

solely on aggregate trading volume reported on [options] exchanges" when determining the market "to which to route their customers' orders." 81/ To provide better volume data for use in the future as a measure of "the relative quality of markets," the Commission "arrange[d] for publication of reports obtained from exchanges trading options regarding proprietary options transactions by floor members." 82/ The Commission did not, however, specifically address the general question of "whether * * * dual trading of options is in the public interest at this time." 83/

Since the inception of multiple trading of standardized options, 22 classes of call options have been traded on more than one exchange. At present, however, only 15 classes are multiply traded. Table 1 identifies each of the call option classes that have been multiply traded. The table also indicates the date that trading began on each exchange and, where applicable, the date that the class was delisted on any exchange. It should be noted that no multiple trading of put classes has yet occurred.

81/ Id.

82/ Id. See also Securities Exchange Act Release No. 13448 (April 15, 1977) 12 SEC Docket 18 (May 3, 1977) and No. 13476 (April 27, 1977), 12 SEC Docket 190 (May 10, 1977).

83/ Securities Exchange Act Release No. 13325, supra, n.73 at 1886.

The NYSE and NASD Plans contemplated an expansion of the multiple trading of standardized options. 84/ As NYSE has stated:

With specific reference to the NYSE Options Trading Plan presented to the Commission in June, 1977, * * * the plan would permit listing and trading of standardized options on underlying securities that are traded on the NYSE, whether or not such standardized options are already listed and traded on other exchanges. In other words, the NYSE's plan endorses and promotes dual trading of standardized options * * * . 85/

Multiple trading, in NYSE's view, is mandated by the 1975 Amendments and should be permitted with respect to all option classes. Thus, NYSE has stated:

[T]he Securities Acts Amendments of 1975 * * *, embodying a clear legislative mandate for maximum competition among orders, among market centers and among market-makers, implicitly preclude the alternative of arbitrarily restricting trading in any security to any single market center. The powerful pro-competitive bias that permeates the 1975 Amendments offers no basis for insulating options trading from competition. Thus, dual trading should not only be permitted in some classes of options and among some market centers, as it is today, but it should be permitted in all classes of standardized options and among all market centers --

84/ The NASD Plan contemplated an expansion of multiple trading in standardized options to the over-the-counter markets. Analysis of such a proposal may require consideration of many of the factors discussed in this section. Additional factors that should be considered when evaluating proposals to expand multiple trading into the over-the-counter markets are discussed in Section V, infra.

85/ Letter to George A. Fitzsimmons, Secretary, Securities and Exchange Commission, from James E. Buck, Secretary, NYSE, dated September 22, 1978 at 5 ("NYSE Letter"). A copy of this letter is provided as Appendix Exhibit 1.

subject, of course, to appropriate regulations and surveillance. 86/

CBOE, on the other hand, has contended:

While we believe that there should be enhanced competition among exchanges in the trading of options and that, in a proper national market system framework, this may take the form of multiple trading, further expansion of multiple trading should not be permitted unless and until a national market system for options, and the resulting creation of a fair field of market competition, have been substantially achieved. In the absence of the latter, expanded multiple trading would inevitably result in (1) further undesirable fragmentation of the market, and, at times, disorderliness and confusion; (2) problems of best execution * * * and (3) a gradual decline in effective competition because of the absence of a fair field of competition. 87/

PHLX 88/ and PSE 89/ view the multiple trading question in generally the same light as CBOE. 90/

86/ Id., at 2.

87/ Letter to George A. Fitzsimmons, Secretary, Securities and Exchange Commission, from Joseph W. Sullivan, President, CBOE, dated September 22, 1978, at 1 ("CBOE Letter"). A copy of this letter is contained in Appendix Exhibit 2.

88/ Letter to George A. Fitzsimmons, Secretary, Securities and Exchange Commission, from Elkins Wetherill, President, PHLX, dated September 25, 1978, at 1-10 ("PHLX Letter"). A copy of this letter is contained in Appendix Exhibit 3.

