January 2, 2019

Mr. Brent J. Fields, Secretary

Securities and Exchange Commission

100 F. Street, NE

Washington, D.C. 20549

Re: Release No. 34-83728, File No. SR-BOX-2018-24; Release No. 34-84823; File No. SR-BOX-2018-37

Dear Mr. Fields:

I appreciate the opportunity to provide feedback and comment to the Securities and Exchange Commission with respect to its review of the filings for changes in connectivity pricing by the BOX options facility. From an economic perspective filings with respect to connectivity pricing raise important issues about the nature of competition for these services and whether the filings satisfy the statutory standards of the Exchange Act. These standards are based upon economic principles and require that the prices implemented be fair and reasonable, not unduly discriminatory and not impose an undue burden on competition.

The filings by BOX point to the prices charged by other exchanges, suggesting that its own prices are reasonable because "they are competitive with those charged by another exchange." It argues that the prices "constitute and equitable allocation of fees, and are not unfairly discriminatory" because they allow the Exchange to recover its costs of offering access through network connections. It suggests that the connectivity fees "are not unfairly discriminatory" as they are assessed on all market participants who wish to connect through the BOX network. It argues that in a highly competitive environment for trading, BOX does not have market power for pricing its services.

As an economist, my judgment is that these conclusions do not follow from the proper invocation of economic principles. That the filings point to prices charged by other exchanges does not address whether there was sufficient regulatory review of those prices or any assessment of the differences among exchanges in the use and value of the connectivity.[1] That the pricing allows BOX to recover costs does not establish that prices "are not unfairly discriminatory" as it does not provide information about the allocation of the charges, which clearly could discriminate against certain classes of market participants. The magnitude of the underlying cost also is not detailed in the filings, but discussion of the cost of exchange connectivity by IEX (in an equity context) suggests that the BOX filings would result in extraordinary margins and be potentially consistent with an undue burden on competition.[2]

[1] In an oligopolistic equilibrium firms would charge the same price as one another (as with competitive prices). In the instant situation the markets for connectivity are segmented and potentially dissimilar (e.g., due to differences in activity among exchanges).

[2] See Ramsay, J., September 26, 2018, "Shakedown in New Jersey: The Hidden Cost of Exchange Connectivity." While explicit comparison is made to somewhat higher NYSE and Nasdaq fees, the underlying point remains valid for the proposed BOX fees.

Furthermore, the structure of connectivity pricing does not appear to be associated with the relative usage of various market participants and any costs that they impose. Excessive connectivity fees, which are a significant fixed cost, act as a large entry barrier operating against small customers (e.g., compared to trading costs). Additionally, while the market for trading itself is relatively competitive, direct connectivity to BOX is controlled by it and subject to market power. For example, one cannot go to the CBOE to purchase direct connectivity to BOX, despite the competition for trading and order flow in the options market. This suggests that the markets for connectivity are segmented. Competition in trading is not the same as competition in connectivity (also see U.S. Treasury Capital Markets Report).

As an economist who studies market structure and trading and who was trained in industrial organization as well as financial economics, I do not feel that the filings provide sufficient information or data to assess the competitiveness of the market for connectivity. It provides little information about the market to either the SEC or outsiders. What is the nature of the competition for connectivity services? How viable are the alternatives and what is the magnitude of the consequences for indirect connectivity vs. co-location? Who are the suppliers and what do they charge? Who purchases such services in various manners? What evidence is there about the elasticity of demand? As an academic who is very interested in the industrial organization of exchange services and trading, I would be delighted to have sufficient information to help me understand the nature of the pricing for exchange services, but such information in not readily available from the filings or otherwise. Transparency in this area also is very important to market participants and regulators.

