The Economics of Best Execution

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The work presented here is still preliminary. I would be delighted to receive any suggestions, comments or corrections.

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1. Introduction

Three characteristics of US securities markets cause people to question whether brokerage customers obtain best execution when they trade. The first is order preferencing. Brokers commonly send their retail order flows to preferred dealers in exchange for various inducements. The receipt of these inducements at first blush seems inconsistent with brokers' agency duties to their clients. The second concerns the exposure of order flow. Brokers do not expose limit orders to the extent that many limit order traders would like. Finally, no universal mechanism exists in the US markets to ensure that exposed limit orders can compete with dealers to provide liquidity.

This paper surveys some economic principles required to understand these three market characteristics, their effects on best execution, and on how best execution should be best regulated, if at all. The analysis examines best execution for market orders and also for limit orders. The issues considered include

- how competition affects payments-for-order-flow and retail commissions,
- what determines bid/ask spreads, price improvement and order flow inducements,
- why you cannot buy what you cannot audit, and
- why the public limit order traders can crowd-out dealers.

The paper is organized as follows. Section 2 presents some definitions of best execution and surveys why some people suspect that existing market structures are not producing it. Section 3 then considers some economic issues that underlie best execution and the implications of these issues for best execution. The next section addresses regulatory approaches to the provision of best execution. It concludes with a through discussion of various changes that regulators are presently considering (and may soon consider) to improve best execution. Finally, Section 5 concludes the paper with some general observations about best execution.

2. Best Execution Issues

2.A Defining Best Execution

When brokers take customer orders, they assume an agency responsibility to obtain "best execution." Unfortunately, best execution is not well defined.

Best execution means different things to different people. To unsophisticated customers, best execution may mean "get the best price possible" for a market order and "trade as quickly as possible" for a limit order. This definition suggests absolute standards for best execution.

More sophisticated customers understand that execution quality depends on the resources (effort, skill and systems) brokers employ to obtain it. They know that in competitive markets, you do not get something for nothing. They expect better executions, on average, when they pay their brokers well for execution services, and they expect lesser executions when they do not pay much. For such traders, best execution means "get me the execution that I am paying you to provide." These traders define best execution in the context of their brokerage relationships.

The most sophisticated customers understand that they cannot buy something that they cannot measure well. If brokers believe that their customers cannot measure execution quality, they are unlikely to provide it, whether paid for it or not: Any broker who spends resources to provide unrecognized execution quality will be undercut by those who do not. In competitive brokerage markets, such brokers cannot compete. They must either go out of business or quit providing high quality service. The most sophisticated customers therefore only pay for the level of execution quality that they can audit. For them, best execution means "get me the execution that I expect you to provide given what I pay you and the limitations of my ability to audit your performance." These traders define best execution relative to the costs of auditing it.

2.B Order Preferencing

Order preferencing is the routing of order flow by a broker to a preferred dealer or market. Most orders are preferenced on the basis of broker-dealer relationships. The routing does not normally depend on current quoted prices or market conditions. Small retail orders are the most commonly preferenced orders.

2.B.1 The order preferencing problem

Preferencing of order flow by brokers to dealers raises questions about whether brokers are obtaining best execution for their customers. The various pecuniary and non-pecuniary inducements that dealers offer brokers in exchange for their order flows ("payments for order flow") may seem like kickbacks. The preferencing of order flow to a broker's own dealer subsidiary suggests obvious conflicts of interest, as does the exchange of order flows among brokers and their dealer subsidiaries.

Since these preferencing relationships directly benefit brokers, it is not obvious that they are meeting their agency obligations to their clients. Moreover, since brokers rarely negotiate individual trade prices for preferenced order flows, and since the routing of a preferenced order rarely depends on the specific order or on current market conditions, it is not immediately apparent that brokers actively search for best execution for their clients.

(The crossing of customer order flows within a brokerage firm also raises questions about whether brokers are obtaining best execution for their customers. In this case the concern is primarily about the allocation of execution quality among customers since a good price for one side is a poor price for the other side. It is unlikely (but not unimaginable) that a broker could obtain better execution for both clients outside the firm.)

2.B.2 Best execution in order preferencing relationships

Dealers and brokers involved in order preferencing arrangements are aware of these potential conflicts. Brokers therefore demand, and dealers generally promise, certain levels of service that depend on order type and size. Since brokers negotiate these promises with their dealers, these agreements implicitly represent the brokers' definition of best execution.

