ORAL ARGUMENT NOT YET SCHEDULED
No. 20-1424

IN THE

United States Court of Appeals for the District of Columbia Circuit

CITADEL SECURITIES LLC,

Petitioner,

v.

SECURITIES AND EXCHANGE COMMISSION,

Respondent,

INVESTORS EXCHANGE LLC,

Intervenor.

On Petition for Review of a Final Order of the
Securities and Exchange Commission

BRIEF OF XTX MARKETS LLC
AS AMICUS CURIAE IN SUPPORT OF RESPONDENT

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CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

Pursuant to D.C. Circuit Rule 28(a)(1), *amicus curiae* hereby certifies as follows:

A. Parties and Amici.

All parties, intervenors, and *amici curiae* appearing in this Court are listed in the Brief for Respondent with the exception of *amici curiae* XTX Markets LLC, Healthy Markets Association, and Better Markets, which appear in support of Respondent Securities and Exchange Commission.

B. Rulings Under Review.

References to the ruling at issue appear in the Brief for Petitioner.

C. Related Cases.

Counsel for *amicus curiae* XTX Markets LLC is unaware of any related cases.

CERTIFICATE OF COUNSEL PURSUANT TO D.C. CIRCUIT RULE 29(d)

Pursuant to D.C. Circuit Rule 29(d), counsel for *amicus curiae* XTX Markets LLC (XTX) certifies that this separate brief is necessary because XTX provides a perspective not found in the parties' briefs or in any of the other *amicus curiae* briefs. As a liquidity provider, XTX is the target of the latency arbitrage strategies the challenged D-Limit order aims to address; it is therefore well positioned to illustrate the need for, and reasonableness of, the Securities and Exchange Commission's approval of the order. Counsel understands that two nonprofit organizations, Healthy Markets Association (a trade association) and Better Markets (a public-interest group), also intend to file *amicus curiae* briefs in support of Respondent, but that their submissions will focus on distinct legal issues from different perspectives. As a result, it would not be practicable for all *amici curiae* in support of Respondent and Intervenor to join a single brief.

 Dated: April 12, 2021

/s/ Daniel A. Rubens

Daniel A. Rubens
Counsel for Amicus Curiae

CORPORATE DISCLOSURE STATEMENT

Pursuant to Federal Rule of Appellate Procedure 26.1 and this Court's Rule 26.1, *amicus curiae* XTX Markets LLC states that it is a registered national broker-dealer. XTX Markets LLC is part of a corporate group: XTX Markets LLC is wholly owned by XTX Holdings LLC, which in turn is wholly owned by XTX Holdings Limited, which in turn is wholly owned by XTX Midco Limited, which in turn is wholly owned by XTX Topco Limited. Each of these entities is an XTX Group Company. No XTX Group Company is publicly held, and no publicly held company has 10% or greater ownership in XTX Markets LLC.

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GLOSSARY

Approval Order	Investors Exchange LLC; Order Approving a Proposed Rule Change to Add a New Discretionary Limit Order Type Called D-Limit, Exchange Act Rel. No. 89,686 (Aug. 26, 2020), 85 Fed. Reg. 54,438 (Sept. 1, 2020)
CboeEDGA	Cboe EDGA Exchange, Inc.
CboeEDGA Proposal	Cboe EDGA Exchange, Inc.; Notice of Filing of a Proposed Rule Change to Introduce a Liquidity Provider Protection on EDGA, Exchange Act Rel. No. 86,168 (June 20, 2019), 84 Fed. Reg. 30,282 (June 26, 2019)
Citadel	Citadel Securities LLC
Commission	Securities and Exchange Commission
CQI	Crumbling Quote Indicator
D-Limit order	Discretionary-Limit Order Type
HFT	High-frequency trading
IEX	Investors Exchange LLC
Registration Order	In the Matter of the Application of Investors' Exchange, LLC for Registration as a National Securities Exchange—Findings, Opinion, and Order of the Commission, Exchange Act Rel. No. 78,101 (June 17, 2016), 81 Fed. Reg. 41,141 (June 23, 2016)
NBBO	National Best Bid or Offer

| SEC Br. | Brief for Respondent Securities and Exchange Commission |
| XTX | XTX Markets LLC |

INTRODUCTION AND STATEMENT OF INTEREST[1]

Amicus curiae XTX Markets LLC (XTX) is a U.S. broker-dealer and regulated electronic proprietary trading firm with global trading operations. XTX trades as both a liquidity provider and liquidity taker in numerous instruments in Equities, FX, Futures, Commodities, Options, and U.S. Treasuries. It executes approximately $275 billion in daily trading volume across all asset classes and geographies. XTX is committed to making markets fairer and more efficient.

As a liquidity provider, XTX can attest to the need for regulators and exchanges to address latency arbitrage. At its core, latency arbitrage is a simple and intuitive trading strategy. It involves exploiting a trading-speed advantage to process real-time price changes affecting a financial instrument and trade on that instrument in the split second before professional liquidity providers, like XTX, and other market participants can update their prices. In transaction after transaction, XTX has experienced latency arbitrage firsthand: XTX

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[1] No party's counsel authored this brief in whole or in part. No party, party's counsel, or any person other than amicus or its counsel contributed money intended to fund preparing or submitting this brief. All parties (including intervenor) have consented to the filing of this brief.

posts a bid or offer for a security that gets traded on in the microseconds or milliseconds before XTX can feasibly know that the security's price (or the price of a correlated financial instrument) has changed on other exchanges. That loss pressures XTX to offer more conservative pricing and post less liquidity. It also creates barriers for liquidity providers to enter the market. As a result, overall market quality suffers.

