October 28, 2019

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

Re: **Order to Approve or Disapprove 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 further on the recent Cboe EDGA ("Cboe" or "EDGA") filing (the "Proposal") to adopt a Liquidity Provider Protection ("LP Delay") mechanism which would introduce a "speed bump" of four milliseconds before liquidity-taking orders would be processed by the EDGA order book, and on the recent Order Instituting Proceedings to Determine Whether to Approve or Disapprove the Proposal (the "Order")[2]. As we have stated previously, the short LP Delay—on the order of magnitude of one-one hundredth of the proverbial blink of an eye[3]—would help foster competition by ensuring market participants have some minimum amount of time to react to price changes in related markets, reducing the damage that would otherwise be imposed on them by the small number of players who use extreme low-latency technology to "pick off"[4] participants who take even an infinitesimally small time increment 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

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[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://www.sec.gov/rules/sro/cboeedga/2019/34-87096.pdf

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

[4] "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.

end users. As we have stated in a prior letter, which we incorporate herein by reference[5], **Cboe's proposal is thoughtful, well-argued, and pro-competitive, and CTC recommends its approval**.

The Order asks commenters to respond to several important questions about the Proposal. Below we consider each of these in turn.

1. Do commenters agree with the Exchange's assertion that the proposal would reduce cross-market latency arbitrage and improve market quality by enabling liquidity providers to maintain tighter spreads for longer durations and with greater size? Why or why not? How should enhancements to market quality be measured?

It is unequivocally true that, all else equal, liquidity providers will provide tighter spreads and/or greater size when risks, and costs associated with those risks, are reduced.   Organizations such as SIFMA[6], STA[7] and others have correctly pointed out, for example, that a Financial Transactions Tax would harm liquidity to the detriment of investors and end users by imposing a cost that liquidity providers would need to incorporate in their bid-ask spreads. Identical logic requires one to accept that an asymmetric speed bump—which, by its very nature, reduces the cost to liquidity providers from pickoffs—will have the same result: in a competitive market, the reduction of transaction costs to liquidity providers must ultimately result in tighter bid-ask spreads for investors (in the case of a Financial Transactions Tax, there is a small cost imposed on every transaction; in the case of latency arbitrage "pick-offs", there is a large cost imposed from time to time, only when there is a profit opportunity for another player). There are a variety of straightforward metrics available to measure market quality, including displayed size pre- and post-implementation and time at the NBBO relative to other markets.

2. According to several commenters, EDGA liquidity would be "illusory" because the Exchange's liquidity providers could update their quotations while incoming orders are delayed. Do commenters believe that the proposed rule change would lead to quote fading? Why or why not? Do commenters believe that the proposed rule change would impact fill rates? Would the "illusory" liquidity be a significant portion of the Exchange's overall liquidity?

We expect no material impact on fill rates whatsoever *for retail investors and end users*. The natural liquidity demands of investors and end users are completely uncorrelated with microsecond- or even millisecond-level price dislocations, so the likelihood that a market maker backs away during the incredibly brief interval—again, on the order of one one-hundredth of the blink of an eye—that a given investor's order is held up by the speed bump is incredibly small. By way of example, we understand that in first four months after Eurex deployed a virtually identical mechanism on its German and French equity options

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[5] See our letter of July 15, 2019, at https://www.sec.gov/comments/sr-cboeedga-2019-012/srcboeedga2019012-5813345-187453.pdf

[6] *See* https://www.sifma.org/wp-content/uploads/2019/10/SIFMA-Insights-Ramifications-of-an-FTT.pdf

[7] *See* https://securitytraders.org/resources/from-the-hill/lighthouse/financial-transaction-tax-this-time-its-different-or-is-it/ .

markets in 2019, agency orders that missed a fill due to the speed bump comprised just 0.004% of market volume—essentially zero.[8]

It is certainly likely that any professional trading firm executing high-frequency latency arbitrage strategies on EDGA whereby they are attempting to take liquidity at microsecond timescales would see a reduction in fill rates—but that's a desirable feature of the Proposal, not a bug, as it will encourage liquidity providers who experience fewer adverse fills from fellow professionals to submit tighter bid-ask spreads.

3. Some commenters assert that the proposal is not unfairly discriminatory under the Exchange Act because the proposal addresses a particular behavior as opposed to specific class or type of market participants. Is this assertion accurate? Why or why not?

Yes. As is well known, the Exchange Act does not prohibit discrimination in general—it is of course true that different participants are eligible to participate on securities markets in different ways, and pay different fees to do so—but only prohibits rules that are "unfairly" discriminatory. The SEC has explicitly recognized the value of liquidity provision and limit orders to investor protection and the public interest, noting for example in the Reg NMS Adopting Release[9] that they in effect offer a "free option" for marketable orders that access posted liquidity—and options are, of course, intrinsically valuable. Academic work has also noted the value of liquidity provision; as University of Chicago Professor Eric Budish has observed, "It is … especially important to protect displayed limit orders from latency arbitrage."[10] Given this value, and the definition of "fair" as "consonant with merit or importance,"[11] it seems to us that taking reasonable measures to protect liquidity provision with the explicit and measurable goal of enhancing market quality surely cannot be regarded as "unfairly" discriminatory. Indeed, *all* limit orders on EDGA would be eligible for LP protection under the proposal, so *all* participants who send limit orders will be treated equally and therefore fairly, rendering this objection moot.