For small market orders, dealers generally guarantee execution at the best displayed bid or offer (BBO) or better, regardless of their own quote. Brokers may also demand other execution quality characteristics such as speed, availability, and reliability.

Any improvement in price relative to the BBO is called price improvement. Brokers may negotiate the price improvement frequency ex ante, or, more commonly, audit it ex post.

The quality of service provided to limit orders varies by market and by dealer. All dealers generally guarantee that limit orders will be executed if their limit prices match the opposing BBO (offer for a buy order; bid for a sell order). Some dealers promise to display limit orders under various conditions. Dealers who are exchange members must give their limit orders price priority over their own trading and they must yield to their public limit orders at a given price. Some dealers promise to fill limit orders after a certain amount of volume has been printed at that price.

The fact that dealers pay for order flows suggests that they could provide better execution services than they do. In particular, dealers may not be providing as much price improvement for market orders as they might. They may also be extracting excessive option values from their limit orders and they may not be giving them as much exposure as they might. If brokers demanded more price improvement and better limit order executions, dealers would pay less for their preferenced order flows.

2.C Limit Order Display

Many US markets do not expose limit orders to the extent that their submitters would like. The inability to widely display limit orders decreases the probability that they will execute quickly. These traders thus believe that they would get better executions if they could display them more widely.

The problem is particularly serious in the Nasdaq markets, but it appears in other markets as well. In Nasdaq, public limit orders historically would only be represented if a dealer could be persuaded to show it. Since few were willing to do so, large public traders started to display their orders in Instinet. Nasdaq and the SEC are presently examining proposed rule changes that would increase public limit order exposure.

2.D Consolidated Time Precedence

Even when limit orders are displayed, no universal mechanism exists in the US (excepting individual exchanges) to ensure that exposed limit orders can compete with dealers to provide liquidity. In particular, since brokers can preference orders to specific dealers willing to match the best exposed prices, public limit orders may only execute when they are the most aggressive traders in the market. Many limit order traders believe that they would get better executions if they could compete on a more equal basis with dealers for order flow.

3. Some Useful Economic Principles and Their Applications

3.A Nobody Earns Excess Profits in Perfectly Competitive Markets

In perfectly competitive markets, nobody earns profits in excess of a fair rate of return on their dedicated resources. Perfectly competitive markets arise when suppliers with identical cost functions can freely enter or exit the market at low cost. When suppliers in such markets make excess profits, they tend to lower price or provide better service to attract more business. New suppliers also enter to share in the excess profits. These responses all drive excess profits to zero.

When suppliers are generating less than their required profits, they raise prices, cut service, or quit. These forces tend to raise profits. In equilibrium, excess profits are zero.

3.A.1 Competition in the wholesale and retail order flow markets

Dealers and brokers both compete in highly competitive markets. In both markets, entry and exit are relatively cheap and both markets have many competitors.

Dealers compete for brokerage order flow. Order flows will be valuable if brokers are unable (or choose not) to enforce high execution standards. In perfect competition, dealers will compete away all excess trading profits by offering various inducements for order flow. These inducements typically lower brokers' costs of doing business. To the extent that brokers and their customers also value non-price execution quality characteristics, dealers may also provide them to attract order flow.

Brokers compete for retail order flow. Retail order flows are valuable because brokers can preference them to independent dealers in exchange for various valuable order flow inducements. They also can route them to their own dealer subsidiaries where they can directly profit from them. In perfect competition, brokers will compete away all excess profits by offering various inducements to obtain customer order flows. These inducements include low commissions and a wide variety of ancillary services.

3.A.2 Implications for best execution

In perfectly competitive markets, if brokers or regulators demand that dealers provide higher execution quality, retail commissions will rise and/or ancillary services will fall. There is a trade-off between execution quality and the price and level of brokerage services. Holding everything else constant, if traders demand greater price improvement for market orders, commissions will rise by a corresponding amount. In perfectly competitive markets, to a first order approximation, net transaction costs for market orders (price impact plus commissions) will not depend on how best execution is regulated.

