovery process and potentially generate additional investor interest in trading securities. Making the pilot Program permanent will allow the Exchange to continue to provide the Program's benefits to retail investors on a permanent basis and maintain the improvements to public price discovery and the broader market structure. The data provided by BX to the SEC staff demonstrates that the Program provided tangible price improvement and transparency to retail investors through a competitive pricing process.

For the reasons stated above, the Exchange believes that making the Program permanent would promote just and equitable principles of trade and remove impediments to and perfect the mechanism of a free and open market.

As described below in BX's statement regarding the burden on competition, the Exchange also believes that it is subject to significant competitive forces and it would increase competition among execution venues, encourage additional liquidity, and offer the potential for price improvement to retail investors.

For all of these reasons, the Exchange believes that the proposal is consistent with the Act.

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

The Exchange 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, as amended. BX believes that making the Program permanent would continue to enhance competition for retail order flow among execution venues and contribute to the public price discovery process.

The Exchange believes that the data supplied to the Commission and experience gained over the life of the pilot have demonstrated that the Program creates price improvement opportunities for retail orders that are equal to what would be provided under OTC internalization arrangements, thereby benefiting retail investors and increasing competition between execution venues. BX also believes that making the Program permanent will promote competition between execution venues operating their own retail liquidity programs. Such competition will lead to innovation within the market, thereby increasing the quality of the national market system.

Additionally, the Exchange notes that it operates in a highly competitive market in which market participants can easily direct their orders to competing venues, including off-exchange venues. In such an environment, the Exchange must continually review, and consider adjusting the services it offers and the requirements, it imposes to remain competitive with other U.S. equity exchanges.

For the reasons described above, BX believes that the proposed rule change reflects this competitive environment.

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

No written comments were either solicited or received.

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

Within 45 days of the date of publication of this notice in the **Federal Register** or within such longer period (i) as the Commission may designate up to 90 days of such date if it finds such longer period to be appropriate and publishes its reasons for so finding or (ii) as to which the Exchange consents, the Commission shall: (a) By order approve or disapprove such proposed rule change, or (b) institute proceedings to determine whether the proposed rule change should be 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.

²⁶ 15 U.S.C. 78f.

²⁷ 15 U.S.C. 78f(b)(5).

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 email to rule-comments@sec.gov. Please include File Number SR-BX-2019-011 on the subject line.

Paper Comments

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

All submissions should refer to File Number SR-BX-2019-011. This file number should be included on 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 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 offices of the Exchange. 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-BX-2019-011, and should be submitted on or before June 5, 2019.

For the Commission, by the Division of Trading and Markets, pursuant to delegated authority.²⁸

Eduardo A. Aleman,

Deputy Secretary.

[FR Doc. 2019-09966 Filed 5-14-19; 8:45 am]

BILLING CODE 8011-01-P

SOCIAL SECURITY ADMINISTRATION

[Docket No. SSA 2019-0002]

Privacy Act of 1974; Matching Program

AGENCY: Social Security Administration (SSA).

ACTION: Notice of a new matching program.

SUMMARY: In accordance with the provisions of the Privacy Act, as amended, this notice announces new matching program with the Law Enforcement Agency (Source Jurisdiction).

The purpose of this agreement is to establish the terms, conditions, and safeguards under which SSA will conduct a computer matching program with Source Jurisdiction in accordance with the Privacy Act of 1974, as amended by the Computer Matching and Privacy Protection Act of 1988, and the regulations and guidance promulgated thereunder, to identify individuals in the Source Jurisdiction who are (1) fleeing fugitive felons, parole violators, or probation violators, as defined by the Social Security Act (Act) and in accordance with the Martinez Settlement and the Clark Court Order, as defined below; and who are also (2) Supplemental Security Income (SSI) recipients, Retirement, Survivors and Disability Insurance (RSDI) beneficiaries, Special Veterans Benefit (SVB) beneficiaries, or representative payees for SSI recipients, RSDI beneficiaries, or SVB beneficiaries.

DATES: The deadline to submit comments on the proposed matching program is 30 days from the date of publication of this notice in the **Federal Register**. The matching program will be applicable on October 10, 2019, or once a minimum of 30 days after publication of this notice has elapsed, whichever is later. The matching program will be in effect for a period of 18 months.

ADDRESSES: Interested parties may comment on this notice by either telefaxing to (410) 966-0869, writing to Mary Ann Zimmerman, Acting Executive Director, Office of Privacy and Disclosure, Office of the General Counsel, Social Security Administration, G-401 WHR, 6401 Security Boulevard, Baltimore, MD 21235-6401, or emailing MaryAnn.Zimmerman@ssa.gov. All comments received will be available for public inspection by contacting Ms. Zimmerman at this street address.

FOR FURTHER INFORMATION CONTACT: Interested parties may submit general questions about the matching program to Mary Ann Zimmerman, Acting

Executive Director, Office of Privacy and Disclosure, Office of the General Counsel, by any of the means shown above, or call (410) 965-8850.

SUPPLEMENTARY INFORMATION: None.

Mary Zimmerman,

Acting Executive Director, Office of Privacy and Disclosure, Office of the General Counsel.

Participating Agencies

SSA and Source Jurisdiction.

Authority for Conducting the Matching Program

The legal authority for the matching program conducted under this agreement is: Sections 1611(e)(4)(A), 202(x)(1)(A)(iv) and (v), and 804(a)(2) and (3) of the Act (42 U.S.C. 1382(e)(4)(A), 402(x)(1)(A)(iv) and (v), and 1004(a)(2) and (3)), which prohibit the payment of SSI, RSDI, or SVB benefits to an SSI recipient, RSDI beneficiary, or SVB beneficiary for any month during which such individual flees to avoid prosecution, or custody or confinement after conviction, under the applicable laws of the jurisdiction from which the person flees, for a crime or attempt to commit a crime considered to be a felony under the laws of said jurisdiction. These sections of the Act also prohibit payment of SSI, RSDI, or SVB benefits to a recipient/beneficiary in jurisdictions that do not define such crimes as felonies, but as crimes punishable by death or imprisonment for a term exceeding 1 year (regardless of the actual sentence imposed), and to an individual who violates a condition of probation or parole imposed under Federal or state law. As a result of a settlement of a nationwide class action in *Martinez v. Astrue*, No. 08-4735 (N.D. Cal. September 24, 2009) (Martinez Settlement), SSA's nonpayment of benefits under these sections of the Act is limited to individuals with certain flight- or escape-coded warrants. Further, as a result of a settlement of a nationwide class action in *Clark v. Astrue*, 06 Civ. 15521 (S.D. NY, April 13, 2012) (Clark Court Order), SSA's nonpayment of benefits under these sections of the Act cannot be based solely on the existence of parole or probation arrest warrants. Sections 1631(a)(2)(B)(iii)(V), 205(j)(2)(C)(i)(V), and 807(d)(1)(E) of the Act (42 U.S.C. 1383(a)(2)(B)(iii)(V), 405(j)(2)(C)(i)(V), 1007(d)(1)(E)), which prohibit SSA from using a person as a representative payee when such person is a person described in sections 1611(e)(4)(A), 202(x)(1)(A)(iv), or 804(a)(2) of the Act. The legal authority for SSA's disclosure of information to the Source Jurisdiction is: Sections

²⁸ 17 CFR 200.30-3(a)(12).