

**Automation in U.S. and
Foreign Securities Markets**

**A Report by the
Division of Market Regulation
of the
U.S. Securities and Exchange Commission**

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AUTOMATION IN U.S. AND FOREIGN
SECURITIES MARKETS 1/

I. INTRODUCTION

Automation of securities markets, both nationally and internationally, has been occurring at a rapid pace. This growth in automation has resulted from, among other things, increased trading volume, technological advances in the areas of computer science and communication services, and cost savings flowing from automation. This paper will focus on automation in the area of order processing. 2/ Specifically, market places have replaced manually intensive order routing and execution procedures with automated systems for the electronic routing and execution of orders.

The automation of the execution of small orders, by providing computer generated trades at displayed bid and offer quotations, has provided customers with speedier executions and greater assurances as to the firmness of displayed quotations but also has deprived customers of the opportunity of obtaining a superior execution at a price in between displayed quotations. 3/ Some markets' automated systems, however,

1/ Thomas R. Gira, who is the Branch Chief of the Options Branch in the Division of Market Regulation, contributed substantially to this report.

2/ Automated systems also have been developed for, among other things, the dissemination of quotation and last sale information, market surveillance, and the clearance, settlement and payment of securities transactions. Because this paper does not include automated information dissemination systems, the National Association of Securities Dealers Automated Quotation ("NASDAQ") system is not separately discussed. The automated trading systems operated by the National Association of Securities Dealers ("NASD") are described.

3/ While such opportunities are at best limited on regional exchanges, as much as 35% of trades on the New York Stock Exchange ("NYSE") occur between the bid and offer when the
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The paper is organized as follows: Section two describes automated routing and execution systems in U.S. securities markets. 6/ Automated systems for the routing and execution of orders are discussed first followed by a description of systems for trading baskets of stocks. 7/ Section two concludes with a description of fully automated trading systems operating in the U.S. Section three describes automated trading systems functioning in the major foreign markets. Specifically, the section describes systems operating on the Tokyo, Toronto, and International Stock Exchanges.

II. AUTOMATION IN U.S. SECURITIES MARKETS

A. ORDER ROUTING AND SMALL ORDER EXECUTION SYSTEMS

Automated order routing systems permit member firms to route market and limit orders directly from their offices to specialist posts, thereby bypassing the member firm's trading desk and floor broker. 8/ Where automated execution is not

5/(...continued)

volume and 70% of transaction volume on the regional exchanges is accounted for by small order automated execution systems. The approximately two percent of NYSE transaction and share volume effected in the over-the-counter ("OTC") market is largely automated. See R. Stern, "Living off the Spread," Forbes, July 10, 1989, at 66-67. Thus, non-automated executions account for about 93% of total share volume and 78% of total transaction volume in NYSE-listed stocks. In Japan, about 75% of all Tokyo Stock Exchange share volume occurs in the 150 stocks not traded in CORES, that is, in an environment that provides for automated order routing but not automated order execution. In the U.K., automated executions are available only for small orders. Similarly, in Toronto, about 80% of total Toronto Stock Exchange share volume occurs in non-CATS stocks, that is, in an environment with automated order routing but no automated order execution.

6/ Only markets within the jurisdiction of the Securities and Exchange Commission are discussed in this section.

7/ Automation of block trading is not separately discussed because automated systems, apart from order-dissemination systems such as Autex, have not been separately developed for block trading.

8/ A market order is an order to buy or sell a stated amount of a security at the prevailing best bid or offer. A

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1. AUTOMATED ORDER ROUTING

i. New York Stock Exchange ("NYSE")

- a. March 1976: Designated Order Turnaround System ("DOT" or "SuperDot") 11/

SuperDot 12/ is the NYSE's network of electronic order processing and post-trade systems. SuperDot essentially provides a communications link between a member firm's trading operations and the NYSE floor, enabling member firms to send market orders and limit orders directly to the appropriate specialist location on the trading floor where each order will be exposed and executed in the agency auction market. Specialists use SuperDot to return the execution reports to the member firm and to simultaneously submit executed trades to the comparison process on a locked-in basis. SuperDot can also be used to route orders electronically to member firms' booths on the NYSE trading floor or to send orders in NYSE options to the NYSE options trading floor.

