A Conflict Inherent in the Maker-Taker Model: Equities vs. Futures

One salient and controversial feature of the US market structure is the system of differential fees and rebates paid by exchanges to price "makers" and "takers". One negative effect of this system is the conflict of interest it creates between brokers and their clients who pay a flat commission. In a previous research note, we highlighted the conflict agency brokers face every time they route a passive limit order. [1] In this note, we illustrate the conflict agency brokers face when deciding whether to cross the bid-ask spread.

Case Study of a Microstructure Signal

Transient market conditions, also known as short-term microstructure signals, can influence short-term trading decisions like whether to post a passive order or cross the spread, or how and where to route an order. One category of microstructure signal provides information about the direction of the next price tick, and has obvious potential application to agency execution tools (to say nothing of proprietary trading strategies).

We draw a distinction between such short-term microstructure signals and longer-term "price prediction," which we addressed skeptically in a previous research note, arguing that in agency execution the reality of predicting evolution of midpoint price over a timescale of minutes or more was likely much less useful than suggested by many algorithm providers' marketing pitches.[2]

In this research note we look at one simple short-term microstructure signal, quote imbalance, in both the US equity and futures markets. We show that even this simple signal does indeed predict short-term price movements. Such predictions can be utilized in a number of different ways to inform the decisions made by a trade execution algorithm. One simple example illustrated below, and which highlights the conflict brokers face as a result of the maker-taker market structure, is to use this signal to decide whether to place an order passively or aggressively. Using this example, we show that the optimal decisions based on this signal may be quite different for the market participants who are exposed to the exchange fees and rebates and for those who are not. In a situation where a client pays a flat per-share commission to its broker, the broker is exposed to the exchange fees and rebates whereas the client is concerned only with the execution price. Hence, a trade execution strategy that is optimal for the broker may not be optimal for the client.

Analysis

There are several ways a signal telling us whether the market is likely next to tick up or down might be employed. For example, an algorithm that would otherwise trade passively in order to capture the spread might instead become aggressive and take at the current market price rather than risking the likelihood of having to repeg to catch up to the runaway price. Conversely, an algorithm that might otherwise cross the spread can become more patient in providing liquidity and avoid needlessly paying the spread if the chances are the price will become more favorable.

In this note, we consider the quote imbalance signal defined as follows:

Quote imbalance = (quote size at the passive price) / (sum of quote sizes at the passive and aggressive prices).

1 *To Hop (the Queue) or not to Hop (the Queue)*, Pragma, No. 3, 2012.
2 *The Limits of Price Prediction*, Pragma, No. 5, 2013.

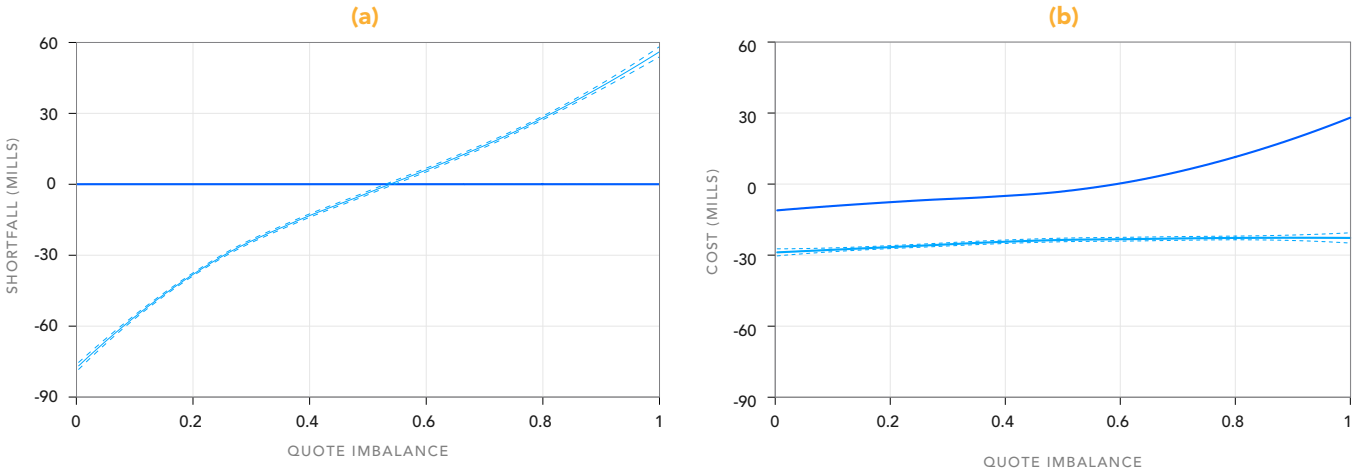

FIGURE 1

The average (a) shortfall relative to the opposite side and (b) fees and rebates of passive and aggressive strategies for US equities as functions of the quote imbalance. Dashed lines are the standard errors. In both plots, light blue is the passive strategy, and dark blue is the aggressive strategy. Both plots use the convention that positive shortfalls and costs are unfavorable.

