

The Law and Economics of Best Execution*

Jonathan R. Macey and Maureen O'Hara

Cornell University, Ithaca, New York 14853

Received October 7, 1996

This paper reviews and analyzes the legal and economic aspects of the duty of best execution. Although a well-established principle of securities trading, we show that the dual problems of definition and enforcement make best execution both unwieldy and unworkable as a mandated legal duty. We examine the impact of several market practices on best execution, in particular payment for order flow, preferencing and internalization practices, and price improvement and order execution protocols. We suggest three possible directions for the future rule and interpretation of the duty of best execution. *Journal of Economic Literature* Classification Numbers: G10, G18, K22, K23. © 1997 Academic Press

1. INTRODUCTION

Best execution refers to traders receiving the most favorable terms available for their trades. Despite the seeming simplicity of this concept, few issues in today's securities markets are more contentious than the debate surrounding best execution. Does clearing a trade in one market at the best available current quote constitute best execution if trades frequently clear between the quotes in another market? Does the mechanism that provides best execution change when trade size is considered? Can investment professionals comply with their legal best execution obligation if their trade price implicitly provides a rebate to the broker rather than a better price to the trader? How can exchanges, investment professionals, and regulators guarantee the provision of best execution? Is best execution an

* We thank George Sofianos, Charles Lee, Jim Shapiro, Richard Lindsay, Dale Nance, David Easley, Dean Furbush and workshop participants at the American Law and Economics Association Annual Meeting, Cornell Law School, and the Stockholm School of Economics for helpful discussions, and Kevin D. Hartzell and Gideon Saar for research assistance. We also thank the referees and the editor, Anjan Thakor, for their help and guidance. We gratefully acknowledge research support from the New York Stock Exchange.

achievable (or even definable) goal, or is it a more amorphous concept akin to market efficiency? These questions represent just a part of what is becoming an issue of increasing complexity.

In this research, we investigate the legal and economic issues connected with best execution. Best execution has different meanings for different clientele, so a necessary first step is to examine the various legal and economic views of best execution. These divergent perspectives provide insight into the fundamental properties of best execution, and they highlight those facets of the issue on which disagreements prevail. Of particular importance in our view is the regulatory perspective, as many of the emerging issues in this area involve inter-market competitive concerns. These perspectives then provide the basis for discussing the major issues connected with best execution.

What emerges from our analysis is a skepticism that the mandate of best execution can, or even should, play more than a limited role in the regulation of financial markets. Unlike pornography, which while difficult to define is known when it is seen, best execution is easily defined but is often unrecognizable. This reflects the difficulty that the term "best execution" does not connote a single execution attribute, such as a price, but rather attaches to a vector of execution components. These certainly include the trade price, but they also involve the timing of trades, the trading mechanism used, the commission charged, and even the trading strategy employed. Such multi-faceted concerns have long been a feature of institutional trade execution, but their emergence now even in retail trading reflects the reality that markets are a great deal more competitive and complex than in times past.¹

One implication of our analysis is that it is the competitive nature of the markets themselves that makes defining best execution so problematic. In a single market setting with an easily discernible price, the "duty" of best execution is both obvious and direct. When markets compete in different ways with respect to the different components of trade execution, it is no longer so clear what "best" execution is, let alone how or when it is attained. Moreover, numerous market practices such as preferencing and payment for order flow, which presumably arise as competitive responses to established markets, directly challenge the provision of a "best" execution standard. Well-meaning attempts to mandate best execution as a consumer-protection device run counter to attempts to make markets less centralized and more competitive. We argue that this difficulty makes best execution both un-

¹ Traditionally, best execution concerns were typically viewed as relevant only for institutional traders. For example, Wagner and Edwards (1993; pg. 65) state that "For the retail investor, whose trades are small enough to be accommodated by an exchange specialist, best execution can be equated with the broker's duty to check all sources. The broker controls the transaction and owes his client loyalty. But this definition is too limited to be applied to institutional investors."

wieldy and unworkable as a mandated legal duty: pursuing a narrow concept of best execution may make markets less competitive.

This paper is organized as follows. In the next section we consider the legal aspects of best execution, with particular attention given to the intent of regulators and Congress in defining this concept and to the courts in enforcing it. Section 3 then considers the economic reality of best execution by reviewing the extensive literature on the measurement of execution costs both within and across markets. In Section 4 we examine the impact of several market practices on best execution, in particular payment for order flow, preferencing and internalization practices, and price improvement and order execution protocols. The paper's last section provides some concluding thoughts on the role and desirability of best execution.

2. THE LAW OF BEST EXECUTION

Fairness includes a duty of best execution, but the term itself eludes definition: despite its central nature it inhabits the texts of securities law without revealing its source. (*In re Merrill Lynch*, 911 F. Supp 754, 768 (1995))

The legal conundrums regarding the duty of best execution can be succinctly summarized. First, while the obligation to give customers the benefits of best execution of orders is one of the most well-established principles of securities law, no clear conception of best execution exists. Thus, despite the increasing preoccupation with the "duty of best execution" in administrative proceedings, regulatory directives, exchange rules, and academic journal articles, this "duty" remains an amorphous concept. Second, even if it were possible to develop a coherent, workable legal definition, there would be an acute enforcement problem. This is because, although aggregate losses to all traders from suboptimal execution of trades could be large, the loss on each individual trade would be small. This gives individual traders little incentive to incur the costs of monitoring their agents to ensure best execution for a particular trade.

The regulatory agencies responsible for the securities markets appear to have concluded that the twin problems of vagueness and lack of enforceability are best solved by legal rules stressing form and process rather than substance, and in particular, stressing disclosure. This section describes the legal underpinnings of the duty of best execution, examines the judicial and regulatory efforts to define the concept, and surveys judicial and regulatory actions involving best execution.

A. *The Legal Duty of Best Execution*

There exists no clear or definitive statement by Congress or any regulatory agency of the requirements necessary to meet the duty of best execution. There is also no explicit regulatory definition of the limits of the duty.

While the SEC notes that “a broker-dealer has a duty to seek to obtain best execution for customer orders, the (SEC) has not promulgated a separate best execution rule or explicitly defined best execution. . . .”²

The legal duty of best execution is, however, widely recognized under securities laws and exchange rules. For example, in establishing NASDAQ, Congress declared its purpose to be assuring “the practicability of brokers executing investors’ orders in the best markets.”³ Courts have noted that “(t)he relationship between a broker/dealer and its customer gives rise to ‘certain fiduciary obligations,’”⁴ and that one of these “obligations is a duty to execute the customer’s order at the best available price.”⁵

Unfortunately, the SEC’s pronouncement that “the duty of best execution requires a broker-dealer to seek the most favorable terms reasonably available under the circumstances for a customer’s transaction,”⁶ raises more questions than it answers. The SEC has defended the lack of a definition of best execution by acknowledging that the scope of the duty “must evolve as changes occur in the market that give rise to improved executions for customer orders, including opportunities to trade at more advantageous prices.”⁷

B. *Legal Rationale of the Duty of Best Execution*

While the interpretive rules of the duty of best execution are broad and appear to vary depending on circumstances, the duty of best execution is firmly grounded in common law principles of agency:

A broker-dealer’s duty to seek to obtain the best execution of customer orders derives from the common law (duty of) agent(t) loyalty, which obligates an agent to act exclusively in the principal’s best interest . . . (the agent) is under a duty to exercise reasonable care to obtain the most advantageous terms for the customer.⁸

² Market 2000: An Examination of current Equity Market Developments, Division of Market Regulation of the SEC, Study V, 1994 SEC LEXIS 135, at *5–6 (1994) (hereinafter Market 2000).

³ 15 U.S.C. § 78k-1(a)(1)(c)(iv) (1994).

⁴ *In re Merrill Lynch*, 911 F. Supp 754, 760 (1995) (cited in *In re E.F. Hutton & Co.*, Securities Exchange Act Release No. 25887, (1988 Transer Binder) Fed. Sec. L. Rep. (CCH) ¶ 84303, 89326 at 89326 (July 6, 1988); Restatement (Second) of Agency ¶ 1 (1957)).

⁵ *Merrill Lynch* at *760 (citing Payment for Order Flow, Exchange Act Release No. 34902 (1994 Transfer Binder) Fed. Sec. L. Rep. (CCH) ¶ 85444, 85849 at 85854 n. 28).

⁶ Order Execution Obligations, Exchange Act Release No. 34-37619A, 60 Fed. Reg. 48290, 48322.

⁷ Order Execution Obligations at 48323.

⁸ *Merrill Lynch* at 769 (citing Market 2000, Study V, supra note 1, at *2; Restatement of Agency § § 387, 424 (1958)).

Consistent with the common law, NYSE rules require members handling market orders to execute orders at the best available prices.⁹ The equivalent NASD rule is equally general:

In any transaction for or with a customer, a member ... shall use reasonable diligence to ascertain the best inter-dealer market for the subject security and buy or sell in such market so that the resultant price to the customer is as favorable as possible under prevailing market conditions.¹⁰

Yet, it is also clear that best execution does not necessarily imply "best price":

(B)rokers have not been held ... to an absolute requirement of achieving the most favorable price on each order (W)hat has been required is that the broker endeavor, using due diligence, to obtain the best execution possible given all the facts and circumstances.¹¹

This also suggests that the duty of best execution does not actually require achieving the best terms, only that the broker tried to do so. The difficulties implicit in enforcing such a requirement of intent are obvious. These factors to be considered in determining whether best execution has been achieved include:

the size of the order, the trading characteristics of the security involved, the availability of accurate information affecting choices as to the most favorable market in which execution might be sought, the availability of technological aids to process such data, the availability of economic access to the various market centers and the costs and difficulty associated with achieving an execution in a particular market center.¹²

The diversity and sheer number of these other considerations underscore the practical difficulty in defining a best execution standard.

A further complication is the advent of new trading technologies and the proliferation of trading venues. Whereas previously trades executed only on exchanges or recognized dealer markets, the availability of electronic clearing networks such as Instinet has attracted extensive wholesale order flow. Indeed, the SEC's recent concept release on the nature of exchanges estimates that Instinet alone now clears upward of 20% of total volume in NASDAQ stocks.¹³ Yet, the proprietary nature of these trading systems means that not all orders can be submitted there, let alone executed, raising the question of whether best execution can be defined with respect to

⁹ New York Stock Exchange Rule 123A.41, 2 NYSE Guide (CCH) P 2123A.

¹⁰ NASD Rules of Fair Practice, NASD Manual (CCH), Art. III, Sec. 1, ¶ 2151.03.

¹¹ *Merrill Lynch* at 770 (citing Second Report on Bank Securities Activities: Comparative Regulatory Framework Regarding Brokerage-Type Services 97-98, n. 233 (Feb. 3, 1977), reprinted in H.R. Rep. No. 145, 95th Cong., 1st Sess. 2333).

