

AN ECONOMIC EVALUATION OF ORGANIZED OPTIONS MARKETS

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I. Introduction

Throughout their history, puts and calls [1] on common stock have been criticized as mere gambling opportunities. Recently, the creation of listed options on the Chicago Board Options Exchange, the American Stock Exchange and three regional exchanges in the United States, has given new respectability to options as investment vehicles. By year-end 1977, listed options to 217 common stocks were available. Even though the market value of these optioned equities comprised about sixty percent of the market value of all New York Stock Exchange stocks, even though the listed options market had been in existence for only four and a half years, and even though most financial institutions are precluded from certain types of option investments, for the calendar year 1977 listed options trading volume (in terms of share equivalents) had grown to seventy-five percent of the common share volume of the New York Stock Exchange.

This unexpected growth in options trading, a general concern that incentives for fraudulent investor behavior may be significantly greater in the listed options market than in the stock market, doubts about the surveillance capability of options exchanges and brokerage firms, and a fear that options might adversely affect the price and volume of the underlying stocks or draw “risk capital” away from unseasoned new equity issues or venture capital, motivated the Securities and Exchange Commission, in July, 1977, to request a “voluntary” moratorium on the expansion of the listed options market.

Securities and Exchange Commission Release No. 34-14056, which proposed on

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October 17, 1977 to formalize the listed options market moratorium, stated:

The Commission announced today the initiation of an investigation and study, pursuant to . . . the Securities Act of 1934, to determine what action is necessary to aid in the enforcement of the Act, and whether additional rules thereunder should be proposed to protect investors and the public interest and to maintain fair and orderly markets in connection with the trading of standardized options and underlying securities.

The release proposed Temporary Rule 9b-1(T), which would make it unlawful for any national securities exchange by any means

to permit expansion of programs for the trading of standardized options, to alter such programs in any material respect not expressly approved by order of the Commission, or to permit the initiation of new programs designed to expand the trading of options.

The phrase "expansion of programs" was interpreted to include, among other things, the listing of options on new underlying securities and the listing of puts on existing underlying securities which, thus far, only had listed calls.

At the same time, a number of exchange proposals were pending before the Commission, including proposals to change strike-price intervals, to multiply existing expiration cycles, to expand the number of authorized call option classes, to open the listing of puts on all underlying securities with currently listed calls, to increase the number of dually listed option classes (*i.e.*, the same options traded on two exchanges), to modify position limits, to initiate trading of options on debt instruments of the federal government, to list options on underlying securities traded in the over-the-counter market, to list options on a broad-based stock market index, and to initiate trading of options at the New York Stock Exchange.

Perhaps the most troublesome issue to be resolved was whether options and their underlying stock should be traded at the same post. This proposal arises naturally from the contractual relationship between options and common stock and the consequent parallelism of changes in the price (premium) of options and the price of the underlying stock. Trading options and stock together would possibly provide economies of scale and would improve the efficiency of both markets in many ways. For example, hedged positions such as the simultaneous short sale of stock and the purchase of calls on that stock would be easier to execute and the reduction of information trading would reduce transaction costs. Illegal trading practices could be detected more easily.

The use of options as an investment tool in modern capital markets may yet be in its infancy. I refer not to the continued expansion of listed puts and calls on greater numbers of stocks, but to the development of new types of options, such as options on government bonds and commodity futures. Perhaps the most promising of recent proposals is the listing of options on a stock market index. Indeed, the general idea of options on a portfolio of securities (*e.g.*, options on closed-end

funds specializing in energy stocks), or options on economic indices (e.g., options on the consumer price index), present interesting possibilities for the future.

This environment of ferment and controversy sets the scene for the following economic evaluation of organized option markets. In Part 2, I provide a general discussion of the contribution of securities markets to the economy. With this background, Part 3 examines the role of organized options markets as they now exist and Part 4 addresses some specific concerns of the Securities and Exchange Commission.