The Securities and Exchange Commission's approval of the D-Limit order reflects a measured response to this serious problem, and Citadel Securities LLC's critiques of that approval are entirely without merit. First, Citadel repeatedly insinuates that concerns about latency arbitrage are overstated or that the concept itself is ill defined. That is fundamentally wrong. The investment world, stock exchanges, market participants, and the Commission have all long understood what latency arbitrage entails and long recognized that it is a market reality. Indeed, studies have found that latency arbitrage accounts for a substantial portion of overall trading activity in global markets, and data provided by Investors Exchange LLC (IEX) reveals those patterns to be reflected on that exchange. It is readily apparent, moreover, that latency arbitrage can produce a series of costly market consequences:

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less displayed liquidity, wider bid-ask spreads, and greater price volatility, to name a few. Although many market participants must change their behavior in response to latency-arbitrage tactics and their harmful effects, it is end investors (including retail and institutional investors) who shoulder the brunt of the costs.

The challenged D-Limit order offers a targeted solution to the harmful consequences of latency arbitrage. The change it implements is modest. IEX already offers an order type that prevents non-displayed orders from getting traded through latency-arbitrage strategies during the few seconds a day those strategies are rampant; the D-Limit order simply extends that protection to displayed orders. And, as the Commission found after careful review, it does so to the benefit of market participants broadly. Contrary to the suggestions of Citadel and its *amici*, the D-Limit order imposes no undue burden on liquidity takers (*i.e.*, those market participants who remove liquidity posted by liquidity providers) or the national market system, nor is the Commission's approval of the D-Limit order inconsistent with its past actions. This Court should accordingly deny the petition for review.

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ARGUMENT

I. Latency Arbitrage Is A Real, Pervasive, And Increasingly Costly Phenomenon.

A. Latency arbitrage is a well documented and readily identifiable practice.

Recurrent throughout Citadel's challenge to the Commission's order is the notion that the problem it targets—latency arbitrage—is ill defined and perhaps illusory. *See, e.g.*, Citadel Br. 34. Contrary to Citadel's repeated suggestion, however, there is nothing "amorphous" about the concept of latency arbitrage, nor anything "purported" about its existence. *Id.* at 19, 20. As IEX has documented, and as the Commission understood, latency arbitrage is an observed trading practice that involves using a speed advantage to process real-time price changes affecting a financial instrument and trade on that instrument (or on a correlated financial instrument) in the split second before the price updates, thereby profiting off of the transient informational advantage. *See* Investors Exchange LLC; Order Approving a Proposed Rule Change to Add a New Discretionary Limit Order Type Called D-Limit, Exchange Act Rel. No. 89,686 (Aug. 26, 2020), 85 Fed. Reg. 54,438, 54,442-44, 54,449 (Sept. 1, 2020) (Approval

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Order); SEC Br. 15 (citing Approval Order, 85 Fed. Reg. at 54,442, 54,449).

The strategy behind latency arbitrage is simple. Under governing regulations, each U.S. stock exchange generally may not execute trades at prices worse than the national best bid and offer (NBBO) in the market at a given time.[2] Professional liquidity providers and other market participants react to underlying price movements in a variety of financial instruments to most accurately reflect a security's NBBO and update their prices accordingly. Changes in a stock's NBBO therefore prompt exchanges to update their pricing. But the process of professional liquidity providers, other market participants, and exchanges responding to new information does not (and cannot) take place instantaneously.

The key to latency arbitrage is that information can travel only as fast as technology allows; the time it takes for a professional liquidity provider, other market participants, and exchanges to send and receive market information (including orders to an exchange to buy or sell

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[2] The NBBO represents the best (highest) available bid price for a sale of a security and best (lowest) available asking price for a purchase of a security across all national securities exchanges. *See* SEC Br. 9.

securities, or to update the prices of orders "resting" on exchanges) is known as "latency." With the aid of costly market data and network infrastructure optimized for speed, certain traders can process real-time price movements and trade on a stock before professional liquidity providers, other market participants, and exchanges can act on that information, often "picking off" orders at the expense of slower professional liquidity providers and retail and institutional investors. The entities carrying this strategy out—latency arbitrageurs—are a select group of high-frequency trading (HFT) firms with the financial means and engineering resources to build sophisticated systems of telecommunications and networking infrastructure (including microwave towers, hardware, and algorithms) to shave off every last microsecond (*i.e.*, a millionth of a second) of latency. And while each set of transactions may turn only a modest gain, the profits rack up as latency arbitrageurs execute up to millions of such transactions each day.

