Chapter 5

The Operation of Options Markets

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THE OPTIONS MARKETS

Options are financial contracts that confer the *right* to buy or sell a specific asset or financial instrument at a given price-the "strike price. "[1] Thus they differ from Futures contracts, which create an *obligation* to buy or sell. There are listed options on individual securities, on securities indexes, on foreign currency, foreign currency indexes, and Treasury instruments, on "physicals other than securities' (e.g., metals), and on futures contracts.

Options on individual securities and indexes of securities are traded on securities exchanges, and are regulated by the Securities and Exchange Commission (SEC). Options on commodities (non-securities, e.g., farm products and oil), and on futures and stock-index futures are traded on commodity exchanges and are regulated by the Commodity Futures Trading Commission (CFTC). Most options on foreign currency are regulated by the CFTC, except those that are traded on a securities exchange (the Philadelphia Stock Exchange, which trades options on seven foreign currencies and is regulated by the SEC).

Call options give the holder the right to buy; put options give the holder the right to sell. For example, the holder of a call option on a stock might find that the market price of the stock has risen above the option contract's strike price. The holder can exercise the option, buying the stock at the lower strike price and selling it immediately at the higher market price. Or the holder can sell the option itself at a higher price than was paid for it. (Most options contracts are closed out in this way rather than exercised.) The holder of a put option, on the other hand, watches for the market price of the security to fall below the strike price. The holder can buy stock at the lower market price and then exercise the put option to sell the stock at the higher strike price. An option contract on stock is normally for 100 shares of stock.

All options on a specific asset or financial instrument, for example, Stock X, are a "class' of options. All options of the same class with the same strike price and expiration date are a "series" of options.

Both call and put options are sold by an option writer, the person who in theory must deliver stock when the call option is exercised, or buy it when the put option is exercised. (In fact, transactions are handled through the options clearinghouse.) The option writer is paid a premium when the option is purchased, and keeps the premium whether or not the option is exercised.

The premium earned by an options writer is determined in the market place and has several elements. An option may have an intrinsic value when it is written. Thus a call option on Stock X with a strike price of $40, at a time when Stock X opens at $48, would have an intrinsic value of $8. An option with intrinsic value is said to be ''in the money.' An option also has "time value,' the extra amount a purchaser will pay for an increased possibility that the price of the stock will move in the desired direction before the option expires. The longer the option has to run, the greater its time value. Other factors also affect the price or premium paid for an option, such as the volatility of the price of the security or of the market in general, and the effect of supply and demand.

Exchange trading of standardized options began in 1973 with creation of the Chicago Board Options Exchange (CBOE); this was followed quickly by options trading on the American (AMEX), Philadelphia, and Pacific Stock Exchanges. The New York Stock Exchange (NYSE) did not begin trading options on stocks until 1985. Stock options trading is still dominated by CBOE, with 60 percent of the total volume.

Before 1973, non-standardized options had been bought and sold for years, in an unregulated

[1]Much of this section of the report draws on an OTA contractor report: Joel Seligman (University of Michigan Law School), *Stock, Options, and Stock Index Futures Trading, 1989,* pp. 100-200. See also, Joel Seligman, "The Structure of the Options Markets," *IO Journal of Corporate Law* 141, *1984;* David Lipton, "The Special Study of the Options Market: Its Findings and Recommendations," 7 *Social Regulation and Law Journal 229,* 1980; *Report of the Special Study of the Options Markets to the SEC,* House Committee on Interstate and Foreign Comrneree, 96th Cong., lst seas. (Comm.Print 96-1FC3 1978).

over-the-counter dealer market. The non-standardized options were typically written in bearer form by professional investors or dealers, and then bought and sold over the counter. In New York there was a Put and Call Brokers and Dealers Association, with 20 members who did most of the Nation's options writing. Over-the-counter (OTC) options writing nearly disappeared after 1973. But after computerized "portfolio insurance' was discredited by the 1987 crash (see chs. 3 and 4), some large brokerages began writing put options for institutional customers to allow them to protect their portfolios.[2] When stock prices began to slide on October 13, 1989—according to SEC and CFTC analyses—the brokers rushed to increase their own hedges by selling futures and stocks, thus contributing heavily to the market break.[3]

Most listed options in both the United States and Europe are 'American-style' options, which means that they can be exercised at any time up to or on the expiration date. "European-style" options can be exercised only on the expiration date.

Total U.S. trading in options contracts increased from 1.12 million contracts in 1973 (all at CBOE), to 305.17 million contracts in 1987 (56 percent of it at CBOE, 22 percent at AMEX). Options contract volume declined more than one-third in 1988, after the crash; and then partly rebounded to 227.02 million in 1989. Stock-option volume as a percent of trading volume in the underlying stock peaked in 1981, at 92 percent of NYSE trading volume. The continued decline from 1981 to 1988 may have been related to the introduction of index options in 1983 (although there had already been some decline) because many investors had been using options on such highly capitalized stocks as IBM to take hedge positions on the market as a whole.[4] By 1986, stock-index option volume was nearly equal to volume of options on individual stocks. After the *1987* crash, index option volume dropped sharply—down 42.5 percent in 1988 at the CBOE, 59 percent at AMEX, and 68 percent at the NYSE. This may have been because many individual investors who had been using stock-index options stopped doing so, but there was also a 40 percent drop in stock-index futures trading volume at the Chicago Mercantile Exchange (CME), and these contracts are mostly used by institutional investors.[5]

