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ABSTRACT

This article compares the bid-ask spread for New York Stock Exchange (NYSE)-listed securities before and after a major third market broker-dealer, Bernard L. Madoff Investment Securities (Madoff), begins to selectively purchase and execute orders in those securities. Tests reveal the quoted bid-ask spread tightens when Madoff enters the market. Furthermore, trading costs as measured by the difference between the transaction price and the midpoint of the contemporaneous bid-ask spread do not increase. Together, these results suggest that the adverse selection problem associated with allowing agents to selectively execute orders in exchange-listed securities may be economically insignificant.

IN 1975 CONGRESS DIRECTED THE Securities and Exchange Commission (SEC) to "amend any restrictions which imposed an unnecessary or inappropriate burden on competition" between domestic securities markets (see SEC Release No. 20074). In response, the SEC passed Rule 19c-3, eliminating off-board trading restrictions for stocks listed on exchanges after April 26, 1979. Rule 19c-3 permitted New York Stock Exchange (NYSE) members to execute orders in NYSE-listed securities against their own account in the National Association of Securities Dealers' Over-The-Counter (OTC) market. The trading of NYSE-listed securities in the OTC market is called third market trading (See Bodie, Kane, and Marcus (1992), p. 125). The SEC also mandated the establishment of the National Market System, which includes the Composite Quotation System (CQS) and the Intermarket Trading System (ITS). The CQS, which compiles and distributes quotes to different ITS-trading venues, and the

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ITS, which permits trading across different ITS-trading venues, became fully operational in 1983.[1]

Before these changes, exchange dealers competed primarily with floor traders and limit order submitters for the opportunity to execute orders.[2] A dealer who posted bid and ask quotes generally executed incoming market orders at those quotes. Since the quotes of other markets were not observable, there was neither the opportunity nor the obligation to pass these orders on to other markets.[3] Thus, dealers were executors of last resort. Today exchange dealers compete to execute orders with floor traders, dealers on regional exchanges, third market broker-dealers and limit order submitters. The new competitors are not executors of last resort because they must execute orders only when they have the best outstanding quote. If they receive an order when they do not have the best quote, they can either execute it at the best quote or send it to the agent with the best quote.

Proponents of these changes have argued that these changes would narrow the quoted bid-ask spread for exchange-listed securities by increasing the number of agents competing to execute orders. However, this argument ignores the fact that these new competitors are not executors of last resort. Battalio and Holden (1995) show there is a potential adverse selection problem associated with allowing differential competition in securities markets. Specifically, when agents use an informational advantage to selectively execute orders (i.e., skim-the-cream), their introduction to the market causes bid-ask spreads to widen and trading costs to rise.[4] Only when agents use a cost advantage to selectively execute orders will their introduction to the market cause trading costs to fall.

[1] Third market broker-dealers have always been able to execute orders in exchange-listed equities in the third market. Moreover, specialists on regional exchanges have been able to execute orders in those exchange-listed securities for which their exchange had obtained unlisted trading privileges. However, before the introduction of the CQS there was little information available regarding the prevailing quotes for NYSE-listed securities on the regional exchanges and the third market and vice versa. As a result, brokerage houses who sent market orders in NYSE-listed securities to a regional exchange or the third market for execution often received execution prices that were different than would have been received on the NYSE. The ITS trading venues include the NYSE, the AMEX, the Cincinnati Stock Exchange (CSE), the Pacific Stock Exchange (PSE), the Philadelphia Stock Exchange (PHLX), the Boston Stock Exchange (BSE), the Chicago Stock Exchange (formerly the Midwest Stock Exchange) (CHX), and the NASD's third market.

[2] A dealer is an agent who takes the other side of orders (i.e., acts as principal). A broker is an agent who processes orders (i.e., acts as agent). A broker-dealer performs both roles.

[3] Quotes for 100 shares are not "ITS eligible" and, as a result, may be traded through.