We explore this signal by looking at the shortfall of executing an order as a function of the signal value. We do this for two different execution strategies. The first "aggressive" strategy is simply sending an order to cross the spread, and the second "passive" strategy is posting a limit order and repegging as necessary until it is filled. We use a database of actual passive algorithmic child orders, i.e. the (typically) 100-share orders that are used to complete a larger parent order. Each child order was posted at the NBBO at an exchange that pays a rebate for providing liquidity. For each child order we record both the signal value and the shortfall relative to the aggressive price at the time we placed the order for each of the two alternative strategies. To calculate the aggressive strategy shortfall we assume that we could have traded aggressively at the opposite side of the NBBO at the moment we initially entered the passive order, with the lowest fee or highest rebate among all the exchanges displaying that price at that time. For the passive strategy we use the actual shortfall realized from each passive order at the price it was eventually executed, including any repegging. For the passive orders that were canceled, we assume execution at the aggressive price at the time of the cancellation.

Results

EQUITIES

Figure 1 depicts the average cost of the passive (light blue) and aggressive (dark blue) strategies as functions of the quote imbalance signal for orders in the US equity markets. This cost is broken down into two components: Figure 1(a) shows the shortfalls only, and Figure 1(b) shows fees and rebates only. Figure 1 demonstrates that the shortfall of the passive strategy is indeed strongly dependent on the demand imbalance, varying by about 1.3 cents between the extreme values of the signal. This is comparable to the average bid-ask spread for the sample at hand (1.2 cents). The second striking feature is that the cost of the aggressive strategy in terms of expected exchange fees and rebates also has a strong dependence on the signal. When the imbalance indicates downward price pressure, it is more likely that there will be an offer at an inverted exchange like Nasdaq BX that offers a rebate to takers, making the average cost for the aggressive strategy lower. When the imbalance indicates the price is running away, it becomes much less likely that a seller will be offering shares on an inverted exchange, making the average cost for the aggressive strategy higher.

An interesting implication of this data is that a broker can use even rudimentary microstructure signals such as this to generate a significant performance improvement for his clients who pay a flat per-share fee, simply by crossing the spread when the quote imbalance is high enough. However, this performance improvement for the client will come at the cost of higher

exchange fees for the broker. The market structure creates an incentive for the broker to pursue a passive strategy in order to maximize his rebate capture and thus his profitability for the trade. Indeed, the loss to the broker of crossing the spread is highest precisely when the client would realize the most shortfall benefit from the broker doing so. Figure 1(b) also illustrates that the cost difference between the passive and aggressive strategies for the broker is economically very significant, in the range of $0.002 – $0.006, on the same order of magnitude as the entire commission that an institutional client pays to its broker for a low-touch execution service.

FUTURES

Another market provides an interesting contrast to the situation in equities. Figure 2 shows the average shortfalls for passive and aggressive strategies as functions of the same quote imbalance signal, for several futures contracts[3]. We see the same basic relationship between the signal and the value of the passive strategy. However, in contrast to the US equity markets, the futures contracts we analyzed only trade on one exchange, the CME. On the CME there are no differential fees or rebates for taking vs. making, so the explicit cost of the aggressive and passive strategies are the same, and are independent of the quote imbalance. Thus, we observe that the same conflicts of interest found in the equity markets do not exist between clients trading futures and their brokers. We also observe that this rudimentary signal alone does not offer an opportunity to achieve improved execution performance by crossing the spread, as the passive strategy is, on average, better than the aggressive strategy regardless of the quote imbalance.

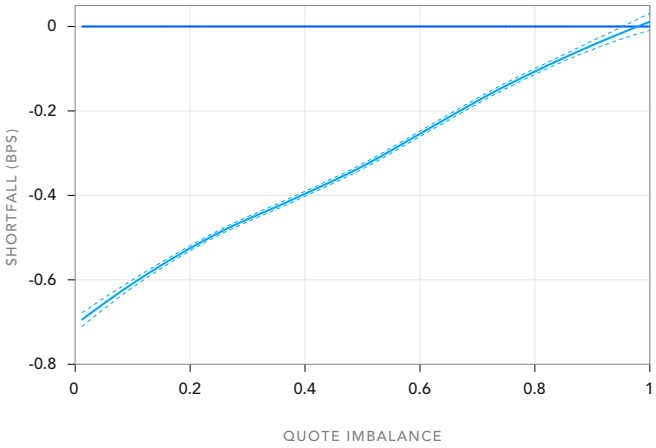

FIGURE 2
The average shortfalls of passive (light blue) and aggressive (dark blue) strategies for futures as functions of the quote imbalance.

Conclusion

Even a simple signal based on quote imbalance provides significant short-term tick-level price prediction. However, the maker-taker market structure creates a divergence between the execution price, which establishes the shortfall experienced by the client, and explicit costs associated with an execution—the fees and rebates paid to the broker by the exchange. When a client pays a flat per-share commission, this maker-taker market structure creates an intractable problem for brokers—being truly blind to fees and rebates would have a dramatic effect on profitability and would even render business at the lower end of current commission levels unprofitable. The US futures market presents an instructive contrast. Here, there is no maker-taker style system of differential fees and rebates, and the conflict does not exist—brokers are better aligned with clients as agents to achieve best execution price.

The competitive power of the maker-taker model has been well established, making this an issue that requires a regulatory remedy. Regulators should eliminate or limit rebates and similar payments for order flow. Such rebates obscure the true economics of the services brokers provide, create market distortions, and create unnecessary and inescapable misalignments of interest between broker and flat commission clients.

3 The contracts considered include ES, AD, BP, CD, EC, and JY. All trade on the CME and operate on time-price priority matching rules, as do equities.