2. The economic function of securities markets

A securities market performs three basic economic functions:

- (1) *Individual wealth allocation.* By issuing and purchasing securities, possibly indirectly through financial institutions, individuals (*i.e.*, consuming units) are able to affect the timing of the consumption of real goods and services over their lifetimes and are able to pool and redistribute among themselves the risks of fluctuation in the value of the economy's real assets.
- (2) *Firm resource allocation.* By issuing securities, firms (*i.e.*, producing units) are able to raise capital from diverse sources. The securities market, by implicitly charging firms different prices, allocates scarce capital among competing uses.
- (3) *Source of information.* The securities market provides information in the form of prices, which can be useful for making a variety of important economic decisions.

By borrowing or lending, an individual can choose to postpone or accelerate the personal consumption of his wealth. By investing in relatively low-risk securities, such as bonds, an individual can shift the bearing of higher risks to other individuals. However, since investors are, on balance, risk-averse — they can be induced to bear greater risk only if their investment promises greater average or expected return — low return will typically accompany investments of low risk. Thus, the securities market provides flexibility in matching the risk of investments with the preferences and opinions of different individuals. Not only are risks *redistributed* through the securities market, with greater expected return as the compensation for bearing the risk, but, to some extent, risk can be *pooled* through diversification to achieve reduced risk without sacrificing expected return. This occurs whenever two investments with the same expected return counter-balance each other: when one does well and the other does poorly or *vice versa*. In this case, combining them in a portfolio leaves the expected return the same but reduces overall risk.

Stock prices that properly reflect available information about corporate prospects play an important role in allocating resources among firms. Higher equity prices encourage firms to raise equity capital. Perhaps more important, equity

prices provide early signals to firms of the market's approval or disapproval of their actions. By this means, the preferences of investors and the aggregate wisdom of the marketplace are indirectly made available to corporate managers.

It is a basic principle of economics that prices produced in competitive markets provide participants in the economy with useful information for making a variety of economic decisions. In particular, an organized and active securities market brings to bear on security prices the pooled knowledge of all participants in the market. According to much of the evidence of "efficient markets", this pooled knowledge contains better predictions of future events than any participant or small group of participants can consistently discover on its own. Thus, the securities market performs an extremely useful economic function by making these superior predictions generally available.

These predictions improve current economic decision-making. For example, futures prices on commodity exchanges contain an estimate of future spot prices, which can guide current decisions to produce or to inventory commodities. Empirical analysis indicates that the anticipated rate of inflation in the near future can be deduced from U.S. Treasury Bill discounts. It is well known that recent past changes in stock market prices tend to be a leading indicator of general economic activity. Differences in yield to maturity of corporate bonds contain predictions about the likelihood of future bankruptcy. The so-called yield curve, showing the relationship at the current time among yields of bonds of differing maturity, can be used to estimate future spot interest rates. The yield curve itself can be directly used to determine discount rates in present value calculations for corporate investment decisions, where alternative projects have cash flows with different time patterns. One of the key problems of a financial economist is to learn how to unravel these predictions from security prices.

In general, the greater variety of securities provided by the market, the better the three functions given above will be performed. At one extreme a decentralized economy, such as that of the United States, would be seriously impaired if no securities were available. At the other extreme, we can imagine a securities market providing so many securities that no additional security could be created whose returns could not be duplicated by a portfolio of already existing securities. In the jargon of finance theory, the securities market would then be "complete".

Why are complete markets desirable? I will give two answers, a simple one and a more complex one. The simple answer is that complete markets are more desirable because they provide maximum flexibility for investors. Coincident with the ethical basis of western civilization, more choice is usually better than less.

The more complex answer relies on a version of the most important theorem in economic thought. We say a financial market is Pareto-efficient if no other set of securities can make some investors better off without making at least one other investor worse off. In a Pareto-efficient financial market, no change in the market would be unanimously approved by investors. The version of the theorem we will need says: *a complete market is always Pareto-efficient irrespective of the nature of*

investors, while an incomplete market must be Pareto-inefficient in some circumstances.