For stocks, SuperDot accepts preopening market orders of up to 30,099 shares, post-opening market orders of up to 30,099 shares, and post-opening limit orders of up to 99,999 shares. Post-opening market and marketable limit orders of 2,099 shares or less that are not on an Electronic Display Book ("EDB") are guaranteed an execution within 3 minutes. Stocks on an EDB generally receive faster executions. Currently,

11/ For many of the systems described in this paper, the current capacities (e.g., order eligibility size) are much larger than they were when they first began operating. For example, even though SuperDot currently can route market orders of up to 30,099 shares, originally its order eligibility size was only 100 shares. See also The October 1987 Market Break, A Report by the Division of Market Regulation (Feb. 1988) ch. 7 at 7-40 and ch. 9 for a further description of these systems.

12/ The term DOT is actually obsolete; the system was renamed SuperDot in 1984. Any references in this paper to DOT are for historical purposes and refer to pre-1984 developments.

d. August 1983: Request Status Reporting Procedure

Addition of a default mode to DOT under which orders not executed within three minutes after reaching the floor are automatically executed based on the last NYSE sale just prior to the order being delivered to the floor by the system. In 1985, the reference price was changed from the previous last sale price to the NYSE quotation at the time the DOT order is received on the floor.

The automatic execution feature, however, does not apply to stocks trading with an EDB, because stocks on EDBs generally receive execution in less than 3 minutes. While guaranteed three-minute executions used to be the principal feature of the system specific to small orders, this is no longer the case because so many stocks are now on EDBs. The principal SuperDot features specific to small orders (2,099 shares) now are: (1) no floor-brokerage is charged; and (2) the specialist assumes responsibility for reporting errors of up to 1/2 point.

e. September 1985: List Processing

The List Order Processing (LIST) enhancement to SuperDot was developed by the NYSE and is one method of access to the SuperDot system. LIST enables users to easily create, maintain and route up to 200 lists of up to 500 market orders (members can enter orders to buy or sell up to 2,099 shares of 500 different stocks) each on a personal computer interface to SuperDot. Member firms can modify the composition of their "basket" on an intra-day basis.

f. September 1984: Options Order Routing

Application of SuperDot to three index options traded on the NYSE. Since February 1985, the NYSE also has used SuperDot to route orders in equity options.

g. December 1987: Odd-Lot Processing

Enhancement of LMT system to permit the automatic execution of standard odd-lot orders (1-99 shares). Odd-lot orders can be easily

the applicable specialist post. About 13% of Amex's contract volume is routed through AMOS.

- c. May 1981: Opening Automated Report Service ("OARS")

Enhancement to the PER system to facilitate more efficient and accurate processing of orders at the opening. The system is identical to the NYSE's OARS system implemented in March 1980.

- d. August 1981: Application of OARS to Amex options

- e. May 1983: AUTOPER

Enhancement to the PER system that enables equity specialists to execute orders routed through PER by using a touch screen terminal.

- f. November 1983: AUTOAMOS

Enhancement to the AMOS system that enables options specialists to execute options orders routed through AMOS by using touch screen terminals. 15/

- g. July 1984: AUTOPER ODD-LOT

Application of the AUTOPER system to odd-lots. The system accumulates odd-lot orders for each security and routes these clusters of orders to the specialist's AUTOPER screen when a last sale price is established for a security.

- h. January 1989: Odd-Lot Processing and Partial Round Lots

Execution of odd-lot market orders at prevailing Amex quote, without a differential, and partial round lots at the same price as round lots, without a differential.

15/ The Amex also has an automated small order execution system for options. See infra, Section 2.vi.

