July 15, 2019

VIA E-MAIL

Vanessa Countryman
Acting Secretary
Securities and Exchange Commission
100 F Street, N.E.
Washington, DC 20549-1090

Re: **Proposed Rule Change to Introduce a Liquidity Provider Protection on EDGA, Rel. 34-86168 (SR-CboeEDGA-2019-012)**

Dear Ms. Countryman:

CTC, LLC[1] ("CTC") appreciates the opportunity to comment on the recent Cboe EDGA ("Cboe" or "EDGA") filing (the "Proposal") to adopt a Liquidity Provider Protection ("LP Delay") mechanism, which would introduce a very short "speed bump" of four milliseconds before liquidity-taking orders would be processed by the EDGA order book. This short delay—on the order of magnitude of one-one hundredth of the proverbial blink of an eye[2]—would help foster competition by ensuring all market participants have at least some minimum amount of time to react to price changes in related markets, reducing the advantage that would otherwise be held only by the small number of players who use extreme low-latency technology to "pick off"[3] participants who take very slightly longer to reprice resting orders in response to new information. The Proposal offers an important opportunity to improve the fairness of the market and, in so doing, directly encourage additional displayed liquidity and efficient price discovery to the benefit of all investors and end users. **Cboe's proposal is thoughtful, well-argued, and pro-competitive, and CTC recommends its approval**.

[1] CTC is a proprietary trading firm that provides liquidity in the regulated futures options and securities options markets in the U.S. and internationally. CTC's affiliated entities include a registered broker-dealer that is a member of the Chicago Board Options Exchange, the C2 Options Exchange, Cboe BZX Options, NYSE Arca Options, NYSE American Options, Nasdaq ISE, and Nasdaq Phlx.

[2] *See* https://bionumbers.hms.harvard.edu/bionumber.aspx?&id=100706&ver=4 .

[3] "Pickoffs" are trades immediately regretted by one party (for example, because a cancellation request had already been transmitted but not yet processed by an exchange matching engine). Trade executions best serve to advance a fair, orderly, and efficient market when, on average, they represent mutually-beneficial transfer of risk.

Liquidity Providers Take Unique Risks to Provide Displayed Liquidity

Liquidity providers contribute directly to transparency and price discovery by publicly disseminating the prices at which they would buy and sell a wide range of securities on multiple exchanges. The role of market makers in facilitating risk transfer is particularly important in less-liquid instruments (including many equities and ETFs, and especially options) where the likelihood of natural buyers and sellers posting simultaneous offsetting orders would otherwise be very low.

Unlike liquidity takers, liquidity providers stand at continuous risk to the market, and—especially to the extent they post a very large number of bids and offers simultaneously—risk significant losses due to instantaneous adverse selection. Professional trading firms with price feeds that are faster than the liquidity provider's by tiny, otherwise-insignificant fractions of a second can be a significant source of such adverse selection. Consequently, market participants who provide liquidity must invest progressively greater sums in direct exchange feeds, ticker plant infrastructure, and related systems in order to avoid being "picked off." These technology expenditures by all parties serve only to protect professional market participants from one another (and, perhaps, to generate a profit for purveyors of market data and trading infrastructure), and do not fill any expressed need for additional speed on the part of investors. Registered market makers are particularly impacted by the associated costs due to regulatory quoting obligations, which typically require providing continuous liquidity in a large number of instruments at once.

The Costs Associated With These Risks Lead to Inferior Executions for Investors

These costs could be justified if they provided meaningful benefit to investors. On the contrary, however, in order to earn a return commensurate with their level of risk, market makers must account for all the costs of running their business when determining the amount of quoted size and the tightest possible bid-ask spread they are able to disseminate to the marketplace. Increased risk of instantaneous adverse selection, and the increased infrastructure cost necessary to mitigate that risk, is therefore a direct cause of market makers' quoting wider spreads and/or smaller size in order to generate sufficient risk-adjusted returns—thereby increasing costs for investors. As a result, the endless furtherance of this technology "arms race" acts counter to investor protection and the public interest.[4]

The LP Delay Will Enhance Liquidity Provision and Price Discovery

The LP Delay proposed by Cboe would reduce adverse selection risk for EDGA liquidity providers in a very thoughtful and deliberate way. By only delaying liquidity-taking orders, the Cboe proposal reduces the disadvantage incurred by those liquidity providers *who are slower by the smallest margin* than the corresponding liquidity takers. By helping to establish a market structure where massive technology

[4] Eric Budish (University of Chicago Booth School of Business), Peter Cramton (University of Maryland), and John Shim (University of Chicago Booth School of Business) have modeled this situation, which they identify as "a never-ending arms race for speed," and characterize the result as "a classic prisoner's dilemma: snipers invest in speed to try to win the race to snipe stale quotes; liquidity providers invest in speed to try to get out of the way of the snipers; and all trading firms would be better off if they could collectively commit not to invest in speed, but it is in each firm's private interest to invest." They conclude, "Our results say that sniping is negative for liquidity and that the speed race is socially wasteful." *See* Eric Budish, Peter Cramton, and John Shim (2015). "The High-Frequency Trading Arms Race: Frequent Batch Auctions as a Market Design Response." *Quarterly Journal of Economics*, 130.4. Retrieved from https://faculty.chicagobooth.edu/eric.budish/research/HFT-FrequentBatchAuctions.pdf

expenditures are no longer as critical in preventing trading losses, the Proposal will help foster a fairer marketplace with superior liquidity provision and tighter bid-ask spreads.

