

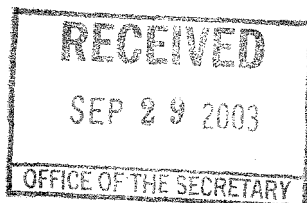
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CAP ANALYSIS

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September 26, 2003

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HAND DELIVERY

Mr. Jonathan G. Katz
Secretary
Securities and Exchange Commission
450 Fifth Street, N.W.
Washington, D.C. 20549

Re: Securities Exchange Act Release No. 48355: File No. SR-BSE-2002-15

Dear Mr. Katz:

Attached is a white paper outlining some of the market implications of the Proposed Rule Change as filed by the Boston Stock Exchange. The CapAnalysis Group was requested to analyze the Proposed Rule Change by the Chicago Board Options Exchange.

Please do not hesitate to call me if you have any questions. My direct dial is (202) 383-6633.

Sincerely yours,

A handwritten signature in black ink, appearing to be "James C. Miller III". The signature is written over a large, stylized, handwritten flourish that resembles a large, open loop or a stylized "J".

James C. Miller III

- cc: Chairman William Donaldson
Commissioner Paul S. Atkins
Commissioner Roel C. Campos
Commissioner Cynthia A. Glassman
Commissioner Harvey J. Goldschmid
Annette Nazareth Director,
Director Division of Market Regulation
Lori Richards, Director Office of
Compliance Inspections and Examinations
Stephen Cutler, Director, Division of Enforcement
Lawrence Harris, Office of Economic Analysis
Robert L.D. Colby, Deputy Director,
Division of Market Regulation
Elizabeth King, Associate Director, Division of Market Regulation
Stephen Williams, Economist, Division of Market Regulation

**MARKET IMPLICATIONS OF THE PROPOSED RULE
CHANGE BY BOSTON STOCK EXCHANGE, INC.
ESTABLISHING BOSTON OPTIONS EXCHANGE
AND THE ASSOCIATED PRICE
IMPROVEMENT PERIOD**

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CAP ANALYSIS

Market Implications of The Proposed Rule Change by Boston Stock Exchange, Inc. Establishing Boston Options Exchange and Associated Price Improvement Period

I. INTRODUCTION

Boston Stock Exchange, Inc.'s ("BSE's") Proposed Rule Change filed with the U.S. Securities and Exchange Commission ("SEC") was noticed for public comments on January 14, 2003. BSE's Proposed Rule Change requests permission to establish a new options trading facility, Boston Options Exchange ("BOX"), and describes a bidding process – Price Improvement Period ("PIP"). The proposed rules applying to BOX have been amended over time. The last amendment was filed on August 21, 2003.

CapAnalysis was asked by the Chicago Board Options Exchange ("CBOE") to review BOX's proposed format and operating procedures to determine whether such a format would be conducive or detrimental to the types and degree of competition that are considered beneficial to investors. We have reviewed the proposed trading rules for BOX and in particular the PIP process. We outline some potential elements of the PIP that are highly susceptible to a type and level of internalization that would be detrimental to investors. We also discuss other questionable elements and predictable outcomes related to the BOX format, referencing recent research as to the likely effects of such practices. We find these practices merit the concern of the Commission and should be evaluated in detail prior to accepting any operating procedures for BOX.

II. SUMMARY OF CONCLUSIONS

Our analysis of the proposed BOX format leads to the following conclusions:

1. The BOX format appears to incorporate or is susceptible to a number of the structural conditions previously identified by the Commission as being detrimental to investors. This conclusion is based on the same well-

accepted economic principles relating to market transparency and access to investors upon which the Commission has traditionally relied in considering other trading formats and procedures.

2. **As** currently structured, BOX appears conducive to a high degree of internalization, which has been considered elsewhere by the Commission to be problematic in terms of offering investors the benefits of efficiency and price improvement. Specifically, the BOX's PIP format appears susceptible to adverse selection, and would likely result in a wider NBBO¹ than would occur without PIP.
3. By benchmarking directly to, rather than meaningfully supporting, the NBBO, the BOX format may foreclose investors from a meaningful degree of price competition.

111. PIP AND THE POTENTIAL FOR INTERNALIZATION

Internalization occurs when the dealer-broker acts as both the buyer and seller for a transaction.² Internalization, as defined by Professor Harris, occurs "*when [dealer-brokers] fill client orders themselves.*"³ As a result of such internalization, instead of routing an order to a market or market makers for execution, and thereby allowing the broadest basis for potential price improvement, the broker fills the order from the firm's own inventory.