This opportunistic strategy bears no resemblance to established and mainstream trading activities like retail investing, institutional investing, and hedging: Latency arbitrage operates on different

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timescales and is based on fundamentally different trading considerations. Latency arbitrageurs earn profits entirely from microseconds- to milliseconds-long price differences across the geographically dispersed data centers where the various relevant exchanges are located—indeed, their money-making opportunity vanishes once the speed-related information asymmetry does. Virtually all other market participants lack the technological capability to exploit such fleeting opportunities. *See* Approval Order, 85 Fed. Reg. at 54,446, 54,449. They operate instead on longer-term trading and investment horizons. *See id.* at 54,449. Liquidity providers, moreover, seek to provide liquidity in thousands of securities at a time (thereby broadly enhancing price discovery). Due to the volume of this activity, liquidity providers will generally move more slowly even when equipped with the same technology as latency arbitrageurs, who trade on orders on a security-by-security basis. Even professional liquidity providers who may be sophisticated enough to update prices as fast as the fastest latency arbitrageur will still lose the "speed race" on average 50% of the time—more than enough to cause harm to overall market quality.

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There is no question that latency arbitrage is on the rise. The past decade has been marked by an expensive and widely reported technological "arms race" to reduce latency.[3] The phenomenon first made headlines in 2010, when a communications company with several HFT customers paid an estimated $300 million to construct a private fiber-optic cable that reduced the round-trip data-transmission time between New York and Chicago stock exchanges from 16 milliseconds to 13 milliseconds. *See* Eric Budish et al., *The High-Frequency Trading Arms Race: Frequent Bath Auctions as a Market Design Response*, 130 Q. J. Econ. 1547, 1548 (2015). In just a few years, that project was rendered obsolete by developments in microwave technology that brought round-trip data-transmission time down to 8 milliseconds. *Id.* at 1549.

Tactics employed by HFT firms to gain a latency advantage have become only more extreme in recent years: One HFT firm built a microwave tower between an exchange and a competitor's microwave

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[3] *See, e.g.*, Hugh Son & Dakin Campbell, *Wall Street's Big Banks Are Waging an All-Out Technological Arms Race*, Bloomberg (Apr. 5, 2018), https://tinyurl.com/p7yjh8pu; Aaron Lucchetti, *Firms Seek Edge Through Speed as Computer Trading Expands*, Wall St. J. (Dec. 15, 2006), https://tinyurl.com/5fp88ww6.

tower to slow the competitor's execution speed.[4] Another firm once

floated a $300 million idea to set up a system of "blimps or drones,"

equipped with latency-reducing lasers, "across the Atlantic from New

York to London."[5] The latest frontier latency arbitrageurs have set

their sights on is space: With companies like Starlink and Amazon

developing large-scale satellite constellations to deliver faster

broadband internet for consumers, HFT firms are now seeking to

launch similar customized systems targeted to reap latency

advantages.[6]

Citadel's insinuations notwithstanding, the nature and existence

of latency arbitrage are by now undeniable. The practice is so palpable,

in fact, that when weather events foil latency-arbitrage efforts by

disturbing microwave transmissions, trading costs on the markets

noticeably decline—to the benefit of all other market participants. *See*

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[4] Nick Baker & Bryan Gruley, *The Gazillion-Dollar Standoff Between Two High-Frequency Trading Towers*, Bloomberg (Mar. 8, 2019), https://tinyurl.com/2vepks5t.
[5] Mitchell Hall, *Inside Wall Street's High-Frequency Trading Technology Arms Race*, PC Magazine (Sept. 25, 2013), https://tinyurl.com/34cwpjs4.
[6] Alexander Osipovich, *High-Frequency Traders Eye Satellites for Ultimate Speed Boost*, Wall St. J. (Apr. 1, 2021), https://tinyurl.com/ejpar8mn.

Andriy Shkilko & Konstantin Sokolov, *Every Cloud Has a Silver Lining: Fast Trading, Microwave Connectivity, and Trading Costs*, 75 J. Fin. 2899, 2924 (2020). Recognizing such dynamics, IEX was launched as an exchange in 2016 with the aim of combatting the rise of HFT strategies like latency arbitrage. *See* SEC Br. 2, 16. And in approving IEX as a new exchange, the Commission acknowledged that the special measures introduced by IEX would help to prevent latency arbitrageurs from executing trades at "stale" prices that have not been updated to reflect a new NBBO. *See* In the Matter of the Application of: Investors' Exchange, LLC for Registration as a National Securities Exchange; Findings, Opinion, and Order of the Commission, 81 Fed. Reg. 41,142, 41,157 (June 23, 2016) (Registration Order); *see also* SEC Br. 19.

B.   Latency arbitrage is prevalent in the global market and on the IEX.

In large part because latency arbitrageurs must engage in massive volumes of transactions for their strategy to pay off, latency arbitrage accounts for a meaningful portion of overall trading activity on exchanges. A recent study by the United Kingdom's Financial Conduct Authority concluded that latency arbitrage constituted 22% of the daily trading volume for the FTSE 100 (an index of major

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companies listed on the London Stock Exchange). Matteo Aquilina et

al., Quantifying the High-Frequency Trading "Arms Race": A Simple

New Methodology and Estimates 4 (Fin. Conduct Auth. ed., 2020). That

activity was concentrated among a handful of firms trading during a

brief portion—fractions of a percent—of the trading day. *Id.* at 26, 29.