2. AUTOMATED ORDER EXECUTION

i. Midwest Stock Exchange ("MSE")

a. August 1981: MSE Automated Execution System ("MAX")

MAX routes market and marketable limit orders of up to 1,099 shares to specialist posts, and guarantees execution of orders up to 1,099 shares at the best ITS bid or offer. About 70% of MSE's transaction volume and 30% of MSE's share volume is transacted through MAX. 17/ An order entered into MAX is displayed on a video terminal at the specialist post for 15 seconds to permit the specialist to improve upon the best ITS price. If the specialist does not intervene within the 15-second window, the order is automatically executed against the specialist at the best ITS price at the time the order was received by the system. Limit orders can also be routed through MAX and receive an execution once the limit price is equalled or penetrated on the MSE or on the primary market.

ii. Pacific Stock Exchange ("PSE")

a. 1969: PSE Securities Communication Order Routing and Execution System ("SCOREX")

SCOREX was the first automated execution system implemented on a U.S. stock exchange. SCOREX processes approximately 63% of PSE transaction volume. 18/ SCOREX automatically executes customer agency orders of up to 1,099 shares at the best ITS bid or offer in a manner identical to MAX. SCOREX also processes and executes limit orders. Like the MSE's MAX system, SCOREX provides each order a 15-second order exposure time in which the specialist can execute the order at a price better than the best ITS bid or ask.

17/ In 1988, the MSE accounted for 5.56% of total share volume and 9.74% of total transaction volume (as measured by trades reported to the consolidated tape) in NYSE-listed stocks.

18/ In 1988, the PSE accounted for 2.81% of total share volume and 8.44% of total transaction volume (as measured by trades reported to the consolidated tape) in NYSE-listed stocks.

iv. Boston Stock Exchange ("BSE")

- a. March 1987: BSE Automated Communications and Order-Routing Network ("BEACON")

BEACON is a fully automated communication, order-routing and execution system. BEACON automatically executes all agency market and marketable limit orders of up to 1,299 shares in stocks traded over the ITS system. 21/

Incoming market orders are automatically traded with the specialist's electronic book if limits are represented at the best quote. If not, the execution automatically defaults to the specialist for his own account. As with the MSE's MAX and the PSE's SCOREX systems, BEACON exposes each order to the specialist for 15 seconds so that the specialist has an opportunity to execute the order at a price better than the best ITS bid or offer.

The BSE is currently pursuing expansion of its link with the Montreal Stock Exchange through a computer-to-computer interface.

v. Chicago Board Options Exchange

- a. February 1985: Retail Automatic Execution System ("RAES")

Since February 1985, RAES has been used to execute automatically public customer market and marketable limit orders of ten or fewer contracts in options on the Standard and Poor's 100 Index ("OEX"). In May 1989, 9.1% of executed retail equity options orders and 26.7% of executed retail index options orders were executed through RAES. Once orders are routed to RAES, they are executed against participating market makers in the CBOE trading crowd on a rotating basis at the best bid or offer quoted on the CBOE floor at the time of the order's entry into RAES. In August 1986, RAES was extended to six classes of individual equity options. In August 1988, RAES was approved for

21/ For the first 10 months of fiscal 1989, the BSE accounted for 1.52% of total share volume and 2.86% of total transaction volume (as measured by trades reported to the consolidated tape) in NYSE-listed stocks.

vii. National Association of Securities Dealers ("NASD")a. January 1985: Small Order Execution System ("SOES") 22/

SOES provides automatic executions for retail customer orders of certain sizes at the best available NASDAQ quotation. From January to May, 1989, SOES accounted for 1.4% of the total NASDAQ/NMS share volume and 9.2% of total NASDAQ/NMS transaction volume. 23/ There currently are three order-size limits for SOES: 1,000, 500, and 250 shares. These limits vary according to the stocks' average daily non-block volume, bid price, and number of market makers. SOES orders are executed against NASDAQ market-makers on a rotating basis. Of 2,731 NMS securities, 1,992 are 1,000 share markets. In February 1989, the NASD began operating on a pilot basis a centralized limit order file to SOES. This file stores all limit orders that are not immediately executable in SOES, and then executes them automatically if the best NASDAQ bid or offer for the stock equals the limit price. All SOES-executed trades are "locked-in" and delivered to the National Securities Clearing Corporation ("NSCC").