The probability of PIP's facilitating widespread internalization depends on the answer to the following consideration, namely, whether there are any features of the PIP process that render it ineffective as a means of generating meaningful competition. In

¹ NBBO refers to the National Best Bid and Offer -- represented to be the fair market price for an option based on the liquidity in the entire market (www.investopedia.com/terms/n/nbbo.asp).

² See, for example, <http://www.sec.gov/answers/internalization.htm>.

³ Larry Harris, *Trading and Exchanges: Market Microstructure for Practitioners* (New York: Oxford University Press, 2003), p. 161. See also, SEC Special Study: Payment for Order Flow and Internalization in the Options Markets, Office of Compliance Inspections and Examinations, Office of Economic Analysis, December 2000, p. 3 - "*In addition, other inducements also have arisen in the options markets, such as "internalization" of retail options orders, i.e. firms trading as counter-parties with their customer orders, or firms routing to affiliated specialists, and reciprocal order routing agreements.*"

our determination, the PIP process, as it is currently proposed, would likely facilitate excessive internalization of this sort.⁴

Various of these specific features are discussed below.

The PIP process allows trading in one-penny increments, rather than the five-to-ten-cent price-improvement increments allowed elsewhere on BOX, and on the other options exchanges. Thus, the PIP process would allow the Order Flow Provider (“OFP”) to internalize orders at a minimal cost of one penny above the NBBO. Even though under this sort of internalization the customer will get a price that is one penny better than the NBBO, customers may pay a price higher than what they otherwise would have paid. The NBBO may well be lower in the absence of the internalization both facilitated by BOX and by the necessity of other exchanges reasonably responding to BOX by increasing internalization opportunities. Moreover, as discussed later, the proposed PIP and associated internalization might allow OFPs to maximize profits at the expense of the customer rather than facilitate difficult customer orders for the benefit of the customer.

PIP also proposes to feature a three-second auction period that restricts meaningful competition. This three-second period is a much more limited time frame than the ten-second exposure approved by the Commission with respect to the International Securities Exchange LLC (“ISE”). Originally, ISE sought a five-second exposure period.⁵ ISE subsequently filed Amendment No. 1 to its proposal, increasing the proposed exposure time to ten seconds. The Commission approved ISE’s amended proposal, suggesting that a meaningful distinction in trading outcomes occurs in a format operating for less than ten seconds.⁶ BOX’s proposed three-second exposure period would appear to raise at least the same concerns the Commission found at fault with ISE’s original five-second format.

⁴ See, for example, Robert Battalio, Brian Hatch, and Robert Jennings, “*Analysis of the Boston Stock Exchange’s Proposal to Create the Boston Options Exchange*,” March 10, 2003. Professors Battalio, Hatch, and Jennings conclude that the BOX mechanism, as proposed, would likely lead to internalization and the problems associated with it.

⁵ Securities Exchange Act Release No. 34-44612 (July 27, 2001), 66 FR 41074.

⁶ Securities Exchange Act Release No. 34-46514 (September 18, 2002), 67 FR 60267.

The interaction of the three-second exposure proposal with the 40 percent guarantee based on the OFP's matching the best price would also likely limit participation of other traders/customers in the PIP process. According to the BOX proposed rules, the OFP is guaranteed at least 40 percent of the order it originates if the OFP matches the best price offer, even if it is the last to do so before the three-second price improvement period expires.⁷ In an options trading facility, like BOX, that operates under very short time limits and is subject neither to an established presence of multiple market makers nor to significant inter-exchange competition, such an arrangement is likely to provide little incentive for other traders to improve the price aggressively.

The PIP process also seems to make it difficult for other traders to participate and price-improve in the bidding process. Customer orders have no priority. Even with its proposal amendments, the ability of traders/customers to participate in the PIP would be limited. A recent amendment would allow a customer limit order to participate in the PIP if it met the complicated requirements of the Customer PIP Order ("CPO"). These requirements include (i) the CPO must be at the NBBO which is in effect when the PIP is initiated, and (ii) customers must have pre-defined their trading strategy, i.e., the price improvements that are acceptable to them. Given these complicated, cumbersome requirements of the CPO, it is unlikely that many customer limit orders would affect the PIP in any significant way.