[4] A February 16, 1993 *Wall Street Journal* article titled, "How Street Turns Trades Into Gold," suggests that Lehman Brothers considers the profitability of an order when deciding whether or not to execute it against its own account. "When a customer buys or sells a Big Board [NYSE] listed stock through Lehman Brothers, the order is sent to Lehman Brothers' computer, which decides whether the firm can trade the order against its own account for a profit or not. If yes, then Lehman Brothers takes the order and trades with itself in Cincinnati, where Lehman Brothers is a dealer. If the computer decides it is not a profitable trade for Lehman Brothers, the customer's order is sent to the Big Board or to some other exchange."

Bernard L. Madoff Investment Securities (Madoff) is a broker-dealer who has entered the market for NYSE-listed securities by selectively purchasing and executing orders. This article examines the changes in bid-ask spreads and trading costs associated with this entry to determine whether Madoff is predominately a cost competitor or a cream skimmer.[5] Madoff attracts order flow by offering brokers cash payments of one cent per share for market orders of less than 5000 shares (that are not submitted by professional interests) and by guaranteeing that these orders will be executed at prices that are no worse than the National Best Bid and Offer (NBBO). Additionally, in late 1990 Madoff began offering executions at prices better than the NBBO to orders received when the difference between the National Best Bid and Offer was greater than an eighth. Madoff typically purchases orders in high volume securities, although they will purchase orders in any security at the request of a broker if that broker guarantees delivery of sufficient order flow. The stocks in which Madoff purchases order flow account for 85 percent of the share volume and 50 percent of the transaction volume in all NYSE-listed securities, and they include both 19c-3 stocks and non 19c-3 stocks. That Madoff executes a substantial percentage of the orders in the NYSE-listed securities they process is evidenced by the fact that in 1991, Madoff executions accounted for about 10 percent of all trades in NYSE-listed stocks (see Forbes, January 6, 1992).

Demsetz (1968), Tinic (1972), Tinic and West (1972), Cohen and Conroy (1990), Wood and McInish (1992), Kahn and Baker (1993), and Davis and Lightfoot (1994) suggest that increased competition in securities markets leads to tighter quoted bid-ask spreads. These cross-sectional analyses, however, may not adequately control for firm differences (Christie and Huang (1994) and Wood and McInish (1992)). In contrast, the comparisons in the present study hold firm identity constant, and rely on statistics estimated over periods before and after Madoff's entry to the market.

Lee (1993) and Petersen and Fialkowski (1994) find evidence that suggests the cost of trading NYSE-listed securities is lower on the NYSE than it is in the third market. Lee concludes his results "raise questions about the adequacy of the existing intermarket quote system, the broker's fiduciary responsibility for "best execution," and the propriety of order flow inducements." Chordia and Subrahmanyam (1995), Easley, Kiefer, and O'Hara (1996), and Lin, Sanger, and Booth (1995) find evidence that suggests a significant portion of the order flow diverted away from the NYSE is informationless. This article extends these studies by examining the marginal impact on quoted bid-ask spreads and trading costs of introducing a major third market broker-dealer to the market for orders in NYSE-listed securities.

[5] Since it is not known whether Madoff uses a cost or an informational advantage to selectively purchase and execute orders, the empirical tests in this article are not direct tests of the theoretical predictions put forth in Battalio and Holden (1995). Rather, conditional on this theory, these tests will provide evidence that suggests whether Madoff predominately uses a cost or an informational advantage to selectively purchase and execute orders.

The results of this analysis suggest that it may be premature to conclude third market broker-dealers and regional specialists largely divert informationless order flow away from the NYSE. Specifically, the results indicate the quoted bid-ask spread for NYSE-listed securities *tightens* when Madoff enters the market for orders in those securities. Furthermore, the absolute difference between the price at which an order is executed and the midpoint of the contemporaneous NBBO does not increase when Madoff enters the market. Together, the results suggest that Madoff predominately uses a cost advantage to selectively purchase and execute orders.