On U.S. stock exchanges like IEX, latency arbitrage activity is

disproportionately evident in the microseconds before the NBBO

changes. As explained, because market data signaling an imminent

NBBO change prompts market participants to react, and eventually

leads the various exchanges to update their prices, this interval is the

moment of opportunity for a latency arbitrageur. IEX data bear this

out. Applying a publicly disclosed formula called the "crumbling quote

indicator" (CQI, also known as the Signal or Indicator) that predicts an

imminent change in the NBBO, IEX found that more than a third of all

orders seeking to remove displayed liquidity from IEX arrive during the

mere seconds of the trading day when the CQI is "on"—that is, in the

microseconds precipitating a likely change in the NBBO. *See* Approval

Order, 85 Fed. Reg. at 54,439. This finding, along with other extensive

evidence, amply supports the Commission's determination that "latency

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arbitrage is occurring on IEX." *Id.* at 54,448 n.133; *see also* SEC Br. 37-38.

This anomalous trading activity cannot be explained away, as Citadel suggests, through references to traditional trading strategies like hedging. *See* Citadel Br. 36-37. As the Commission recognized, commenters clarified that hedging trades occur throughout the day. *See* Approval Order, 85 Fed. Reg. at 54,442. Those comments track XTX's experience as a large liquidity provider that frequently engages in hedging. Indeed, XTX can think of no strategic reason why hedging orders would be concentrated during the extremely brief periods when the NBBO is in flux: Market participants hedge simply to offset the risk of another investment that tends to move in the opposite direction. And just as ordinary trading activity occurs throughout the day, so too does hedging activity. It is thus no surprise that, as the Commission observed, market participants that engage in hedging support the D-Limit order. *See* Approval Order, 85 Fed. Reg. at 54,442.[7]

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[7] Citadel also suggests that IEX's evidence of unusually robust trading activity during the CQI period is attributable to large orders that seek to execute on liquidity orders across multiple exchanges, another conventional trading practice. *See* Citadel Br. 36-37. The Commission

C.   The gains of latency arbitrageurs come at the expense of other investors and market participants.

Although latency arbitrage is no doubt lucrative to those with the resources to execute the strategy, those gains are offset by a chain reaction of harms, both direct and indirect, that reverberate throughout the market. Most immediately, latency arbitrage imposes monetary losses on individual trades for market participants—including retail and institutional investors—who lack the speed advantages that latency arbitrageurs cultivate.

By definition, latency arbitrageurs profit by causing other market participants' orders to be traded at a stale, less favorable price. In effect, latency arbitrage exacts a tax from virtually all other market participants. And by one estimate based on U.K. market data, that tax is equivalent to 0.0042% of daily stock-trading volume—perhaps not alarming on an individual-transaction basis, but a "significant[] increase[]" to the "trading costs of large investors" when viewed in the

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found no persuasive evidence to support this theory. *See* Approval Order, 85 Fed. Reg. at 54,441. Rather, the Commission explained, liquidity takers placing large, inter-exchange orders "can, and generally do," utilize "commonplace" routing techniques that do not trigger the CQI. *Id.*; *see also* SEC Br. 29, 40.

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aggregate. Aquilina et al., *supra*, at 4-5. Eliminating latency arbitrage, meanwhile, would lower market participants' trading costs by 17%. *Id.* at 5.

This latency-arbitrage tax also has market-wide repercussions. *See* SEC Br. 45-46. For one thing, it "increases the cost of liquidity provision" and thus creates strong disincentives to post liquidity. Budish et al., *supra*, at 1593. As multiple commenters urged, and as the Commission underscored in approving the D-Limit order, this deterrent effect can be powerful. *See, e.g.*, Approval Order, 85 Fed. Reg. at 54,440, 54,442 & nn.59-61, 54,448; Letter from Mehmet Kinak & Jonathan D. Siegel, T. Rowe Price, to Vanessa Countryman, Sec'y, SEC 1 (Feb. 5, 2020), https://tinyurl.com/de6n93hf; Letter from Brian Urey, Senior Trader, Allianz Glob. Invs., to Vanessa Countryman, Sec'y, SEC 1 (May 12, 2020), https://tinyurl.com/ry76uwrt. And it reduces diversity among liquidity providers, potentially forcing non-traditional liquidity providers to exit the market. *See* Approval Order, 85 Fed. Reg. at 54,443. Less displayed liquidity from a shallower pool of providers means less known supply, or fewer displayed orders for trading. That dynamic, in turn, weakens a fundamental function of the market: public

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price discovery—that is, the process by which buyers and sellers negotiate a mutually agreeable price that helps to set the market price. *See id.* at 54,449, 54,451.

In addition to reducing the amount of displayed liquidity, the latency-arbitrage tax prompts liquidity providers to post wider bid-ask spreads: To counteract the losses they incur when their displayed liquidity orders get picked off at stale prices, liquidity providers lower the price at which they are willing to buy a stock (the bid) and raise the price at which they are willing to sell it (the ask). *See* Budish et al., *supra*, at 1554 ("In a competitive market, trading firms providing liquidity incorporate the cost of getting [their orders] sniped [at stale prices by latency arbitrageurs] into the bid-ask spread that they charge."). These wider spreads deter market participants from trading, as they must purchase at higher prices and sell at lower prices than they would in the absence of latency arbitrage. Again, here, the burden of the latency-arbitrage tax gets passed on to retail, institutional, and other ordinary investors.