Further, this objection fails to recognize that liquidity providers adopt a risk that liquidity takers do not: the risk of being picked off by participants who have any speed advantage whatsoever in exchange connectivity or market data processing (if a firm engages in a purely liquidity-taking strategy using only Immediate-or-Cancel orders, it is at no risk of being picked off due to sending a cancellation one microsecond too late). Reducing the *degree* of an *existing* disparity—which, under the Proposal, would *still* exist, albeit to a lesser degree!—cannot constitute unfair discrimination.

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[8] Eurex has provided the relevant statistics in writing in multiple member forums and, we understand, to regulators (ESMA), but does not have a link to public data available at the time of writing, as their pilot is still ongoing. We reference this statistic with permission.

[9] *See* Securities Exchange Act Release No. 51808 (June 9, 2005), the "Reg NMS Adopting Release".

[10] *See* comment letter to the SEC from Prof. Eric Budish of the University of Chicago Booth School of Business regarding the Chicago Stock Exchange's proposed Liquidity Taker Access Delay ("LTAD") mechanism, dated October 13, 2016.

[11] *See* https://www.merriam-webster.com/dictionary/fair

4. Will the proposal increase the risk of adverse selection for liquidity takers and market participants that are unable to react to market signals in order to adjust their quotes within four milliseconds?

For liquidity takers: No. Liquidity takers whose orders are not correlated with microsecond-level price dislocations—which is the vast majority, including substantially all retail orders—should expect the same fill rate as today, as discussed above.

Regarding participants who post limit orders and are unable to react quickly enough to cancel them at a millisecond level, it must be noted that those participants have already seen their adverse selection increase by massive amounts due to the proliferation of latency arbitrage over the last decade. Today, only the firms with the very fastest, microsecond-level cancel signals are able to avoid adverse executions of their limit orders when prices change quickly. The proposal would *extend the benefits currently enjoyed by that select group to a much larger group*—everyone able to cancel within the duration of the LP Delay.

We note further that millisecond-level algorithms to effect cancels in the case of various adverse signals, including price moves in correlated instruments or "crumbling quotes," are commercially available from a wide range of service providers, broker-dealers and even exchanges.[12] The Proposal would therefore benefit any investor using, or able to use, these commercially-available order placement algorithms, not, as has been alleged, merely a select group of high-speed participants. (Indeed, if anyone remains concerned that the group of parties who will benefit from this change is too small, an obvious remedy would be a longer speed bump.)

5. Is an intentional delay of four milliseconds necessary to minimize the effectiveness of latency arbitrage strategies? Will the delay negate the advantages that trading firms using the latest microwave connections have over liquidity providers using traditional fiber connections? Should the delay be shorter or longer to accomplish this goal? Is four milliseconds an appropriate duration for a delay? Is such delay consistent with the Act? Why or why not?

We do not have a strong view on the optimal delay duration. We agree with Cboe's statement that, as the proposed duration is approximately equal to the latency differential between microwave and fiber signals between the Chicago and New York metros, and because that duration is highly relevant to many market participants given the importance of S&P 500 index futures (traded on the CME at their Illinois data center) to the equities markets, it is reasonable. A delay that is somewhat shorter or longer would, in our view, also be appropriate and consistent with the Act as furthering investor protection and the public interest for the reasons stated throughout.

6. Is the proposal tailored in a manner such that its potential benefits outweigh the potential or likelihood of harm or unintended consequences to the national market system?

Yes. We believe the highly speculative negative consequences of the Proposal are overstated. Many of the firms who commented against the proposal have thriving businesses that add value in large measure

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[12] *See* for example https://iextrading.com/trading/signal/ describing the IEX "Crumbling Quote Indicator".

due to the complexity of today's market structure, including a variety of lit and dark markets with disparate fee structures, matching models, and indeed speed bumps—and for that success they are to be commended. In fact, many securities exchanges experience, under normal operation, *natural matching engine outlier latencies that can exceed the proposed speed bump by several orders of magnitude*. We are highly confident in our peer firms' and competitors' ability to adapt and continue to thrive in an environment where one or several exchanges add a short asymmetric speed bump to the mix.

7. Should the Exchange's unprotected, manual quote be allowed to lock or cross manual quotations disseminated by another manual market? Why or why not?