The CBOE created modern options in 1973 by pioneering two concepts: contract standardization (by fixing of expiration months and strike price intervals) so that options are fungible; and establishment of a clearinghouse to be the issuer and guarantor of the options. This clearinghouse, the Options Clearing Corporation (OCC), is now jointly owned by all the equity options exchanges, and acts as the issuer and intermediary for all listed options. The clearing-house becomes one counterpart to every trade; the other party being either the writer of the option or the buyer of the option, regardless of whether the option is a put or a call. The holder of the option looks to OCC rather than to an individual writer of options for performance when the option is exercised.[6] If an options writer wants to close out a position without waiting for an option to be exercised or to expire, the writer can buy an identical option, balancing out the obligation to OCC. If a purchaser does not want to exercise or hold an option, the purchaser can sell it in the secondary market (i.e., on the exchange).

A stock option is generally eligible for options trading on an exchange if the stock is exchange-listed (or is a NASDAQ National Market System security) and is widely held and actively traded. At the end of 1989, CBOE was trading 237 classes of options, AMEX 207, Philadelphia 148, Pacific 144, and NYSE 33. Most stock-index options are based on broad-based indexes such as the Standard and

[2]In this form of hedging, if stock prices fell, the institutions would require the broker to honor the put, that is, to buy back the institution's stock at the higher strike price.

[3]SEC, Division of Market Regulation, *Trading Analysis of October 13 and 16, 1989, May* 1990, p. 5; Commodity Futures Trading Commission, Division of Economic Analysis, *Report on Stock Index Futures and Cash Market Activity During October 1989,* May 1990, p. 3.

[4]According to Charles J. Henry, President and Chief Operating Officer of the CBOE, personal communication to OTA. Information On trends in options trading volume was provided by the CBOE, March 1990.

[5]About 11.4 percent of total futures accounts are retail, and 34 percent of securities options accounts are retail. OCC estimates that between 25 and 40 percent of the OCC's total open positions are part of covered call programs, usually retail. Retail investors include both small investors and wealthy large investors, but investors in futures markets are typically wealthy. (OTA staff discussion with John Hiatt, Options Clearing Corp., Sept. 20, 1989.)

[6]The OCC makes sure that when an option is written to a purchaser, a writer of the same series of options is contractually obligated to OCC through a clearing member of OCC. The aggregate obligations of the OCC always equal the aggregate obligations of writers to the OCC. If the writer fails to perform, the clearing member firm is obligated to perform.

Poor 100 (S&P 100), although there are some on the Oil and Gas Index (AMEX), Gold/Silver Index (Philadelphia), and other narrow-based indexes. Settlement of index options is always in cash, never in the stocks that composed the index.

OPTIONS EXCHANGES

Options are traded on U.S. exchanges in two ways. The CBOE and Pacific exchanges use competitive market-makers who trade for their own accounts, with an exchange employee called the Order Book Official (OBO) handling the limit order book. The AMEX, NYSE, and Philadelphia Stock Exchanges adapted the specialist system to options trading, but with additional market-making provided by "registered options traders" (ROTS) who trade on the floor for their own account; but have an affirmative obligation to make markets, as a specialist does.[7]

In the CBOE, still the largest options market, there are several market-makers (dealers) for every stock option group, with dozens for the most active classes of options, and several hundred for the S&P 100 stock-index option. Bids and offers are made by public outcry, as in the futures market. Unlike locals on futures exchanges, however, CBOE options traders cannot act as both agent and principal in a single class of options in a single trading day; i.e., they cannot do dual trading. Also unlike the practice in futures exchanges, CBOE market-makers have affirmative obligations with regard to maintaining ''continuous two-sided markets with limitations on the maximum quote spread," and there is a public limit order book to insure priority of customer orders. The OBO is not like a specialist; he or she is an exchange official, and cannot trade for his or her own account. The OBO accepts and executes limit orders from customers (not from market-makers or firms trading for their own account). In general, limit orders from the book have precedent over those on the floor at the same price, and the OBO must display the highest bid and lowest offer to the trading crowd. The OBO also manages the opening of each trading session, where bids and offers are made from the crowd for each series of options, in rotation, to determine opening prices.

The OBO only handles limit orders in the book. Large market orders and more sophisticated orders such as spreads and straddles,[8] firm proprietary orders, and market-maker orders must be handled by floor brokers, who work only as agents and do not trade for their own account. On the CBOE there is also an automatic order execution system for public customer orders up to 10 contracts, called the Retail Automatic Execution System (RAES).

This kind of trading floor may have an advantage over the specialist system when trading reaches a certain volume. Limited empirical evidence suggests that the competition among market-makers on the CBOE at high volume levels may lead to narrower price spreads[9] than the specialist system produces.[10] It may not work as well when volume of trading is consistently low. The CBOE currently has a pilot program[11] to use a designated primary market-maker (DPM), much like a specialist, for some classes of options. The Pacific Stock Exchange (PSE) has a similar program that establishes a Lead Market-Maker (LMM) for multiply-traded option classes with volume in the lowest 20 percent. Exchange members appointed as LMMs would "assume responsibilities and acquire rights in their appointed options classes beyond the obligations and rights of market-makers that trade in the same options class. '[12] Both the CBOE and the PSE

[7]In the NYSE these are called competitive options traders, or COTS.