89/ Letter to George A. Fitzsimmons, Secretary, Securities and Exchange Commission, from Charles J. Henry, President, PSE, dated September 22, 1978, at 5-7 ("PSE Letter"). A copy of this letter is contained in Appendix Exhibit 4.

90/ AMEX and MSE have not recently expressed views on the broad issue of whether multiple trading of standardized options is appropriate or should

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This section will discuss the factors that the Commission should consider when determining whether, and under what circumstances, multiple trading of standardized options should be permitted to expand. It will (i) discuss the effects that multiple trading may have had on the markets for standardized options that have been multiply traded, (ii) describe the fragmentation of the markets for standardized options that has resulted from multiple trading, and (iii) provide a framework within which proposals to expand multiple trading of standardized options may be evaluated.

A. The Effects of Multiple Trading of Standardized Options

In their responses to the Commission's request in March, 1977 for public comments concerning multiple trading, both CBOE and AMEX were of the view

(footnote continued)

be allowed to expand. AMEX has addressed the multiple trading question solely in the context of multiple trading involving NYSE and the options exchanges, and MSE has not indicated any views with respect to any of the issues presented in Securities Exchange Act Release No. 14854, *supra*, n.73. With regard to AMEX views on multiple trading involving NYSE, see Letter to George A. Fitzsimmons, Secretary, Securities and Exchange Commission, from Robert J. Birnbaum, President, AMEX, dated September 29, 1978, at 5 ("AMEX Letter"). A copy of this letter is included as Appendix Exhibit 5. NASD has expressed views with respect to multiple trading only insofar as exchange-listed options may be traded in the over-the-counter markets. See Letter to George A. Fitzsimmons, Secretary, Securities and Exchange Commission, from Gordon S. Macklin, President, NASD, dated September 22, 1978 at 6-7 ("NASD Letter"). A copy of this letter is included as Appendix Exhibit 6.

that multiple trading provided significant benefits to the investing public.

CBOE, for example, stated:

Experience in multiple trading in options to date has shown that, largely in response to forces of competition, markets have improved and costs have been reduced on the exchanges that have been engaged in this competition. Although these benefits are concentrated in the option classes that have been the subject of dual trading, in many cases they have also carried over to classes of options that are not dually traded. Market improvements are reflected in narrower bid/ask spreads, better price continuity between consecutive transactions and greater depth and liquidity. Cost savings have resulted from, among other things, reductions in charges by CBOE board brokers and AMEX specialists, and reductions in floor brokerage. 91/

Similarly, AMEX stated its belief "that dual trading can provide positive benefits to the public in terms of more effective markets, lower execution costs and improved services." 92/

In October, 1978, however, CBOE concluded that its statement that multiple trading had "improved" the markets "was not well-founded, both because (1) we did not sufficiently take into account other variables (apart from dual trading itself) that can affect comparisons of bid/ask

91/ Letter to Sheldon Rappaport, Division of Market Regulation, Securities and Exchange Commission, from Joseph W. Sullivan, President, CBOE, dated March 15, 1977, at 1-2.

92/ Statement of the American Stock Exchange, Inc. in response to Securities and Exchange Commission Release No. 13325 (March 17, 1977), at 2.

spreads and successive prices, and (2) later experience has shown that improvements in these respects in the first few months after the commencement of dual trading have not generally been sustained over longer periods of time." ^{93/} This section will examine the effects that multiple trading has had (i) on the quality of the markets for options that have been multiply traded, and (ii) in fostering competition among options exchanges.

1. The Effects of Multiple Trading on the Quality of Markets for Multiply Traded Option Classes

"Continuity" and "liquidity" are among "the most conspicuous ingredients" of orderly securities markets. ^{94/} These concepts are frequently used to evaluate the quality of these markets. A "continuous" market is one in which "a series of consecutive separate transactions, even though involving price changes, will involve minimum price variations or deviations." ^{95/} A "liquid" market is one in which "a willing seller can readily (or perhaps immediately) find a buyer, or vice versa, at a mutually agreeable price." ^{96/} "Depth," another term that is often used to describe and measure the quality

^{93/} Letter to Richard I. Weingarten, Special Counsel, Special Study of the Options Markets, from Joseph W. Sullivan, President, CBOE, dated October 11, 1978. A copy of this letter is provided in Appendix Exhibit 7.