It could be argued that allowing quotations to lock each other should be permitted in general, not just in the case of EDGA—in our experience, when arbitrage opportunities present themselves across markets, they quickly resolve with no need for a regulatory mandate to prevent them. Certainly, in the particular case of the Proposal, we believe it is appropriate to allow one manual quote to lock another manual quote, in comportment with the nature and original purpose of the manual quote designation.

8. What impact, if any, would the dissemination of an unprotected, manual quote have on the national market system? Should EDGA's unprotected, manual quote be disseminated by the SIP? If so, should the SIP disseminate a modifier to indicate that EDGA's quote is manual? Should the EDGA quote be used to calculate the NBBO? Should the EDGA quote be used to calculate midpoint values?

We understand that the Commission has already ruled, in the Reg NMS Adopting Release, that "eliminating all manual quotations from the NBBO [would] lead to decreased execution quality for investors". We agree with this existing ruling, and with Cboe's arguments explaining its relevance to the Proposal.[13]

Again, our expectation is that the EDGA BBO will in fact be accessible for the overwhelming majority of investor and end-user orders. Accordingly, its inclusion in the NBBO will provide valuable information to investors. If data later suggests that a large proportion of investor orders miss fills on EDGA, it would be appropriate to reconsider this decision—but we find this highly unlikely.

It seems appropriate that the SIP disseminate a modifier indicating that the EDGA quote is manual, which broker-dealers can use at their discretion.

We understand the decision of how to compute midpoint prices to be primarily made by individual broker-dealers pertaining to their own view of the most useful metrics in making order handling decisions. We further understand that, under the Proposal, broker-dealers will and should continue to be free to make their own determination as to whether they can best serve their customers by including EDGA in their midpoint calculation or not.

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[13] *See* Cboe letter of August 22, 2019 at https://www.sec.gov/comments/sr-cboeedga-2019-012/srcboeedga2019012-6009676-190812.pdf .

9. How will the dissemination of EDGA's unprotected, manual quote impact a broker-dealer's obligation to obtain best execution?

We understand that the Commission has already ruled, in the Reg NMS Adopting Release,[14] that "a broker-dealer reasonably could determine, as part of its regular and rigorous review of execution quality, to bypass [a manual quote] if its prior experience demonstrated that attempting to access the market would not be in its customers' best interest." Given this, we are surprised that several commenters contend they would struggle to determine their best execution obligations under the Proposal. Today's best execution decisions require complicated estimation of fill rates and likely price improvement across multiple lit and dark venues with a proliferation of rules, order types, and natural latencies. The very clear existing guidance that broker dealers may disregard manual quotes when needed as part of their existing, sophisticated best execution decisions seems highly reasonable to us, and should apply under the Proposal as well.

10. What would be the impact, if any, on the national market system if other national securities exchanges, with a larger percentage of overall trading volume, adopted a similar proposal? In particular, how would the proposal affect market quality?

This question is equivalent to asking, "If every market reduced costs for liquidity providers, what would happen to liquidity?" If every market reduced costs to liquidity providers, every market would see enhanced market quality as a result, improving the overall investor experience proportionately. We would expect the same result under broad adoption of a mechanism like that in the Proposal.

11. What are commenters' views on how the proposal would affect trading activity, in general, and liquidity providers, in particular, on other markets? Would the LP2 delay mechanism impose systemic risks and create informational disparities across the national market system? Would the proposal provide EDGA liquidity providers with the option to leverage or free ride price discovery that occurs at other trading venues?

A short asymmetric speed bump of the nature proposed would certainly not impose "systemic risks."

To the extent that trading on one market vs. another offers an informational advantage (which is certainly true in many cases today—a firm that trades both the SPY ETF on NYSE Arca and SPX options on Cboe, for example, is likely to possess an informational advantage resulting from access to their order status and fill information on both markets that a firm trading on only one market would not), that advantage or disadvantage can be addressed by commencing participation on the additional markets, as is the case today. We don't believe the Proposal poses any new or concerning challenges in this respect.

Regarding "free riding": firms regularly compete with each other by adding additional size at the same price, either on the same market or another market, based on competitors' quotes. This activity happens today and would continue to happen either with or without the Proposal. If *nobody* were quoting on

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[14] *See* Securities Exchange Act Release No. 51808 (June 9, 2005), the "Reg NMS Adopting Release".

EDGA today, it is plausible that, if the Proposal were approved, the *first* liquidity provider to begin quoting on EDGA would simply do at the prevailing NBBO, as would be in their economic interest. However, the *second* liquidity provider then has a choice: do they simply join the existing quote, incurring inferior queue position as a result, or price-improve, thereby setting a new, better NBBO to the benefit of investors? That decision occurs all day, every day, on all markets today—however, under the Proposal, the second liquidity provider has a new and unique incentive *to improve the price*—namely, that his or her expected costs will be lower than today due to the proposed LP Delay. Therefore, far from engendering ongoing "free riding," we expect that the Proposal would result in a new and enhanced level of market quality relative to the status quo.

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For all of the reasons cited above, we again 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 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.[15] 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

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[15] 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 .