22/ The first automated execution system developed by the NASD was the Computer Assisted Execution System ("CAES"), which became fully operational in 1983 principally to facilitate the link between the OTC market for listed securities and ITS. CAES, which also can be used to trade non-listed National Market System ("NMS") securities, allows firms to route market or limit orders to specific market makers quoting the best bid or offer. Market orders are executed automatically and locked in at the best bid or offer, and limit orders are printed and stored as day limit orders. ITS commitments are routed to the ITS processor for distribution to the destination market. CAES has not been used greatly, either to route ITS orders to other markets or to execute OTC orders.

23/ NASDAQ/NMS stocks are the largest, most actively traded NASDAQ companies. The relatively low percentage of automatic executions received through SOES, in comparison to other self-regulatory organizations' ("SRO") automatic order execution systems, reflects the large number of OTC trades that are internalized by broker-dealers and the small size limits for SOES.

the automatic execution of public agency market and marketable limit orders of up to 2,099 shares at the best ITS bid or offer. The designated dealer must also guarantee executions of public agency limit orders when the limit order price is penetrated by a transaction on another ITS market. In 1988, the CSE accounted for 0.53% of total share volume and 0.35% of total transaction volume in NYSE-listed stocks.

2. Instinet

In 1969, Instinet Corporation ("Instinet"), a registered broker-dealer, commenced operation of a proprietary communications network that allows institutions and broker-dealers, including exchange specialists, to execute trades with one another electronically. 24/ Since its introduction in 1969, the Instinet system has grown and has developed more elaborate automated execution functions. 25/ Currently, the Instinet system permits customers anonymously to enter orders and receive execution reports, to negotiate trades with other users, and to route orders to other participants in over 9,000 exchange-listed and OTC-traded securities. In 1988, Instinet accounted for 2.84% of total share volume in NASDAQ and exchange-listed NMS securities.

There are three types of orders in the Instinet system: (1) market; (2) last sale; and (3) customer-specified. Participants can specify the length of time their orders are to be displayed. Market orders are priced automatically by the system at the consolidated best bid or offer for the security at the time the order is entered into the system. 26/

24/ See letter from Richard G. Ketchum, Director, Division of Market Regulation, SEC, to Daniel T. Brooks, Esq., Cadwalader, Wickersham & Taft, counsel for Instinet, dated August 8, 1986.

25/ As of June 30, 1989, the Instinet system consisted of approximately 913 terminals located in North America (236 at institutions, 499 at broker-dealers, and 178 at exchange specialists) and 128 terminals located outside of North America. In sum, more than 150 financial institutions and over 200 broker-dealers, market makers and specialists are connected through the system.

26/ The Instinet system has a dynamic market information database that prices orders entered into the system. It
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stocks. 27/ The data is disseminated in U.K. pounds sterling. Trades are handled by Instinet U.K. Ltd. Trading in these issues is generally effected in the same manner as other issues handled in the Instinet System.

By informal agreement with a London market maker, Instinet is able to show substantial sizes for so-called "guaranteed execution" 28/ in some 640 Alpha and Beta stocks for which TOPIC publishes inside markets similar to those published in NASDAQ. At the top of the Instinet book for that equity, bid and offer sizes are displayed. No price is indicated for either because it is understood that any trades with the U.K. market maker will be at the inside London market as displayed in the Quote Montage and obtained from TOPIC. Eligible orders are routed directly to that market maker. Before routing for guaranteed execution, orders are matched against orders in the Instinet Book. Trade reporting, confirmations and clearing are handled from the U.K. in a normal manner.

Trades are done in London in pounds sterling through Instinet U.K. Ltd., a broker registered in the U.K. For a U.S. customer to be eligible to trade such issues, the customer must have designated an appropriate agent bank and otherwise made appropriate U.K., pound sterling denominated, trading and clearing arrangements. There are only a dozen or so such U.S. customers at this time.