^{94/} Special Study, *supra*, n.63, at 15.

^{95/} *Id.*, at 16 (footnote omitted).

^{96/} *Id.*

of a market, has been referred to as "the quantity of buying and selling interest and the potential activity on each side of the market." 97/

In an effort to evaluate the effects of multiple trading on option classes that were traded on more than one exchange, the Options Study obtained data from each of the options exchanges concerning the liquidity, continuity, and depth of the market for each multiply traded class for each week for the three months before and the three months after the initiation of multiple trading. 98/ More specifically, the Options Study sought to measure liquidity for each multiply traded class by gathering data concerning the average difference between the bid and ask price ("bid/ask spread") during the before and after period. Price continuity was tested by obtaining data regarding the average variation in price between transactions and the contract volume for each such class during the six month study period.

Table 2 compares price continuity data on the exchange that first listed an option class for the three months before and after the initiation of multiple trading. The table includes only those option classes that

97/ Id., at 17.

98/ See, e.g., Letter to Joseph W. Sullivan, President, CBOE, from Richard Weingarten, Special Counsel, Special Study of the Options Markets, dated July 10, 1978. A copy of this letter is contained as the last document in Appendix Exhibit 7.

CBOE and AMEX multiply trade. The data reveal that, after multiple trading began, price continuity improved significantly on the exchange that had initiated trading in the multiply traded class. In fact, the average variation in price between transactions on the exchange that initiated listing declined by approximately 20 per cent during the periods studied.

Similarly, bid/ask spreads improved on the exchange that had initiated trading in a multiply traded class after multiple trading began between CBOE and AMEX. Table 3, for example, contains data comparing the average bid/ask spread on CBOE or AMEX, depending upon which exchange commenced trading in an option class, for the three months before and after the initiation of trading on both exchanges. The data indicate that the average bid/ask spread improved on the exchange that listed the multiply traded class initially by approximately 34 per cent. In addition, Table 4 indicates that total contract volume was substantially larger during the three months following the initiation of multiple trading on CBOE and AMEX than it had been previously. This increase in total volume may have contributed to improvements in price continuity and bid/ask spreads on both exchanges, even though the volume of each exchange was generally less than the volume on the exchange that had traded the class prior to the initiation of multiple trading.

Tables 5 and 6 show similar patterns when multiple trading occurred between CBOE or AMEX and PHLX, PSE, or MSE. Price continuity improved

on the exchange that initially listed the option class by an average of 14.8 per cent, and bid/ask spreads improved by an average of 13.6 per cent.

Although these data indicate that the quality of the markets for standardized options generally improved after the initiation of multiple trading, they may not be sufficient to support broad conclusions with respect to the causal relationship, if any, between the improvement in market quality and multiple trading. CBOE, for example, recognized the role that factors other than multiple trading may have played during the study period and prepared an analysis of the impact of multiple trading on market quality during the three months before and after CBOE began to engage in multiple trading. ^{99/} With respect to the impact that other factors may have upon price continuity and bid/ask spread data, the CBOE Study stated:

A principal conclusion * * * which warrants emphasis at the outset is that changes in price continuity or bid/ask spreads on a given exchange between periods before and after dual listing can result from factors which have nothing to do with dual listing, such as changes in the price level of underlying stocks, changes in the mix of striking prices of outstanding option series and the occurrence of option expirations.

^{99/} See attachments to Letter to Richard I. Weingarten, Special Counsel, Special Study of the Options Markets, from Joseph W. Sullivan, President, CBOE, dated October 11, 1978, at 2 ("CBOE Study"). A copy of the CBOE Study is contained in Appendix Exhibit 7.

