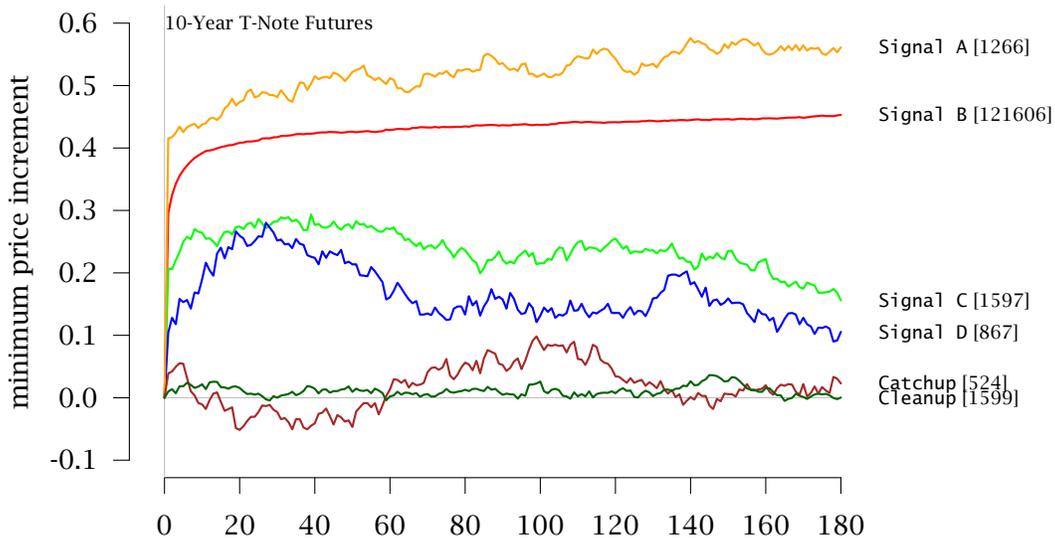


Market Impact and Alpha

Price impact caused by an aggressive order is a staple of market microstructure research. The simplest measure of market impact is to look at changes in midpoint price following a trade at the bid or the ask. The price motion should be due both to the immediate liquidity consumption and to the information transmitted by the order to other traders in the market.

It is often forgotten that the decision to send the aggressive order was itself likely based on a forecast price motion. Using QB internal order data, we can explore this distinction.



The figure above shows average midpoint price change following aggressive orders sent by QB's execution algorithms, as multiples of the exchange's minimum price increment, for the CME 10-Year Note futures contract for calendar year 2016. Price change is normalized by the sign of the aggressive order: positive for buys, negative for sells. The horizontal axis is elapsed time in seconds, for a maximum duration of three minutes.

The different curves correspond to different reasons that the algorithm submitted the aggressive order—this information is not available to an external market observer. The number shows the number of distinct events. The sizes of market orders vary across the categories, but we have also controlled for size and the results presented here are robust.

Reasons Cleanup and Catchup are purely timer-based, with no opinion about the future market direction. The graph shows that market orders sent for these reasons have almost no price impact, and this suggests that the market orders themselves cause no price impact.

All the other reasons incorporate price prediction signals. In particular, Signal B sends aggressive orders based on order book imbalance. These orders appear to have price impact, but comparing with Catchup and Cleanup it is clear that the price change is actually due to correctly forecasted alpha rather than impact. Since these aggressive orders represent 95% of the total number of orders, an unconditional average would incorrectly conclude that market orders have impact. What is actually being observed is the correct price prediction, which is the reason the aggressive order was sent, rather than a consequence.

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