¹² *Id.*

¹³ See Securities and Exchange Commission Release No. 34-38672, Regulation of Exchanges.

a price that is not available to the market. The expansion of such automated trading systems to retail trading (as is currently being done by the Island trading system) only compounds the problem, suggesting even greater difficulty with implementing this concept in the future.

Given the vagueness of the available definitions of the duty of best execution, the courts, not surprisingly, have had difficulty finding violations of the duty. Yet, if extant definitions are unworkable, what is the right definition for best execution? Put differently, how would we want the concept of best execution to be defined and implemented if we could somehow dictate this to the courts and regulators?

One way to establish this is to look to the economic underpinnings of the common law principles giving rise to the concept of best execution. The relationship between traders and their brokers, like other principal-agent relationships, is contractual. Legal rules exist, in part, to clarify the contractual relationships that exist between parties; i.e., to encourage transactions by economizing on transaction costs (see Easterbrook and Fischel, 1989). The rules requiring best execution supply for free certain contractual terms to everybody who buys or sells securities through an agent. More generally, such rules “fill in blanks and oversights” in contractual terms that people would have bargained for had they anticipated the problems and been able to transact costlessly in advance. From this viewpoint, the law of best execution “supplements but never displaces the actual bargains” that exist between traders.¹⁴

Three policy implications emerge from this approach. These concern: (1) the ability of market participants to customize or “contract around” the duty of best execution; (2) the role of courts and agencies in construing the duty; and (3) the sources of the duty of best execution.

1. *Customization.* Consistent with the idea that the rules of best execution are contractual in nature, it follows that it should be possible to “contract around” or “opt-out” of the best execution requirement. For example, if a customer directs his or her broker to execute a transaction at the “National Best Bid and Offer” (NBBO),¹⁵ the broker presumably could

¹⁴ Id.

¹⁵ SEC rules require that any NASDAQ dealer that wishes to hold itself out as a market maker in a particular security must continually report the prices at which it is willing to buy and sell the security. Such market makers must be willing to honor their reported bid and offered prices up to the “quotation size,” i.e., the number of shares that the market maker reports as being willing to buy at the bid side or sell at the offered side. 17 C.F.R. Section 240.11Ac1-(c)(1)(2), and (10). NASDAQ is required by the SEC to “collect, process and make available ... the highest bid and lowest offer communicated ... by each member ... acting in the capacity of an OTC market maker” for each reported security. 17 C.F.R. Section 240.11Ac-1(b)(1)(ii). This latter quotation has come to be known as the NBBO (National Best Bid and Offer).

execute the trade per those instructions even if a better price (one "in between" the NBBO quotes) could have been obtained. Similarly, if an agent is directed to execute the trade at a particular venue, then his or her fiduciary duty would have been met even if a better price could have been obtained elsewhere.

2. *The Role of Courts and Administrative Agencies.* The contractual approach suggests a framework that courts and regulatory agencies can use to determine whether the obligation to provide best execution has been met. Simply put, because the duty of best execution is contractual, the legal question of whether a trader has received best execution can best be answered by examining whether the trader got what he contracted or bargained for. If there is no explicit bargain, then courts and regulatory agencies must consider what the trader would have bargained for had the parties gone to the trouble to consider formally the way that the trade should have been executed. This approach, known in law and economics as the "hypothetical bargaining perspective" (see Easterbrook and Fischel, 1989), explicitly recognizes that the complexity of actual market dealings precludes *ex ante* specification of every nuance of a transaction. Consequently, under this view, the correct outcome for the court to impose is the hypothetical bargain the trader and the broker would have struck, assuming that both parties were fully informed and had bargained over every aspect of the transaction in an arms-length negotiation.

The need for such an analytical approach is starkly illustrated by a recent court decision regarding the fiduciary obligation of best execution. In *In re: Merrill Lynch et al. Securities Litigation*, Merrill Lynch, Paine Webber, and Dean Witter were sued by customers for whom they had purchased and sold various over-the-counter securities. The suit was brought as a class action on behalf of all people who placed market orders with Merrill Lynch, Paine Webber, or Dean Witter during the 2 year period from November 4, 1992 until November 4, 1994. The underlying issue was whether trading at the NBBO constitutes best execution.

Plaintiffs claimed that the defendants relied exclusively on the NBBO price quotation to fulfill their best execution obligation, despite the availability of better prices from a number of sources, including SelectNet,¹⁶

¹⁶ SelectNet, introduced in 1990 by NASDAQ as an alternative to the traditional method of trading in the over-the-counter market in which traders negotiate by telephone, is an on-line service on which subscribers can negotiate trades and execute orders in over-the-counter securities. Subscribers post the price, size, and period during which the offer is open, and can specify that the size of their order and the price is negotiable. Subscribers also may direct their order at a specific market maker or group of marketmakers if they so choose (this practice is known as "preferencing" an order).

Instinet,¹⁷ in-house limit orders or in-house market orders,¹⁸ or the SOES limit order file.¹⁹ Plaintiffs also alleged that the defendants executed market orders for their own accounts at the NBBO price, and then immediately retraded those securities at a better price for defendants' personal profit. Plaintiffs argued that both factors dictated a breach in the provision of best execution for their orders.

The court nevertheless granted the defendants' motion for summary judgment, basing its decision on two arguments. First, the court claimed that there were no "special circumstances," or express representations by the defendants that they were going to give the plaintiffs the best possible price. The *Merrill Lynch* court cited examples where special circumstances have arisen: where a broker made explicit representations that he was attempting to execute the plaintiff's orders when in fact the broker was trading on his own behalf in the same security;²⁰ where a securities firm traded on its own behalf in a security after expressly accepting a customer's order to sell the same security;²¹ and where there were willful violation of the Securities Exchange Act of 1934.²² Furthermore, the court argued that these special circumstances must exist in every covered transaction; occasional discrepancies are not sufficient.²³

Certainly, these "special circumstances" would seem to constitute such egregious violations of a fiduciary duty that there is little doubt that best execution did not transpire. But are such flagrant violations the only way in which best execution is violated? Might not other trading practices, such

¹⁷ Instinet, the acronym for Institutional Networks, Inc., is a privately owned on-line trading system that, unlike SelectNet, permits both market makers, as well as non-market makers to display quotes and to trade anonymously (on SelectNet, only non-market makers can post bids and offers and trade anonymously). Traders, particularly large institutions, conduct large transactions on Instinet without any revelation of their identity, thereby enabling them to avoid the adverse market reaction that would accompany the revelation of their identity. Orders on Instinet may range in size from a minimum of 1000 shares to a maximum of 50,000 shares.

¹⁸ Full-service brokerage firms receive orders to buy and sell securities in the course of a trading day. When an order to buy or sell is received before a corresponding order to sell or buy is executed, it is possible to match or cross the orders at a price midway between them. Some markets, such as those in Austria, Belgium, Germany, and Israel, regularly utilize order crossing by batching corresponding orders for simultaneous execution as a single price.

¹⁹ The SEC created the Small Order Execution System (SOES) in 1984 and added the Limit Order Services in 1989. The SOES limit book file, as the service is known, allows retail customers to place limit orders and orders that are "GTC" or "good until canceled" of one thousand shares or less. These orders are stored electronically and automatically executed when a market maker's quote reaches or exceeds a limit order price.

²⁰ *Opper v. Hancock Securities Corp.*, 250 F. Supp. 668 (S.D.N.Y.), *aff'd*, 367 F.2d 157 (2d Cir. 1966).

²¹ *Barnett v. United States*, 319 F.2d 340 (8th Cir. 1963).

²² *Charles Hughes & Co. v. SEC*, 139 F.2d 434 (2d Cir. 1943), *Cert. denied*, 321 U.S. 786 (1944).

²³ *Id.* at 771.

as accepting a rebate for directing order flow to a particular broker, or essentially filling a customer order on Instinet yet charging a higher price,²⁴ also violate best execution? Here the court's answer is apparently no, provided that such behavior is consistent with industry practices.

Second, the court concluded that "it would be highly imprudent to hold defendants liable for making a material omission of fact by means of an implied representation based on an ill-defined duty that the relevant regulatory authority is only now struggling to clarify for an industry that is constantly undergoing regulatory change."²⁵ In essence, the court concluded that, whatever best execution is, it is too vague a concept to actually enforce.²⁶

The problem with the court's analysis is that it ignores the contractual nature of the fiduciary duty of best execution. There is no support for the court's conclusion that special circumstances must be present in order to trigger the fiduciary duty. The court's discussion of "special circumstances" implies that the fiduciary duty of best execution only applies when there is an express misrepresentation, or a failure to disclose which rises to the level of misrepresentation.²⁷ This is a particularly troubling interpretation of best execution because it apparently has very little to do with whether the investor received the best execution price.

Moreover, the court's conclusion that the fiduciary duty of best execution is an "implied representation . . . a promise of 'fair dealing,'" and that "it would be highly imprudent to hold defendants liable . . . based on an ill-defined duty . . ."²⁸ raises a more fundamental problem. While it is true that the meaning of best-execution is ill defined, the economic function of fiduciary duties is to fill in the gaps in contingent contracts where it is too costly and too difficult for the contracting parties to specify the relevant terms for themselves. Thus, the court in *Merrill Lynch* puts the parties in a kind of Catch-22. The opinion says that the court will not attempt to define best execution because the term is too vague and imprecise. But if

²⁴ For example, suppose that a market maker receives a buy order from a customer. The market maker buys the security on Instinet at 50, and immediately sells the security to the customer at 50½, thereby making an ½ profit.

²⁵ *Merrill Lynch* at 17.

²⁶ The court noted that "the difficulty here is that neither Congress, the SEC nor the NASD has issued a definitive statement on the point concerning the use of the NBBO as satisfaction of the duty of best execution." *Id.* at *6.

²⁷ The court in *Merrill Lynch* noted that judicial and SEC rulings concerning a failure to exercise reasonable diligence to obtain best execution "have been limited to cases in which there have been express representations contrary to existing regulations or SEC interpretations thereof." In this context, the court concluded that a violation of the fiduciary duty of best execution has not necessarily occurred when the plaintiff merely has proven that the broker-dealer did not follow industry custom.

²⁸ *Id.*

the term could be defined with precision, there would be no need for the court to supply the missing terms, because such terms would already be well-known.

3. *The Sources of the Obligation of Best Execution.* Of course, sources besides the judiciary can supply the missing terms in the incomplete contracts that exist between market participants. For example, the SEC, as well as self-regulatory organizations such as the NASD and the stock exchanges, can provide convenient, off-the-rack rules to fill in the missing gaps in contingent contracts. However, relying on SROs to produce these rules may lead to an underproduction of regulation since the rules can be seen and copied by free-riding competitors. A second, and more serious difficulty, is that SROs may not have appropriate incentives to enforce optimal rules, since these organizations are likely to be dominated, or “captured,” by the brokers or members, who may have little incentive to enact rules limiting their own profitability.