[8]Spread orders involve buying and selling a different series of options of the same class (i.e., on the same stock but of different expiration date); straddle orders consist of both a put and call on the same stock, at the same expiration date.

[9]The price spread is the difference between the highest price that any potential buyers *bid* for an option, and the lowest amount that potential sellers *offer* to sell it for. When a market-maker is buying and selling, competition will lead him or her to keep the spread narrow; i.e., to sell for only a little more than he can buy the option for.

[10]Chicago Board Options Exchange, *Exchange Dual* Listing: *A Six Months Review, 1977,* reported that for 10 dual-listed options classes the average bid/ask spread was 1.8 to 4.0 cents narrower on the CBOE. The CBOE volume in these stocks ranged from 19 to 86 percent of total. A second CBOE study, "Summary of Analysis of Quality of Markets Measures in Dually Traded Option Classes," October 1978, had comparable findings. These studies dealt with a small number of securities and the studies are over a decade old.

[11]The CBOE program began as a 2-year Pilot pro= in 1987 and was extended in 1989 for 2 years more. SEC Release No. 27167, Aug. 22, 1989, 54 FR 35960.

[12]The LMM has additional Obligation for ensuring accurate dissemination of quotations, must participate in automatic execution systems, and mUSt be present at the trading post throughout the day; in return for these and other duties the LMM would be allocated a 50 percent participation in transactions in the issues.

require a "Chinese Wall," between LMMs and any affiliated upstairs firm to prevent any improper behavior.[13]

TRADE SUPPORT SYSTEMS IN OPTIONS MARKETS

The CBOE began an automated order routing system in 1978, achieving direct routing of orders to the floor in 1979. It was the frost options exchange to have a retail automatic execution system (RAES), in 1985. RAES came into floorwide use in 1988 and now handles about 25 to 30 percent of customer orders, which is about 8 to 10 percent of contract volume. Other options markets also have automatic execution systems; for example, at AMEX, an electronic system for execution of orders for stock and stock-index options, (AUTO-EX), is responsible for handling between 1 and 2 percent of options order flow. AMEX also has an agreement with the European Options Exchange (EOE) by which EOE trades options contracts fungible with the AMEX MMI (stock-index) option contract. A trader can buy on the AMEX and sell on the EOE, and vice-versa.

The CBOE has developed a hand-held personal computer to capture trade data on the floor of the exchange. This "Market-Maker Terminal" (MMT) is scheduled to be pilot-tested during the third quarter of 1990.[14] The device will record trade data, identify the trader, and time-stamp the transaction record to create an audit trail. This will strengthen the exchange's ability to enforce tightly the opening and closing time for trading sessions. The MMT will also allow a trader to review his current position and provide him with analytic and risk management tools.

The MMT uses a touch screen to minimize necessary keystrokes, and has a one-keystroke "repeat" feature for speed in recording similar trades during surging high-volume trading peaks. A wireless communications network will provide the interface between the MMTs, held by traders, and the other trading support systems of the exchanges.

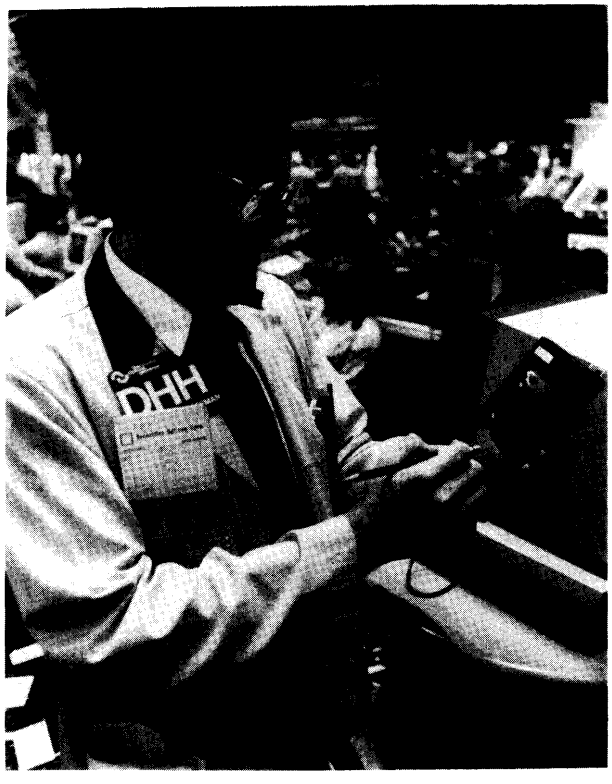

Photo credit: Chicago Board of Exchange

CBOE'S **modern market-maker terminal.**

OPTIONS MARKETS IN THE 1987 CRASH

Options trading volume on October 19-20, 1987—although heavier than normal-declined sharply relative to the surging volume of stock trading.[15] Options exchanges have discretion to halt trading under specified circumstances. They stopped the trading of nearly 100 options at various times during the crash, because of trading halts in the primary markets and order imbalances. In addition, the opening rotations for index options, during which initial prices are determined, were either delayed or long drawn out due to volume and order imbalance.[16] This delayed trading and meant that most

[13] For example, it would be improper for a firm to purchase an option assigned to an affiliated LMM except to reduce or liquidate positions, when approved by a floor official.

[14] Information about MMTs was prepared for OTA by the CBOE, May 1990.

[15] However, on both days, the volume of cleared contracts remained above the year-to-date average, according to the OCC.