The academic literature is replete with findings corroborating these market dynamics, which XTX has experienced firsthand as a

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liquidity provider. As one study observed when modern high-frequency trading began to take off, latency arbitrage "negatively affect[s]" "market efficiency" on the whole, "with no countervailing benefit in liquidity or any other measured market performance characteristic." Elaine Wah & Michael Wellman, *Latency Arbitrage, Market Fragmentation, and Efficiency: A Two-Market Model* 16, Proceedings of the Fourteenth ACM Conference on Electronic Commerce (2013). Recent commentators confirm that bottom line—concluding, for instance, that latency arbitrage "has unambiguously detrimental implications, both increasing the spread and reducing information acquisition." Markus Baldauf & Joshua Mollner, *High-Frequency Trading and Market Performance*, 75 J. Fin. 1495, 1532 (2020).[8]

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[8] *See also* Budish et al., *supra*, at 1617 (concluding that latency arbitrageurs' profits "come at the expense of liquidity provision, as measured by both bid-ask spreads and market depth"); Albert Menkveld & Marius Zoican, *Need for Speed? Exchange Latency and Liquidity*, 30 Rev. Fin. Studies 1188, 1214-15 (2017) (finding that when latency arbitrageurs are faster than liquidity providers, as they almost always are, the latency differential "c[an] hurt liquidity" and prompt liquidity providers "to set a wider [bid-ask] spread to recoup the increased adverse-selection cost" of getting traded at a stale price); Thierry Foucault et al., *Toxic Arbitrage*, 30 Rev. Fin. Studies 1053, 1090 (2016) (finding that latency arbitrage that exploits brief periods of stale pricing leads to less liquidity and wider bid-ask spreads).

Still worse, if left unchecked, the incentives for capturing latency profits may induce a race to the bottom among latency arbitrageurs and liquidity providers alike. Latency arbitrageurs "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 [latency arbitrageurs]; 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." Budish et al., *supra*, at 1555. Absent intervention, latency arbitrage thus foments a "classic prisoner's dilemma," *id.*, with slower investors who cannot afford to compete getting left farther and farther behind.

Given the detrimental effects latency arbitrage has had across the market—on liquidity depth, liquidity diversity, and public price discovery—the costs of which are borne by long-term investors, the Commission acted well within its mandate and governing regulations in approving IEX's proposed means for leveling the playing field.

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II.   The D-Limit Order Provides A Targeted Solution To The Harms Caused By Latency Arbitrage.

A.   The D-Limit order is a narrowly tailored response to recent deterioration in posted liquidity.

As XTX has explained in previous comment letters to the

Commission, the race for speed in trading has now reached an inflection

point. *See* Letter from Eric Swanson, CEO, XTX Markets LLC, to

Vanessa Countryman, Sec'y, SEC 2 (Jan. 17, 2020),

https://tinyurl.com/4662j86c; Letter from Eric Swanson, CEO, XTX

Markets LLC, to Vanessa Countryman, Sec'y, SEC 2 (July 17, 2019),

https://tinyurl.com/tcfhkde4. As certain HFT firms continue to invest

enormous sums to gain information mere microseconds to milliseconds

before other market participants, displayed liquidity has reached

alarming lows; and at the same time, increasing volume has moved to

alternative trading systems like "dark pools" that keep orders hidden

from the rest of the market.[9] Threats to liquidity are particularly

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[9] *See, e.g.*, Gunjan Banerji, *Buying or Selling Stocks? It Isn't Always Easy*, Wash. Post (Jan. 2, 2020), https://tinyurl.com/33274m9r (reporting decline in liquidity); NYSE, *Market volume & off-exchange trading: more than a retail story* (June 15, 2020), https://tinyurl.com/f67cra22 (documenting "record off-exchange ... market share" with "little corresponding benefit to liquidity for

dangerous in times of economic uncertainty, such as the current

pandemic, when liquidity is already in crisis. *See, e.g.*, Hitesh Mittal et

al., *US Equity Liquidity in the Covid-19 Crisis* 7-8, 15 (Mar. 31, 2020)

(documenting "unprecedented challenges in availability of liquidity").

The D-Limit order represents a tailored response to the harmful

consequences of these latency arbitrage strategies, including the

downturn in displayed liquidity. It ties the D-Limit order's application

to a key trigger of latency-arbitrage trades: a change in the NBBO.

When such change is imminent, IEX's algorithm for predicting price

movements (CQI) turns on a signal for up to two milliseconds. *See*

supra p. 11. As the Commission notes, the propriety of the CQI is not at

issue here; the Commission approved the CQI in 2016, finding it

consistent with the Exchange Act. *See* SEC Br. 19; Registration Order,

81 Fed. Reg. at 41,152-53; *see also* Approval Order, 85 Fed. Reg. at

54,444-45 (surveying the Commission's prior consideration of the CQI).

The CQI now turns on roughly 0.007% of the day during regular market

hours—around 2 seconds total on average per day—but during that

institutional order flow"); Alexander Osipovich, *'Dark Pools' Draw More*
Trading Amid Low Volatility, Wash. Post (May 3, 2019),
https://tinyurl.com/c35hajzk (chronicling a rise in dark-pool trading).

brief interval, the IEX receives a strikingly large percentage (33.7%) of the day's orders seeking to remove displayed liquidity. Approval Order, 85 Fed. Reg. at 54,447.