To illustrate how such factors may affect quality of markets measures in different time periods, a drop in the price of an underlying stock from one period to another would be expected, other things equal, to result in a decrease in the average price change from last trade or in the average bid/ask spread of an option class, as option prices decline in response to the decline in the price of the underlying stock. In addition, changes in the availability of option series with various striking prices may affect measures of quality of markets between two periods. For example, during one period, if an underlying stock trades in a narrow range of 61-64, with only 50 and 60 option series available, both series would be in-the-money. If during a second period, the stock trades in the slightly broader range of 61-65, the 70 series would be introduced. When quality of markets measures for the two periods are compared, the average price change from the last trade and average bid/ask spreads could both be lower in the second period simply because an out-of-the-money series had been available, as compared with only in-the-money series in the first period. Moreover, the occurrence of an option expiration can affect quality of market comparisons. For example, the erosion in time value of expiring series as expiration approaches may tend to reduce average price changes and bid/ask spreads in comparison with a period immediately after expiration, when expired series have been replaced with new nine month options which have a high time value. 100/

In view of these considerations, CBOE concluded with respect to the quality of its markets immediately before and after the initiation of multiple trading:

[W]hen factors which affect quality of markets measures independently of dual listing are considered, dual listing did not materially affect price continuity

100/ Id., at 3-4.

or size of bid/ask spreads on the exchange on which option classes had been exclusively listed * * *. 101/

While the Options Study does not disagree with the method of CBOE's analysis, a closer look at the quality of markets for DuPont de Nemours and Company ("DuPont") and Merrill Lynch Corporation ("Merrill Lynch") calls immediately before and after CBOE and AMEX initiated the multiple trading of these classes offers some additional insights. DuPont calls, for example, were traded exclusively on AMEX prior to the initiation of multiple trading. The CBOE Study did not consider this class in its analysis of classes initially listed on AMEX. 102/ Table 7A, however, contains price continuity data for DuPont options on AMEX for the three months prior to and following the initiation of multiple trading, and Table 7B contains, for comparison purposes, CBOE price continuity data after dual trading had begun. 103/ Table 7A also indicates high and low

101/ Id., at 7-8.

102/ The CBOE Study analyzed the quality of markets before and after the commencement of multiple trading for only two of the five classes that AMEX initially listed and that are multiply traded with CBOE. These classes, Disney Productions and Merrill Lynch, were selected "at random." See CBOE Study, *supra*, n.99, at 2-3, 12-19.

103/ While CBOE data are provided for the purposes of comparison, these data are at best only generally comparable because CBOE and AMEX derive price continuity data differently and bid/ask

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stock prices during each week of the study period, the weeks during which expirations occurred, and the series that were traded each week. Table 8A shows bid/ask spread data for Dupont options on AMEX

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data may reflect the different marketmaking systems of these exchanges. As AMEX has stated:

It is necessary to comment on the statistics on dual trading in options that are being issued by the CBOE since these statistics have been published without an explanation of some important differences in the reporting systems employed by each exchange, and may be used by firms in making important decisions on order flow.

Continuity

Liquidity statistics as furnished by CBOE are, in most instances, not comparable [to those furnished by AMEX], because of important differences in the systems each exchange utilizes to report trades on the options transaction reporting] tape. In particular, CBOE data * * * neglects to differentiate the following:

Where a buyer purchases options from four different sellers at the same price in one trade, the Amex would report one transaction while the CBOE would report four transactions, all at the same price. This difference in reporting methods unrealistically raises the number of CBOE transactions reported at "no change".

On the CBOE, if the buyer of 20 options enters into a transaction and the price is up 1/8 from the last sale, and there are four sellers on the other side, the transactions will be reported as one trade for five contracts up 1/8 and three additional trades "unchanged". On the Amex, the transaction would be reported as one trade of 20 contracts, up 1/8. * * *

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before and after the initiation of multiple trading, and Table 8B contains similar data for CBOE for the period after multiple trading had begun.