3.B You Can't Buy What You Can't See

Suppliers who offer expensive quality that buyers cannot recognize can be undercut by those who claim to do so but do not. If buyers cannot tell the difference between high quality and low quality suppliers, suppliers can give them lower quality products regardless of what they promise. As a result, buyers tend to purchase from the low cost suppliers. Price will reflect the costs of the low quality suppliers and high quality suppliers will be unable stay in business.

3.B.1 Retail customers cannot easily determine whether they receive good execution

Good execution for market orders means good prices and quick service. Retail market order traders can easily audit response times, but they are not well prepared to audit the quality of their prices.

To effectively measure execution price quality, traders need to examine the relation between their execution prices and nearby trade prices and quotes. However, few retail traders have access to the transaction and quote records surrounding their trades. Those that do may not analyze their

transaction costs carefully because the process is too time consuming: The resulting information is too expensive relative its value. Most retail traders only know the quoted spread and last price at the time of their order submission. From this information alone, it takes many trades to reliably estimate price improvement rates (unless they are extremely good or bad).

The execution audit problem for limit order traders is even more difficult because it can be hard to determine whether a limit order should have executed, especially if the order matched or even bettered the best BBO. The uncertainty associated with limit order executions greatly complicates the execution audit problem.

Even if traders measure execution price quality, they still cannot judge whether they are receiving good executions without having some norms against which they can compare their experiences. To obtain such norms, they must either trade with several brokerages, or they must compare their experiences with other traders. In either event, they must be careful to compare apples to apples and oranges to oranges since some securities are harder to trade than others. Due to their costs, retail traders rarely do such comparisons.

3.B.2 Implications for best execution

Since retail customers generally do not know whether they receive good executions on average, brokerage firms have little incentive to demand that dealers provide good execution. If they did, they would obtain fewer order flow inducements from dealers. Instead, brokers accept relatively poor execution and use the resulting order flow inducements to lower their brokerage commissions, which their customers can readily audit.

The brokerage industry is not likely concerned about this equilibrium. From a marketing viewpoint, when deciding to trade, most customers probably give more weight to their visible commission costs than to their less obvious built-in transaction costs. If so, the brokerage industry would prefer low commissions to good executions because low commissions encourage customers to trade.

3.C Bid/ask Spreads Depend on Market Structure

The competition among dealers and limit order traders to attract those order flows that traders route to the best displayed prices determines bid/ask spreads. Spreads therefore depend on preferencing arrangements, limit order display and on the information in the order flow.

Spreads will be tight if three conditions are met:

1. Mechanisms exist to route order flows to the best available prices. This condition ensures that price competition is effective.
2. Traders must have widespread access to that mechanism. This condition ensures that spreads reflect the prices that the most aggressive traders are willing to offer. Often these traders are public traders who offer limit orders to lower the costs of trades that they already want to do. Since they do not need to set their prices to ensure profitable round-trips (on average), these aggressive can undercut dealers who must. Dealers may be driven out of markets that have many such aggressive public limit order traders.
3. The order flows routed by the price-preferencing mechanism cannot come from well-informed traders. If they do, traders who offer liquidity to these order flows will lose on average if they

price their quotes (or limit orders) too aggressively. Spreads will have to be wide to recover from uninformed traders what the liquidity suppliers lose to informed traders.

In exchange-organized markets, order precedence rules route liquidity-demanding order flows to the orders or quotes that first display the best price. Spreads in these markets tend to be low because offering liquidity to these order flows tends to be profitable, because traders will get the order flow if they bid for it, and because limit order traders can compete with dealers.

In all markets where order preferencing arrangements are common and where dealers guarantee execution at the BBO, the relation between quoted price and order flow may be weak. Generally, the only orders that trader route to the best quoted prices are those that dealers are unwilling to provide other incentives to attract. Since these are usually well-informed order flows (nobody wants to trade with informed traders), spreads in those markets tend to be greater than they would be if there were no order preferencing.

Dealer-organized securities markets tend to have high spreads for three reasons:

1. Order preferencing arrangements are common.
2. Dealers have weak incentives to attract order flow by price.
3. Public limit order traders cannot easily represent their interests.

3.C.1 Implications for best execution

In markets where dealers obtain preferenced uninformed order flows, the BBO prices at which they may fill those order flows will be wider than necessary to compensate them for their losses to informed traders. Suppose that competition forces these dealers and their corresponding brokers to offer price improvement, better service, and/or lower commissions to these uninformed traders. The uninformed traders will be better off under the order preferencing system than under a consolidated order price-preferencing system. They will obtain better net prices because they are no longer pooled with well-informed traders. Order preferencing in competitive markets therefore provides better execution for uninformed liquidity-demanding traders.