Indeed, the Proposal is explicitly pro-competitive. Using an exchange-imposed speed bump to mitigate "pick-off" risk that could otherwise only be addressed through massive technology expenditures will lower technological barriers to entry and allow *more firms*—including those unwilling or unable to spend giant sums to build a microsecond-latency trading platform—to once again be competitive at providing liquidity, and will empower many existing liquidity providers to quote more aggressively.

Notably, while asymmetric speed bumps encourage and promote competition among liquidity providers, they still provide benefits to those who choose to invest in higher-performance trading systems (since, under the Proposal, the first liquidity-taker to pass through the speed bump will uniquely be able to execute against the entire remaining posted size, if desired—even if he or she beats out other would-be takers by only a single nanosecond). This is the beauty of the speed bump as a solution: it protects resting orders of *all* market participants, both liquidity providers and end users, affording the best service and pricing to investors while still preserving the opportunity for those who wish to pursue higher speeds to benefit from doing so. At the same time, the Proposal represents a new and innovative approach that will encourage competition among exchanges in accordance with the Exchange Act. The ultimate benefit of all this, of course, will go to the investing public.

The Duration of the Proposed Speed Bump is Appropriate

While longer in duration than the differently-functioning "symmetric" speed bumps previously approved by the SEC and currently implemented by IEX and NYSE American, Cboe's proposal for a four-millisecond speed bump appropriately recognizes the realities of U.S. market structure, where highly correlated instruments including equities, futures, and ETFs are variously traded in data centers across the New York-New Jersey metro area as well as in and around Chicago.[5] As speed-of-light transmission times between the most distant relevant venues takes multiple milliseconds, and the latency differential between various transmission modalities can introduce swings of several more milliseconds[6] among market participants, Cboe's recommended four-millisecond speed bump reasonably reflects the technological realities of cross-market securities and derivatives trading and hedging strategies.

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For all of the reasons cited above, we encourage the Commission to approve the Proposal. We believe that the Proposal will: (1) protect investors and the public interest by enhancing price discovery and transparent liquidity provision through improved disseminated quotes, (2) encourage new entrants and

[5] A market maker, for example, might trade (1) E-Mini S&P 500 futures on the Chicago Mercantile Exchange at their primary data center in Aurora, Illinois; (2) S&P 500 ("SPX") index options on the Cboe at their data center in Secaucus, New Jersey; and (3) shares of the S&P 500 ETF ("SPY") on various equities exchanges with data centers in New Jersey and (in the case of NYSE Chicago's "CH2" data center) Chicago. The market maker's ability to provide good liquidity in *all* of these instruments is impaired by its risk of being "picked off" in *any* of them, which is in part a function of competitive transmission times between the Chicago and New York/New Jersey metros.

[6] As Cboe notes, "Quincy Data advertises a latency of 4.005 milliseconds for its high speed microwave connection, or about half the 7.75 milliseconds of latency experienced over a fiber connection provided by ICE Global Network. See https://www.quincy-data.com/productpage/#latencies; https://www.theice.com/publicdocs/ICE_Data_Services_Topology.pdf." (*See* Proposal, footnote 10.)

competition among liquidity providers by lowering technological barriers to entry, (3) promote competition among exchanges on the basis of market structure innovation, and (4) continue to remove impediments to the operation of fair and orderly markets that arise from the trading technology arms race—all directly in line with the explicit goals of the Exchange Act. The risk introduced by microsecond-level pick-offs, and the corresponding cost of the never-ending arms race for speed, has resulted in less-attractive pricing and inferior displayed liquidity on many markets and in many asset classes.[7] Asymmetric speed bumps are an efficient way to mitigate this risk and once again encourage competition to display liquidity.

Should you have any questions with respect to this letter, we would welcome the opportunity to discuss it further. We appreciate the opportunity to respond.

Sincerely,

Steve Crutchfield
Head of Market Structure

cc: The Honorable Jay Clayton, Chairman
The Honorable Robert Jackson, Commissioner
The Honorable Allison Lee, Commissioner
The Honorable Hester Peirce, Commissioner
The Honorable Elad Roisman, Commissioner
Mr. Brett Redfearn, Director, Division of Trading and Markets
Mr. David S. Shillman, Associate Director, Division of Trading and Markets
Mr. John Roeser, Associate Director, Division of Trading and Markets

[7] See, for example, the Intercontinental Exchange (ICE) filing to introduce a three-millisecond asymmetric speed bump for several futures products, recently permitted to take effect by the CFTC: https://www.cftc.gov/sites/default/files/2019-02/ICEFuturessPassiveOrder020119.pdf (CTC, which trades on ICE futures markets, supported ICE's proposal through the public comment process; *see* https://comments.cftc.gov/PublicComments/ViewComment.aspx?id=62096).

Also, in June, Eurex launched a trial of a similar mechanism on German and French equity options, noting, "[b]y differentiating latency in selected option markets, we ensure that trading participants can strengthen their focus on serving the needs of the end-clients and grow the market as a whole." *See* https://www.eurexchange.com/exchange-en/resources/initiatives/passive-liquidity-protection .