Significantly, Table 7A demonstrates that Dupont stock was trading within substantially the same price range before and after the initiation of multiple trading: the stock traded between \$121 1/2 and \$139 3/4 before multiple trading and between \$123 and \$134 5/8 after. In addition, the table shows that the mix of in- and out-of-the-money series remained relatively constant throughout the study period, even though two expirations took place. Hence, Dupont presents a situation in which the influence of factors other than multiple trading on the quality of market data should be minimal.

(footnote continued)

Trades

In addition, CBOE statistics provide the number of trades for each dually traded option class. These figures, too, are subject to the different methods of reporting outlined above and to the extent that they report one transaction as multiple trades, tend to inflate the number of CBOE trades.

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Memorandum to Members, Member Organizations and Registered Options Principals, from Robert J. Birnbaum, Executive Vice President, AMEX, dated March 7, 1977.

Under these circumstances, the quality of the AMEX market for DuPont options improved considerably after the initiation of multiple trading. The average variation in price per transaction was reduced by approximately 20 per cent, and the average bid/ask spread narrowed by approximately the same amount. Moreover, a comparison of the four weeks immediately following the January expiration and the four weeks immediately following the April expiration, during which time the stock was trading in a similar range and the mix of in- and out-of-the-money series was essentially the same, reveals an improvement of approximately 19 per cent in price continuity and of nearly 18 per cent in the bid/ask spread. It should also be noted that these improvements in market quality occurred even though the average number of contracts per transaction increased on the AMEX by 49 per cent after multiple trading began. ^{104/} Most dramatically, in the three weeks immediately following the initiation of multiple trading, a 31 per cent improvement in price continuity and a 27 per cent improvement in the bid/ask spread took place on AMEX despite the facts that (i) a new series of far term, in-the-money, options was introduced, and (ii) there was a increase of approximately 140 per cent in the average

^{104/} A substantial increase in the number of contracts per transaction may result in wider variations in price between transactions and wider bid/ask spreads, because the risk associated with each transaction may be greater.

number of contracts per transaction. Both of these factors would normally be expected to result in a worsening of market quality indicators. 105/

Tables 9 and 10 contain data with respect to the quality of markets for Merrill Lynch options on AMEX prior to and following, and on CBOE following, the initiation of multiple trading. Again, stock prices during the study period, expiration weeks, and the mix of in- and out-of-the-money series are shown. CBOE, in its analysis of Merrill Lynch option activity, stated:

[T]he quality of markets in Merrill Lynch on the Amex changed rather markedly between the month of January and the three months following dual listing. For example, the average price change between transactions fell from 3.5 cents in January to 2.3 cents in the after period while average bid/ask spreads dropped from 14.1 cents to 11.2 cents. * * *

[T]he change in quality of markets after dual listing appeared to result from a sharp drop in the price of the underlying stock. During January, the underlying stock's monthly mid-range was 23-7/8; after dual listing its weekly mid-range declined almost continuously from 19-1/2 to 17-1/2. The difference in underlying stock price levels in the two periods resulted in substantial differences in Merrill Lynch option prices. For example, on the Amex, the average Friday closing price of all Merrill Lynch option series was \$1.72 a week before the January expiration, compared with \$0.58 a week before and \$1.15 two weeks after the April expiration. 106/

105/ See n.100, and accompanying text, supra, and n.104, supra.

106/ CBOE Study, supra, n.99, at 16-18 (footnote omitted).

While CBOE may have appropriately analyzed the period from January through the end of the study period, the six weeks immediately following the initiation of multiple trading deserve closer consideration. From the January expiration to the April expiration, no changes occurred in the series that were being traded. Moreover, while the stock was consistently declining in price in the weeks prior to the beginning of multiple trading, neither this decline nor the diminishing time value of the options series between January and April seems sufficient to explain the improvements in market quality on AMEX that occurred at the same time as CBOE initiated multiple trading. Specifically, even though the stock price was declining consistently during December, January, and February, AMEX quality of market indicators did not vary significantly during that period. For the four weeks after the January expiration week, for example, the average variation in price between transactions on AMEX was 2.9¢ with the stock trading between \$19 7/8 and \$23 7/8. In the six weeks immediately after the initiation of multiple trading, however, the stock traded between \$18 and \$20 5/8 but the average variation in price between transactions was only 1.85¢. Most dramatically, during the week before the initiation of multiple trading, Merrill Lynch stock traded between \$19 7/8 and \$21 3/8 and the average variation in price between AMEX transactions was 3.1¢, and during the week after multiple trading began the stock traded between \$18 1/2 and \$20 1/2 and the average AMEX variation in price was 2.1¢, a 32 per cent improvement. In addition,