By way of background, I served as Chief Economist of the Commission (2004-2007) during the adoption and implementation of Regulation NMS and served as a member of the Commission's Equity Market Structure Advisory Committee (EMSAC) from 2015 through 2017. My academic expertise has addressed many related questions. In recent years I have analyzed the conflicts of interest that have resulted from the structure of fees and rebates[3] under Regulation NMS as well as the nature of market power by exchanges for the structure of equity trading.[4] My work in the market structure arena has included the earliest published study of the interaction between the order flow and limit order book,[5] a study of competition between platforms in the pre-NMS period[6] and a survey of market microstructure theory.[7] In industrial organization economics I

---

[3] Angel, J., L. Harris and C. Spatt, 2011, "Equity Trading in the 21st Century," *Quarterly Journal of Finance* 1, 1-53; Angel, J., L. Harris and C. Spatt, 2015, "Equity Trading in the 21st Century: An Update," *Quarterly Journal of Finance* 5, 1-39; and Spatt, C., 2018, "The New Realities of Market Structure and Liquidity: Where Have We Been? Where Are We Going?" Chapter 13 (page 247-263) in *Public Policy and Financial Economics: Essays in Honor of Professor George G. Kaufman for His Lifelong Contributions to the Profession*, World Scientific Publishing Co., Singapore.

[4] See, C. Spatt, revised December 5, 2018, "Is Equity Market Structure Anti-Competitive?"

[5] See B. Biais, P. Hillion, C. Spatt, 1995, "An Empirical Analysis of the Limit Order Book and the Order Flow in the Paris Bourse," *Journal of Finance* 50, 1655-1689.

[6] See B. Biais, C. Bisiere and C. Spatt, 2010, "Imperfect Competition in Financial Markets: An Empirical Study of Island and Nasdaq," *Management Science* 56, 2237-2250.

[7] See B. Biais, L. Glosten and C. Spatt, 2005, "Market Microstructure: A Survey of Microfoundations, Empirical Results, and Policy Implications," *Journal of Financial Markets* 8, 217-264.

have studied questions involving price discrimination,[8] network externalities[9] and learning. I also have undertaken visible research in financial economics in various other domains including trading networks and bid-ask spreads in the bond market, arbitrage and trading, foundational aspects of mortgages, and taxes and asset allocation. I was one of the founders in the mid-1980s of the *Review of Financial Studies* (which quickly emerged as among the three leading journals in finance) and its second executive editor and served as President of both the Society for Financial Society and the Western Finance Association. Besides the EMSAC, I also have served as a member of both the Model Validation Council of the Federal Reserve System and the Advisory Committee of the Office of Financial Research as well various non-governmental groups, such as the Systemic Risk Council and the Shadow Financial Regulatory Committee.

In summary, I do not feel that BOX has established that its proposed pricing for connectivity services meets the requirements of the Exchange Act and feel that the filings do not provide sufficient information to allow regulators and sophisticated observers to assess whether the proposed pricing meets the requirements of the Exchange Act.

Sincerely,

Chester Spatt

Chester Spatt

Pamela R. and Kenneth B. Dunn Professor of Finance, Tepper School of Business, Carnegie Mellon University;

Golub Distinguished Visiting Professor of Finance, Sloan School of Management, MIT

and former Chief Economist, U.S. Securities and Exchange Commission (2004—2007)

Cc: Hon. Jay Clayton, Chairman

Hon. Hester Peirce, Commissioner

Hon. Robert J. Jackson, Jr., Commissioner

Hon. Elad Roisman, Commissioner

Chyhe Becker, Acting Director of the Division of Economic and Risk Analysis

Brett Redfearn, Director of the Division of Trading and Markets

[8] See R. Chiang and C. Spatt, 1982, "Imperfect Price Discrimination and Welfare," *Review of Economic Studies* 49, 155-181; and C. Spatt, 1983, "Imperfect Price Discrimination and Variety," *Journal of Business* 56, 203-216.

[9] P. Dybvig and C. Spatt, 1983, "Adoption Externalities as Public Goods," *Journal of Public Economics* 20, 231-247.