Nonetheless, an incomplete market may be Pareto-efficient. For example, consider the extreme case where all investors are economically identical, *i.e.*, they have the same endowed (initial) resources, preferences, and expectations. In this case, no trading will occur, since identical investors must hold identical positions. Prices on whatever securities that exist are set at such levels that each investor is content with his own resources. The fact that no trading is desired implies that the financial market is Pareto-efficient and therefore no securities *need* exist. However, if investors were economically different, some trading would generally be desired. For example, investors very averse to risk may desire to exchange their initial highly uncertain pattern of returns for a relatively riskless pattern. In this case, a seriously incomplete market would probably be Pareto-inefficient. The unique feature of a complete market is its property of Pareto-efficiency irrespective of the economic identities of investors.

Unfortunately, a number of practical matters prohibit the creation of our idealized complete market. Chief among these are the difficulty of writing specific and enforceable contracts to cover certain contingencies (such as options on future labor income), the costs of exchanging securities (*i.e.*, transactions costs), and government regulation.

In view of the practical impossibility of creating complete markets, we need to ask two questions:

- (1) Given the traditional securities issued by firms, what other securities can be created which will move the financial market toward completeness without excessive transactions costs?
- (2) Are investors sufficiently similar that maximum welfare can be approximated closely with only a few securities in addition to the basic set of securities issued by firms? If so, which securities are they?

These questions are central to the formation of efficiently functioning securities exchanges and financial intermediaries. The next part provides some answers to demonstrate the efficacy of options.

3. The role of options

Gambling usually refers to the purchase of a future monetary reward which may

- (1) be unproductive from a social point of view,
- (2) have a negative expected value,
- (3) be highly uncertain,

- (4) have a short time before payoff, or
- (5) arise from uninformed differences of opinion among several participants who bet against each other.

All five characteristics typify horse race betting. If options did not reduce the cost of diversification, could not affect corporate productive decisions, or did not lead to wider dissemination of useful information, they would probably be socially harmful, since they would tempt poorly informed individuals to unbalance their portfolio holdings away from prudent diversification and would generate unnecessary transactions costs. That is, from a social standpoint, the options market would be, at best, a zero-sum game, where the gain to society from its existence would be zero or negative. Since options must compete with other opportunities, options would have all the characteristics of gambles except (2) and none of the features of useful investments.

It is easy to dismiss options as mere gambling opportunities; it is harder to demonstrate that options perform a useful social function. I will now advance this more difficult and more interesting argument. First, I will consider options as an aid to individual wealth allocation; second, to firm resource allocation; and third, as a source of information.

Even cursory examination must lead to the conclusion that currently listed options considerably expand the range of investment opportunities in the securities market. For example, without options it may be impractical, through the use of other securities, to take a position which benefits fully from stock price increases but which is insured against the loss resulting from a decline. To accomplish this with options, one need only buy a put on a stock which would otherwise have been held by itself. To take another example, suppose you, as a potential investor, believe some important news is about to be made public (such as the results of a merger negotiation), which would have a significant impact on the market price of a stock, but you do not know in advance whether the news will be favorable or unfavorable. Simultaneously buying a put and a call on the same underlying stock might be an appropriate strategy. In this case you show a profit if the stock price makes a strong move — and it does not matter in which direction! If the price change is minor, you lose only the cost of the options, but without options you could not have safely taken advantage of your beliefs. This is a clear example, among many others, of the situation in which the availability of options adds flexibility to investment decisions.

Except where the ratio of the market price of a stock to the striking price of an option on that stock is very high, the change in the option price in response to a change in the price of the underlying stock is less than the stock price change. The ratio of the change in the option price to the change in the price of the underlying stock is known as the hedge ratio, Δ , and it represents the number of shares an investor must hold for each option sold in order to have a portfolio that is riskless for small price changes. Suppose the hedge ratio is 0.5. In this case if the price

of the underlying stock changes by $\frac{1}{4}$, the option price will change by $\frac{1}{8}$. If, for each share held, an investor sold two options, a $\frac{1}{4}$ point price increase (decrease) in the stock would exactly offset the $\frac{1}{8}$ point decrease (increase) on the two options the investor was short.