it should be noted that the average bid/ask spreads on AMEX for the four weeks after the January expiration was 12.8¢, but was 8.9¢ for the six weeks after the initiation of multiple trading, and improved more than 17 per cent, from 11.5¢ to 9.5¢, between the week before and the week after multiple trading began. As with DuPont, these improvements occurred even though the average number of contracts per transaction on AMEX increased from 9.7 to 13.3, a 37 per cent increase, between the January and April expirations.

Supplemental data that AMEX submitted showed similar improvements in the quality of the markets for two more of the five classes that AMEX initially listed and CBOE and AMEX multiply trade. 107/ The AMEX data summarized price continuity and bid/ask spreads for multiply traded options in various price categories. AMEX organized its data in this fashion so that changes in price continuity and bid/ask spreads for options with similar premiums could be compared before and after the initiation of multiple trading. Since option premiums reflect, among other things, (i) price movements in the underlying stock, and (ii) the mix of in- and out-of-the-money series available at a particular time, many of the difficulties associated with evaluating continuity and spread data for a class of options over a period of time may be reduced. 108/

107/ See n.102, supra.

108/ See discussion at 34-40, supra.

Table 11A supports the previous conclusions that have been drawn with respect to improvements in the quality of AMEX markets for DuPont options after the initiation of multiple trading. The table contains summary price continuity and bid/ask spread information, organized by option premium size, for DuPont calls. The data indicate that the average variation in price between transactions in DuPont calls was lower in the three months following the initiation of multiple trading in every option premium range but one. ^{109/} In the DuPont calls whose premiums ranged from \$8 - \$9 7/8 and from \$10 - \$14 7/8, for example, the average variation between transactions was reduced by 35 per cent and 37 per cent respectively. Similarly, the DuPont calls with premiums ranging from \$6 - \$7 7/8, \$8 - \$9 7/8, \$10 - \$14 7/8 and \$15 - \$19 7/8 all showed 15 per cent or more reductions in average bid/ask spreads in the three months after the initiation of multiple trading.

Tables 11B and 11C evidence similar improvements in Burroughs Corporation ("Burroughs") and Digital Equipment Corporation ("Digital") options. These tables show that price continuity in both Burroughs

^{109/} It should be kept in mind that the relevant comparison of data when price continuity and bid/ask spread information is presented by premium is between options trading within the same premium range in the before and after period. With respect to Table 11A for instance, the 2.3¢ average variation in price of DuPont calls trading at premiums under 7/16 in the before period is most appropriately compared to the 2.0¢ average variation in the after period for similarly priced options.

and Digital calls consistently improved after the initiation of multiple trading. ^{110/} Moreover, bid/ask spreads were significantly reduced at each premium range for both Burroughs and Digital. In fact, Table 11B shows that in all but three premium ranges, average bid/ask spreads for Burroughs calls were reduced by 15 per cent or more in the three months following multiple trading. More dramatically, for Digital options in all premium ranges above \$1/2 - \$15/16, bid/ask spreads improved by 20 per cent or more after the initiation of multiple trading.

