

## **Non-technical abstract**

We study the relation between broker ownership of Alternative Trading Systems (ATSs) and the execution quality of client orders handled by the broker. Venue ownership can affect broker's routing decisions in several ways. First, the brokerage firm receives trading fees from clients on its own venue instead of paying fees to other venues. Second, higher trading activity on the broker's venue is likely to attract other traders to the venue, thus further increasing trading fees. On the other hand, brokers have a duty of best execution to their customers, which generally requires brokers to seek executions that are as favorable as possible under prevailing market conditions. In this study, we address the following questions. Do brokers show a preference for routing client orders to affiliated ATSs? Is there any systematic association between routing preferences and execution quality? Finally, can broker routing decisions be explained by a preference for opaque ("dark") versus transparent ("lit") venues rather than affiliated venues?

Using FINRA Order Audit Trail System (OATS) data, we analyze 330 million institutional broker orders routed by 43 active institutional brokers for a size-stratified sample of 272 stocks during October 2016. While not all brokers with affiliated ATSs show a preference to route client orders to affiliated ATSs, we identify a subset of institutional brokers who do exhibit such a preference. Brokers with high affiliated ATS routing are associated with lower order fill rates. In terms of economic significance, when we divide brokers into three groups based on affiliated routing, the group with the highest affiliated ATS routes filled an average of 16.9% of an order, which is significantly lower than the 29.8% for the middle group and 43.5% for the lowest group.

Are lower fill rates for ATS-affiliated routes offset by favorable transaction prices and smaller information leakage? In this context, information leakage represents the ability of others to trade ahead of the order because they know of its existence. For institutional clients who incur an opportunity cost for unfilled orders, our results suggest that trading costs are higher when clients use a broker with high affiliated ATS routes. These differences exist after controlling for stock attributes, order characteristics and market conditions in a multivariate regression framework. The differences across brokers in routing decisions, fill

rates and trading costs are persistent over time, indicating that past broker behavior is predictive of future behavior. We do not find that brokers with high affiliated ATS routes counterweigh the lower fill rates with better outcomes on other dimensions, such as mitigating leakage effects. We do not find empirical support for an alternative explanation that our results are simply a manifestation of a routing preference between dark and lit venues.

Institutional investors face a number of informational frictions in equity markets such as the opacity in order handling practices, the ability to process high frequency data, and the ability to measure execution quality in a fragmented market structure. Our study points to the potential value of improved disclosure on broker routing practices in general and a higher level of scrutiny when brokers show a preference to route orders to affiliated venues. We also recognize that institutional clients could receive benefits from brokers that extend beyond execution services. In those cases, our study provides guidance to institutions in quantifying the tradeoffs involved in obtaining a portfolio of services from a broker.