IV. PROBLEMS GENERALLY IDENTIFIED WITH INTERNALIZATION

A. Adverse Selection

The PIP process and the internalization associated with it would allow adverse selection. Adverse selection, as that term is used in the economic literature, occurs when certain market participants, using private information, are able to engage in transactions

⁷ The recent amendment allows for directed orders from an OFP to a market maker. This appears to be a payment for order flow mechanism, allowing such market makers to take advantage of the OFP's 40 percent participation rate without establishing the best price.

favorable to them and leave the less favorable transactions to others. Adverse selection and its associated ramifications (market failure, equilibrium where supply and demand are not equivalent, and price rigidities) are broadly covered in the economic literature.’

In this case, the BOX format appears susceptible to adverse selection because the OFP has the ability to identify and retain more profitable orders while directing the less profitable orders elsewhere within the market. For example, assume a customer of the OFP wants to sell 100 contracts and the current NBBO is \$1.95. The OFP has a choice when it receives an order for those contracts. It can either buy them itself (at one cent above the NBBO⁹) using PIP or it can take the order to the market maker, i.e., the liquidity provider in this market.

Consider two circumstances related to the proposed order. In one, the OFP considers the customer to be particularly well informed in the underlying market for the security, while in the other, the customer does not hold such specialized knowledge. In the first case, the OFP might suspect that if the informed trader is willing to sell at \$1.95, the true price of this option might well be below \$1.95. Given the relatively low margin on this order, the OFP would have no incentive to internalize this order and, thus, in all likelihood would send the order to another exchange to be executed by market makers. On the other hand, in the case of the uninformed trader, the OFP (who thinks the true price is at, say, \$1.98) would be very willing to buy these contracts at \$1.95 (the NBBO) or \$1.96 (the NBBO plus one cent). In this case, OFP would have an incentive to take this order through a PIP process and internalize it.

⁸ See, for example, Joseph Stiglitz and Andrew Weiss, “*Credit Rationing in Markets with Imperfect Information*,” *American Economic Review*, 1981, pp. 393-410. This article identifies adverse selection as it arises in the loan market. The authors observe that when a bank makes a loan, it cannot perfectly monitor the riskiness of the borrower’s investments. One response of a borrower to a high interest rate might be to take on more risky projects. A bank may sometimes be unwilling to raise the interest rate in the face of excess demand for loans for fear that the increased interest rate will drive the borrowers to pursue riskier projects, to the bank’s disadvantage. Therefore, the bank might refuse to make additional loans rather than raise the interest rate. As in this example, asymmetric information leads to an equilibrium in which supply does not equal demand and there is rigidity in a price variable – the asymmetric information creates incentives for adverse selection.

⁹ As discussed above, BOX allows a one-penny improvement, which is below the normal five-to-ten cent trading increments allowed generally.

Professors Battalio and Holden show that if brokers can distinguish between informed and uninformed orders, they can profit by internalizing uninformed orders.¹⁰

The broker's ability to use the PIP as a vehicle to internalize more profitable contracts while redirecting less profitable ones to the market maker would affect the market maker's ability to remain profitable. In this circumstance, the PIP would free ride on the liquidity provided by the market maker.

As the object of adverse selection, the market maker ultimately would be less willing to provide liquidity. Furthermore, the market maker would also understand that the trade was originated by the OFP and account for this (imperfect) signal from the OFP. Thus, if the order to sell 100 contracts at \$1.95 came to the market maker from the OFP, the market maker would recognize that the true price of this option is probably less than \$1.95. The market maker might decrease his bid from \$1.95 to \$1.90, thus increasing the spread.

Similarly, Professor Harris explains –

“Dealers expose themselves to well informed traders and to large traders when they offer firm quotes that any trader can take. They therefore quote wider spreads than they would quote if they traded only with small uninformed traders.” ... “The internalization and preferencing of order flows take orders away from traders who price aggressively. Internalization and preferencing therefore place aggressive dealers and limit order traders at a disadvantage and thereby weaken incentives to price aggressively. Internalization and preferencing thus increase bid/ask spreads

¹⁰ Robert Battalio and Craig Holden, “*Why Doesn't Decimal Trading Eliminate Payment for Order Flow and Internalization?*,” Working Paper, 1996; and Robert Battalio and Craig Holden, “*A Simple Model of Payment for Order Flow, Internalization and Total Trading Cost*,” Journal of Financial Markets, 2001, pp. 33-71.