Although these data are limited and have not been subjected to complete regression analysis, they suggest that multiple trading between AMEX and CBOE may improve the quality of markets for an option class that is multiply traded in the short run. These data, however, do not provide sufficient information to permit conclusions concerning what the effects of multiple trading may be on the quality of markets for standardized options over the longer term. In particular, movements in the price of an underlying stock, expirations of option series, the addition of new series, and changes in the mix of exercise prices of outstanding series may contribute to changes in price continuity, bid/ask spreads and contract volume for a multiply traded option class. Further, improvements in market quality during the three month period immediately following the

^{110/} While Digital calls with premiums ranging from \$10 - \$14 7/8 showed significantly higher variations between transactions in the post-multiple trading period, this result may be explained by the fact that fewer transactions were executed at those premium levels in the three months after multiple trading. See, e.g., Burroughs data in Table 11B concerning price continuity and number of transactions for similarly priced options.

initiation of multiple trading may not be sustained over a longer period of time because marketmakers seeking to attract order flow and establish their market as the primary market 111/ may allocate more capital and assume greater risks during the first weeks of multiple trading than under normal conditions. 112/ Moreover, general market conditions may change significantly over time and make it difficult, if not impossible, to isolate the effects of multiple trading from the effects of these other factors.

With respect to option classes that were multiply traded between CBOE or AMEX and PHLX, PSE, or MSE during the six month study period, the data did not suggest conclusions different from those stated above. Over the long term, however, PHLX, PSE, and MSE have not been able to attract sufficient order flow to provide markets that would be competitive with those that CBOE and AMEX provide. As Table 1 indicates, PHLX, PSE, and MSE have voluntarily delisted 6 of the 13 option classes that these exchanges multiply traded with CBOE or AMEX. In addition, Table 12 demonstrates the extremely limited order flow that these exchanges

111/ The "primary market" is generally "the market which has the greatest trading volume" in a particular security. Special Study, supra, n.63, at 12. Other market centers will be referred to as "secondary" markets or exchanges in this chapter. The significance of a primary market designation is discussed at 52-61, infra.

112/ It should be noted that options marketmakers may have increased their proprietary trading during the first few weeks of multiple trading for the purpose of inducing others to send options orders to the exchange on which these marketmakers were making markets. The Options Study has not attempted to determine what effect, if any, such trading may have had upon the data discussed above. See Securities Exchange Act Release No. 13433, supra, n.80.

have been able to attract when competing with CBOE or AMEX.

2. Competition Among Market Centers

Quality of market indicators are not the only measure of the effect of multiple trading upon the markets for options that have been traded on more than one exchange. Indeed, it should be kept in mind that multiple trading provides the public with a choice regarding where to send an order for execution. As a result, multiple trading is the foundation for competition among market centers and provides competing market centers with "the impetus for greater operational efficiencies, improved services and new technological developments." 113/ Moreover, multiple trading is the exclusive means by which marketmakers at various market centers can compete with each other for orders for a security. In fact, competition "among brokers and dealers, among exchange markets, and between exchange markets and markets other than exchange markets" 114/ could occur only under extremely limited circumstances if multiple trading were not permitted.

The competition among market centers that multiple trading of standardized options has caused may be seen in numerous areas. CBOE board

113/ Statement of the American Stock Exchange, Inc., *supra*, n.92, at 2. See also, *e.g.*, Special Study, *supra*, n.63, at 903-906 and 937-942.

114/ Section 11A(a)(1)(C)(ii) of the Exchange Act [15 U.S.C. 78k-1(a)(1)].

brokers and AMEX specialists, for example, have occasionally reduced their brokerage charges in an effort to attract more option orders. 115/ Reductions in the rates that independent floor brokers on these exchanges charge their customers have occurred for the same reason. 116/ In addition, CBOE and AMEX have begun to develop automated order routing systems and methods of protecting public limit orders with a view toward reducing the costs of executing orders on their exchanges, obtaining more rapid execution of public orders, and assuring better protection of limit orders. Among the considerations involved in making the decision to develop and implement these innovations was the clearly perceived need to attract a substantial portion of public orders in multiply traded options. 117/ Similarly, NYSE has stated that, in addition to offering "competitive execution prices," it will offer other services "to make it worthwhile for brokerage firms to send their [option] orders to the NYSE market "if permitted to engage in multiple trading." 118/ NYSE stated:

115/ Letter to Sheldon Rappaport from Joseph W. Sullivan, supra, n.91, at 2.