This brings into focus the question of whether industry practices constitute sufficient grounds for defining best execution. Here the courts have held that following standard industry practice was a defense to the claim that the defendant knew that what they were doing was wrong, an issue known in legal circles as a defense to scienter. The courts further declined to “second-guess the SEC” or be used as a vehicle to effect reform in the comprehensively regulated securities industry. The SEC, however, has itself challenged certain industry practices involving appropriate dealer markups above market prices.

In *G.K. Scott & Co., Inc. v. SEC*,²⁹ petitioners challenged the SEC’s determination that they charged retail customers unfair and fraudulent markups in the sale of certain securities in the OTC market. NASD Rules of Fair Practice require that a dealer’s markup generally not exceed 5%.³⁰ Petitioners were market makers who traded 100% of the volume in the security and charged retail markups of 16% to 480%. The SEC calculated the markups using the “contemporaneous cost” method, which considers the prevailing market price to be the price at which a dealer acquired the security in a contemporaneous transaction with another dealer. Petitioners disagreed with this determination of the market price. They asserted that their use of inter-dealer quotations was sufficient and complied with their duty of best execution under Article III of the NASD Rules of Fair Practice.

The court rejected the petitioners’ claim, noting that the NASD rules state that the Article III duty “do(es) not relate to the reasonableness of commission rates, markups or markdowns which are governed by Article

²⁹ 56 F.3d 1531 (D.C. Cir. 1995).

³⁰ NASD Securities Dealers Manual (CCH) ¶ 2154 at 2056-57 (1995).

III, Section 4 of the NASD Rules. . . .³¹ While this is apparently contradictory, because the permissible markup would apparently be some percentage of the best execution price, the SEC has determined that where a market maker dominates the market for a security, prevailing market price must be calculated using contemporaneous cost.³² This implies that, at least in some circumstances, there is a calculable best execution price, and it is not at the prevailing bid or offer.

In light of the definitional problems that plague characterization of the legal duty of best execution, the SEC has taken a "disclosure" and "process-oriented" approach to ensuring best execution. That is, rather than define best execution, the SEC is implementing systems and procedures which will ostensibly ensure the best execution price. Such an approach is consistent with the SEC's 1975 mandate to institute a National Market System, which envisioned a transparent, economically efficient trading system in which markets compete to provide all traders the best prices. But this approach is also consistent with the more fundamental problem that, absent a better understanding of either the markets or the transactions they are regulating, the SEC has little choice but to choose a process and hope that it results in the desired objective.³³

The new mandates introduced by the SEC are generally viewed as responses to specific market practices and activities, and as such we consider them more fully in Section 4 where we discuss such new developments. We note in concluding this section, however, that the legal definition of best execution is both ill-defined and evolving. Whether the actual implementation of best execution is similarly transient is an issue we consider in the next section.

3. DOES IT MATTER? THE ECONOMIC MEASUREMENT OF EXECUTION COSTS

The analysis of the previous section suggests ambiguities in the legal and economic meaning of best execution. Yet, like the bumblebee who flies despite its theoretical impossibility, it may be that the concept of best execution is less problematic in practice than in theory; that despite the

³¹ *G. K. Scott & Co.*, 1995 WL 364671, at *2 (citing NASD Manual (CCH) ¶ 2151.03 at 2026 (1995)).

³² See *Orkin v. SEC*, 31 F.3d 1056, 1064 (11th Cir. 1994).

³³ Macey and Haddock (1985) argue that the SEC has been ineffective in implementing the NMS largely because they have allowed vested interests—including those of the SEC bureaucracy—to dictate policy rather than actively pursue economically rational policies. This has resulted in inconsistent, and ineffective, rule making characterized by the type of ad hoc rules noted here.

myriad difficulties raised above, competitive forces in markets ensure best execution in practice. In this section, therefore, we consider the issue of execution costs and their measurement. As will be seen, few issues in market microstructure have attracted more research interest, with a plethora of empirical studies investigating this issue. Of significance is the relative unanimity of their results with respect to a number of issues relevant to our study.

The basic question we are interested in is what are execution costs. If the fiduciary responsibility inherent in best execution is to minimize execution costs, then it is necessary to know what these costs are before one can determine if the legal standard is met. Yet, here the ambiguity of the legal and economic definitions comes squarely into play. For many purposes, execution costs are most naturally measured with respect to trade price. But for others, such as the trading of large quantities, execution costs must be measured dynamically, reflecting that executing large orders involves decisions of both trade quantity and timing. Following this distinction, the finance literature contains price-based studies concentrating on comparisons of inter-market trading costs, as well as dynamic studies investigating the execution costs of large trades under various trading strategies. Both issues have relevance for best execution, so we briefly outline the findings of each.

A. *Intermarket Comparisons of Execution Costs*

That execution costs could differ with trading locale is an issue of widespread research interest. While the initial studies concentrated primarily on the definition and measurement of trading costs for single markets (see, for example, Roll, 1984; Stoll, 1989), more recent work has focused on the comparative nature of these costs between markets (see Huang and Stoll, 1994; 1995a; 1995b; 1996; Affleck-Graves *et al.*, 1994; Lee, 1993; Kothare and Laux, 1995; Petersen and Fialkowski, 1994; Christie and Huang, 1994; Bessembinder and Kaufmann, 1995; 1996; Blume and Goldstein, 1992; 1997).³⁴ Underlying virtually all of these studies is the notion that execution costs can be measured by examining price and quote data. This assumption, while limited in some dimensions, captures the important intuition that execution costs are perhaps best viewed in a relative context by looking at how trade prices compare to some reasonably exogenous reference point. How exactly to do this, however, is less clear.

Most studies use some measure of the bid-ask spread to measure execution costs (see Collins and Fabozzie (1991) or Huang and Stoll (1994) for more discussion). Quoted spreads (the ask-bid), or half spreads (the quoted

³⁴ There are also a large number of papers comparing international execution costs, see Roell (1992) and Dejong *et al.* (1993).

spread divided by 2), provide perhaps the simplest measure of the cost of buying or selling the security. If trades can occur between the quotes, however, this will overstate execution costs. A measure correcting for this is the effective half spread, which is defined as the actual transaction price less the midpoint of the quoted spread.

A measurement issue not captured by these spread measures is the effect of the trade on the price itself. That is, rather than view the price as an exogenous variable, it may be more economically meaningful to incorporate the price impact of the trade into any measurement of execution costs. These price impacts occur because trades may be viewed as signals of underlying information. For large trades, price impact effects have long been realized as a major component of trading costs, but they may also be significant for small trades. Two measures capturing this effect are the realized half spread (defined as the difference between the price at some point τ in the future less the relevant bid or ask) and the perfect foresight half spread (defined as the absolute value of the difference between the price at some point τ in the future less the trade price).

An additional measurement problem is raised by Petersen and Fialkowski (1994), who argued that these measures ignore the asymmetry of execution costs between buyers and sellers. That is, while the effective spread may be appropriate when a market order executes against a limit order, it may seriously overstate the execution cost if the trade involves the crossing of two market orders. In this latter case, the buyer (seller) may be benefiting relative to the seller (buyer), a gain not captured by measuring only the single trade. To address this problem, they used an effective spread measure based on the difference between each order's execution price and the midpoint of the spread when the order was submitted. Calculating this measure requires not only price and quote data, but information on individual orders as well.³⁵

Given the multiplicity of trading cost measures, it is not surprising that the various studies yield different absolute measures of execution costs. What is remarkable, however, is the consistency of these findings with respect to the issue of *relative* execution costs. Overall, the research indicates that execution costs, however measured, are lowest on the NYSE. Blume and Goldstein (1992) found that NYSE spreads were lowest across all the trading venues considered. Lee (1993) in his extensive study of eight trading venues estimated that on average the price for non-NYSE trades is 0.7

³⁵ A measurement issue not addressed by any work we are familiar with is the effect of differential exchange fees on transaction costs. In particular, the feed charged by regional exchanges have typically been below those of the NYSE. This has been changing as the NYSE has lowered fees to compete for order flow, but it underscores the difficulty of determining exactly what are the costs of trading in different venues. We thank the referee for pointing this out to us.

to 1 cent per share less favorable than that of adjacent NYSE trades. Interestingly, he found substantial differences between the execution costs of the alternative trading locales, with costs on the Cincinnati and Chicago Exchanges being very similar to the NYSE, and those in the other markets (particularly the NASD) being substantially higher. These findings mirror those of Bessembinder and Kaufman (1995), who found NYSE execution costs to be lowest with those of Cincinnati closest in size, and Blume and Goldstein (1997), who found that Cincinnati matched the NBBO more frequently than any other regional exchange.

More recent research confirming this finding is the work of Huang and Stoll (1994; 1995a; 1995b; 1996). In an interesting matched pairs study of stocks trading on the NYSE and the NASDAQ, Huang and Stoll (1996) concluded that quoted half spreads on NASDAQ were approximately twice those of the NYSE. Viewing effective half spreads resulted in an even larger execution cost difference, as did realized half spread measures.³⁶ In a related study, Huang and Stoll (1994) estimated the execution costs of all NYSE listed stocks trading in the S&P 500 for the period 1987–1991. Using a data base of over 67 million transactions, they concluded that “the evidence indicates that when quoted, effective, and realized spreads are examined in isolation from one another, the measured execution costs are usually lowest on the NYSE.”

Petersen and Fialkowski (1994) reached a similar conclusion in their study of the execution costs of particular orders. This very interesting work also notes that posted spreads provide little if any insight into actual trading costs due to the very large fraction of trades that trade between the spread. Measuring costs with respect to the time the order was submitted, they conclude that “the effective spread on the regional exchanges is significantly higher than on the NYSE.”

A dissenting view to this finding is found in Affleck-Graves *et al.* (1994). Based on a sample of stocks trading in 1985, they found no evidence of execution cost differences between NASDAQ and the NYSE. A possible explanation for this divergence is given by Kothare and Laux (1995) who examined spreads between the two markets in 1984, 1988, and 1992. They found that spreads widened dramatically on the NASDAQ between 1984 and 1992, while those on the NYSE actually fell over the same period. Bessembinder and Kaufman (1996) in a matched pairs study reported that trading costs on the NASDAQ appear to have fallen as of late, but that they are still substantially higher than on the NYSE. Confirming evidence that the markets differ is given by Christie and Huang (1994), who found

³⁶ Specifically, they found the NYSE effective half spread averaged 7.9 cents, while on the NASDAQ it averaged 18.7.

that trading costs fall for firms who switch from the NASDAQ to the AMEX or the NYSE.