[16] At the beginning of each trading session, one options series at a time is called for bids and offers from the floor, which frees the initial prices. Not until after the opening rotation is complete does free trading begin. On the 19th and 20th some rotations in individual options were delayed in part because trading in many of the underlying stocks on the principal stock exchange had not begun. Another factor was that CBOE had just added 112 new S&P 100 series.

orders had to wait a long time to be executed. At some points on the rotation traders could not predict the execution prices. When there were trading halts, rotations had to be repeated to reopen trading.

Market-maker participation declined by 75 percent between October 19 and 23, and quoted spreads between bids and offers drastically widened. Market-makers' performance was sharply criticized by the SEC.[17] Order execution through RAES and AUTO-EX effectively stopped, both because they do not function during rotation, and because the exchange severely restricted the series eligible for these systems due to the reluctance of market-makers to participate.

CBOE and AMEX made some rule changes after the crash (e.g., changing the procedure for opening rotation and strengthening the obligation to participate in automated execution systems). As a goodwill gesture CBOE index options market-makers made refund payments to customers who had bought certain options series during the period of greatest volatility and uncertainty on October 20, 1987.[18]

SIDE-BY-SIDE TRADING

Options trading on stock exchanges raised the issue of side-by-side trading of stock and options, especially at the NYSE. NYSE competitors feared that the exchange, the primary market for most of the stocks on which options are traded, would have unfair advantages in options trading. Many brokerage firms have electronic systems for automatically routing customers' stock orders to the NYSE, and options orders might also be routinely routed there. Combination orders of stocks and options would make it more economical to hedge using options. More importantly, the NYSE would have the possibility of trading stock and options at the same or adjacent posts, or allowing one specialist to handle both, which because of the specialists' possession of the limit order book would raise frontrunning or manipulation concerns as well as tending to give the NYSE strong competitive advantages.

The SEC made a special study of these issues, which delayed the trading of options at the NYSE until 1985. The SEC imposes special conditions on the NYSE, such as a requirement that stocks trading and options trading take place on separate floors. Specialists may however use options to hedge their risks in making markets. The NYSE has so far remained last among the exchanges in the number of equity option classes traded.

MULTIPLE-TRADING OF OPTIONS

Beginning in 1980, the exclusive right to trade a new option on exchange-listed stocks was awarded to one or another exchange by means of a lottery .19 In May 1989 SEC promulgated Rule 19c-5, which after January 21, 1990, allows all newly listed options to be multiply traded, and after January 22, 1991, will allow all options to be traded on all five options exchanges. The agency provided many reasons for the rule change, the most important being that competition among exchanges would lead to improvements in the quality of exchange services. It is expected that multiple-trading will also provide a strong incentive to develop an integrated electronic system that would allow brokers to route options business to the exchange offering the best price at that moment.

The argument about multiple-trading had been going on for 12 years, and illustrates how, in spite of talk about free markets and the dangers of regulation, exchanges often resist additional competition. This resistance sometimes takes the form of opposition to technological systems.

After the introduction of options trading, there was fierce competition between the exchanges. The SEC said that:

> . . .because many brokerage firms automatically **route their small public orders for an option to the options exchange with the greatest volume of trading in that option, market-makers of options exchanges appeared to have engaged in pre-arranged trades, wash sales, and trade reversals to give the appearance**

ITSEC, The October 1987 Market Break, washingto~ DC, pp. 8-8 to 8-10.

[18]Charles J. Henry, **President and Chief operating** Officer **of the** CBOE, **in correspondence to OTA, Mar. 28, 1990, said** that these payments were **not made by the exchange, as reported at the time in newspapers; the payments were advanced by the exchange on behalf of the market-makers and repaid to the exchange by market-maker contributions of one cent per contract. The payments covered the part of the options premium that was determined to be excessive. The AMEX had a similar refund program.**

[19]Exchanges **competitively traded options on OTC stocks, a much smaller** market.

of increased trading volume in multiply-traded options on their options exchanges.[20]

There is a tendency for trading of any asset to concentrate in one market. While at least 22 classes of options were traded on more than one exchange during the 1970s, by 1977 only 15 were multiple-traded. The SEC was asked to rule on whether the AMEX, Philadelphia, and New York exchanges could engage in competitive trading. Long committed to the idea of increasing competition, SEC first acknowledged that 'under appropriate circumstances, the benefits of expansion of multiple-trading appear to outweigh any adverse consequences. "[21] Nevertheless SEC said that it would defer a decision until the options exchanges presented a plan to develop ''market integration facilities' designed to minimize market fragmentation and maximize competitive opportunities. According to SEC staff, delay and inaction by the exchanges discouraged the agency from further increasing the number of multiple-traded stock options at that time.

The argument for and against multiple-trading turns on the effects of competitiveness on option prices. When stocks or options are traded on only a single exchange, the higher volume of trading that results tends to keep bid-offer spreads narrow. When the same volume of trading is divided among two or more exchanges, two factors may influence whether spreads broaden or narrow. The diminution of order flow to each market tends to broaden price spreads, because overhead is divided among a smaller number of transactions and the market-making risk increases. On the other hand, competition should keep price spreads as narrow as possible in order to attract orders. The little comparative data available on options trading in 1977 indicated that with multiple-trading, price spreads narrowed, the average variance of price from one transaction to the next declined, and brokerage and floor broker rates also declined.[22]

Some people argued against multiple-trading of options because of their conviction that competition is not effective in narrowing spreads. They say that brokers, in spite of their legal obligation as agents to execute customer orders at the best price available, usually do not send orders to the options exchange with a superior quotation, but route the orders automatically to a primary options exchange. Benefits from competition, according to this argument, are outweighed by the tendency of multiple-trading to fragment markets and reduce order flow to any one market.

