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September 12, 2019

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

Re: Release No. 34-86168; File No. SR-CboeEDGA-2019-012

Dear Ms. Countryman:

Thank you for the opportunity to comment on Cboe's proposed implementation of its Liquidity Provider Protection delay mechanism.

In recent research, we have formulated and analyzed a theoretical model that speaks to the issue of asymmetric speed bumps such as the one Cboe is proposing.¹ Below, we summarize the research and discuss our views on how it connects to Cboe's proposal.

Two of the things that one would most desire from our markets are liquidity and informative prices. Sometimes these two objectives conflict, so that there may be a tradeoff between them. Nevertheless, one would ideally like our markets to approach the *frontier* of that tradeoff.

In our model, the scenario in which exchanges operate conventional limit order books is not on the frontier of this tradeoff between liquidity and informative prices. The reason is what Cboe has referred to as "latency arbitrage": situations in which a trader, reacting to order flow or public news, trades against a quote in the instants before it would have been cancelled.

Because latency arbitrage forces outcomes off this frontier, it may be desirable to find ways to eliminate it. The Cboe proposal is one way of doing that. Indeed, in our model, the scenario in which each exchange operates an asymmetric speed bump achieves this frontier. Moreover, by tuning the parameters of the speed bump (i.e., by adding an appropriate amount of randomness to the length of the delay), this "asymmetric speed bump outcome" might dominate the "conventional limit order book outcome" in both dimensions: more liquidity and more informative prices.

Of course, our model is stylized in many respects and, out of necessity, does not capture every detail of modern financial markets. Nevertheless, we believe that the basic insights it illustrates are robust and would apply in practice. For these reasons, we believe that asymmetric speed bumps can represent real improvement. In our view, Cboe's proposal represents a step in this direction, and for that reason we support it.

One thing that we would emphasize is that it is important to consider equilibrium effects when

¹"High-Frequency Trading and Market Performance", *Journal of Finance*, forthcoming. <https://ssrn.com/abstract=2674767>. In the paper, what we refer to as "non-cancellation delay" is an asymmetric speed bump that resembles Cboe's proposal.

evaluating proposals such as these. What we mean by this is that—although the immediate beneficiaries of the asymmetric speed bump will primarily be high-frequency liquidity providers—they may not be the ultimate beneficiaries. In particular, our model highlights the following points. Although high-frequency liquidity providers will face better conditions because of the speed bump, competition among them will likely lead them to quote tighter and deeper markets, thereby passing some or all of the benefits on to other traders. These quotes might fade during episodes of latency arbitrage (to the detriment of high-frequency arbitrageurs), but they are likely to remain accessible during other times (to the benefit of most investors).

As to the length of the delay, our analysis suggests that the benefits of an asymmetric speed bump materialize even for very short delays. More precisely, the benefits materialize when the difference in latency between two high-frequency traders responding to the same event is almost always shorter than the length of the delay. For this reason, we believe a delay that is somewhat shorter in length than the proposed 4 milliseconds may suffice. Nevertheless, the Cboe proposal seems to us to be a step in the right direction. In summary: we believe, based on our research findings, that this proposal represents a great opportunity to further improve our market system, and we encourage the Commission to move forward on it.

Sincerely,

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