Why such differences arise between markets is a puzzling, and important, question. Lee (1993) argued that the main reason was the higher proportion of trades executing within the spread on the NYSE relative to the other markets. Huang and Stoll (1995) found that while 26.7% of trades on the NASDAQ were within the spread, this rose to 37.9% of trades on the NYSE. Examining the behavior of only small trades, Huang and Stoll (1994) found that 24.5% of NYSE trades took place at the midpoint, compared to 20% of NASD trades. Petersen and Fialkowski (1994) also presented evidence of significant differences in midpoint trades between NASDAQ and the NYSE. These authors also provided the intriguing statistic that 19% of the retail brokerage orders in their sample were sent to an exchange showing an inferior quote. This latter finding raises the question of whether the fiduciary responsibility inherent in best execution is being met even under the simple standard of matching the best outstanding quote.

The differing incidence of midpoint trades between markets, and its related effect on execution costs, raises a number of important issues with respect to best execution. From a pragmatic perspective, it suggests that the notion of a single market system, in which trades execute at the best price wherever it is to be found, is chimerical. If even retail trades no longer execute at quotes, then trading at the NBBO on the ITS does not guarantee that an order received best execution, or perhaps even good execution. Moreover, if quotes no longer represent the best available price, then even knowing what the quote represents is problematic. This is particularly important given that many trading algorithms implicitly use matching the best bid or offer as their pricing mechanism.

Conversely, executions between the quotes may reflect the increased use of limit orders by retail traders. The SEC's order handling rules introduced in January 1997 allowed limit order traders enhanced execution status, and this in turn provided a mechanism for small traders to reduce their execution costs. From this perspective, the decreased importance of the quotes may be the result of lower execution costs for at least some types of traders.

There are a number of reasons conjectured for why trade execution has differed between markets. Certainly, price improvement schemes, by definition, lead to trades inside the spread. There may be other factors, however, contributing to the divergent behavior across markets. Purchased order flow and soft dollar brokerage commissions, for example, are alleged to contribute to the problem. Preferencing of orders, as well as internalization of order flow, may also be important. The existence of alternative trading systems such as SOES or Instinet may contribute to the divergence of execution costs between trading locales. We examine these issues in more detail later in the paper, but for now we note that they raise serious

questions about the applicability, or even viability, of best execution in markets.

While our discussion thus far has focused on the role of the transaction price, there are other important dimensions to the notion of execution cost. In particular, trade quantity and timing are important determinants of the price impact of a trade, and these execution costs can be quite large, particularly for institutional traders. Analyses of these costs have generally involved measuring trading costs for dynamic strategies, an issue that we now consider.

B. *The Trading Costs of Large Trades*

Not surprisingly, execution costs have particular importance for wholesale traders. These costs are generally more complex to analyze than those associated with retail trades due to the sheer size of trades involved. For example, from an investment perspective, the impact of the trade on the value of the underlying securities being traded may have far greater significance on overall execution cost than the particular price at which it transacts. Similarly, the time it takes to execute the trade influences the overall cost to the institutional trader. Moreover, unlike retail trades, large trades typically involve negotiated prices, with the result that quoted spreads are not generally a relevant measure of execution costs. Explicit costs such as commissions must also be considered in determining the overall trading cost (see Wagner and Edwards (1993) for more discussion).

The measurement of these price impact and opportunity costs of trading, what Keim and Madhavan (1996) term the “implicit costs” of trading, has been the subject of extensive research. Early work (see Krauss and Stoll, 1972); Holthausen, *et al.*, 1987) focused on measuring the temporary and permanent impact of the trade on trading prices. For large orders, eliciting sufficient liquidity to execute the trade may induce a temporary adverse effect on price, but this cost may be mitigated if prices “rebound” over the day. Beerbower and Priest (1980), for example, used the difference between the day’s closing price and the trade price to measure this permanent price impact of an order. Berkowitz *et al.* (1988) used a weighted average of transaction prices surrounding the trade to capture these implicit trading costs.

Since institutional orders are frequently broken up and traded dynamically, Perold (1988) noted the importance of the timing of trades (and of orders not executing) in affecting execution costs. He defined trading costs as the difference between the prices at which a portfolio of trades occurred and a hypothetical portfolio of transactions executed at prices at the time of the trading decision. In an interesting theoretical paper, Bertsimas and Lo (1996) derived the optimal trading strategy to minimize these costs using a dynamic programming approach. Keim and Madhavan (1995; 1996)

employed a timing approach similar to Perold to measure these implicit costs, and they also included explicit measures of commissions and other costs to arrive at total execution costs. Chan and Lakonishok (1993) examined the percentage return calculated from the day's opening price to the trade and from the trade to the day's closing price. They also compared the transaction price of the institutional trade to a volume-weighted average transaction price on the trade day, a measurement technique also employed in Chan and Lakonishok (1995).

One unambiguous result that emerges from this research is that execution costs of large trades are affected by a wide range of factors. One of the most important is trade direction. Using a unique data set of signed institutional trades, Chan and Lakonishok (1993) found that following a large purchase of stock prices increase and essentially remain at the permanently higher level; following a sale prices initially fall but then recover to pre-trade levels. This results in a daily price change effect of 0.34% for institutional purchases but only -0.04% for institutional sales. Keim and Madhavan (1995) also found that the direction of trade matters, and they estimated execution costs for buyer-initiated trades on exchanges of 0.49% while seller-initiated trades face costs of 0.55%. The data analyzed by Keim and Madhavan (1995) also include the type of trades submitted in executing the order, and thus they were able to examine how the type of trading strategy affects execution costs. Perhaps not surprisingly, execution costs are higher for large traders who transact via market orders than for those who transact via limit orders.

Trading venue also affects trading costs. Institutional trades are often negotiated off of the exchange floor, a process referred to as "upstairs trading." Madhavan and Cheng (1997) investigated whether these trades arranged in the "upstairs market" face different execution costs than those in the "downstairs" market. They concluded that for orders over 20,000 shares, "the expected price impact of a trade was smaller for trades facilitated in the upstairs than for trades sent directly downstairs." They argue, however, that this difference may be economically insignificant, with differences of trading costs only on the order of 15 or 20 basis points.

Another locational issue is whether the institutional trade was on NASDAQ or was exchange traded (i.e., the NYSE or the AMEX). Keim and Madhavan (1996) found that blocks traded on NASDAQ display larger temporary price effects than their exchange traded counterparts. This results in higher overall execution costs. Keim and Madhavan (1995) suggested that the market capitalization of the underlying stock may be one possible explanation for this divergence. In particular, they estimated that execution costs for relatively small trades in large capitalization stocks average only 0.31%, but that the execution costs of large trades in small capitalization stocks are an impressive 2.35%. Since NASDAQ has a higher

percentage of small cap stocks than the NYSE, the difference in execution costs may be more a sampling difference than an economic one.

One issue that we have not been able to find addressed in the literature is the execution costs of trades on proprietary trading systems such as Instinet and POSIT. These trading venues are primarily used for executing institutional orders and for inter-dealer trading. Data availability has precluded careful study and measurement of their trading costs, but their growth suggests that for many traders they provide a better, and presumably less costly, trade mechanism. One reason may be the greater anonymity these trading venues offer relative to traditional market settings. On Instinet, for example, the identity of the trader is not revealed to the market or even to the counterparty, allowing for greater flexibility in implementing trading strategies. Madhavan and Cheng (1997) found indirect evidence of reputational effects in transactions costs, lending support to the argument that for some traders execution costs are minimized by trading outside of the market system. This has particularly troubling implications for the duty of best execution because it suggests that for some traders it may not be attained on any U.S. dealer market or exchange.

That execution costs differ across a wide variety of dimensions is a fundamental theme running through all of this research. While such divergences have long been noted in the markets for large blocks, and indeed may even explain the development of alternative trading venues, their importance and prevalence in retail markets is of more recent vintage. From the perspective of best execution, these cost differences among venues indicate that our theoretical concerns with best execution also coincide with practical concerns: best execution is not a natural outcome of the market process. This suggests examining in more detail the factors that impede its attainment, a topic we consider in the next section.

4. WHY NOT BEST EXECUTION? MARKET BEHAVIOR AND BEST EXECUTION

For best execution to be meaningful, it must be possible to determine not only when it is attained, but also when it fails to occur. The previous section suggests that this failure occurs quite frequently if viewed on a relative basis; that it might also occur on an absolute basis seems a reasonable conjecture. In this section, we consider some of the myriad factors that may lead to this result. We caution at the outset, however, that our analysis is both selective and incomplete; few topics can compete with the vastness of best execution, and we do not pretend, or intend, to provide

an encyclopedic list of all of these factors.³⁷ Instead, our goal is the more modest one of outlining several factors that contribute to the difficulty of attaining best execution.

Certainly, some failures to obtain best execution are apparent. As our earlier discussion of "special circumstances" suggests, a broker executing a small trade at a price worse than the prevailing NBBO seems an obvious violation, as do inflated trading commissions or markups above some reasonable level. Similarly, a broker "trading through" an outstanding customer order would seem inconsistent with best execution. But, as we shall discuss shortly, it is not obvious that best execution is achieved absent such egregious behavior, nor is it apparent that getting, or not getting, a specific trading price is sufficient to define inferior execution. What matters for the individual is a vector of factors; trade-offs within these cannot be easily determined.

An added complexity is revealed by the question of best execution for whom. Specifically, while a particular trading protocol may provide the best available execution for the particular order in question, it may adversely affect the attainable level of best execution for the market as a whole. This difficulty raises a broader concern: the goal of best execution for the individual order need not be compatible with the broader goal of best execution for the market.

A. *Purchased Order Flow*

A development of particular importance in recent years has been the diversion of retail order flow to specific trading venues and dealers. While a number of activities fall under this rubric, our general concern is with the routing of orders as part of order purchase agreements between a broker and a third-party dealer or exchange, or as the result of preferencing arrangements in place on regional exchanges. A related, but somewhat different issue, is internalization of order flow, in which a broker dealer clears its customers' orders internally at the NBBO. We consider these preferencing and internalization issues in a later subsection.

Order purchase agreements, and their effects on the markets, have been the subject of growing research interest (see Lee, 1993; Chordia and Subrahmanyam, 1995; Easley *et al.* 1996; Battalio, 1997; SEC Market 2000, 1994; Harris, 1995; Blume and Goldstein, 1997).³⁸ While order purchase agreements undoubtedly existed in various forms in the past, this practice increased dramatically in the late 1980s (see Huang and Stoll (1994) for

³⁷ An more extensive discussion of the effects of some new market practices on best execution can be found in Harris (1995).