The SEC, in urging the exchanges to develop a market integration facility, insisted that they analyze three approaches to market integration:

- a market linkage system to move orders from one option exchange to another, like the Intermarket Trading System (ITS) operated by stock exchanges (see ch. 3);
- a neutral switch, or automatic routing of individual orders by brokers to the market center with the best quotation; and
- a central limit order file (an order exposure system to simultaneously display all public limit orders to all options exchanges) .23

Several options exchanges insisted that none of these is possible because of the difficulties that options market-makers have in entering firm quotations. These difficulties arise because options are ''derivative' of securities. A change in the underlying stock price will require adjustments in as many as 8 or 10 series of call options and 8 or 10 series of put options based on that stock. The market-maker may be following as many as 25 or 30 stocks, each with 16 to 20 option series. It would be impossible, some said, for market-makers to monitor and constantly update quotations on so many series.

This problem, however, has effectively been solved by the development of "auto-quote' devices that automatically change several series of options quotations when one of them is changed, or when the underlying stock quotation changes. The CBOE describes its Auto-Quote System as "performing mathematical operations that use input on the underlying stock (bid, ask, last sale or mean of the bid/ask) and input from the market makers (industry volatility, interest rates, supply and demand, positions, time to expiration). " As early as May 1989,

[20]SEC Release No. 13433, Options Floor Trading, Apr. 5, 1977. SEC Docke2194.

[21]SEC. Ex. Act. Rel. 16,701, 19 SEC Dock. 998, 1980.

[22]''Report of the Special Study of the Options Markets to the SEC,'' House Committee on Interstate and Foreign Commerce, 96th Cong., lst sess. 1053, 1056 (Comm. Print 96-1FC3 1978)

[23]Sec. Ex. Act Rel. 16,701, 19 SEC Doc. 998, 1008, 1980.

SEC reported that for this reason "the lack of firm quotations is no longer the impediment it once was to the development of an options intermarket linkage. '[24]

Another problem has been the size of the crowd in index options markets. It may include several hundred floor brokers, market-makers, and ROTS. In contrast to the stock market, where the ''crowd' by the specialist post is usually only a few people, there may be hundreds of traders in the S&P 100 stock-index options pit (as there are in stock-index futures pits at the CME). Merely identifying who entered a quotation is difficult, yet a firm quotation system would have to include market-maker identity, quotation, and size for each series of options.

This problem, too, will soon be solved by technology. As described earlier, the CBOE expects to have hand-held terminals ready to be used by market-makers in the pits before the end of 1990. They can transmit information on quotations, time, and quoter identity.

The SEC preferred a limit order execution system linking the markets (the third alternative above), to either a "firm quotation" or order exposure system. The agency wanted a system that would handle only public limit orders and that would provide a display summary of the orders on each options exchange, and give floor members on each an equal opportunity to execute the orders.[25] An inter-exchange task force objected that only a small percent of trading involved limit orders booked with a specialist or OBO, and therefore a limit order system could not integrate the options markets enough to let market centers compete for order flow. It would not change the practice of brokers always sending options business to the exchange with the highest volume of activity in that options class.[26] The task force said that a central limit order file "was not likely to reduce substantially the adverse effect of multiple-trading." The CBOE also objected that the project would cost many millions of dollars and 'cannot be cost-justified. '[27] The SEC decided that the industry should make the final decisions about technological choices. It did not compel the construction of the limit order market integration facility, or any other kind of market integration system immediately. But it has since resumed its pressure on the exchanges to develop such a system.

The SEC did permit multiple-trading of subsequent new options products, most significantly the multiple-trading of options on over-the-counter (OTC) stocks-not exchange-listed stocks—beginning in June 1985. Of the first 30 options on OTC stocks, 9 were multiple-traded. But AMEX quickly captured nearly 90 percent of that market. By June 1987 only two of the nine options were still multiple-traded.[28] Nevertheless, subsequent experience has convinced the agency that competition in trading these options has been beneficial. An SEC study in late 1986[29] found that AMEX OTC options which could be traded on other exchanges, had a bid-ask spread nearly 20 percent narrower than the spreads of AMEX options that could not be traded on other exchanges. Moreover, in the first group 38.6 percent of trades were inside the quote (i.e., between published best bid and best offer), a measure of market-maker performance, compared to 21.7 percent in the second group. Another SEC study concluded that the cost to investors of single-exchange options trading exceeds $150 million annually.[30] SEC concluded that evidence showed that multiple-trading may be beneficial to the markets and at worst "has not resulted in any deterioration of those markets."[31]

In June 1987 SEC proposed Rule 19c-5 providing for unlimited multiple-trading. For hearings in February, 1988, the CBOE brought in evidence of

[24]Sec. Ex. Art Rel. 26,871, 43 SEC Dock. 1519, 1529, 1989.

[25]Sec. Ex. Act Rel. 16,701, 19 SEC Dock. 998, 10009-1010, 1980.

[26]*Supplementary Report of the Amex, Pacific, and Philadelphia Stock Exchanges and th, CBOE in Response to Release No.* 34-26,70110, 1981.

