

# Getting Best Execution

## Some Lessons from Simulation Analysis

**D**emonstrating that you have met a best-execution obligation is not simple—even in a simplified environment. Since Congress enacted the Securities Acts Amendments of 1975, best execution has been an equity markets objective. The obligation involves executing customer orders at the best possible price with minimum market-maker/dealer intervention.

Sounds easy? It isn't. What in fact is the obligation? That has never been specified. Some situations are easy. Suppose that the offering price for shares of XYZ is \$30.00 in market A, \$30.10 in market B, and that the two markets are similar in terms of attributes such as speed and anonymity. Buying XYZ in market B at \$30.10 would not be a "best execution." But the alternatives may not be so clear. A simulation can elucidate the complexities involved.

Our simulation software (called TraderEx) has four modalities. Each session opens with a call auction. After the auction, three other venues appear on the TraderEx screen: a public limit order book, a "dark pool" block trading facility and a quote-driven dealer market. Each session closes with another call. Trading is commission-free, with no short-selling restrictions. Live participants have direct market access, with no additional strictures. At times, news flashes across the screen, giving participants updates on

XYZ Corp.

The simulation requires that you, as a live participant, make some strategic decisions. Should you trade in the call, or in the continuous environment, or both? Should you break your orders into smaller tranches for sequential submission, or use block trading, or both? Should you enter market orders, or limit orders, or both? Should your patience level depend on where you believe price is heading, and on how far you are into the trading day?

### Strategic Decisions

These strategic decisions are made in the face of uncertainty. For instance, if you place a limit order, will it execute? If you wait for a call auction, will you get a better price? Will a counterparty be in the block-trading facility? If you start the trading day as a patient buyer, will price be lower later on? Will you get the job done before the trading day ends? In this context, best execution means following a strategy that gives you the best expected

outcome.

One must show that the order management approach used outperforms the alternatives on average. Think that's easy? Try it in the simulated environment. The trick is to find the probability distributions and the algorithms to exploit them. We have been using trading simulations in teaching for more than 10 years. Our finding: After many simulations, you might get somewhere. But what if, as you are gaining knowledge of the dynamic workings of the market, the market's dynamics change? And what about the unpredictable behavior of other live participants?

With the TraderEx software, multiple live participants interact with each other and with machine-generated order flow as they trade shares of XYZ stock in a networked environment. Each participant can be an agent who has been given a large order to work, or a proprietary trader who goes in and out of the market looking for quick profits, or a market maker with an affirmative obligation to post continuous two-sided quotes.

This is a complex environment even in the closed world of a single day's trading in a single security. The live participants strive to fill orders, control inventory positions, minimize implicit trading costs and, if they are day traders or market makers, to maximize trading profits. En route to

accomplishing this, can they know if best execution has been achieved?

On a trade-by-trade basis, best execution is a vacuous concept. But perhaps, you might think, best execution will, for a sequence of trades, translate into a meaningful performance measure. So you select a benchmark. The lower the average price at which you have bought shares (or the higher the average price at which you have sold them), relative to that benchmark, the better your performance. Will it work? The procedure will not be meaningful for any given simulation, because prices may unexpectedly move against the trader. Only by averaging results over many sim-

ulations can your performance be assessed.

There is another problem: What benchmark should you use? TraderEx offers a few. Beating the volume-weighted average price is one possibility. Unfortunately, VWAP has some problems (e.g., your own actions affect VWAP, and it can be gamed). How about trading profits? Unfortunately, news can change prices in the simulations as it does in actual markets, and it is not easy to separate trading gains from investment returns. How about implementation shortfall? Transaction-cost analysis can also be problematic. The bottom line is that no really good benchmark exists. Consequently, attention

has turned away from transaction costs to assessing the process that a buy-side desk uses to implement a portfolio manager's investment decisions.

So, where do we stand with best execution? Our simulations meet one regulatory requirement—minimum broker intervention. In fact, in our DMA setting, there is none. What about the obligation to execute at “the best possible price”? Again, the simulation simplifies. We have only one marketplace, and its four venues are on one screen. Price discovery is coordinated between venues. Limit order book and call auction orders are executed using strict time and price priority rules. Dealer quotes are integrated with the limit order book. Block trades are made between the quotes. There are no trade-throughs. How can one not get best execution every time?

Unfortunately, you can. In the simulations, you can feel good about some trades and upset about others. As they play the game, participants learn more about the marketplace, and they develop their own best-execution processes. They realize that best execution means little when examined for just a few executions. And participants conclude that best execution shares something with liquidity: Both are hard to define and measure, but you sure do know them when you see them.

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