³⁸ See also Payment for Order Flow, Exchange Release No. 33026, 58 Fed. Reg. 52934 (1993), reprinted in (1993 transfer Binder) Fed. Sec. L. Rep. (CCH) ¶ 85,234 at 84,537.

an excellent discussion of the regulatory changes that led to this development). The effect of these agreements on the market has been profound, with the NYSE estimating that upward of 35% of retail trades are lost to order purchase agreements (see Cochrane, 1993). In an extensive study of this practice, the National Association of Security Dealers (NASD) (1991) noted that most order flow agreements provide payments of 1 to 2 cents per share for specific stocks, limit the transactions size they will accept, and require a minimum order flow per month. Fundamental to at least the early agreements was the guarantee to clear the orders at the NBBO. In practice, Blume and Goldstein (1992) found that this was virtually always the NYSE bid or ask quote.

From one perspective, order purchase agreements might be viewed as contributing to best execution by providing the potential for a lower total transaction cost for the retail broker. Since the dealer pays the broker for the order, the retail trader may gain if the broker in turn uses the rebate to lower trading commissions. Chordia and Subrahmanyam (1994) argued that it is the excessive mandated minimum spreads on exchanges that gives rise to the practice in the first place. For actively traded stocks (which are the ones used in order purchase agreements), they argued that the minimum $\frac{1}{8}$ spread is too large, thus providing rents to the clearing dealer or specialist. By diverting these orders and paying a rebate for the order flow, this excess profitability and the investor's overall execution cost are reduced. Whether the entire rebate is actually passed on to the investor is problematic. To our knowledge there are no empirical studies sufficiently detailed to address this issue. Certainly, the rapid growth of discount brokers and their extensive use of such arrangements suggest that at least a portion of this rebate flows back to the investors. The recent reduction of spreads to sixteenths on both the NYSE and the NASDAQ may retard this growth in the future.

Of perhaps greater importance than the rebate is the price at which these trades execute. There are a number of issues to consider here. As we noted in the previous section, simply matching the NBBO does not guarantee best execution if the trade could reasonably be expected to clear between the quotes. Harris (1995) argued that dealers may quote larger spreads in the anticipation that actual trades will be negotiated at better prices. Clearing purchased orders at the quoted bid and ask will thus result in inferior execution. Similarly, because a larger fraction of trades on the NYSE clear mid-quote than on other venues, diverting orders from the NYSE to other venues may miss out on the potential for price improvement. This point is raised in the SEC Market 2000 study, where it is argued that some mechanism for price improvement is needed to ensure that orders are not disadvantaged. More recent order purchase arrangements do provide price improvement mechanisms, an issue we consider in more detail later in this section. The empirical evidence thus far, however, suggests that execution

costs are higher on the regional exchanges and on NASDAQ, a fact inconsistent with diverted orders receiving similar price improvement.³⁹

Even if orders did receive comparable execution prices, however, there are serious issues connected with the effects of order purchase agreements on the markets as a whole. In particular, a concern raised by several researchers (see, for example, Harris (1995), Easley *et al.* (1996), Battalio (1997), and Bessembinder and Kaufmann (1996)) is that order purchase arrangements divert only the uninformed "liquidity" trades, leaving to the NYSE the orders that are more informative. This "cream-skimming" problem has two important policy implications. First, payment for order flow may undermine the process of price discovery because the diverted orders are merely cleared at the existing price and do not contribute to the determination of the new one. Second, if cream-skimming of orders occurs, then matching the NYSE quote for those orders actually raises execution costs for all traders since trading prices are based on an order flow that is now substantially riskier than it would have been in the absence of the diversion.

These cream-skimming arguments have been investigated by Easley *et al.* (1996). Using an empirical technique based on trade data, these authors find that the information content of orders cleared on the Cincinnati Exchange is significantly less than that of the remaining orders on the NYSE. Hence, even if these orders clear at the same prices as those on the NYSE, Easley *et al.* argued that this overcharges the traders in Cincinnati since the adverse selection component there is less. In other words, even allowing for price improvement potential does not result in best execution because of underlying differences in the composition of the order flow.

Other authors have used price data to address the information content of the order flow. Hasbrouck (1995) used the price impacts of trades to show that virtually all price discovery occurs on the NYSE. This suggests that orders cleared or diverted to regional exchanges do not convey information, a fact consistent with the cream-skimming of orders. Bessembinder and Kaufmann (1995) reached a similar conclusion upon finding that realized half spreads are much higher for trades off the NYSE or on the NASDAQ. They raise the concern that existing rules do not ensure that diverted orders receive the best possible execution.

One implication of the cream-skimming hypothesis is that the remaining orders, therefore, would be informationally riskier, and this in turn should widen spreads in the original market. If trades are then matched to these quotes, execution would worsen for the entire market. Battalio (1997)

³⁹ Again, however, we stress that these execution cost comparisons must be viewed with care as the relative fees and costs of operating in different markets has not been completely accounted for in comparative studies of execution costs.

investigated this issue by running an event study on the spread effects when Bernard L. Madoff Investment Securities, the largest market maker paying for order flow,⁴⁰ adds a stock to their purchase list. Interestingly, he found that spreads narrow when this occurs, a result at variance with the cream-skimming of orders. One possibility is that there is a multiplicity of effects; that minimum spreads already are too high at one-eighth and that they might be even higher in the absence of cream-skimming. Nonetheless, this research suggests that the effects of order purchasing on markets generally need not be straightforward, and could indeed be beneficial.

From the perspective of best execution, these agreements raise important issues regarding not only who captures any gains in execution costs, but also about the ability of the market as a whole to provide best execution. The SEC has chosen to focus primarily on this former concern, and in line with this has promulgated new regulations for disclosure. Specifically, the SEC amended Rule 10b-10(a)(7)(iii) to require broker-dealers to include on the confirmation of each transaction whether payment for order flow was received and the extent, if any, of the payment, rebate, or reduction in fee.⁴¹ In addition, the SEC added Rule 11Ac1-3 to require disclosure on each new account statement and on a yearly basis thereafter the firm's policies regarding POF from any broker-dealer, exchange member, or exchanges to which it routes customers' orders in national market system securities for execution, as well as aggregate payments for order flow received in the preceding year by the firm.⁴²

More recently, the SEC has made significant changes to its rules about how market makers and specialists handle their customers' limit orders and quotation obligations. These changes have implications for best execution. Rule 11Ac1-4, the "Limit Order Display Rule," requires market makers and specialists to change their quotes to represent the price and size of customer limit orders that would improve their bid or offer for a security and to represent the size of customer orders that are at prices equal to the best quotations available.⁴³ The "Quote Rule," Rule 11Ac1-1, requires market makers and specialists to include in their published quotes any orders at better prices that they enter into an electronics communication network (ECN) or else to enter better-priced orders into an electronic communications network in order to enable these orders to be included in the public quotation system operated by an exchange or association.⁴⁴

However, the SEC recently rejected a proposal to require market makers and specialists to provide all other market makers and specialists with

⁴⁰ This statistic is reported in Blume and Goldstein (1997).

⁴¹ See 17 C.F.R. § 240.10b-10(a)(7)(iii) (1995).

⁴² See 17 C.F.R. § 240.11Ac1-3 (1995).

⁴³ Order Execution Obligations at 48290.

⁴⁴ *Id.*

the opportunity for price improvement. Broker-dealers routing orders for automatic execution must only “periodically assess the quality of competing markets to assure that order flow is directed to markets providing the most beneficial terms for their customers’ orders.”⁴⁵ The SEC explicitly noted that routing order flow for automatic execution, or internally executing order flow on an automated basis, at the best bid or offer “will not necessarily satisfy a broker-dealer’s best execution duty for small orders.”⁴⁶

The requirements for fulfilling the duty of best execution have become perhaps even murkier in the wake of these recent pronouncements by the SEC. The SEC has provided virtually no direct guidance or clarification of the duty.⁴⁷ Instead, the SEC has said:

Broker-dealers routing orders for automatic execution must periodically assess the quality of competing markets to assure that order flow is directed to markets providing the most beneficial terms for their customers’ orders. . . . Broker-dealers deciding where to route or execute small customer orders must carefully evaluate the extent to which the order flow would be afforded better terms if executed in a market or with a market maker offering price-improvement opportunities. In making this evaluation, a broker-dealer must “regularly and rigorously” examine execution quality likely to be obtained from different markets or market makers trading a security.⁴⁸

Some of these requirements imply a broader view of best execution, one that goes beyond the actual trade price to include other aspects of the cost of trading. For example, best execution might require that any money received from a dealer for order flow be remitted to the customer. The common law of agency speaks directly to this issue. Under Section 388 of the Restatement (Second) of Agency, “(u)nless otherwise agreed, an agent who makes a profit in connection with transactions conducted by him on behalf of the principal is under a duty to give such profit to the principal.” The broker is unquestionably the agent of the purchaser or seller, and the payment for order flow is, without a doubt, profit. Consequently, payment for order flow should, under the basic fiduciary principles of agency from which the obligation of best execution is derived, remit all such payments back to their clients.

Under a strict view of best execution, the obligation to remit payments

⁴⁵ *Id.* At 48323.

⁴⁶ *Id.*

⁴⁷ The SEC has made it clear that where an OTC market maker has an undisplayed limit order that is better than the best bid or offer in the market, the market maker is required to execute market orders at the limit price, rather than at the best displayed bid or offer. For example, suppose that the best quoted market for a security is 10½ bid and 10 offered, and a market maker has a limit order to buy 200 shares at 10½. If the market maker receives an order to buy 500 shares at the market price, the market maker must buy at least 200 shares of this market order to the customer who has placed the limit order to buy at 10½.

⁴⁸ Order Execution Obligations at 48323.

from purchased order flow agreements cannot be obviated by disclosure after the fact. The only ways to satisfy the fiduciary obligations triggered by payment for order flow are: (1) to remit the payment to the principal; or (2) to obtain the customers' permission to obtain the payment in addition to the money received from the customer as commission. Certainly, under a broader definition of best execution, it could be argued that the first condition could be met if the overall execution cost (including the brokerage commission) was reduced due to the payment for order flow. But this broader approach raises the unappealing specter that best execution need not be defined with respect to any current market data, and that best execution is more an overall condition, rather than an absolute requirement at every point in time.

Similarly, some firms that pay for order flow argue that their price improvement mechanisms "obtain performance superior to that of the exchanges."⁴⁹ These firms contend that savings have resulted as spreads generally have declined, thereby improving the prices that all traders receive on their transactions. As noted above, the overall effects on the market is a subject of contention. But again, under a narrow view of best execution,⁵⁰ these arguments would be irrelevant even if they were accurate. The rule requiring best execution does not merely require that the execution price be "generally good" or "better than that available in other markets." The price must be the best available, and, by definition, if a broker receives payment for order flow, the customer is not getting the best price, because the price would be improved if the payment were remitted to the customer.