The D-Limit order operates differently from other order types only during those few seconds when latency arbitrage is rampant. Under existing exchange rules, liquidity providers like XTX can already submit non-displayed orders pegged to the midpoint of the NBBO. *See* Approval Order, 85 Fed. Reg. at 54,445 ("Discretionary order types informed by the CQI … are not new for IEX."). The D-Limit order simply allows liquidity providers to submit displayed orders that also continue to track current market prices while the NBBO is in flux. It gives any liquidity provider the option to select an order type that, during only the few seconds the CQI is on, automatically adjusts displayed orders to maintain their relationship to the NBBO. *See* SEC Br. 24.

As the Commission correctly determined, the D-Limit order is critical to incentivizing greater posted liquidity and achieving overall market benefit. *See* Approval Order, 85 Fed. Reg. at 54,442-43; *see also* Self-Regulatory Organizations: Investors Exchange LLC; Notice of

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Filing of Proposed Rule Change To Add a New Discretionary Limit

Order Type, 84 Fed. Reg. 71,997, 72,006 (Dec. 20, 2019) (Notice of

Proposed Rule Change) (expressly targeting the D-Limit order to

"enhance [the exchange's] ability to compete with alternative trading

systems"). The extensive data that IEX submitted, and the Commission

evaluated, demonstrates that without the protection the CQI provides,

displayed orders are sitting ducks for latency arbitrageurs. *See* SEC Br.

37-38; *see also* Notice of Proposed Rule Change, 84 Fed. Reg. at 72,001-

02; Letter from Eric Swanson, CEO, XTX Markets LLC, to Vanessa

Countryman, Sec'y, SEC 3 (Jan. 17, 2020), https://tinyurl.com/4662j86c.

XTX's experience as a liquidity provider confirms as much. As

explained, that state of affairs deters liquidity providers like XTX from

posting liquidity and leads to wider spreads, thereby undermining the

market's crucial price-discovery function. *See supra* pp. 15-16 & n.8;

Approval Order, 85 Fed. Reg. at 54,443.

Applying the CQI to displayed orders is a carefully calibrated

intervention, as the Commission explained at length. The CQI turns on

only in predefined circumstances and for mere seconds a day. *See*

Approval Order, 85 Fed. Reg. at 54,446 ("IEX would only rarely reprice

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the order in response to a very targeted and specific pre-defined signal that suggests a high potential for latency arbitrage."). It operates simply to prevent orders pegged to the NBBO from being picked off by latency arbitrageurs during fractions of seconds of instability. Indeed, the D-Limit order is considerably narrower than measures other exchanges have adopted to combat latency arbitrage. The pan-European Aquis Exchange, for instance, prevents proprietary trading firms like HFT firms from taking liquidity altogether in order to "prevent HFT firms from pursuing" the "aggressive" strategy of "latency arbitrage." Tim Cave, *Aquis to curb predatory HFTs in liquidity chase*, Fin. News (Feb. 3, 2016), https://tinyurl.com/rmzr325k.[10] The D-Limit order does not categorically prevent HFT firms from taking liquidity—it simply stops latency arbitrageurs from deploying their technological advantage during fleeting intervals of price instability.

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[10] Even these more aggressive measures have proven successful; Aquis boasts more displayed liquidity and tighter spreads than most other pan-European exchanges. *See* Aquis Exchange, Monthly Statistics, https://tinyurl.com/y24pfkk.

B.   **The D-Limit order does not unduly benefit liquidity providers at the expense of liquidity takers.**

Despite the costs that latency arbitrage imposes on broad categories of market participants, Citadel complains the D-Limit order should have been disapproved because it unfairly "discriminates" against liquidity takers. *See, e.g.*, Citadel Br. 21, 45-47. But the D-Limit order is neither discriminatory against liquidity takers, *id.* at 7, nor is there anything remarkable about a rule with differential effects on liquidity takers versus liquidity providers.

1. Citadel first contends that the D-Limit order privileges liquidity providers as "winners" by giving them an unfair "advantage" over "loser[]" liquidity takers. Citadel Br. 47. That argument incorrectly assumes that the Commission's approval upends some preexisting level playing field between liquidity providers and liquidity takers when, in fact, the approval counteracts "information asymmetries" created by latency arbitrage. Approval Order, 85 Fed. Reg. at 54,442-43; *see also id.* at 54,449, 54,451; SEC Br. 44-45.