[27]Letter from Walter Auch, Chairman and Chief Executive Officer, Chicago Board Options Exchange, to George Fitzsimmons, Secretary SEC, 14-16, Sept. 22, 1980.

[28]Sec. Ex. Act Rel. 24,613,38 SEC Dock. 865,869-870, 1987. In January 1989 AMEX traded 18 multiply-traded options, and held an average 88.12 percent of the market.

[29]Securities Exchange Co remission, Directorate of Economics and Policy Analysis, *The Effect of Multiple Trading on the Market for OTC Options 2,* pp. 16-17, November 1986.

[30]Securities Exchange Commission, Office of the Chief Economist, potential Competition *and Actual Competition in the Options Market* 2, *November 1986. The* options allocation plan distributed options among the exchanges for single-exchange trading.

[31]Sec. Ex. Act Rel. 24,613, 38 SEC Dock. 865. 871, 1987; see also Sec. Ex. Act Rel. 26,870, 43 SEC Dock. 1498, 1501-1503, 1989.

''trade-throughs" (cases in which customers did not get the best execution) in a specific multiple-traded stock option,[32] and also argued that expansions of multiple-trading would lead to market fragmentation and would give the NYSE unfair competitive advantages. Other options exchanges argued that it would be especially harmful in the absence of effective electronic market linkages. AMEX and NASD defended multiple-trading as providing more liquid markets and narrower spreads, and criticized the allocation system for leading to the proliferation of redundant options in which investors had little interest. The SEC says that multiple-trading should also encourage enhancements in services, as exchanges compete with each other. Rule 19c-5 was issued in 1989, to take full effect after a phase-in through 1990.

This debate about technology continues, revived by the approach of multiple-trading. A contractor for the Philadelphia, Pacific, and New York Stock Exchanges recommended that a market linkage system like the ITS be adopted. Two other contractors, Professors Amihud and Mendelson, carried out an assessment of such an Option Markets Integration System (OMINTS), calling it a "cloned ITS. "[33] They condemned the ITS model as "likely to produce a number of undesirable results," because it would violate principles that are important to the proper functioning of the options markets. Specifically, an ITS-like link would ignore the growing interdependencies between the options market and cash markets, and

> . . . effectively forego the opportunity to develop alternative forms of linkage that take advantage of the price interdependencies that are so important in the options markets.

Amihud and Mendelson recommended two intermediate technological systems:

- an automatic routing system based on individual exchanges' limit order books and automatic execution systems, designed so as to preserve important secondary priorities of time and size, and developed by either the OCC or a commercial vendor of market information; and
- automating the opening transactions with a kind of single price auction (see discussion in ch. 3).

The SEC called for new systems proposals for electronic integration of markets-linking systems—by October 1, 1990. Two proposals are under discussion. The Philadelphia Stock Exchange has suggested an 'Auction Intermarket System' (AIMS). Four exchanges (the CBOE, NYSE, AMEX, and Pacific Stock Exchange) are developing ideas for a "Public Investors Privileged Express' (PIPE, now—as improvements are planned-called PIPE-PIus).

The President of the Philadelphia Stock Exchange, Nicholas Giordano, told OTA:

> If we are going to have a multiple trading environment we must have electronic linkage in order to provide the public customer the opportunity to receive the best price available. Otherwise they will become the victim of the arbitrageur.[34]

Although the SEC has approved a rule to allow multiple-trading of securities-based options beginning in 1991, it is unlikely that competition will be achieved easily. Trading may still tend quickly to concentrate in one dominant market to the exclusion of others, unless there is an intermarket order routing system. SEC staff, however, say that the possibility—or threat-of direct competition for the market in options goes far toward forcing exchanges to improve the quality of their services.

OPTIONS MARGINS

Efforts are underway to strengthen and streamline the process by which securities transactions and related derivative product transactions are cleared and settled (see ch. 6). (Clearing is the matching for the buyer and seller of their records of a transaction to be sure that they agree on terms; settlement is the exchange of payment for ownership of the security or derivative product.) There are differences in the processes by which clearing and settlement is carried out for securities, futures, and options, especially as related to the way margins are handled (see the discussions in chs. 4 and 9). Now that those

[32] See "Regio@ Exchanges Clash With AMEX, NASD Over Multiple Trading of Options," 20 *Securities Regulation& Law Report* (BNA) 253, 1988. SEC objected that this option was a thinly traded option with infrequent updating of quotes, and argued that the benefits of narrower spreads in multiple trading exceeded the cost of trade-throughs. See Securities Exchange Commission, Office of Economic Analysis, Memorandum on Trade-Throughs in Multiply-Traded Options, Sept. 23, 1988.

[33] Yakov Amihud and Haim Mendelson, ''Option Markets Integration: An Evaluation.L" January 1990, to be published.

[34] Telephone interview, April 1990.

markets are closely linked by hedging techniques and arbitraging practices, differences in margining systems between the markets are increasingly controversial.

In all markets, margin is a way of limiting the risk that a market participant will fail to deliver what he has sold or pay for what he has bought. When a clearinghouse is the party to the trade, as in most U.S. markets, margin requirements serve to reduce clearinghouse risk.