This raises the question, however, of whether best execution dictates that the gains from any trading system improvements must all accrue to the traders. In particular, some order purchase providers, most notably Bernard Madoff, argue that it is the efficiency of their trading systems that permits them to offer rebates to brokers while simultaneously providing competitive execution prices to traders. Harris (1995) noted that "the Madoff trading system takes orders, arranges trades, sends out confirmations, and settles trades with no paperwork and no data-entry costs."⁵¹ He argued that payment for order flow may "represent the transformation of the brokerage market from a market for the provision of an unauditable service (the search for the best price) to a market for the provision of a standard auditable service (very quick and reliable execution at a low commission)."⁵²

Yet, again, this begs the question of what is actually required by best

⁴⁹ The Perils of Payment for Order Flow, 107 *Harvard Law Review* 1675, 1680 (1994).

⁵⁰ *Id.* at 1680.

⁵¹ Harris (1995), pg. 289.

⁵² *Id.* at 289.

execution. Providing reliable execution at a low commission may be a reasonable and desirable goal, but it does not necessarily result in the trader receiving the best execution for his or her order. Moreover, what this distinction highlights is that order purchase agreements may actually solve the agency problem of the broker in determining whether he received reasonable execution of his total orders from the market maker, rather than the agency problem of the individual trader in determining whether he received the best possible price from the brokers.

B. *Order Preferencing and Internalization*

Similar issues arise with respect to internalization and order preferencing arrangements. Under preferencing arrangements, order flow can be preferred to a particular dealer who in turn agrees to execute the orders at the NBBO (see Huang and Stoll (1995) for more discussion of preferencing and internalization). Preferencing arrangements arise for a number of reasons, including regulation and economic efficiencies. For NYSE listed stocks, a major impetus is provided by NYSE Rule 390 which prohibits executing orders off an exchange for a particular subset of stocks known as non 19c-3 stocks. SEC Rule 19c-3 allows non-exchange trading for stocks listed after a certain date. For those stocks, dealers can execute orders themselves, a process referred to as internalization. For non 19c-3 stocks (which must be executed on an exchange), both the Cincinnati and Boston Stock Exchanges have instituted designated market maker programs in which a firm can pre-arrange to receive order flows in specific stocks. These preferencing programs have been very successful, suggesting a demand for the economic integration such programs allow. Such an economic rationale may also explain the pervasive use of preferencing arrangements for NASDAQ listed stocks, where exchange trading rules do not apply.

Preferencing arrangements and internalization essentially allow for vertical integration by allowing the broker-dealer to internalize their order flow. If there are vertical economies of scale, then such arrangements hold the potential for improvements in execution costs for traders. It is also possible, however, that vertical integration could reduce customer welfare due to the dealer's ability to exploit its oligopolistic position more fully. In particular, because the broker-dealer takes the other side of each transaction, the agency relationship connected with its broker role may conflict with the principal role of its dealer position.⁵³

⁵³ The SEC raised concerns along these lines in reviewing the preferencing programs of the Cincinnati and Boston Stock Exchanges. They noted that "it is important that the competing specialist (and preferencing) program provide real quote competition for the benefit of investors and not simply a means for firms to internalize their customer order flow while receiving specialist designation and treatment..."

A second area where concerns arise with preferencing (and internalization) is that it is inconsistent with price–time priority. In particular, in a continuous auction setting, orders are exposed to the market according to strict price–time priority rule. Thus, at the NYSE, an order executes at the best prevailing price whether that is the price set by the specialists, or the trading crowd, or is the price resulting from a limit order;⁵⁴ on a dealer market such as the NASDAQ, orders flow to the dealer who posts the best price. Under a preferencing arrangement, however, orders are not exposed to the market. Who executes the order is pre-ordained, and the designated dealer need only match the NBBO for that order.

These execution protocols raise serious incentive problems. First, the dealer has no incentive to actually set the “best” quote since he receives the orders in any case. Moreover, by clearing orders at the NBBO, the dealer essentially captures the spread by executing submitted buy orders at the ask and submitted sell orders at the bid. Crossing orders at the midpoint, which would clearly improve execution costs for both buyers and sellers, need not occur. Perhaps more important, a competing dealer has no incentive to set a better price since he will not obtain the preferred order flow. The end result can be that quotes and prices remain above the level that would prevail in the absence of preferencing.

Whether this outcome actually occurs in equilibrium was addressed by Dutta and Madhavan (1997). Using a game-theoretic analysis, they showed that a collusive equilibrium is easier to sustain when preferencing arrangements are allowed than when they are not. This suggests that preferencing arrangements may have detrimental effects on overall market spreads and thereby undermine best execution. Huang and Stoll (1995) reached a similar conclusion in their analysis of the execution cost differences between markets. Indeed, they argued that preferencing arrangements are the primary cause for execution cost differences between markets.

A formal empirical analysis of preferencing programs is given by Battalio, *et al.* (1995). These authors examined the effects on trading prices, spreads, and market maker participation following the adoption of designated market maker programs by the Cincinnati Stock Exchange and the Boston Stock Exchange. The most striking impact of these programs is on market share; the initiating exchanges on average doubled their market share in the preferred stocks. Specifically, they found that 13% of small orders are diverted from the NYSE to sponsoring exchanges. These volume effects suggest the importance that preferencing arrangements can have on market

⁵⁴ Time priority issues arise on the NYSE with respect to limit orders, as the book is treated as a single broker (because it is represented by the specialist). This can result in deviations from strict time priority for orders matched against a large incoming market order. In general, however, orders on the NYSE are executed by price and time priority. We thank the free pointing this out to us.

behavior. Of particular importance for our analysis, these authors did not find evidence that spreads were adversely affected and indeed, found little evidence of adverse price effects.

The effects of preferencing on individual dealer behavior are examined by Bloomfield and O'Hara (1996), who used experimental markets to investigate the effects of preferencing programs. This research provides the intriguing result that in markets where all, or all but one, dealers receive preferred orders, preferencing widens spreads, enhances dealer profits, and reduces the informational efficiency of prices. When two or more dealers do not receive preference orders, however, none of these negative effects occur. The authors argued that this evidence is consistent with preferencing programs not harming markets, provided the practice is not too widespread.

The issues raised by preferencing and internalization go well beyond the purview of best execution, but their implications for this topic are important. Is it necessary for orders to be exposed to the market for best execution to occur? Does such exposure preclude preferencing or internalization, or can the beneficial effects of exposure be met through some other means? How does the ability to preference affect the time priority that attaches to limit orders? These issues are complex, and as yet unsettled, but their resolution goes to the heart of what is entailed by the duty of best execution.

Recently, these issues have arisen in another context as the SEC struggles to determine what defines an exchange and how should it be regulated. Although seemingly remote to the issue of best execution, the nature of an exchange in fact determines not only what information must be reported to regulators (and when) but also who can trade and at what prices, issues clearly relevant for best execution. The SEC would like an expanded definition to allow trading systems or ECNs to fall under the exchange framework; the largely proprietary trading systems prefer to remain regulated as broker-dealers, and therefore be able to offer anonymous executions in ways not possible for an exchange. While it is too early to predict the resolution of this debate, its outcome will affect not only the definition of best execution, but its implementation as well.

C. Price Improvement and Order Execution Protocols

In light of concerns about complying with the obligation of best execution, a number of market initiatives have developed for providing price improvement to customer orders. Madoff Investment Securities, for example, developed a price improvement algorithm for executing its purchased order flow. The NYSE has instituted its PRIMES program, in which the amount of price improvement is reported to the trader. Price improvement, per se, arises when an order transacts at a price better than the prevailing bid or ask. This is done primarily by allowing market orders the opportunity to

clear against other submitted market orders⁵⁵ or against limit orders that may exist within the spread.⁵⁶ Because the specialist guarantees execution at the current outstanding quote or better, these initiatives provide the potential for market orders to receive enhanced execution.⁵⁷

A concern raised by some is that this enhanced market order execution comes at the expense of reduced limit order execution.⁵⁸ That is, a market order stopped and held for a better price might have initially cleared against a submitted limit order. The limit order provider is now disadvantaged in that his order must wait to execute, if it executes at all. Indeed, the held market order is itself now turned into a limit order, albeit one with a market guarantee by the specialist. One could argue that this difficulty for the limit order provider is more imagined than real; the limit order, by definition, is a contingent order, and as such has no guaranteed right to execution. But it can also be argued that limit order providers bear risk by providing a “free option” to the market.⁵⁹ Their compensation for doing so is the ability to clear against market orders needing liquidity, and price improvement programs essentially remove, or at least reduce, that compensation. *Ceteris paribus*, this would be expected to reduce the number of traders willing to submit limit orders, with a consequent reduction in the ability of the market to provide liquidity.

Several exchanges have examined the extent to which limit orders have been disadvantaged by these price improvement practices. For example, in SEC Release No. 34-32664, the AMEX notes that between July 21, 1993 and March 21, 1994, between 39.8-41.4% of the volume on the opposite side of the market from the stopped order, that would have been entitled to execution had the order not been stopped, did not receive an execution before the end of that day’s trading.⁶⁰ This suggests that concerns regarding the negative effects on limit submitters may be well-founded.

⁵⁵ Some dealers who do not have substantial order flow also use algorithms that determine (sometimes randomly) when the dealer will give up an eighth on a trade. We thank a referee for this point.

⁵⁶ McInish and Wood (1994) argue that NYSE quotes overstate actual available trading prices because they do not include “hidden limit orders.” These orders are small limits that lie between the spread. Exchange rules allowed specialists some leeway in choosing whether to change the quote to reflect small limit orders, with the result that orders could actually receive better execution when crossed against these orders. Recent changes in NYSE trading protocols are expected to reduce the incidence of such hidden limit orders.

⁵⁷ Stopping of orders is not a new development in the market, but the ability to stop orders in minimum spread markets was only permanently approved by the SEC on October 20, 1995. Whether this has led to an increase in stopped orders is not yet known, but the NYSE in its Prime program now makes disclosure of any price improvement available to each trader. This, in turn, should make it more apparent the actual execution costs paid by the trader.

⁵⁸ See comment letter, Junius Peake.

⁵⁹ For a discussion of the free option problem see O’Hara (1995).

⁶⁰ We thank the referee for making this known to us.