3.D Clearinghouses

Order routing systems that match buyers to sellers who do not have relationships with each other must provide a mechanism to guarantee that both sides will honor and fulfill their contracts. Otherwise untrustworthy traders will not attempt to settle trades that have moved against them, and uncreditworthy traders will not be able to do so. Such systems typically employ clearinghouses that guarantee trade performance.

Clearinghouses regulate their members to ensure that they are trustworthy and creditworthy. In the event that a member fails to perform, the other members end up bearing the cost.

The provision of these services can be quite expensive. The expense usually falls disproportionately on those who are most trustworthy and creditworthy since they do not tend to default. Accordingly, the most trustworthy and creditworthy members always want to remove the least trustworthy and creditworthy from among them, or at least charge them risk-based fees for participating. If they cannot do so, and if the expenses of belonging to the clearinghouse are high, they may prefer to opt out.

3.D.1 Implications for best execution

Trustworthy and creditworthy dealers and brokers who can establish and maintain low cost clearing relationships can potentially provide better execution to their clients. Regulatory attempts to impose a universal matching system upon dealers will have to consider how clearinghouse functions are to be provided and regulated.

4. Regulating best execution

Customers, brokers, dealers, exchanges and the government may all regulate best execution. This section considers the advantages and disadvantages of various regulatory frameworks.

4.A Caveat Emptor

Since the customer is the ultimate beneficiary of best execution, they should look out for their own best interests. Customers should choose brokers who will provide them with the best execution for which they are willing to pay. Brokers who fail to do so will go out of business.

This caveat emptor principle of regulation only works if customers can cheaply audit the quality of the services that they receive from their brokers. If not, there is little reason to assume that customers can effectively choose brokers who will provide them with the level of service that they desire. Competitive market forces will force brokers to supply only those services that customers can easily audit. Customers who are willing to pay more for better service will not be able to obtain it. Instead, they will have to accept relatively poor executions at low commission rates. They may also have to accept that they will not be able to use limit orders as much as they would otherwise want.

Best execution under these assumptions is the best execution the market is willing to provide. If order flow markets are competitive, the price of this service will be low. To the extent that traders care only about price, the net effect may be small: What traders lose through poor executions, they gain through lower commissions.

4.B Regulation of Best Execution by Individual Brokers

Brokers are much better prepared to measure execution quality than are their customers. Given their interest in providing low commissions, however, they are unlikely to demand improvements in execution that would lead to a reduction in valuable order flow inducements. Instead, they will audit their executions to ensure that they obtain execution quality sufficient to satisfy their clients, to the extent that their clients can recognize such quality. They also audit their executions so that they are better prepared to negotiate order flow preferencing agreements with their correspondent dealers.

4.C Regulation of Best Execution by Dealers

Individual dealers have no incentive to provide best execution except to the extent that they are required to do so to obtain order flow from brokers, or to comply with the rules of the exchanges and dealer organizations of which they may be members. Best execution is costly to dealers. To provide it, they must offer better prices to market orders and they must allow limit orders to compete with them.

4.D Regulation of Best Execution by Exchanges

Exchanges, especially those dominated by public traders, are very interested in regulating best execution. Unlike dealers and brokers, exchanges (that are not simply dealer fronts) have a strong interest in allowing public traders to compete with dealers to provide liquidity. Exchanges that have liquid markets attract more order flow, which generates more volume. Exchanges with high volumes command substantial listing fees, receive substantial trade reporting fees, and their officers are widely respected as business leaders.

Exchanges regulate best execution though the trading rules that they use to organize their markets. Price priority and time precedence (coupled with an economically significant tick) encourage traders to improve prices by allocating order flow to those traders who are most willing to make market.

Exchanges also regulate their member dealers in a manner that restrains the profits that may be associated with their unique positions. Exchanges require specialists to provide liquidity to public market orders under some circumstances, and specialists must refrain from taking liquidity from public limit orders in other circumstances. Requirements to provide liquidity to market orders improve execution prices. Prohibitions against taking liquidity protect public limit orders from executing when market conditions are such that the specialist believes the orders are too aggressively priced. This protection gives public limit order traders more time to cancel their orders and it allows public market order traders a chance to obtain better prices if the limit orders remain uncanceled. These rules thus improve execution quality for both order types.