Nor does the D-Limit order impose broad, systemic harm on liquidity takers as a group. In the first place, many market participants assume both provider and taker roles in different

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transactions—as the Commission well knew. *See* Letter from John

Ramsay, Chief Mkt. Pol'y Officer, IEX, to Vanessa Countryman, Sec'y,

SEC 20 (May 10, 2020), https://tinyurl.com/52m5ru9f. Even accepting

Citadel's rigid categorization of market participants, the vast majority

of liquidity takers would be unaffected by the D-Limit order. That is

because, as a variety of stakeholders explained to the Commission,

ordinary liquidity takers do not target their trading to the milliseconds

a day when the NBBO is in flux. If the average liquidity taker happens

to try to execute a trade during those milliseconds of instability, it is

often latency arbitrage, and not the CQI, which prevents the trade from

going through; most liquidity providers lack the extensive resources to

compete for the microseconds to milliseconds of time advantage latency

arbitrageurs exploit. *See* Letter from Sean Paylor, Trader, AJO, to

Vanessa Countryman, Sec'y, SEC 4 (Feb. 10, 2020),

https://tinyurl.com/3c9bs3zs; T. Rowe Price Comment Letter, *supra*, at

2; Letter from Daniel Aisen, CEO, Proof, to Vanessa Countryman, Sec'y,

SEC 5 (Dec. 24, 2019), https://tinyurl.com/53h5536t; *see also* Approval

Order, 85 Fed. Reg. at 54,445-46. And when the CQI is off—virtually

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the entire trading day—nothing about the D-Limit order affects liquidity taking.

At bottom, Citadel's argument is shortsighted. The relationship between liquidity providers and liquidity takers is symbiotic: The more liquidity that providers are able to offer, the more liquidity is available for takers to trade on. As the Commission thoroughly explained, the increase in posted liquidity will "contribute to price discovery and displayed depth to the benefit of *all* market participants." Approval Order, 85 Fed. Reg. at 54,449 (emphasis added); *see generally id.* at 54,445-47, 54,449.

2. Even if the D-Limit order could be said to favor liquidity providers as a category, that effect would not make the Commission's actions arbitrary and capricious. As IEX noted in submitting the D-Limit order for Commission review, "[t]he existing equity market structure is replete with examples of exchange rules that seek to incentivize, disincentivize, or deter various types of trading activity." Notice of Proposed Rule Change, 84 Fed. Reg. at 72,002-03. To take IEX's example, Nasdaq imposes "excess order fees" on only certain members who have a relatively high number of orders away from the

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NBBO. *Id.* at 72,003; Nasdaq Rule § 118(m),

https://tinyurl.com/mvuyzw73. And even Citadel's *amicus* admits that

"in the past the SEC has taken action that advantages high-frequency

traders more than other market participants." Brief of *Amicus Curiae*

Andrew N. Vollmer In Support of Petitioner 19 n.5. There is nothing

unusual or amiss about an agency or exchange rule that benefits or

burdens specific actors in the market.

    To the contrary, everyday market operations affect participants in

different ways. Many major exchanges employ a "Maker-Taker" (i.e.,

provider-taker) pricing system, under which the exchange pays liquidity

providers and charges liquidity takers for their participation. *See*

Notice of Proposed Rule Change, 84 Fed. Reg. at 72,002-03. There is no

doubt maker-taker pricing benefits liquidity providers and burdens

liquidity takers. And on the other hand, some exchanges offer taker-

maker prices, which undisputedly benefit takers and burden providers.

Id. at 71,999. Along similar lines, exchanges routinely offer different

fees to different members; the complex tiering structure in exchange fee

schedules may not only offer an exchange's largest clients better rates,

but it could also create particular fees for specific clients or tightly

defined groups of clients. *See, e.g.*, NasdaqTrader, *Price List,* https://tinyurl.com/8p3y684h.

Differential treatment is thus a common reality on exchanges, even with express regulatory blessing. That is because many of these differential measures are designed to encourage competition and benefit the broader market—for instance by increasing liquidity, incentivizing narrower spreads, drawing liquidity to transparent public exchanges, and enabling competition between trading venues. *See, e.g.*, Brief of New York Stock Exchange et al. 6-8, *New York Stock Exchange LLC v. SEC*, No. 19-1042 (D.C. Cir. Sept. 5, 2019) (ascribing such advantages to maker-taker pricing).

The D-Limit order furthers these very benefits, and it does so in a more tailored way than do other measures that may affect various market participants differently depending on how they are positioned. The D-Limit order does not impact all liquidity takers, unlike, for example, maker-taker pricing. And it is less plainly differential than favorable fees and rates made available to only a client or two. As the Commission recognized, the order targets only those takers who systematically seek to trade on quote instability and affects such takers

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only during the milliseconds of the trading day when such instability exists. Approval Order, 85 Fed. Reg. at 54,449.

Correcting the information asymmetry present during those milliseconds is a feature, not bug, of the D-Limit order. The Commission's decision to approve a focused solution to a rampant problem, regardless of one's opinions on modest differential effects, was thus both "reasonable and reasonably explained." *Stilwell v. Office of Thrift Supervision*, 569 F.3d 514, 519-20 (D.C. Cir. 2009) (rejecting arbitrary-and-capricious challenge because agency had authority to "balance the power" of multiple interested parties "to achieve its multiple regulatory objectives").

C.   The Commission properly considered the impact of widespread adoption of the D-Limit order on the national market system.

Citadel and its *amicus* NYSE also contend that the Commission failed to consider the hypothetical effects of other exchanges' widespread adoption of orders like those contemplated in the D-Limit order. Citadel Br. 47; Brief of *Amici Curiae* New York Stock Exchange LLC et al. 13-15 (NYSE Br.). Yet in the same breath, they acknowledge the Commission's commitment to "carefully analyze" any future

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proposals that follow in the D-Limit order's tracks. Citadel Br. 48;

NYSE Br. 14-15 (quoting Approval Order, 85 Fed. Reg. at 54,446 n.114).