The next section contains the questions examined in this article and describes the empirical design. Section II contains a detailed description of the data and methodology used in this experiment. In Section III, empirical results are presented and discussed. Section IV concludes.

I. Empirical Design

A security's quoted bid-ask spread should widen upon Madoff's entry to the market if Madoff primarily uses an informational advantage to selectively purchase and execute orders in that security. Alternatively, if Madoff predominately uses a cost advantage, trading costs should fall once Madoff enters the market. To determine which, if either, of these hypotheses the data support, two measures are examined before and after Madoff enters the market for orders in NYSE-listed securities.

The time-weighted bid-ask spread, used by McInish and Wood (1991), is used to examine how Madoff's entry affects quoted bid-ask spreads. For the ith security, the time-weighted bid-ask spread is computed as:

$$\overline{S}_i^{PRE} = \left(\sum_j \tau_j \right)^{-1} \sum_j \tau_j s_j, \tag{1}$$

where j indexes all quotes posted prior to the start of Madoff's trading, s_j is the inside bid-ask spread and τ_j is the length of time the quote is active. $\overline{S}_i^{POST}$ is the corresponding statistic for the post-Madoff-trading sample.

The liquidity premium, defined by Lee (1993), is used to explore how Madoff's entry to the market for orders in NYSE-listed securities affects the cost of trading those securities. For the ith security, the average liquidity premium is:

$$\overline{LP}_i^{PRE} = \left(\sum_j x_j \right)^{-1} \sum_j x_j |p_j - q_j|, \tag{2}$$

where j indexes all transactions occurring prior to the start of Madoff's trading, x_j is the number of shares in the jth transaction, p_j is the price of the jth transaction and q_j is the prevailing quote midpoint. $\overline{LP}_i^{POST}$ is the corresponding statistic for the post-Madoff-trading sample. Assuming the bid-ask spread is set symmetrically around the equilibrium price, the liquidity premium provides a per share estimate of execution costs. To the extent that

incoming buy (sell) orders are executed at the bid (ask), the liquidity premium overestimates these costs. Since the distribution of liquidity premia depends on the contemporaneous bid-ask spread, all tests are done conditional on the prevailing bid-ask spread. All other things equal, comparisons of $\overline{LP}_i^{PRE}$ and $\overline{LP}_i^{POST}$ will indicate how trading costs are affected when Madoff enters the market.

Finally, if Madoff is predominately a cost competitor, the cost of having an order executed by Madoff should be less than the cost of having an order executed on the NYSE. To explore whether Madoff or the NYSE offers better execution prices for orders in NYSE-listed securities, $\overline{LP}_i^{POST}$ is computed separately for transactions occurring in the third market and for those occurring on the NYSE. Under the assumption that third market executions can be attributed to Madoff, comparisons of these statistics will suggest whether Madoff or the NYSE provides better execution prices.

II. Methodology

The data for this study are obtained from the Institute for the Study of Security Markets (ISSM) database. The first date that Madoff posts either a bid or an ask for a given security in the ISSM database is used as a proxy for the date on which Madoff entered the market for orders in that security.[6] This date is called the event date. The sample period starts on January 1, 1988, and ends on December 31, 1990. To allow for the knowledge of Madoff's entry to disseminate to the relevant market participants, a window of 15 trading days on either side of each event date is discarded. The tests in this article are conducted using transactions data collected for 15 consecutive trading days on either side of this window for each event.[7] Any security with a primary listing on an exchange other than the NYSE is eliminated from the sample. Furthermore, any event date for which there are not thirty consecutive days of transactions data on either side of the date on which Madoff enters the market for orders in that security is eliminated. After applying these filters, 327 of the original 484 event dates remain in the sample.