4.E Regulation of Best Execution by the Government

With its broad powers, the government can undertake many regulatory initiatives that others cannot. In particular, the government is the only agency that can mandate changes that require coordination among otherwise unwilling participants. These may be as simple as requiring broader disclosure to as intrusive as specifying a consolidated market structure. This subsection considers the economic effects of a variety of possible regulatory initiatives.

4.E.1 Prohibit cash payments for order flow

To avoid the appearance of kickbacks, regulators could act to prohibit payments for order flow. As a practical matter, it would only be able to regulate cash payments. As a consequence, dealers will offer greater non-pecuniary inducements to attract order flow. In addition, to circumvent the economic effects of the regulation, brokers will buy or start more dealer subsidiaries and more brokers will swap their order flows among their dealer subsidiaries.

In competitive markets, traders will find ways to capture excess profits that may be associated with executing uninformed order flows at wide spreads. The elimination of the most convenient and most easily audited means of transferring these profits does not seem prudent. Regulators should consider it only if the practice so offends the public that they reduce their trading. To the extent that this is true, it may not be necessary for regulators to intervene in any case. Brokers like Charles Schwab are already purchasing dealer subsidiaries so that they can report to their clients that they do not pay for order flow.

4.E.2 Require that brokers report payments for order flow to their customers.

Regulators already require brokers to report that they have received payments for order flow. Customers can learn the exact nature of the compensation on request. This proposal would strengthen this requirement by making it easier for customers to learn about the payments for order flow by presenting the information to them directly. Many customers, however, may find the information to be confusing.

If brokers believe that reporting this information would upset their customers, they will ask their dealers to substitute non-pecuniary order flow inducements for pecuniary inducements. They will also expand their dealing operations, as described above.

4.E.3 Require that payments for order flow be rebated directly to the customer's account.

If the retail brokerage market is quite competitive, as seems likely, the implementation of this proposal will increase brokerage commissions. It will probably also alter the distribution of brokerage commissions among order types and sizes. For those brokers whose commission schedules currently discriminate between limit orders and market orders, the increase will primarily fall upon market orders.

Given the lower net costs associated with executing market orders as compared to limit orders, it may be instructive that more brokers do not presently offer lower commission rates to market orders. Brokers may believe that their customers will not tolerate the additional complexity or that the discrimination will alienate them. If these explanations are correct, the effect of this rebate proposal will be to confuse investors who may not be interested in the issue.

This disclosure would certainly focus more attention on payments for order flow. Customers may not want to receive these rebates if they believe (rightly) that they can only be funded through poor transaction prices. In which case, brokers may choose to have their dealers to substitute non-pecuniary order flow inducements for pecuniary inducements. This will cause the competition for retail order flow to continue to remain focused on commissions rather than on the combination of the commissions and rebates.

Alternatively, customers may start demanding these rebates, without recognizing that in competitive markets, they can only be funded through less price improvement or greater commissions. If so, brokers' incentives to obtain price improvement for their customers will be diminished, if not reversed. They may also have their dealer subsidiaries explicitly pay for order flow instead of internalizing their excess profits.

Some practical problems are associated with rebating payments for order flow. Payments for order flow may not be easy to allocate to individual orders. Although preferencing arrangements may specify a price per share for various order types and sources, other conditions may be attached to the contract that modify these payments. If these conditions depend on global characteristics of the order flow, the allocation of payments to individual orders may be difficult. Moreover, it may not be possible to do the allocation at the time of the trade. If so, the rebates will be uncertain and deferred. Neither characteristic will likely appeal to retail customers. One effect of the implementation of a rebate system may therefore be a restructuring of payment arrangements to make it easier to allocate payments to individual orders. If so, the benefits, if any, that come from existing arrangements may be lost.

4.E.4 Require that brokers report execution performance statistics.

Since brokerages are much more able to audit average execution performance than are their customers, it may be useful to require that they all collect and make publicly available a comparable set of performance statistics. The statistics naturally would differ by order type.

For market orders, these statistics might include average price improvement and average time to fill. Since trading problems differ across brokers, these statistics would be most useful if the results were classified by prevailing bid/ask spread, order size, primary listing market. Other interesting classification variables might include time of submission and security size.