C. BASKET TRADING SYSTEMS

In 1985, the NYSE developed a means to route basket trades automatically to its specialists. 29/ Executions are effected stock-by-stock in a non-automated, non-coordinated fashion. Private, non-exchange systems have been developed that provide for the electronic entry and

27/ The ISE's alpha, beta, and gamma classifications are explained below in Section III.C.

28/ The System previously provided a U.S. equity service known as the "guaranteed execution service." It was discontinued at the request of market makers during the Market Break in October 1987, and has not been reinstated. Instinet has from time to time discussed plans for reinstating some variant of the service.

29/ See supra, Section II.A.1.i.e.

in the system. The "residual" portion is that part of the order that cannot be matched within the parameters established by the investor. The investor may specify a minimum percentage of its order that must be matched, and how the residual is to be handled (e.g., cancelled, retained for future matching, or executed on an exchange or against Jefco). Fourth, the investor specifies how much information about its order may be revealed to the various participants in POSIT. The system allows for selective disclosure in that orders can be revealed to certain investors and suppressed for others. Fifth, POSIT matches orders entered into the system. Once matched, a Jefco registered representative decides whether the trade should be executed as matched by the computer, or whether to contact the customers with any questions or suggested modifications to the trade.

2. Instinet

As described above, Instinet is a registered broker-dealer that operates a proprietary trading system limited to institutional customers and broker-dealers. In May 1987, Instinet added a new service, the Crossing Network. The Crossing Network, which is very similar to the POSIT system and only operates after the NYSE close, provides for the automated entry of orders and for the automated matching and execution of such orders against orders entered into the system on the other side of the market, to the extent they exist. As in POSIT, pricing is based upon primary market, i.e., usually NYSE, prices. If after pairing off buy and sell orders there are unmatched orders, the system advises the customer of the unmatched orders. Instinet, if instructed by the customer, will send these orders to an exchange for execution or execute the residual against Instinet as principal. Participants in the system enter orders via PCs driven by Instinet software and a dial-up modem.

3. New York Stock Exchange

The NYSE uses a new electronic trading system to accommodate the trading of Exchange Stock Portfolios ("ESPs"). ^{32/} In essence, the system involves a

^{32/} ESPs exist in addition to member firms' LIST processing and other basket trading systems.

representing a size market for three baskets at some parameter at or away from the Tier 1 quote.

The priority rules for ESP transactions will be different from other NYSE securities transactions in that they will employ strict time and price priority.

As in other securities, the highest bid and lowest offer will have priority in all cases. The priority of orders at the same price, however, is determined not by the time of representation but by entry into the display unit. Therefore, an order entered into the display unit would have priority over another order at the same price that was represented earlier in the crowd. Agency crosses may be effected between displayed quotations without exposure to the market. Principal/agency crosses (facilitation orders) may be effected at one tick (.01 index points) above (below) the best bid or offer without exposure to the market. "Walking the book" is permitted. 34/

Once orders are represented, either through placement in the display book or representation in the crowd, execution is accomplished by the BBD matching the best bid and offer. 35/

34/ Under normal NYSE auction procedures, a block that is to be effected outside the NYSE bid/ask price is effected at one clean-up price, and orders on the book above (below) that price receive that price. See NYSE Rule 127. In contrast, "walking the book" permits executions to occur at successive price intervals up to (or down from) the price at which the order is filled. For example, if there is one basket bid on the book at 337.01, one basket at 337.00, and two at 336.99, an order to sell four baskets could sell one to the order at 337.01, one to the order at 337.00, and one to the order at 336.99.

35/ Once the basket trade is executed through the system, the basket is "burst" into positions in each of the component stocks in the clearing process. Therefore, while the trade is in a basket, the resulting ownership is in individual stock positions. "Bursting" permits, among other things, post-trade customization by allowing investors to take only some of the individual stock positions into their accounts.

