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GUEST COMMENT
Principal Bid vs. Agency Trading: Defining the Edge

By Anna Bystrik and Akis Georgiou

Many changes in equity trading over the last decade have contributed to the growth in program and algorithmic trading. These include the advent of electronic communications networks (ECNs), decimalization, increased usage of order management systems (OMS) and the FIX protocol, and the application of quantitative research to the trading arena. In the last year, the introduction of algorithms that incorporate market impact and risk models have more closely tied algorithmic and program trading, allowing for the execution of an optimal trading strategy for the entire portfolio. Miletus' Risk Optimized Basket Execution is an example.

The evolution of algorithms has been closely followed by the introduction of sophisticated pre-trade analysis tools, which, in addition to providing estimates of market impact, facilitate the agency-versus-principal decision. While innovative algorithms are able to significantly reduce the timing risk of a portfolio, they cannot completely eliminate risk. A risk-averse investor might therefore find greater appeal in a seemingly risk-less principal trade.

Our analysis of the estimated costs of agency versus principal-bid trading is based on actual data from program trades executed in 2006. We compare the structure of the trading cost for a single program trade and for similar repeated trades over a longer trade horizon.

In a typical principal trade, a portfolio is auctioned to a few brokers. In order to avoid front-running, characteristics of the portfolio rather than the ticker list are provided. The brokers compete for the basket, and the winner is the brokerage with the lowest bid.

A principal-bid trade transfers market risk from the client to the broker-dealer. The broker's principal bid incorporates a risk premium, the exact amount of which is not disclosed. Quotes are normally given as basis points away from a pre-agreed benchmark (e.g., midpoint of bid-and-ask prices).

Optimal Trading and Principal Bids

Whereas the cost components of an agency execution are well understood, it is considerably more difficult to understand the cost components of a principal-bid charge—the principal-bid broker is not required to spell them out. In what follows, we ignore the implicit component of trading costs (applicable to agency and principal trading), and concentrate on two trade-cost components that are easily measurable: market impact and timing risk. The relationship between the two is quantified in a 2000 paper, "Optimal Execution of Portfolio Transactions," by Robert Almgren and Neil Chriss.

Any attempt to devise a strategy with low timing risk leads to aggressive trading and an inevitable increase in market-impact costs. Conversely, the decision to minimize market impact necessitates passive trading, and a high degree of timing risk.

The principal-bid broker will perform its own estimate of market impact and timing risk. As is always the case with pre-trade estimates, they will be approximate and depend on data, inventory and the set of pre-trade tools used (market impact model, risk model, etc.).

For simplicity, we introduce a (hypothetical) brokerage that executes the same portfolio trade twice: first as an agency, and second as a principal. Under the usual assumptions, the cost of the agency trade can be described as normally distributed with the expected impact representing the mean and the timing risk representing the standard deviation. The cost of the principal trade is typically the sum of the impact and timing risk (for one day) with a possible discount, q, applied to the timing risk component. The magnitude of the discount depends on factors such as broker inventory, expected trading horizon, competition, etc. The higher the level of q, the greater the portion of timing risk charged to the client.

Given that, in our example, the broker uses the same tools for both the principal and agency trade, the impact and timing risk estimates for both trades are assumed equal. Under this assump-

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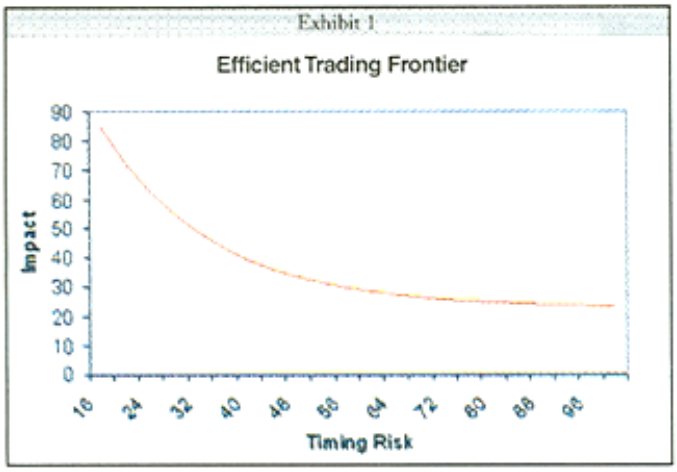
The structure of this relationship, termed the Efficient Trading Frontier, is illustrated in Exhibit 1. Points along the frontier represent strategies that optimally trade off impact and timing risk.

Exhibit 1



tion, the probability of a principal trade outperforming the agency trade can be determined from the cumulative normal distribution function of the cost differential.

Depending on the client's appetite for risk, the higher probability that the agency trade will outperform the principal trade may be an acceptable trade-off given the speed and convenience of the principal trade. If, however, the client trades several times a year, (trading similar baskets with monthly or biweekly frequency) the cost associated with principal-bid trades increases linearly, while, at the same time, there is a dramatic increase in the probability that agency trading will outperform principal trading. Indeed, if the client submits the baskets k times a year, then (assuming for simplicity that the impact and risk estimates don't change from basket to basket) the total cost associated with agency trading will be normally distributed with a mean of k times the expected impact and a

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