For limit orders, these statistics might include fill rate and time-to-fill distributions, classified by limit price position relative to the BBO at the time of submission. The statistics also should be cross-classified by prevailing bid/ask spread, order size, primary listing market and time of submission. Information necessary to evaluate the effect of cancellations and cancellation instructions also should be provided.

Brokers may argue that the collection and distribution of these statistics may impose an unreasonable burden on them. These analyses, however, should not be too expensive since brokers can compute them easily from their electronic audit trails. In any event, responsible brokers should already be doing these analyses.

Brokers may also argue that most of their retail clients are not be adequately prepared to analyze this information. While this is undoubtedly true, many consumers' groups are able to do so and would do so if the data were readily available.

The regulator's role in this initiative is to provide a standardized set of statistics that would allow analysts to make reasonable, easy and fair comparisons across brokerage firms. Government regulators do this in other industries as well. For example, airlines must report their on-time performance. Standardization is necessary because information must be reported on the same basis to be useful for making comparisons across brokers.

These reports will make it easier for consumers to buy the exchange services that they want by allowing them to determine which firms offer it. Since it is difficult for customers to audit execution quality on their own without this information, it is unlikely that brokers would otherwise provide high quality exchange services. This information allows brokers charge for, and supply, the services that their customers want.

Large institutions already audit their executions using methods similar to those described here. The costs of these services, such as are provided by the Plexus Group, Abel/Noser or SEI, are quite low. Institutions can effectively audit their executions because they trade quite often, possibly hundreds of times per day. Smaller customers need to obtain this information directly from their brokers.

4.E.5 Require dealers to meet market quality standards

In principle, the government could try to specify standards for price improvement, bid/ask spreads, and for other measures of market quality. In practice, governmental regulators are poorly equipped to do so. Regulators who wish to specify standards for dealer behavior must have a very close understanding of how dealers behave and what problems they face. If the government wishes to impose such standards, it probably would most effectively do so by

delegating the authority and responsibility, subject to regulatory oversight, to self regulating organizations (exchanges and dealer organizations). These SRO's are much better equipped to specify reasonable standards, and to enforce them.

The specification of performance standards raises several serious problems. Perhaps the most important problem is that the specified standards may be inconsistent with consumer interests. If the standards specify a higher level of service than consumers desire, they will pay more and be worse off. It is unclear how a regulator would decide what services consumers want. Moreover, since consumers have different preferences, attempts to regulate meaningful universal performance standards almost guarantee that they will hurt some consumers.

Effective enforcement of performance standards requires that the standard be well defined, easily measured, and appropriate. Otherwise, enforcement will be contentious and subject to selective discrimination. It is unclear, however, that any agency can specify a set of standards that apply to all trading problems that dealers face. For example, how would a requirement to provide price improvement adjust for the fact that markets for different securities vary substantially? Differences in spreads, trading activity and the degree of informed trading in the order flow would need to be factored into the performance standard, but doing so would be quite difficult. Failing to do so would be unfair.

Finally, even if regulators could specify reasonable standards, some combination of sticks and carrots would be necessary to ensure that traders met those standards. The regulator therefore would need to be able to control the allocation of privileges and/or have access to a meaningful disciplinary procedure. The use of privileges to motivate traders is only effective if those privileges are not already widely available. To be effective, such privileges often involve awards of market power. This is troublesome, since the award of unique privileges may be anti-competitive. Likewise, disciplinary procedures are only effective if regulators can place meaningful sanctions on traders. Exchanges and dealer organizations already have similar procedures in place to enforce their rules and, in the case of exchanges, to allocate specialties. These procedures are cumbersome, contentious and quite expensive to run.

4.E.6 Regulate market structure

The last set of initiatives that regulators can undertake in a quest for best execution involves the regulation of market structure. The government could specify order exposure rules, order precedence rules, and even a consolidated price-time precedence system. Some of these changes might require new legislative authority. Others might be accomplished within the SEC's present authority to regulate (and influence) SRO's.

4.E.6.a Regulate limit order exposure

The BBO depends on dealer quotes and on those standing limit orders that traders can expose. If more limit orders were displayed, the BBO would likely shrink. Regulators may therefore require that dealers and exchanges display more public limit orders.