Dealers posting quotes on the CQS are responsible for honoring their quotes until they revise them. Each day, the opening quote from the NYSE is taken as the opening NBBO. Subsequently, whenever there is a quote from an ITS market center that is better than the existing quote, that quote is taken as the

[6] Each month, Madoff sends a letter to brokers and broker-dealers informing them of any additions and/or deletions to the list of stocks in which they wish to purchase order flow. These lists are obtained for an eight-month period from March through October of 1992. There were 36 NYSE-listed securities added during this period. The method described above *perfectly* identifies these securities. However, while these letters were sent out at the beginning of every month, Madoff began posting quotes for these securities at different points throughout the month. In a telephone conversation, Peter Madoff stated that the date on which Madoff first posts quotes for a given security is the date on which Madoff begins to selectively execute orders for that security.

[7] The length of the event window was arbitrarily chosen. However, the results of this article are robust to a change in the event window from 15 to 30 days.

NBBO. Employing this methodology using ISSM data yields zero and negative spread estimates on occasion.[8] To avoid this situation, when a new bid is posted that is above one dealer's offer price, the dealer with the offer price is removed from consideration in the construction of the NBBO until that dealer posts new quotes. An analogous method is used when a dealer has a stale bid. This eliminates "stale quotes" when determining the NBBO. The construction of the NBBO may bias the measurement of the spread. For example, a delay in removing the inside quotes from the regional exchanges will result in a re-created NBBO that is tighter than the actual NBBO. However, there is no reason to believe that Madoff's entry affects this bias. Since all of the tests in this article are relative, if a bias exists, it should not affect the results of this article.[9]

The dates on which Madoff entered the market for orders in NYSE-listed securities are distributed throughout the sample period. Madoff added 81 securities in 1988, 117 in 1989, and 129 in 1990. The largest number of additions in a single month was 69 (in October 1990).[10] The dispersion of event dates throughout the sample period reduces the possibility of exogenous factors influencing the outcomes of the comparisons detailed in the previous section. Furthermore, because the stock and the trading system are held constant, there should be no systematic change in the volume or number of transactions in a stock associated with Madoff's entry. As noted in Table I, Madoff's entry does not affect the number or size of transactions. While trading volume increases for a significant percentage of the securities in the sample when Madoff enters the market, the average increase is only 2.4 percent.

Although Madoff's entry has a negligible impact on the number, volume, and size of transactions in NYSE-listed securities, Table II suggests Madoff's presence significantly alters where orders in those securities are executed. Consistent with the fact that Madoff executes orders both on the Cincinnati Stock Exchange (CSE) and in the third market, the percentage of all orders for 100 to 4900 shares executed in the third market and on the CSE increases by 480 percent and by 324 percent, respectively, after Madoff's entry.[11] The

[8] As noted in Goldstein (1994), the generally available ISSM tapes do not include "autoquotes," quotes posted by regional exchanges to ensure that they are outside the NBBO. Generally, an autoquoted bid is an eighth below the best bid and an autoquoted ask is an eighth above the best ask. ISSM removes autoquotes to save space. However, autoquotes are essential for determining the NBBO, because they indicate when a regional exchange "pulls away" from the NBBO.

[9] Tests using measures defined relative to the NYSE best bid and offer produce results similar to those reported in this article.

[10] Excluding these securities from the sample does not change the empirical results.

[11] Even before Madoff introduced their price improvement algorithm, they offered orders the opportunity for price improvement by exposing them to other ITS market participants in the form of quotes on the CQS. Because it is difficult to post quotes for non 19c-3 securities in the third market, Madoff does so on the CSE. Hence, the majority of Madoff's CSE executions represent incoming ITS orders that were executed against Madoff's quotes. Madoff does not pay for any order that receives price improvement.

