



Market Data and Connectivity: More Facts

A multitude of opinions have been expressed in recent months around market data and access to exchanges, but very little factual information and data has been presented. This document represents Cboe's continued effort to inject objective, factual information into the discussion around the experience of Main Street investors, proprietary market data, the SIPs and connectivity.

Main Street Investors

Are Main Street investors shouldering the costs that exchanges' charge trading firms for market data?

The first goal of the SEC's 2018-2022 Strategic Plan is to focus on Main Street investors. Thus, it is appropriate to ask if Main Street investors are shouldering the cost of market data fees. Cboe believes that Main Street investors are not impacted by those charges.

- Retail investors enjoy real-time market data, paid for by their brokers, and have seen their costs to trade decline dramatically. The cost per trade for retail online brokerage has decreased by at least 30% since 2010. Mutual fund fees and 401k equity fund expenses have also declined by over 40% between 2000 and 2017.
- Brokers pay a maximum of \$3 per month per user to provide unlimited real-time displayed market data from the consolidated tape to their non-professional (retail) clients. These rates are absorbed by brokers, not investors, and they have been steady for many years.

Proprietary Market Data

Are exchanges required to provide proprietary market data?

No, proprietary market data offerings were developed in an effort to provide value to customers, but exchanges can stop offering the products at any time.

Are trading firms required to purchase exchanges' proprietary market data, such as depth of book data?

No, in fact the majority of Cboe's approximately 200 members do not purchase depth-of-book data from Cboe exchanges.



Are exchanges' proprietary market data revenues disproportionate to the value of those offerings?

No, exchange market data costs remain extraordinarily low, especially when compared to the total revenues received by broker-dealers. For example, Cboe's total proprietary equity market data revenue was \$9 million in the third quarter of 2018. This is remarkably low compared to the \$7.2 billion in equities trading revenue and \$17.8 billion in securities trading revenue earned by just the top five investment banks in the third quarter.

SIPs

Are exchanges' proprietary market data sales a disincentive to make improvements to the SIPs?

Not only does Cboe believe in the SIP model and the benefits it provides to all investors, but also Cboe's share of SIP revenues incentivizes Cboe to make SIP improvements such that SIPs can remain viable and beneficial well into the future. Any claim that Cboe's proprietary market data business diminishes these incentives ignores Cboe's belief in the benefits of the SIP model, as well as the fact that Cboe's share of SIP revenues (approximately \$23 million in Q3 2018) far outpaces Cboe's revenues from proprietary market data (approximately \$9 million Q3 2018).

Have there been technical improvements made to the SIPs?

Yes, there have been numerous technical improvements that have decreased CTA latency from 300 microseconds in 2013 to 80 microseconds in 2018 and UTP latency from 1.2 milliseconds in 2013 to below 18 microseconds in 2018.

Have there been improvements to SIP governance and transparency?

Yes, there have been numerous improvements made to SIP governance and transparency. For example, the SIPs have increased the number of advisory committee members from an initial five members to the current 11 members; moved virtually all agenda items from the executive session to the general session, which includes advisory committee members; and began publishing executive session agendas, general session summaries and the revenue allocation formula.

Are exchange-allocated SIP revenues growing?

Exchange-allocated SIP revenues have fallen by over 23% (inflation adjusted) since 2008. Moreover, total industry spend on NBBO and last sale data provided by the SIPs (allocated to exchanges and non-exchanges) has declined by 6% from 2008 to 2017.

Connectivity

What are physical and logical ports?

Physical ports grant access to the Cboe's physical connectivity infrastructure. Logical ports represent technical ports established by the exchange within its trading system for the delivery and/or receipt of trading messages (orders, accepts, cancels, transactions, etc.). Together, logical ports and physical ports are the mechanisms by which trading firms satisfy their overall capacity needs.



Do trading firms purchase the same amount of capacity?

Capacity needs vary from firm to firm. An individual logical port, for example, offers match capacity of 5,000 messages per second. Firms that require more messages per second purchase more match capacity to satisfy their business needs. To illustrate, the top 10 trading firms by market share on BZX Equities purchase 47% of the match capacity on BZX Equities. Within the top 10, match capacity also varies. For instance, in September 2018, the largest client by market share across Cboe's four equities exchanges was 6th in terms of match capacity.

Moreover, a significant number of members connect indirectly through a number of different third party providers, such as another broker-dealer or service bureau. In fact, 24% of members that traded equities on BZX Equities in November connected indirectly to the Exchange. Ultimately, whether due to the size of their U.S. equities business, the trading strategies that they employ, or the desire to reduce latency by maintaining multiple separate logical connections, members that require more capacity purchase more capacity.