Since dealers generally must fill orders at the BBO, or better, increased order exposure might narrow spreads and improve thereby improve market order executions. Narrowing spreads, however, would decrease price improvement rates. It would also decrease payments for order flow.

The display of limit orders would also improve limit order execution rates by making them more available to other traders. However, without rules that route market orders to the best available price, limit order execution rates would not necessarily improve much. Brokers would force dealers to match the best price and only route to the limit order if their dealers were unwilling to trade. The improvement in limit order execution rates in such markets depends on the extent to which dealers who need liquidity take it from displayed public limit orders.

4.E.6.b Regulate market order exposure

Traders willing to offer liquidity to market orders do not always display their willingness through their quotes and limit orders. Many do not do so because they want to discriminate among market orders. For example, exchange specialists often quote $1/4 spreads but effectively provide $1/8 spreads to small orders on demand. The larger spread is appropriate for institutional-sized orders that well-informed traders often generate. The smaller effective spreads are appropriate for small uninformed retail traders. A similar phenomenon occurs in the Nasdaq markets. Dealers commonly quote wide spreads but provide substantial price improvement within the spread for individual orders. The wide spreads reflect the fact that much of the order flow that traders route to dealers based on their quoted prices comes from SOES bandits. These traders are generally well informed at the instant they submit their orders. Dealers set their spreads wide so that they do not lose too much and too often to them. They are often willing to trade at better prices when presented with more benign orders.

To improve the execution of market orders, regulators could require that they be more widely exposed. One way to do this would be to require that dealers stop market orders (guarantee price) when they receive them. They would then try to improve upon the stopped price by quoting a better price. If no one takes the new quote within some specified interval, the dealer fills the order at the stopped price. Otherwise, the more aggressive trader fills the order. Madoff and some other dealers already use this market order display system. Government regulators or their SRO surrogates could require all traders to use it.

Implementation of this exposure rule probably would increase market order price improvement rates. In competitive markets, this increase in price improvement would decrease payments for order flow and ultimately commissions.

This rule would also improve public limit order execution rates. The tightening of the spreads would allow more standing limit orders to be executed. The increased competition from limit orders, however, would further erode dealer profits.

In quickly moving markets in which many dealers operate, this market order exposure rule would be difficult to implement without the use of a computer assisted trading system. If many traders attempt to hit the exposed market order, some mechanism will have to allocate the trade. If the mechanism is not automated, the process will generate frequent conflicts about whether the trades are being fairly allocated. This problem is one of the main shortcomings of the current Intermarket Trading System (ITS).

An important disadvantage of this exposure rule is that it would slow market order executions. Although traders could get an immediate report of the stopped price, they would not know the actual trade price until the price is improved or the exposure interval expires. Since brokers value

quick executions (it allows them to hold the trader on the phone and ask "now what would you like to do") they may resist the additional costs this system imposes upon them.

4.E.6.c Regulate precedence rules

To improve public limit order executions, regulators could impose one or more order precedence rules on all dealers. These rules would regulate the conditions under which dealers could trade when they hold public limit orders.

A price priority rule would prohibit traders from trading at prices inferior to those offered by standing limit orders in their book. To trade at an inferior price, dealers would have to fill those orders that have price priority first. Otherwise, dealers would have to offer prices equal to or better than their best-priced public limit orders. If regulators also impose a public order precedence rule, the dealer could only trade at strictly better prices.

The imposition of these rules would force dealers to allow their limit orders to execute more often and it would force them to offer more price improvement to their market orders. Since both effects will erode dealer profits, payments for order flow will decline.

The additional constraints that these rules impose on dealers may cause them to refuse to hold standing limit orders. Alternatively, they may charge brokers for handling them, or they may forward them to another dealer less interested in trading on the same side. Most dealers currently accept limit orders primarily to serve brokers. (The public limit order flow does, however, give dealers valuable trading options.) This service encourages brokers to send them market orders. If a change in precedence rules makes holding public limit orders costly, dealers will refuse to accept them unless compensated for their increased costs.

4.E.6.d Require brokers to route market orders only to dealers or markets displaying the best price.

This rule would strengthen the relation between price and order flow. Dealers who want order flow would have to quote aggressively for it. Bid/ask spreads would decrease. The decrease might be quite substantial.