The SEC has recently promulgated additional rules intended to improve order execution. The SEC is careful to note, however, that "These procedures are not . . . intended to be the only method by which OTC market makers and specialists may offer the opportunity for price improvement."⁶¹ These regulations amend the "Quote Rule," to require exchanges and OTC market makers that account for more than 1% of the volume in a listed security to publish their two-sided quotations for that security. This requirement is extended to include non-Rule 19c-3 securities.⁶² The newly adopted rules require display of the size in full of any limit order that improves the NBBO and display of any limit order that is a more than a *de minimis* change to the size displayed by the specialist or market maker.⁶³

When promulgating new rules, the SEC declined to adopt a new Price Improvement Rule that would have provided a best execution "safe harbor" for the execution of orders at prices better than the NBBO. This rule would have required market makers and specialists to stop the order for exchange-listed securities and the 250 NASDAQ securities with the highest daily trading volume over the previous quarter and publish and maintain a bid or offer on behalf of the customer for 30 seconds. If the order is not executed, the specialist would fill the order at the NBBO price at the time the order was stopped.

These rules were developed largely as a regulatory response to accusations of collusion on NASDAQ. In 1994, about two dozen civil lawsuits alleging price fixing were filed against firms that make markets on NASDAQ. These suits also prompted an investigation of NASDAQ and member firms by the Justice Department, as well as by the SEC, into possible anticompetitive practices. The particular focus of both actions was price spreads on NASDAQ; charges included manipulation of stock prices, refusing to honor quoted prices, illegal delay of reporting large trades, and harassing dealers who "broke ranks" to narrow spreads.⁶⁴ While NASDAQ is not an exchange, but rather an association of electronically linked dealers, there is some evidence that the dealer quoted prices for many smaller-company stocks, as well as the stock of some larger companies, moved in lockstep, avoiding odd-eighth prices.

⁶¹ Order Execution Obligations, 61 Fed. Reg. at 48290.

⁶² Id. at 52797. As a result, firms that hold themselves out as willing to buy and sell non-Rule 19c-3 securities on a regular or continuous basis, even if they have not elected to register as market makers with the NASD, are subject to the Quote Rule if they meet the 1% threshold. Id.

⁶³ Id. For example, if a person covered by the rule is quoting 10-10½ when it receives a customer limit order in a covered security to buy at 10¼, it must change its bid to 10½ to reflect the limit order. Id. at 52802.

⁶⁴ Scot J. Paltrow (1995). SEC plans civil charges in its NASDAQ probe, *L.A. Times* July 7, A1.

These allegations and the consequent investigations triggered several responses, including the reorganization of NASDAQ such that the operations of the NASDAQ market were separated from the NASD's regulatory functions.⁶⁵ Another regulatory response was the Order Execution Rules, noted above. The Justice Department advised the SEC that the rules would increase competition among dealers, narrow the spreads, and thus undermine market makers "willingness and ability to collude."⁶⁶ Following the January 10, 1997 introduction of these rules for the largest 50 NASDAQ stocks, spreads did indeed narrow, suggesting that market competitiveness is enhanced by greater order transparency. Whether it reduces collusion among dealers remains to be seen.

The introduction of these rules reflects a shift in focus toward a more pro-active regulator role. The NASD, which opposed the Order Execution Rules, has urged the SEC to allow market forces to improve competition, rather than embark on wholesale market redesign through regulation.⁶⁷ The NYSE, which also opposed the proposed rules, urged the SEC "to consider whether it is prepared to involve itself in the intricate workings of the nation's securities markets to the extent necessary to implement this proposal."⁶⁸ The NYSE has further argued that agency-auction market trading is the most advantageous market mechanism in terms of achieving best execution.⁶⁹ This conclusion has prompted calls for regulatory reforms such as the repeal of SEC Rule 19c-3, which allows off-exchange trading of listed stocks.

Essentially, the NYSE view of best execution is that it is impossible for rival markets to achieve best execution prices because the other markets do not utilize the agency-auction market. Consequently, the duty of best execution can only be met by sending orders to the best market, which by this definition is the NYSE. This view, however, fails to consider that an aspect of best execution is its achievement for a particular security at a particular place and time. It is unlikely that a single market always provides the best execution for every trade. Even on the NYSE, large trades are routinely sent to the "upstairs" market, where trades are negotiated rather than handled by a pure auction framework. Thus, even within a single trading venue, best execution need not be straightforward. When issues such as trader identity are also considered, the question of the best trading framework becomes even more debatable.

⁶⁵ William Power (1996). NASD members back reorganization; SEC investigation may be near end, *Wall Street J.* Jan. 12, B6.

⁶⁶ Jeffrey Taylor (1996). Justice department sees "Willingness to collude" Among dealers on NASDAQ, *Wall Street J.* Jan. 30, *1; available in Westlaw, WSJ Database.

⁶⁷ Id.

⁶⁸ Id.

⁶⁹ See James E. Buck, Response to Market 2000 Study of the U.S. Securities Market, in Re: Market 2000 Study of the U.S. Securities Markets 12-13 (New York Stock Exchange 1992).

It is important to consider best execution in terms of trading for a particular security across different markets, as opposed to consideration of the issue only as it relates to trades on rival markets, for several reasons. First, the fiduciary duty of best execution does not require that all securities be traded on the New York Stock Exchange. Congress has explicitly recognized the importance of a national market system regardless of the type or physical location of the particular trading markets.⁷⁰ Accordingly, Congress has directed that best execution principles be applied across all markets, without regard to a particular trading methodology.

Second, a preference for any specific market structure may generate negative externalities. For example, exchanges and exchange members both recognize that, in general, wide dissemination of market information generates greater trading volume. However, this generalization is not equally applicable across all markets. Because the costs of disseminating information are borne by all whose orders are executed on that exchange, these costs accrue equally to all traders. Yet, the need for such information, and the benefits arising from it, need not be the same across all traders. The small trader who intends to buy and hold 100 shares may have very different informational requirements than the institutional trader who actively trades tens of thousands of shares at a time. This divergence highlights the relative nature of the duty of best execution; that is, the duty can only be defined with reference to the varying needs and capabilities of market participants. This fundamental proposition is reflected by the inability of regulatory agencies and courts to formulate a precise statement of the duty of best execution.

One argument against consideration of best execution in relation to information costs is free-riding. Exchanges which do not generate and disseminate information, but instead rely on the information generated by other exchanges—quote matching—are actually misappropriating information, imposing external costs, and perhaps taking market share from the more informed exchange. While this can certainly happen, it has not been the necessary outcome either in the United States or elsewhere. Exchanges in competition with one another, and that vary in the provision and cost of information, also vary in other key factors such as liquidity.⁷¹ This leads competing markets to attract different market participants.

For these reasons, it is important that legal and regulatory policy not focus on a particular definition of best execution in relation to one type of exchange market at one particular location. Best execution has resisted precise legal definition because, as a concept, it embraces a multitude of

⁷⁰ Market 2000, *supra* note 30.

⁷¹ See International Organization of Securities Commissions, *Transparency of Secondary Markets*, 55 (1992).

concerns relating to the nature of market participants which are not easily quantified. Any legal rule which does not consider a broad range of issues, but rather imposes a narrow concept of best execution, will inevitably be both over- and under-inclusive, imposing excessive costs on some and providing inadequate information to others.⁷²

5. CONCLUSION

The search for best execution remains an elusive quest. In this paper, we have argued that the concept and implementation of best execution is sufficiently problematic to make any overall standard at best futile and at worst detrimental to the overall efficiency of markets. This latter possibility arises because the market structure that produces the best execution from the perspective of individual traders may not be the market structure that provides the best bid and ask spreads or the most liquidity for the market as a whole. Moreover, such a market structure may not produce the most information or provide the most efficient mechanism for price discovery. Thus, even if a particular retail trader receives the best available execution price for a particular transaction by participating in an in-house agency cross or a trade for which payment for order flow is received, that trade may contribute to wider spreads on the primary, price-setting market for the security, which in turn may lead to wider spreads on average.

Another way of conceptualizing this problem is to recognize that individual traders and their brokers may be in a prisoner's dilemma with respect to best execution. While particular traders may benefit by moving certain trades into secondary venues where spreads may be narrower under certain circumstances, all traders might be better off if trading were confined to a particular location. But the incentives to defect are too high, and the penalties for defection are non-existent.

In this paper we have argued that a full understanding of best execution must take into account such issues as market-timing, order size, speed of execution, the commission charged, and the trading strategy employed in

⁷² For example, NASDAQ trading practices have recently come under harsh scrutiny by regulatory agencies. While this scrutiny may make NASDAQ more "fair" for small investors, it may also become less efficient. Most big market makers have dramatically reduced the number of stocks they make markets in—Merrill Lynch made markets in 900 NASDAQ stocks in 1987, and in only 1000 in 1995. Market structure changes such as this do benefit some interested parties and market participants, but at a significant cost to companies which cannot list on other exchanges and to the investors who purchase their stocks. See William Power and Dave Kansas (1995). Big NASDAQ dealers scale back market-making, *Wall Street J.* Oct. 18.

evaluating whether a particular customer has received the best execution for a particular trade. Unfortunately, the complexity of the issue, combined with the low stakes involved in individual transactions, suggests that it will be difficult, if not impossible, to achieve best execution through ordinary market processes. The costs of monitoring and enforcing the fiduciary duty of best execution simply are too high.

What then should be the future role and interpretation of the duty of best execution? Our analysis suggests three directions. First, best execution must be considered within the context of market structure. Whether that particular structure is the "best" trading mechanism is, or at least should be, a separate issue. Thus, to suggest that an individual has not been afforded the benefit of best execution because a trade has not been consummated on an auction market is not appropriate, even though such a market might provide the best structure for the market as a whole. Similarly, it seems unreasonable to argue that best execution requires executing trades at prices drawn from other trading structures, ignoring that each trading structure provides a different vector of execution attributes and services a different clientele. If alternative markets provide other benefits to traders, then focusing narrowly on the trade prices misses the property that trade execution is a multi-dimensional process. This analysis seems particularly strong in the context of large block trades where traders' concerns about the impact of a particular trade on market prices is likely to dwarf concerns about the trading price in relation to the quoted spreads.

Second, the concept of best execution should be an all inclusive one, recognizing that it is the total transaction costs (including the opportunity costs from failing to execute the trade in a timely manner) that is of concern to traders. In general, however, we would argue that, absent an explicit demonstration of other offsetting costs, the duty of best execution requires that the trade execute at the best prevailing price. This view shifts the onus of meeting best execution for the broker or dealer away from demonstrating that it did not occur to that of demonstrating that it did.

This approach complements our third recommendation that the issue of best execution for particular trades is best dealt with through competition among the individual trading venues that compete with one another. The advent of technology provides new alternatives for trading securities. The success or failure of these alternatives will largely derive from their ability to deliver execution services more cheaply, and therein lies the essence of the duty of best execution. While initially traders may face costs in determining the relative costs of trading, rival market places have a strong incentive to gather information about best execution of particular trades in order to compete effectively for order flow. It is this competition, and the resultant dissemination of information it engenders, that provides a workable basis for the duty of best execution.