Citadel and NYSE describe the Commission's commitment to analyze

later cases on their facts as an ad hoc approach, as if it were arbitrary

and capricious for an agency to make decisions based on careful

analysis of the record before it. To the contrary, this Court will uphold

an agency's decision where the agency "made a reasonable predictive

judgment based on the evidence it had." *FCC v. Prometheus Radio

Project*, 592 U.S. ___, 2021 WL 1215716, at *7 (Apr. 1, 2021) (slip op., at

12).

More specifically, Citadel does not identify even a single aspect of

the potential for widespread adoption the Commission failed to

consider, arguing only that the Commission should have considered

more. One exchange (NYSE) tries to fill the gap, arguing in its *amicus*

brief that widespread adoption would lead to flickering quotes across

markets. *See* NYSE Br. 14. The sheer rarity of the CQI's operation

belies that claim: It is on for only a few seconds per day, spread out

over several milliseconds-long increments. That is simply not enough

time for liquidity providers, who usually lack access to the same

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technology as latency arbitrageurs, to create flickering quotes by rapidly offering and reneging offers for liquidity. It is thus unsurprising that NYSE's brief (which no other registered securities exchange has joined) offers no support for its claim; nor do the comments it cites.

In the end, the "floodgates"-type concerns ignore that the D-Limit order is merely one optional order type among many others. No market participant is forced to use the D-Limit order type; participants must affirmatively choose to do so at the time they submit an order. Rational exchanges would not adopt an order type that in fact causes the kinds of harms Citadel threatens. Only if the D-Limit order has the intended benefits to the market—as the evidence before the Commission suggests it does—will other exchanges follow suit. In considering the effects of the D-Limit order itself, the Commission necessarily considered market-wide impact because the D-Limit order will only be as impactful and widely adopted as exchanges and market participants choose. Widespread adoption could only be a testament to the D-Limit order's success.

III. **The Commission's Approval Of The D-Limit Order Is Consistent With Its Prior Rejection Of The CboeEDGA Proposal.**

In approving IEX's proposal, the Commission analyzed at length the differences between the IEX D-Limit order and CboeEDGA's recent rejected proposal to institute a speedbump for liquidity takers. Approval Order, 85 Fed. Reg. at 54,449-50. Citadel and NYSE nonetheless accuse the Commission of arbitrarily and capriciously changing course without explanation. NYSE contends, for instance, that the "purpose" of the D-Limit order and CboeEDGA's proposal was the same—to counter "adverse effects of latency arbitrage"—which somehow renders inconsistent the Commission's decision to approve the IEX D-Limit order but not CboeEDGA's proposal. NYSE Br. 17. NYSE fails to appreciate critical differences between those proposals. To be sure, both were targeted at a pressing market problem; their overlap in purpose only confirms the widespread harm latency arbitrage causes. The difference between them, however, is that the D-Limit order offered a distinct, and narrower, solution—just as the Commission here explained.

The Commission reviewed comments on both sides of the issue and carefully recounted the key differences between the two proposals: Under CboeEDGA's proposal, only liquidity providers with access to high-speed technology would have the option to reprice their orders during takers' speedbump, while the D-Limit order enables all providers to avoid latency arbitrage by automatically adjusting orders (as a commenter who opposed CboeEDGA's proposal but favored IEX's noted[11]); IEX's evidence of latency arbitrage on its exchange was more robust than that in CboeEDGA's submission; the D-Limit is narrowly tailored to address latency arbitrage while CboeEDGA's proposal broadly affected ordinary trading; and IEX, unlike CboeEDGA, submitted more compelling data and analysis that the D-Limit order would not unduly burden ordinary liquidity providers or liquidity takers. Approval Order, 85 Fed. Reg. at 54,450; *see also* SEC Br. 52-55. These differences demonstrate that at no point did the Commission change course. It simply reached a different conclusion based on a different record.

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[11] T. Rowe Price Comment Letter, *supra*, at 2.

The Administrative Procedure Act does not prevent the Commission from considering each proposal on its own terms; the Act requires only that the Commission support its decisions with reasoned analysis. *See, e.g.*, *S. Cal. Edison Co. v. FERC*, 717 F.3d 177, 185-86 (D.C. Cir. 2013) (holding that "disparate treatment" is not arbitrary and capricious where an agency "explained how its different purposes determine its different approaches" to "similarly situated" entities). That is precisely what the Commission did here.

CONCLUSION

The petition for review should be denied.

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Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

This brief complies with the type-volume limitation of Fed. R. App. P. 32(a) and Fed. R. App. P. 29(a)(5), because this brief contains 6114 words, excluding the parts of the brief exempted by Fed. R. App. P. 32(f).

This brief complies with the typeface requirements of Fed. R. App. P. 32(a)(5) and the type style requirements of Fed. R. App. P. 32(a)(6) because this brief has been prepared in a proportionally spaced typeface using Microsoft Word in Century Schoolbook 14-point font.

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CERTIFICATE OF SERVICE

I hereby certify that I electronically filed the foregoing with the Clerk of the Court for the United States Court of Appeals for the District of Columbia Circuit by using the appellate CM/ECF system on April 12, 2021.

I certify that all participants in the case are registered CM/ECF users and that service will be accomplished by the appellate CM/ECF system.

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