III. AUTOMATION IN FOREIGN EQUITY MARKETS 37/

A. TORONTO STOCK EXCHANGE: COMPUTER ASSISTED TRADING SYSTEM

In 1977 the Toronto Stock Exchange ("TSE") introduced its automated execution system, called the Computer Assisted Trading System ("CATS"). As of 1989, 840 of the approximately 1700 TSE listed stocks are traded in CATS. 38/ Stocks traded in CATS trade exclusively in the system; they do not also trade on the TSE physical floor and trading outside the system is not permitted. 39/ Since its introduction in 1977, CATS consistently has accounted for about 20% of total TSE share volume and 18% of TSE Canadian dollar volume.

CATS is an order-driven, fully automated trade matching system. Although each CATS stock has an assigned "registered trader" that has certain affirmative trading and quotation obligations, according to the TSE, registered traders for CATS stocks play a substantially

37/ This section deals with equity trading systems. The notable automation developments in foreign derivative markets (e.g., SOFFEX, LIFFE, and IFOX) will be discussed in a separate paper. As mentioned below, CORES is used for Tokyo Stock Exchange futures products.

38/ The TSE has automated order routing systems for non-CATS stocks similar to the NYSE's DOT system and CATS terminals can be linked to these systems. Thus, CATS can be used to route orders in non-CATS stocks electronically to the TSE physical floor. Moreover, in August 1989, the TSE approved substantial automation improvements to the market for non-CATS stocks (modified floor and CATS rules). See Toronto Stock Exchange Notice to Members No. 89-232 (August 17, 1989). The modified floor rules are designed to, among other things, increase the visibility of the floor market to members and to improve information flow to the public. Members will see committed order price and size and brokers' numbers, as well as more information relating to pre-opening orders.

39/ An Exchange Committee determines whether a new listing will be traded on the physical floor or in CATS based upon the characteristics of the stock such as float and institutional holdings as well as the registered traders who apply to trade the stock. Some registered traders trade only in CATS. Of the 42 TSE registered traders, 34 trade only in CATS and eight trade both on the TSE physical floor and in CATS.

CATS also has a feature permitting the automated execution of "trade along" orders. ^{41/} For example, a firm with a 25,000 share customer order can enter the order into the system as a "pop-up" order, the first 5,000 shares of which are displayed at the best bid or offer and the remaining 20,000 shares of which are undisclosed. When the 5,000 displayed shares are executed, the next 5,000 shares "pop-up" and are displayed at the best bid or offer. The process continues until the order is completed or cancelled. The TSE represents that, because quotes identify the entering member firm, it is possible to watch the system and see whether a particular firm has a "pop-up" order working. Firms recognizing this often call the "pop-up" entry firm and negotiate an execution of the unexecuted portion of the order. Two percent of CATS volume is effected through "pop-up" orders.

Openings are generally automated, ^{42/} with the system collecting pre-opening limit and market orders starting at 7:00 a.m., local time, dynamically calculating the opening price at which the most stock will be executed, disseminating to member firms these calculations, and then, at 9:30, effecting the opening trade.

CATS has been licensed to the Paris Stock Exchange, where all but the 15 most-active listed stocks now trade in the system. CATS also has been licensed to exchanges in Belgium and Spain.

B. TOKYO STOCK EXCHANGE: COMPUTER ASSISTED ORDER ROUTING AND EXECUTION SYSTEM

In 1982 the Tokyo Stock Exchange ("TKE") introduced the "Computer-Assisted Order Routing and Execution System" ("CORES"). CORES includes about 90% of the domestic stocks listed on the TKE, all foreign stocks listed on the

^{41/} These orders are similar to percentage orders on the NYSE and the Amex. See NYSE Rules 13 and 123A.30 and Amex Rule 131(n).

^{42/} Under the modified rules adopted in 1989, see supra note 37, a registered trader is now able to manually override the system-calculated opening price where this is necessary to the performance of its obligation to maintain orderly trading.

their own account and may not receive orders from any investors. There are no market makers in the system. 49/

All trades in CORES stocks must be executed through the system. Orders entered into the system are executed on the basis of strict price and time priority. There is no size precedence or public customer preference in the system. Limit orders are arranged by the system in accordance with these priorities, in other words, the highest bid and lowest offers are listed first and bids or offers at the same price are listed by the time of entry. Unlike CATS, CORES does not display the identity of the member firm entering particular orders. The contents of the limit order book are disseminated to member firms' offices. While real-time price information is made available to vendors, 50/ the "quotations" contained in the CORES limit order book are made available only to member firms 51/ and are not made available to vendors. Member firms may communicate this information to customers either in person or by telephone.