If regulators allow brokers to preference orders among those dealers who are at the best price, dealers may still offer order flow inducements. These inducements, however, would be smaller because the spreads will be tighter. Price improvement relative to the tighter spreads would be less common.

The decrease in spreads would also improve public limit order execution rates by allowing more standing limit orders to be executed.

This rule would not be effective if brokers could quickly advise their correspondent dealers that an order is coming so that they can match the best available quote. To prevent such behavior, it may be necessary to require that a dealer's market-matching quote stand for a some interval before it is eligible to attract order flow. Enforcement of this rule would require the operation of a consolidated order routing system.

The adoption of this rule could force brokers to trade with dealers whom they do not trust to settle their trades in a timely and efficient manner. To avoid settlement problems, some clearinghouse would have to guarantee performance.

If regulators adopted this rule, it presumably would only apply to small market orders. Since large orders often involve direct negotiations, it would probably be desirable to exempt them from this rule.

4.E.6.e Maintain strict price-time priority among dealer and market quotes and require brokers to route market orders accordingly.

This rule is the same as the previous one, except that brokers will not be able to preference orders. The application of time precedence will further strengthen the relation between price and order flow by rewarding those traders who most aggressively improve price.

Under this rule, spreads should narrow substantially. There will be no price improvement and no payment for market orders.

4.E.6.f Replace order preferencing with a consolidated system based on price-time precedence.

The final and most drastic change that governmental regulators could impose upon the markets would be to require the operation of a consolidated trading system that maintains price and time precedence among all traders, including public limit order traders. This system would allow dealers and public limit order traders to compete with each other regardless of where they are.

Since public traders often use limit orders to lower the cost of a trade that they intend to complete, they may price their orders quite aggressively to ensure that they execute. In a consolidated system, these traders can make spreads so narrow that it may be impossible for dealers to cover their costs.

4.F Some Final Notes about Regulatory Consolidation

If regulators were to force market consolidation, they would eliminate much of the competition among marketplaces that characterizes our current markets. That competition has discovered that diverse traders are willing to support a diversity of trading systems, each of which has evolved to provide low cost service to some constituency. Forced consolidation would eliminate that diversity and perhaps many of the idiosyncratic benefits that specific systems provide.

There are strong reasons to believe that the current fragmentation of markets is not particularly costly relative to the service benefits it provides to diverse clienteles. The widespread availability of market quote and trade data, the ability to route orders to the best prices, and the activities of arbitrageurs all act to integrate fragmented markets. These considerations weigh strongly against heavy-handed regulation.

There are also strong reasons to believe that markets might consolidate further if it were not for certain problems with agency and externalities. Brokers do not always accurately represent the desires of their clients, dealers resist allowing public limit orders access to the order flow, and the order flow externality (liquidity attracts liquidity) protects incumbent trading systems from competition by innovative entrants. If the effect of this consolidation were to reduce the role of

intermediaries in the markets, as it probably would, public traders might realize great benefits. These considerations suggest a role for further regulation.

5. Conclusion and Observations

In competitive markets, traders price all order flows. If dealers can profit from order flow, they pay brokers for it by providing various order flow inducements. If brokers can profit from order flow, they pay customers for it by lowering commissions and by providing various ancillary services.

Brokers will not provide high quality execution services to their customers if they cannot recognize whether the brokers deliver the service. Without such information, customers will not be able to obtain such services, no matter how much they may want them.

The prices at which dealers fill orders depend on their incentives to improve price and on the best bid or offer. When these incentives are weak, and when the BBO is wide, payments for order flow will be large.

The BBO depends on the orders that flow to dealers based on price alone. When these orders are largely informative, the BBO will be wide and payments for relatively uninformed order flows will be large. It also depends on the extent to which public limit order traders can display their orders.

Dealers profits must suffer when markets are organized to allow public limit orders to offer liquidity. Public limit order traders and dealers both compete to offer liquidity. Public traders can squeeze dealers out of the market if they are willing to offer aggressive prices to complete their traders. This observation explains why dealers resist efforts to allow public limit orders access to public market order flows.

Viewed most broadly, best execution is synonymous with low transaction costs. From the view of all public traders taken together, the total net costs of trading are simply what is lost to intermediaries like dealers, brokers, and exchanges. From this point of view, for a given quantity of trade, best execution is achieved when the least resources are devoted to the execution services industry. This observation explains why public traders want to offer liquidity to public traders.