relative to what they would be if brokers routed all orders to traders who offered the best prices.”¹¹

Thus, adverse selection facilitated by PIP could be expected to increase bid-ask spreads and undermine the quality of the NBBO by restricting the amount of liquidity upon which the NBBO is based (market fragmentation). PIP and other similar formats could be expected to detract from the value of the NBBO.¹²

B. Market Fragmentation and Free Riding

Internalization is also criticized because it results in market fragmentation. *“Internalization, order preferencing, and internal order crossing all arrange trades away from organized markets. Traders say that these practices fragment the market.” “Less obviously, traders and regulators wonder whether these practices hurt the market by making it more difficult for traders to find each other.”¹³*

In this case, the PIP process would allow liquidity to be pulled out of the broader market and put in a separate bidding process (segmented markets). Moreover, because the PIP simply benchmarks to the NBBO before offering any price improvement, the PIP would not contribute to or support the NBBO process. Thus, PIP would likely divert liquidity away from other markets, where the NBBO is likely to be determined, to BOX. **By free riding on NBBO, BOX would undercut NBBO.**¹⁴

Traders taking advantage of the PIP mechanism with a three-second market would fragment the market and undermine the inter-market linkages, which are designed to pool market liquidity. Moreover, as other exchanges reasonably respond to the PIP

¹¹ Larry Harris, *Trading and Exchanges*, pp. 519-520.

¹² The response of other exchanges to the PIP and internalization would likely further erode the value of the NBBO.

¹³ Larry Harris, *Trading and Exchanges*, p. 514.

¹⁴ This should also undermine the recent effort to establish inter-market linkages allowing for more broad-based supply of liquidity.

with penny-trading and other possible mechanisms for internalization, the NBBO might be further devalued and linkage may be further undermined.¹⁵

Accordingly, the consumer can be made worse off in a world with PIP and NBBO than in a world with only NBBO. The analysis presented here regarding the problems of asymmetric information, adverse selection, market fragmentation, and free riding suggest that in a trading format with PIP and its likely level of internalization, the bid-ask spread would actually increase. That is, the NBBO-ask (with PIP) would be higher than the NBBO-ask (without PIP), and the NBBO-bid (with PIP) would be lower than otherwise. In such a case, even when an investor got a penny improvement over the existing NBBO, the investor nonetheless would be worse off than if there were no PIP (and no penny improvement). The alternative to PIP is likely to be a lower NBBO based on liquidity in the entire market.

V. CONCLUSION

As currently proposed, the BOX format raises several potential concerns for investors that merit careful consideration by the Commission. Chief among these concerns is the likelihood that the PIP process would result in significant internalization. The potential for internalization stems from structural impediments to the price discovery process. Moreover, rather than offering investors meaningful price improvement, the PIP might well devalue NBBO, the basis on which the system is designed to free-ride.

As currently proposed, BOX raises other concerns that warrant further research and evaluation before a format could be deemed acceptable. These include:

1. The interaction between the 40 percent guarantee to the OFP and the three-second PIP.

¹⁵ They can't respond with the PIP process itself because BSE has a patent pending for PIP.
<http://www.bostonoptions.codprii.php>

2. Whether this interaction might unduly limit price competition. According to recent research by Professor Roth and Ockenfels, “*the fraction of bids submitted in the closing seconds of the auction is substantially larger in eBay than in Amazon, and more experience causes bidders to bid later on eBay, but earlier on Amazon ... [Infact] there is even a market for bidding software that makes snipping [last minute bidding] easy.*¹⁶ In this case, last-minute bidding will not only limit price competition but also increase the likelihood of the OFP’s emerging as a price leader.
3. A determination of the “costs” of internalization as they pertain to the combination of price and quality in the execution of investor orders.
4. Whether and the extent to which the BOX format is predicated on free riding off other exchanges, and in turn whether such free riding would threaten the NBBO system.

In conclusion, until answers to these questions can be ascertained and evaluated, it does not seem prudent to approve the proposed BOX rules including the PIP process.

¹⁶ Alvin Roth and Axel Ockenfels, “*Last-Minute Bidding and the Rules for Ending Second-Price Auctions: Evidence from eBay and Amazon Auctions on the Internet,*” American Economic Review, forthcoming, pp. 2-3.