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MARKET STRUCTURE

IMPROVING THE PRICE IMPROVEMENT MODEL

Price improvement mechanisms provide an opportunity for retail orders to receive a better execution price than the displayed NBBO. However, the current model is overly complicated, anti-competitive and often results in a better price but not the best price.

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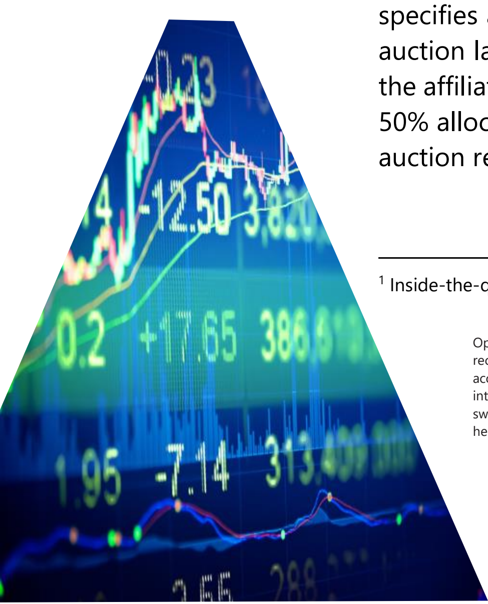
Over the past two years, we have witnessed the proliferation of price improvement mechanisms (PIMs) on the US equity option exchanges. These offerings are an often overlooked, but essential part of the market structure. These models allow wholesalers who provide order routing to place retail marketable[1] orders into an auction mechanism with the intention of improving the execution price over the National Best Bid and Offer (NBBO).

In theory, these mechanisms provide a simple forum for competition and price improvement. In reality, they are overly complicated and give outsized benefits to wholesalers with an affiliated market maker (MM). They allow these wholesalers to selectively focus routing decisions to give themselves the greatest possibility of internalizing orders while providing the minimum amount of price improvement possible. These mechanisms also limit the ability of unaffiliated MMs to compete as they are forced to pay an oversized premium for providing price improvement.

Overall, we understand the goal of these mechanisms, which is to open up every retail order for price competition amongst all market participants. However, these mechanisms, as currently structured, impede maximum price improvement and essentially act as an internalization mechanism for wholesalers with an affiliated MM arm.

THE AUCTION PROCESS

Eleven US option exchanges offer price improvement mechanisms. PIMs work as follows: A wholesaler submits a retail order it represents as "customer" against principal interest, which is typically sourced from their affiliated MM entity. To initiate a price improvement auction, the wholesaler marks the order for auction processing at the exchange. It then specifies a price at which it seeks to cross the customer order with its affiliated MM. This auction lasts no longer than 100 milliseconds. At the conclusion of the auction, assuming the affiliated MM has responded with a match to its price, the affiliated MM is entitled to a 50% allocation if one other respondent had the same price or 40% if more than one other auction respondent matched the best auction price.



[1] Inside-the-quote, at-the-quote, near-the-quote

The affiliated MM that submitted the paired order to the price improvement auction is subject to lower fees than other MMs that participated in the auction. Most exchanges charge a contra response[2] fee of $0.05 per executed contract. All other unaffiliated responses that are executed are charged $0.50 per executed contract. Additionally, paired order types like auto-match allow the affiliated MM firm to not initially respond at the best price level(s) as other responding firms, but rather automatically match the best response. These auto-match features essentially guarantee enhanced participation rights to the affiliated MM on the orders of its choosing. Additionally, it is difficult for the customer to independently measure if maximum price improvement has taken place with the orders that are submitted to PIMs.

By providing a market structure that guarantees participation rights for the affiliated MM and penalizes unaffiliated MM for price improving, exchanges are facilitating and, at times, encouraging greater levels of internalization by the wholesaler and affiliated MM. With increasing levels of internalization, there is greater risk for a reduced liquidity profile as well as a reduction in the likelihood for maximum price improvement to retail investors.

PROPOSED SOLUTIONS

The following changes can be made to price improvement mechanisms to enhance competition and level the playing field for all MMs:

- Remove guaranteed participation rights on auto-price matches.
- Reduce the guaranteed allocation for the affiliated MMs.
- Adjust the difference in fees for unaffiliated MM auction responses that offer price improvement.
- Encourage exchanges to be more transparent on reporting price improvement statistics with robust supporting data including:
  - The number of contracts improved over NBBO.
  - The percentage of improvement contracts executed better than the NBBO.
  - The percentage of contracts improved.
  - The percentage of price improved contracts internalized.

CONCLUSION

While officially being open to any exchange members, in reality price improvement mechanisms are heavily skewed in favor of wholesaler/affiliated market making firms that

[2] These contra fees are labeled as such on the exchange fee schedules. A contra may be the affiliated MM, but could be any firm that the wholesaler is sourcing for liquidity.

bring orders to the exchange and work as another way to internalize flow with minimal competition.

We believe that there is a place for these mechanisms in general. These mechanisms do provide opportunities for retail customers to receive price improvement over the NBBO. However, these mechanisms as currently designed are not encouraging the maximum benefit of additional price improvement due to asymmetrical allocation features and fee structures.

These asymmetries manifest in a few ways:

- Exchange matching algorithms that essentially preference the wholesaler/affiliated MM.
- Embeds an execution optionality via auto-match feature for the affiliated MM.
- Fee structures that penalize other responding MMs that may break-up these crosses with price improvement by charging them 10x the fees.

In the end, wholesalers are incentivized to route to these mechanisms in such a way as to maximize allocation for their affiliated MM, not to maximize the price improvement for a retail investor.

These mechanisms should be improved to promote competition and therefore encourage maximum price improvement in auction responses.

ABOUT OPTIVER

Over thirty-five years ago, Optiver started business as a single trader on the floor of Amsterdam's European Options Exchange. Today, we are a leading technology-driven MM, with more than 1300 employees in offices around the world, united in our commitment to improve the market by competitive pricing, execution and thorough risk management. By providing liquidity on multiple exchanges across the world in various financial instruments we participate in the safeguarding of healthy and efficient markets.

We provide liquidity to financial markets using our own capital, at our own risk, trading a wide range of products: listed derivatives, cash equities, ETFs, bonds and foreign currencies.