116/ Id.

117/ See, e.g., CBOE, OSS Report, dated March 22, 1978, at Section II, 1-4.

118/ NYSE Letter, supra, n.85, at 3.

First, the NYSE believes that using an order book official, who is an Exchange employee, to represent the orders on the limit order book, will lead to cost-effective service.

Second, the NYSE is developing an automated limit order book for options that should reduce much of the human-intensive paper handling that is so costly to firms. The ability to transfer "away-from-the-market" orders directly from the firm's computer into the automated book, coupled with an automated delivery system for executable orders, should be attractive to firms handling options orders. * * *

* * *

[Third,] the NYSE is also looking into other possible computer-supported services which might be introduced to enhance the effectiveness of an NYSE options market at some time after it has gained essential experience in trading standardized options. 119/

NYSE also suggested that it may be able to offer "substantial efficiencies that would result from a firm's ability to route customers' combined stock/option orders to a single market center * * * ." 120/

Multiple trading has also caused CBOE to improve certain aspects of its floor operations. During the high volume period from April 14-21, 1978, CBOE had "difficulties" matching the parties and terms of trades that occurred on its floor. 121/ At least partially as a result, a number of brokerage firms determined to send their retail orders for option

119/ Id., at 3-4, 10.

120/ Id., at 9.

121/ Letter to Andrew M. Klein, Director, Division of Market Regulation, from Joseph W. Sullivan, President, CBOE, dated June 16, 1978, at 6.

classes that were also traded on AMEX to that exchange. One of these firms explained:

In terms of what happens to the order subsequent to execution, we believe, * * * that the performance of the AMEX during the recent periods of extraordinary volume, was superior to that of the CBOE. 122/

Subsequently, CBOE, faced with the possibility of losing a substantial portion of its order flow in multiply trading options, "undertook a number of steps intended to strengthen its capacity to handle trade matching at high volume expiration periods" and "to improve the trade comparison process." 123/

B. Market Fragmentation

"Market fragmentation" is the dispersion of trading activity for a multiply traded security among numerous market centers. When markets are fragmented, it may be difficult for brokerage firms to discover and obtain the most favorable price for their customers. Firms need to monitor and obtain rapid access to more than one market center and, due to the limitations on the ability to obtain and react to market information instantaneously, may not be able to execute orders at the

122/ Letter to Roberta S. Karmel, Commissioner, Securities and Exchange Commission, from Wallace O. Sellers, Vice President, Merrill Lynch & Co. Inc., dated June 13, 1978.

123/ Letter to Andrew M. Klein from Joseph W. Sullivan, supra, n.121, at 8.

best available prices even if monitoring the markets continuously. 'In addition, prices in the various markets may not reflect a complete assessment of current value by all buying and selling interests since orders sent to or present at different market centers may not have an opportunity to interact. In view of these two factors, certain kinds of orders, particularly orders of retail customers, may not be executed at the most favorable prices obtainable. 124/

This section will discuss the extent of market fragmentation for multiply traded option classes. It will then describe the methods that brokerage firms use to route orders to and among markets for these multiply traded classes in pursuit of the most favorable execution opportunities. Finally, the impact of multiple trading on the pricing of classes traded on more than one exchange will be examined.

1. The Extent of Market Fragmentation For Multiply Traded Option Classes

Table 12 indicates the percentage of contract volume that each options exchange attracted in each class traded on CBOE or AMEX and on a secondary exchange on selected days between February 24, 1977 and August 31, 1977. Table 13 indicates the percentage of contract volume that CBOE and AMEX attracted in each class that was multiply traded on these exchanges exclusively during the same period. The data that these tables contain

124/ See generally, with respect to the problems of market fragmentation, Securities Exchange Act Release No. 13662 (June 23, 1977), 12 SEC Docket 947, 958-964 (July 5, 1977).