Openings and re-openings in CORES are fully automated. The system receives pre-opening orders, calculates the opening price at which the most stock can be executed, executes the orders and generates the trade reports to the order entry firms and to vendors. CORES, like CATS, collects and disseminates to member firms pre-opening orders, starting about 40 minutes before the openings. If an opening cannot be accomplished within the TKE's daily and transactional price limits, the satoro disseminates

48/ (...continued)

disclose at the request of floor members the contents of the limit order books. Thus, the role of the satoro is not fundamentally different for the 150 non-CORES stocks; indeed CORES was designed to automate rather than change the essential nature of the satoro system.

49/ Because CORES does not have registered traders, the system is unable to provide system-wide small order guarantees.

50/ These price reports are available through interrogation devices; there are no running "slow" tickers in Japan as there are in the U.S. According to one source, for the 150 non-CORES stocks there are too many transactions to make a ticker useful, while for the CORES stocks there are too few.

51/ The limit order display is available only on the CORES terminal located in the member firms' central office, and branch offices can obtain this information only by telephone.

over the telephone. SEAQ operates from 7:30 a.m. to 6:00 p.m., London time. 54/

ISE stocks are divided into three categories -- alpha, beta, and gamma -- depending on their trading volume, market capitalization, and number of market makers. 55/ This categorization scheme dictates the type of information required to be disseminated over SEAQ. 56/ All quotations for alpha and beta stocks are firm to other ISE members, except other market makers. 57/ The minimum quotation size is 5,000 shares for alpha stocks, and 1,000 shares for beta stocks. Quotations for gamma stocks of 1,000 shares or less may be either firm or indicative, but quotations for more than 1,000 shares are automatically firm. For each alpha, beta, and gamma stock, SEAQ disseminates the best bid and offer ("touch" price) and a montage of all dealer quotes showing the sizes of these quotes.

Trade prices for all trades in SEAQ securities are reported to the ISE. Trades in alpha and beta stocks must be reported within three minutes of execution, and trades in gamma stocks must be reported within one hour of

54/ Market makers are obligated to maintain quotations from 9:00 a.m. to 5:00 p.m.

55/ ISE securities that are very lightly traded are classified as "delta" securities. For delta securities, market makers may post indicative (non-firm) bid or ask quotations.

56/ In May 1989, the Council of the ISE issued a Consultative Document prepared by the Domestic Equity Market Committee ("Special Committee") titled "Review of the Central Market in U.K. Equities" ("Consultative Document"). The Special Committee recommended, among other things, that the alpha, beta, and gamma categories be replaced with a more flexible, stock-by-stock categorization.

57/ SEAQ alpha and beta quotations were firm even to other market makers until January 1989, when the ISE, acting in response to complaints by some ISE market makers, changed this requirement. See "Stock Exchange amends rules to cure Big Bang 'Weakness'," Financial Times, January 11, 1989, p.8. In May 1989, the ISE Special Committee recommended that consideration should be given to reintroducing the obligation of market makers to deal with one another at the prices and sizes they are displaying on SEAQ once certain other changes, such as changing the required size of displayed quotations, are in place.

market makers in SAEF-eligible securities must participate in SAEF, one option allowed is to accept SAEF executions only when quoting the best bid or offer. Thus, market makers, except those quoting the best bid or offer, can effectively opt-out of SAEF executions.

61 / (...continued)

and Barclays de Zoete Wedd's TRADE system. The BEST and TRADE systems provide for the automatic execution of orders of up to 5,000 shares at the best SEAQ quote. One of the recommendations of the Special Committee was that SAEF be linked with these systems in order to provide customers with executions at the best quotations available in all three systems. See Consultative Document, supra note 55.