The options buyer pays a sum which is known as the premium; this is all the buyer owes for the life of the option. (Of course, if he chooses to exercise the option and buy the underlying product, he will at the time of purchase owe additional amounts.) The settlement (payment) of premium obligations occurs next day. The current system of options margining requires the premium to be credited to the account of the writer (seller) of the option, who must keep it posted as margin and also must post additional margin to cover the risk that the market may increase the cost of the writer's obligation underlying the option. The writer also must put up more margin collateral when the market moves against him (beyond the maintenance margin level) during the life of the option. However, these margin requirements may be met with assets other than cash (e.g., U.S. Government securities, letters of credit, stock), because option holders pay their premiums in full and thus do not realize gains or losses until the position is closed out.

Some innovative margining mechanisms were recommended by several market crash studies, and are still under consideration. A proposal for cross-margining is being reviewed by the SEC and CFTC (pending the results of two pilot programs), while a proposal for futures-style margining for some options is being considered by the CFTC, but only for use on a limited basis, because of prudential concerns by regulators. Proposals for changing margining methods often evoke controversy because significant problems could result from adopting a system that might under stressed market conditions result in failure of market participants. However, some of the arguments for and against cross-margining and futures-style margining are also intended to ward off potential losses of business by some market participants, or to gain market share at the expense of another segment of the industry.

The potential costs and benefits of alternative margining schemes are difficult to assess because margin mechanisms are probably well understood only by a relatively few experts with a stake in the issue. The challenge to regulators is to separate socially sound, functionally robust, innovations from other proposed innovations that are merely self-serving.

Cross-Margining

Four of the reports on the '87 market break—those of the Brady Commission, the Working Group on Financial Markets, the SEC, and CFTC reports—recommended some form of intermarket cross-margining. Since that time, two cross-margining programs have been set up. The Options Clearing Corp. (OCC) and its futures clearinghouse subsidiary, the Intermmket Clearing Corp. (ICC), began a cross-margining program in 1988, but at the end of 1989, the program had only one participant (a firm that is a clearing member of both the OCC and the ICC). The OCC and the Chicago Mercantile Exchange (CME) in October 1989 began another cross-margining program that had three participants as of late 1989.

The basic idea in cross-margining is to reduce the extreme demands for collateral that occur in meeting the original margin requirements of firms which are members of multiple clearing organizations, and are using inter-market transactions to hedge. Cross-margining recognizes the reduced risk resulting from hedges across markets, for example, between an S&P 500 futures contract traded on the CME and an S&P option traded on the CBOE. A clearinghouse recognizes the counterbalancing or hedging effect of positions that one market participant may have at different exchanges, and allows such market participants to reduce their margin obligations accordingly. It is a form of netting which reflects an overall assessment of the net risk of default and provides an estimate of the amount of margin required to cover that risk.

Advocates of cross-margining argue that it reduces the gross amount of payments due, and payments owed, by market participants and clearinghouses, and thereby both reduces the possibility that a counterpart to the trade may default and relieves some stress on the payment system. Cross-margining also reduces differences between pay and

collect schedules, and increases the sharing of credit information between clearinghouses.

The CME normally pays clearing members and collects margin at 6:40 a.m., while the OCC collects at 9 a.m. and pays at 10 a.m. However, for CME-OCC cross-margining accounts, there is only one time to collect margin-6:40 a.m.—and only one time for clearinghouses to pay clearing members-10 a.m. Thus, a cross-margined member cannot use money due from the OCC to pay the CME, but instead must find another source of funds for the 3 hour and 20 minute interval between making and receiving payments. Nonetheless, cross-margining reduces the number of calls for payment flowing through the settlement systems.

However, an SEC analysis pointed out that cross-margining does not solve the problem of asynchronous cash flows:

> [In] essence, these commentators focus on the need for cash to meet futures variation margin payments when it is the futures leg of an intermarket hedge that declines in value and the options leg appreciates in value. In that circumstance, because options contracts [can] appreciate in value but do not pass through profits and losses on a daily basis, the clearing member holding the option must finance, from his own or borrowed funds, payment on the futures contract.[35]

In the CME and OCC cross-margining program, each participating clearing member maintains a cross-margin account at CME and OCC, and designates which positions are to be cross-margined. Each day, CME and OCC transmit to each other information about the positions in each cross-margin account, so that each clearinghouse knows the entire portfolio of index option, futures, and futures option positions. This is run through each clearinghouse's portfolio risk analysis margining system, and the cross-margin account at each clearing organization collects half of the total margin determined by that calculation. Each clearinghouse retains the right to make an independent assessment of the amount of risk and of whether a greater amount of margin should be required.

The CME and the OCC are currently working with their settlement banks and regulators in an effort to setup cross-margining with bank financing. For example, participants could pledge profitable long options positions in their cross-margining account to a bank, in order to secure that bank's financing of variation margin payments for unprofitable hedged positions owed to the CME clearinghouse.[36] However, the CFTC questions the appropriateness of granting priority over the proceeds of liquidated positions to a bank in the event of a member's default, because this would increase the liquidity risk to the clearinghouse.[37]

OCC-cleared long securities options can currently be pledged to banks to secure financing (separate from any cross-margining programs), but no futures clearinghouse has a corresponding program for its members because banks are reluctant to accept futures positions as collateral. Both the CME and OCC argue that expanding the ability of market participants to pledge cross-margined positions to banks to obtain financing is an important step towards reducing liquidity problems in times of market stress.

Both the CME-OCC and the OCC-ICC programs are currently limited to the cross-margining of clearing member holdings which are defined as "proprietary" (under CFTC regulations) or "non-customer" (under SEC regulations) .38 This restriction is rooted in regulations which govern the disposition of customer property in the event of a bankruptcy by a Futures Commission Merchant. Both the CME and the OCC have been discussing ways to resolve these regulatory issues and to expand cross-margining to include market-makers and commodities market professionals.