Table I

The Effect of Madoff's Entry on Various Trading Statistics

An event date refers to the first date that Madoff posts either a bid or an ask for a New York Stock Exchange (NYSE)-listed security between January 1, 1988 and December 31, 1990 as documented in the Institute for the Study of Security Markets (ISSM) database. The relevant statistics are measured using data collected for 15 consecutive trading days on either side of a 30 trading day window centered on the event date. The time-weighted bid-ask spread for a given security is the inside bid-ask spread as recreated from the ISSM database weighted for the percentage of time that the spread was outstanding in the sample period. The Liquidity Premium is the absolute difference between the trade price and the midpoint of the contemporaneous inside bid-ask spread. All executions occurring when the inside spread is ⅛ are said to have occurred in a ⅛ market. The fact that the average liquidity premia in ⅛ markets reported in this table are greater than $0.0625 is consistent with both of the following explanations. First, the method used to recreate the inside bid-ask spread from ISSM data may introduce error that causes orders executed at the National Best Bid and Offer (NBBO) to be recorded as being executed at a price inferior to the NBBO. Second, these results could reflect the presence of orders for greater than the quoted depth if those orders were executed at prices inferior to the NBBO. The parametric difference in means test (See Morrison (1976), p. 24) and the nonparametric sign test are used. Both tests are two-tailed.

N = 327 Event Dates		Before Madoff	After Madoff	Difference in Means Statistic	Proportion of Events with Post Madoff Increase
Number of transactions	Average	2,093	2,182	−0.768	49.24%
	(Std. Dev.)	(1,477)	(1,485)		
Number of shares transacted		37,710	38,633	−0.413	55.96%*
		(28,374)	(28,784)		
Trade size		1,880	1,840	0.057	47.71%
		(888)	(920)		
Time-weighted bid-ask spread		$ 0.1758	$ 0.1711	1.944*	38.23%**
		(0.0316)	(0.0302)		
Liquidity premium in ⅛ markets		$ 0.0706	$ 0.0703	0.108	40.06%**
		(0.0360)	(0.0350)		
Liquidity premium in ⅜ markets		$ 0.0749	$ 0.0737	0.208	46.77%
		(0.0738)	(0.0732)		
Liquidity premium in ⅜ markets		$ 0.1160	$ 0.1159	0.014	54.47%
		(0.0784)	(0.0825)		

** Indicates significance at the 1 percent level.

* Indicates significance at the 5 percent level.

percentage of transactions executed on the NYSE and Chicago Stock Exchange (CHX) falls by 3.03 percent and by 21.2 percent, respectively. Additionally, the NYSE's share of transactions falls for 231 of the 327 securities in the sample.

III. Results

Table I reports the average time-weighted bid-ask spread for the securities in the sample before and after Madoff's entry. The average time-weighted bid-ask spread tightens for a significant 61.67 percent of the securities in the sample following Madoff's entry. Across all firms, the average time-weighted

Table II

The Effect of Madoff's Entry on Execution Location

The percentages in this table are computed as follows. The numerator is the total number of transactions for the securities in the sample in the 15-day window either before (PRE) or after (POST) Madoff's entry that were for the specified number of shares and were executed on the respective Intermarket Trading System (ITS) trading venue. The denominator is the total number of transactions for the securities in the sample in the 15-day window either before or after Madoff's entry that were for the specified number of shares and were executed on any of the ITS trading venues. The sample of securities consists of 327 New York Stock Exchange (NYSE)-listed securities in which Madoff began selectively purchasing and executing orders between January of 1988 and December of 1990. Only transactions occurring when the National Best Bid and Offer (NBBO), as recreated from the Institute for the Study of Security Markets (ISSM) database, was ⅜ or less are considered. The Third Market refers to the trading of NYSE-listed securities on the Over-The-Counter market. CSE is the Cincinnati Stock Exchange, CHX is the Chicago Stock Exchange, PSE is the Pacific Stock Exchange, PHLX is the Philadelphia Stock Exchange, and BSE is the Boston Stock Exchange.