REFERENCES

1. *Articles*

- Affleck-Graves, John, Hegde, Shantaram, and Miller, Robert (1994). Trading mechanisms and the components of the bid-ask spread, *J. Finance* **49**, 1471–1488.
- Battalio, Robert H. (1997). Third market broker-dealers: cost competitors or cream skimmers? *J. Finance* **52**, 341–352.
- Battalio, R., Greene, J., and Jennings, R. (1995). “Do Competing Specialists and Preferencing Dealers Affect Market Quality,” Working Paper, Indiana University.
- Beerbower, G., and Priest, W. (1980). The tricks of the trade, *J. Portfol. Manage.* **6**, 36–42.
- Berkowitz, S., Logue, D., and Noser, E. (1988). The total cost of transactions on the NYSE, *J. Finance* **41**, 97–112.
- Bertsimas, Dimitris, and Lo, Andrew (1996). “Optimal Control of Execution Costs,” Working Paper, LFE- 1025-96, Sloan School of Management, MIT.
- Bessembinder, Hendrik, and Kaufman, Herbert M. (1995). “Quotations and Trading Costs on Domestic Equity Exchanges.” Working Paper, Department of Finance, Arizona State University.
- Bessembinder, Hendrik, and Kaufman, Herbert M. (1996). A cross-exchange comparison on execution costs and information flow for NYSE-listed stocks, *J. Finan. Econ.*, forthcoming.
- Bloomfield, R., and O’Hara, M. (1996). “Does Order Preferencing Matter?” Working Paper, Johnson Graduate School of Management, Cornell University.
- Blume, Marshall, and Goldstein, Michael (1992). “Displayed and Effective Spreads by Market,” Working Paper 27–92, Rodney White Center, The Wharton School (December 23).
- Blume, M. E., and Goldstein, Michael (1997). Quotes, order flow, and price discovery, *J. Finance* **52**, 221–244.
- Buck, James E. (1992). Response to market 2000 study of the U.S. securities market, in “Market 2000 Study of the U.S. Securities Market,” New York Stock Exchange, New York.
- Chan, Louis, K. C., and Lakonishok, Josef (1993). Institutional trades and intra-day stock price behavior, *J. Financ. Econ.* **33**, 173–201.
- Chan, Louis K., and Lakonishok, Josef (1995). The behavior of stock prices around institutional trades, *J. Finance* **50**, 1147–1174.
- Chordia, Tarun, and Subrahmanyam, Avanidhar (1995). Market making, the tick size, and payment-for-order flow: Theory and evidence, *J. Bus.* **68**(4), 543–575.
- Christie, William G., and Huang, Roger D. (1994). Market structures and liquidity: A transactions data study of exchange listings, *J. Finan. Intermediation* **3**, 300–326.
- Cochrane, J. (1993). “U.S. Equity Market Competitiveness,” Working Paper, New York Stock Exchange, New York.
- Collins, Bruce M., and Fabozzi, Frank J. (1991). A methodology for measuring transaction costs, *Finan. Anal. J.* (March/April), 27–36.
- De Jong, F., Nijman, T., and Roell, A. (1993). A comparison of the cost of trading French shares on the Paris Bourse and on Seaq International, *Eur. Econ. Rev.*, **39**, 1277–1301.
- Dutta, P., and Madhavan, A. (1997). Competition and collusion in dealer markets, *J. Finance* **52**, 245–276.
- Easley, David, Kiefer, Nicholas, and O’Hara, Maureen (1996). Cream-skimming or profit-sharing? The curious role of purchased order flow, *J. Finance* **51**, 811–834.

- Easterbrook, Frank, and Fischel, Daniel (1989). The corporate contract, *Columbia Law Rev.* **89**, 1416.
- Harris, Lawrence (1995). Consolidation, fragmentation, segmentation, and regulation, in "Global Equity Markets: Technological, Competitive, and Regulatory Challenges" (Robert A. Schwarz, Eds.), Irwin Publishing, New York.
- Hasbrouck, Joel (1995). One security, many markets: Determining the contribution to price discovery, *J. Finance* **50**, 1175–1199.
- Holthausen, R., Leftwich, R., and Mayers, D. (1987). The effect of large block transactions on security prices, *J. Finan. Econ.* **19**, 237–267.
- Huang, Roger D., and Stoll, Hans R. (1994). "What Does It Cost to Execute Trades? Evidence from the NYSE," Working Paper 94–05, Financial Markets Research Center, Owen School, Vanderbilt University (November 28).
- Huang, Roger D., and Stoll, Hans R. (1995a). "Competitive Trading of NYSE Listed Stocks: Measurement and Interpretation of Trading Costs," Working Paper 94–13, Financial Markets Research Center, Owen School, Vanderbilt University (March 13).
- Huang, Roger D., and Stoll, Hans R. (1995b). The components of the bid-ask spread: A general approach, *Rev. Finan. Stud.* forthcoming.
- Huang, Roger D., and Stoll, Hans R. (1996). Dealer versus auction markets: A paired comparison of execution costs on NASDAQ and the NYSE, *J. Finan. Econ.* **41**(3), 313–357.
- Keim, D. B., and Madhavan, A. (1996). The upstairs market for large-block transactions: Analysis and measurement of price effects, *Rev. Finan. Stud.* **9**, 1–36.
- Keim, Donald B., and Madhavan, Ananth (1995b). Execution costs and investment performance: An empirical analysis of institutional equity trades, *J. Finan. Econ.*, forthcoming.
- Kothare, Meeta, and Laux, Paul (1995). Trading costs and the trading system for NASDAQ stocks, *Finan. Anal. J.* (March/April), 42–53.
- Kraus, A., and Stoll, H. (1972). Price impacts of block trading on the New York Stock Exchange, *J. Finance* **27**, 569–588.
- Lee, Charles (1993). Market integration and price execution for NYSE-listed securities, *J. Finance* **48**, 1009–1038.
- Macey, Jonathan R., and Haddock, David D. (1985). Shirking at the SEC: Failure of the National Market System, *Univ. Illinois Law Rev.* **2**, 315–362.
- Madhavan, Ananth, and Cheng, Minder (1997). In search of liquidity: Block trades in the upstairs and downstairs markets, *Rev. Finan. Stud.* **10**, 175–203.
- NASD (1991). "Inducement for Order Flow, A Report of the Order Flow Committee to the Board of Governors," National Association of Securities Dealers, Inc., Washington, DC.
- Notes (anonymous) (1994). The perils of payment for order flow, 107, *Harvard Law Rev.* 1675–1692.
- O'Hara, Maureen (1995). "Market Microstructure Theory," Blackwell, Cambridge, MA.
- Paltrow, Scot J. (1995). SEC plans charges in NASDAQ probe, *L.A. Times*, July 7.
- Perold, A. (1988). The implementation shortfall: Paper versus reality, *J. Portfol. Manage.* **14**, 4–9.
- Petersen, M., and Fialkowski, D. (1994). Posted versus effective spreads: Good prices or bad quotes? *J. Finan. Econ.* **35**, 269–292.
- Power, William (1996). NASD members back reorganization, *Wall Street Journal*, January 12.
- Power, William, and Kansas, Dave (1995). Big NASDAQ dealers scale back market-making, *Wall Street Journal*, October 18.
- Roell, Ailsa (1992). Comparing the performance of stock exchange trading systems, in "The

- Internationalization of Capital Markets and the Regulatory Response” (Fingleton and Schoemaker, Eds.), Graham and Trotman, London.
- Roll, Richard (1984). A simple implicit measure of the bid-ask spread in an efficient market, *J. Finance* **39**, 1127–1139.
- SEC (1994). “Market 2000: An Examination of Current Equity Market Developments,” Division of Market Regulation, United States Securities and Exchange Commission, Washington, DC.
- Stoll, Hans R. (1989). Inferring the components of the bid-ask spread: theory and empirical tests, *J. Finance* **44**, 115–134.
- Taylor, Jeffrey, and Getler, Warren (1995). U.S. examines alleged price fixing on NASDAQ, *Wall Street Journal*, October 20.
- Wagner, W., and Edwards, M. (1993). Best execution, *Finan. Anal. J.* **49**, 65–71.

2. Cases

- Barnett v. United States, 319 F.2d 340 (8th Cir. 1963).
- Charles Hughes & Co. v. SEC. 139 F.2d 434 (2d Cir. 1943); *cert. denied*, 321 U.S. 786 (1944).
- Chassins v. Smith, Barney & Co., 438 F.2d 1167 (2d Cir. 1970).
- G.K. Scott & Co., Inc. v. SEC, 56 F.3d 1531 (D.C. Cir. 1995).
- In re E.F. Hutton & Co., Securities Exchange Act Release No. 25887 (1988 Transfer Binder), Fed. Sec. L. Rep. (CCH) ¶ 84303 (July 6, 1988).
- In re Merrill Lynch, No. CIV 94-5343 (DRD). (1995 WL 746866 (Fed. D.N.J.) 1995).
- Opper v. Hancock Securities Corp., 250 F. Supp. 668 (S.D.N.Y.), *aff’d* 367 F.2d 157 (2d Cir. 1966).
- Orkin v. SEC, 31 F.3d 1056 (11th Cir. 1994).

3. Statutes, Regulations, and Related Material

- 15 U.S.C. § 78k-1(a)(1)(c)(iv) (1994).
- 17 C.F.R. § 240.10b (1995).
- 17 C.F.R. § 240.11Ac (1996).
- NASD Rules of Fair Practice, NASD Manual (CCH), art. III, sec. I, ¶ 2151.03.
- NASD Securities Dealers Manual (CCH) ¶ 2154 (1995).
- New York Stock Exchange Rule 123A.41, 2 NYSE Guide (CCH) ¶ 2123A (1995).
- Order Execution Obligations, Exchange Act Release 34-37619A, 61 Fed. Reg. 48290 (1996).
- Payment for Order Flow, Exchange Act Release No. 33026, 58 Fed. Reg. 52934 (1993).
- Payment for Order Flow, Exchange Act Release No. 34902, (1994 Transfer Binder) Fed. Sec. L. Rep. (CCH) ¶ 8544.
- Proposed Rules on Order Execution Obligations, Exchange Act Release No. 34-36310, 60 Fed. Reg. 52792 (October 10, 1995).
- Proposed Rules on Order Execution Obligations, Exchange Act Release No. 34-36718, 61 Fed. Reg. 1545 (1996).
- Regulation of Exchanges, Exchange Act Release No. 34-38672, International Series Release No. IS-1085 (1997).
- Restatement (Second) of Agency (1957).
- Second Report on Bank Securities Activities: Comparative Regulatory Framework Regarding Brokerage-Type Services (February 3, 1997), reprinted in H.R. Rep. No. 145, 95th Cong. (1st Sess., 2333).