Critics of cross-margining have argued that in the event of a crisis involving defaults, cross-margining would increase liquidation risks to the banks and the clearinghouses. The risk would increase because of

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[35] SEC. Ex. Act. Rel. 27,296, 44 SEC Dock. 1328, Oct. 10, 1989.

[36] Money owed t. the market participant by each clearinghouse would be paid directly to the bank, thereby reducing the size of the Participants bank loan.

[37] The OCC points out that "the granting of a secured lien on securities positions carried in the accounts of brokers/dealers is at the heart of the capital formation process and is the longstanding practice within the securities industry.' OCC letter to OTA, Feb. 5,1990. This issue is about different markets' views of how safety and soundness should be achieved in different markets.

[38] The CME-OCC program is open t. two categories of clearing firms: joint members of both CME and OCC, and pairs of affiliated firms, one of which is a CME clearing member and the other an OCC member.

the larger amounts of capital in the markets, capital which would have been tied up in margin under traditional margin systems. Further, they argue, risk might be increased if offsetting positions cannot be liquidated at the assumed values during times of market stress. This issue highlights the need to balance efforts to increase liquidity and concerns about the stability of markets in times of turmoil.

Futures-Style Margining

Some of the advocates of unified or improved clearing systems acknowledge that the different margin systems for different markets are an obstacle. One proposal to reduce these differences is "futures-style margining" of options, currently being discussed only for futures options. The current system of margining options requires the buyer of the option to pay a sum, the premium, which is all that the buyer owes for the life of the option. The premium (for a call option) is credited to the account of the writer (seller) of the option, who must keep the premium posted as margin and also must post additional margin to cover the risk that the value of the option may increase. The value of the option is marked to market and, when the market moves unfavorably, additional margin must be provided.

The futures-style margin proposal would change options on futures margining so that both buyer and seller must meet mark-to-market variation margin requirements. The value of the option would be marked-to-market daily, with the clearinghouse collecting cash-only variation margin from losing buyers and sellers and crediting the accounts of winning buyers and sellers. This would alter the fundamental nature of each party's overall obligations, since both the buyer and seller would be obligated to post margin. It would also increase overall credit requirements in the marketplace as both sides of the option would have to be financed. The potential for losses on the part of the writer of the option would remain essentially unlimited, while the option buyer's potential for losses would remain limited to the value of the full premium/obligation.[39]

Proponents of futures-style margining (mostly within the futures industry) say that the major benefits would be improved information sharing on risk positions and greater symmetry in the cash flows on hedged options and futures contracts.[40] It could eliminate or minimize three problems of the current margining system.[41] One perceived problem is that the present treatment of risk is asymmetric. The buyer of call or put options on futures has risk limited to the value of the premiums at the time of purchase, but are not permitted to margin and must post the full premium (which is small compared to the value of the underlying asset). The second perceived problem is that the amount of funds collected and held in the margin system exceeds that which is necessary to guarantee performance because options profits must be kept in the account. Holders of long or covered futures options are forced to keep more funds in the margin system than for a comparable position in futures. This applies to all options and results in a significant demand on capital. The third problem is that the options margin system encourages the holder to exercise margins earlier than necessary; profits from "covered" options[42] must be kept in the holder's margin account even though there is no risk of default, and can be realized only by exercising the option (or by offsetting a put option with a new call option).

The OCC, the SEC, and the securities industry, generally, are opposed to futures-style margining because it would create a new and potentially large asynchronous cash flow problem for equity-related options. Covered writers of call options pay no margin to the OCC because the stock position effectively serves as collateral. If futures-style margining were extended to all options, they would be required to pay daily margin payments whenever their options position declined in value, without the benefit of a positive cash flow from the securities position. This would alter the traditional nature of equity-related options and, with it, the types of trading and uses of these financial products. Costs would fall disproportionately on individual investors, who frequently do covered call option writing. The present system of margining securities options

[39]CFTC Cement in "Petition for Rulemaking to Delete CFTC Regulation 33.4 (a) (2)," July 27, 1989.

[40]One of the proponents is the CME. CME letter to the CFTC, July 27, 1989, pp. 2-3, in "Petition for Rulemaking to Delete CFTC Regulation 33.4(a)(2)," 54 Fed. Reg. 11233, Mar. 17, 1989.

[41]Ibid.

[42]"Covered writing" refers to the writing (selling) of call options by an investor who owns the instrument underlying the option contract, as opposed to one who has borrowed or must borrow it to backup the option.

helps to minimize margin calls by permitting various types of collateral to be used (government securities, pledges of approved stock, letters of credit), rather than just cash. It is consistent with the practices of the equities market.

This debate reflects one disadvantage of having two separate, independent regulators. The issue of futures-style margining for options has been centered in the CFTC, but arises from recommendations by the President's Working Group calling for the investigation of futures-style margins for all options, including those issued by the OCC and regulated by the SEC. Discussions of futures-style margining should be examined in parallel with current efforts on cross-margining.[43] They involve inter-market issues, not all of which are within either regulator's jurisdiction. Neither regulatory agency is likely to be able to take into account the full effects of its decisions on other markets.

[43] As recommended by representatives of the SEC and CFTC at OTA's meeting of experts on clearing and settlement Aug. 22, 1989.