ITS Trading Venue	Trade Size (in shares)					
	100–4900		5000+		All Sizes	
	PRE	POST	PRE	POST	PRE	POST
NYSE	63.64%	61.60%	7.21%	7.10%	70.85%	68.70%
Third market	1.48%	6.28%	0.13%	0.13%	1.61%	6.41%
CSE	0.15%	0.87%	0.01%	0.02%	0.16%	0.89%
CHX	11.37%	8.92%	0.35%	0.32%	11.72%	9.24%
PSE	9.57%	9.04%	0.11%	0.10%	9.68%	9.14%
PHLX	3.04%	2.84%	0.08%	0.09%	3.12%	2.93%
BSE	2.76%	2.61%	0.10%	0.08%	2.86%	2.69%
All	92.01%	92.16%	7.99%	7.84%	100.00%	100.00%

bid-ask spread tightens by a significant $0.0047.[12] This tightening amounts to an average reduction in trading costs of $2.35 (assuming symmetry) on a purchase of 1000 shares at the best ask for these securities. In addition, there would be a $10 savings on the order if it was sold to Madoff and the proceeds from this sale were passed on to the trader who placed the order. Together, the results suggest that Madoff predominately uses a cost advantage to selectively purchase and execute orders.[13]

There may be some concern whether the tightening of the average time-weighted bid-ask spread associated with Madoff's entry to the market simply reflects a general tightening of bid-ask spreads over the sample period. One way to address this concern is to conduct similar tests on a control sample of

[12] Using methodology introduced by Madhavan, Richardson, and Roomans (1994), the adverse selection component of the bid-ask spread is estimated for each of the securities in the sample before and after Madoff enters the market for orders in those securities. The nonparametric sign test reveals there is not a significant change in the estimated adverse selection component.

[13] Harris (1994) notes the one-eighth spread may be above a competitive level for lower priced stocks, and that payment for order flow is one way to lower the effective spread. Hence, discrete pricing may be the source of this cost advantage. The median price for the securities in the sample is $27.00.

NYSE-listed securities in which Madoff does not purchase and selectively execute orders. However, since Madoff purchases orders in the most active NYSE-listed securities, this procedure would produce a control sample of securities that are traded less frequently and have wider absolute bid-ask spreads than the securities in the sample. To avoid this problem, a control sample is constructed by assigning a nonevent date to each security in the sample. The nonevent dates are randomly assigned subject to the constraint that the 60-day period surrounding the true event and the 60-day period surrounding the nonevent do not overlap. There is no significant difference in the time-weighted bid-ask spread before and after these nonevents (results not shown). Thus, a general decrease in quoted bid-ask spreads over the sample period does not appear responsible for the tightening of the average time-weighted bid-ask spread across the event dates.

The average liquidity premia, conditional on the contemporaneous bid-ask spread, before and after Madoff's entry to the market are listed in Table I. Across all firms, the average liquidity premium is not significantly affected by Madoff's presence in the market. However, the average liquidity premium for orders executed in one-eighth markets (i.e., orders executed when the contemporaneous bid-ask spread is one-eighth) decreases for a significant 59.94 percent of the securities in the sample following Madoff's entry.

Comparisons of liquidity premia computed for third market and NYSE executions after Madoff's entry suggest that the NYSE provides executions that are significantly closer to the midpoint of the contemporaneous NBBO. As evidenced in Table III, once Madoff enters the market, the liquidity premia for orders executed in two-eighth markets are, on average, two cents lower for orders executed on the NYSE than for those executed in the third market. This suggests that when Madoff is in the market, traders generally pay lower liquidity premia when their orders are directed to the NYSE rather than to the third market. However, this does not imply that traders who avoid Madoff incur lower trading costs, since Madoff pays a penny per share for orders and since not all orders executed in the third market are executed by Madoff. For example, assume that third market executions are representative of Madoff's executions and that traders whose orders are sent to Madoff rather than to the NYSE are not charged lower brokerage fees. Under these assumptions, the results suggest that traders incur lower trading costs when their orders are routed to the NYSE rather than to Madoff for execution. However, if instead it is assumed that 10 percent (40 percent) of the payments made by Madoff for orders are passed on to traders whose orders are sold to Madoff and executed in one-eighth markets, Madoff offers execution costs that are indistinguishable from (lower than) those offered on the NYSE. Similarly, the cost of having an order executed by Madoff in two-eighth markets is statistically indistinguishable from the cost of having it executed on the NYSE under the assumption that 20 percent of the payments made by Madoff for orders are passed on to traders.

Table III

Liquidity Premium for Orders in NYSE-Listed Securities Executed on the NYSE and in the Third Market After Madoff's Entry into the Market

The relevant statistics are measured for the securities in the sample using data collected for 15 consecutive trading days that begin on the sixteenth trading day following the day on which Madoff posts either a bid or an ask for that security in the Institute for the Study of Security Markets (ISSM) database. The Liquidity Premium is the absolute difference between the trade price and the midpoint of the contemporaneous inside bid-ask spread. All executions occurring when the inside spread is ⅛ are said to have occurred in a ⅛ market. Daily Trans. represents the average number of transactions per day for one of the New York Stock Exchange (NYSE)-listed securities comprising the sample at the specified market center. The Third Market refers to the trading of NYSE-listed securities on the Over-The-Counter market. Only those transactions occurring on the NYSE (Third Market) are considered when computing the statistics under the NYSE (Third Market) heading. Only securities that had five or more transactions on both the NYSE and in the Third Market before and after Madoff entered the market are included in this analysis. This leaves 214 events for the ⅛ markets comparison and 92 events for the ⅜ markets comparison. The results in both ⅛ and ⅜ markets are stronger when the trading activity constraint is increased. The parametric difference in means test (See Morrison (1976), p. 24), and the nonparametric sign test are used. Both tests are two-tailed.

		After Madoff		Difference in Means	Proportion of Events with Larger Liquidity
		NYSE	Third Market	Statistic	Premium on NYSE
Liquidity premium in ⅛ markets	Average (Daily Trans.)	\$0.0705 (1,071)	\$0.0708 (116)	0.925	21.43%**
Liquidity premium in ⅜ markets		\$0.0697 (376)	\$0.0891 (35)	−12.87**	8.79%**

** Indicates significance at the 1 percent level.

IV. Conclusion

This analysis examines whether the recent increase in the number of agents competing to execute orders in NYSE-listed securities has affected the cost of trading those securities in ways that would be predicted by standard economic theory. Perversely, because these agents can selectively execute orders, trading costs may have actually increased from this increased competition. This article examines the effect that one "new" competitor, Madoff, has on trading costs when it begins to selectively purchase and execute orders in NYSE-listed securities. Tests reveal the time-weighted bid-ask spread tightens and execution costs as measured by the liquidity premium do not worsen when Madoff enters the market. The results are consistent with assertions that Madoff predominately uses a cost advantage to selectively purchase and execute orders.

Once Madoff enters the market, orders sent to the NYSE for execution typically pay lower liquidity premia than similar orders sent to the third market for execution. However, since Madoff pays brokers for orders and since not every order executed in the third market is executed by Madoff, these

results do not imply that traders who have their orders executed by Madoff incur higher trading costs than those who have their orders executed at other trading venues, such as the NYSE. For example, if it is assumed that third market executions represent Madoff executions and that brokers pass on to traders 40 percent or more of the payments made by Madoff, traders whose orders are sent to Madoff for execution in one-eighth markets incur the lowest trading costs.

The results of this analysis suggest that the potential adverse selection problem associated with allowing agents to selectively execute orders may be economically insignificant. This conclusion, however, is predicated on the assumption that Madoff is a typical broker-dealer. As noted in the introduction, there are reasons to believe that this is not necessarily true. While Madoff purchases orders from brokers, other broker-dealers receive orders directly from the public. These agents may have access to better information than Madoff, and thus, may be more likely to use an informational advantage to selectively execute orders.

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