Since a short position of one call plus a long position of Δ shares of the underlying stock is the equivalent of a risk free portfolio for relatively small changes in the price of the stock, it is the equivalent of an investment in government (default free) bonds. It follows that the reverse, *i.e.*, a long position of one call plus a short position of Δ shares of the underlying stock is the equivalent of a short position in government bonds. A long position in one call is therefore equivalent to the short position in government bonds plus a *long* position of Δ shares. But that, in turn, is similar to a margined holding of stock. With the passage of time, all other things being equal, the values of options decline. To maintain an equivalent margined position, the investor would have to adjust his equivalent portfolio of stock and bonds so that the percentage margin would change. The call permits an automatic adjustment of the percentage margin with the passage of time [2], without incurring transaction costs. Furthermore, it is possible to use options in conjunction with stock to create a position which automatically changes in risk as the value of the stock changes. Consider a portfolio that is long in puts and the underlying stock. This is obviously a hedge position since it is protected against a fall in the price of the stock below the striking price. A portfolio of equivalent risk can be created by taking an appropriate long position in both the stock and a default-free bond. Note that if the stock price falls, both the stock/bond portfolio and the stock/put portfolio automatically become more conservative. However, once the stock price falls to the striking price, all the downside risk of the stock/put portfolio disappears. To achieve a comparable reduction in the risk of the stock/bond portfolio, the investor would have to sell all the stock and incur the associated transaction costs. Not only can these costs be avoided with the stock/put portfolio, but the investor retains the opportunity to recoup his losses until the put expires.

It can also be demonstrated that there are conditions under which options can be used along with or in place of stock to achieve more efficient portfolio diversification.

Under some circumstances, though fewer since the Tax Reform Act of 1976, the use of options may reduce taxes. This, of course, may represent a private but not social benefit.

Given existing margin requirements, calls provide a means of taking positions similar to buying stock, but with less capital. Since a purchased call is indeed equivalent (but without the transactions costs) to a carefully adjusted portfolio of the purchased underlying stock and default-free borrowing, option transactions may allow investors to lever at interest rates better than they face directly.

Similarly, buying a put is an alternative to shorting stock. Since the proceeds of a short sale must be left with the lender of the stock and margin rules treat short sales as though they were purchases, the cash outlay associated with buying a put is

much less than with a short sale. Given existing commission schedules for short term positions (*i.e.*, less than one and a half years), options may also provide a cheaper way to short the underlying stock [3].

Accompanying this practical view of options is a more abstract and fundamental interpretation from the academic literature. To make this intelligible, I will first need to introduce some terminology. A pattern of returns is defined as a set of identifiable portfolio outcomes, exhausting all possible future contingencies. For example, "\$ 50 if the Dow Jones Industrial Average is less than 1,000 at the end of the year and \$ 150 if it is equal to or greater than 1,000" is a pattern of returns. More generally, a pattern of returns may be associated with multiple and more complex contingencies, provided only that they exhaust all possibilities. "The returns on General Motors stock" defines a pattern of returns. The ability to form portfolios of different securities vastly multiplies the variety of patterns of returns constructable in the marketplace. The set of all possible patterns of returns constructable by forming portfolios of an existing set of securities is said to be the space spanned by those securities.

It seems natural to ask how ordinary puts and calls contribute to the patterns of returns constructable from their underlying stocks. Stephen Ross, Professor of Economics and Finance at Yale University, has provided an excellent analysis of this question [4]. His principle result, for our purposes, compares the ability of ordinary options to enrich the patterns of returns available to investors with the patterns of returns obtainable from "simple options". A simple option is a generalized form of option whose return is solely determined by the return of a *single* underlying stock. Ordinary puts and calls are just one example of simple options. Another example would be an option which paid the square of the value of the stock on an agreed date. That is, if the stock price on that date were \$ 50, the option would be worth \$ 2,500, and if its price were \$ 100, the option would be worth \$ 10,000. With little imagination we can think of many exotic kinds of simple options. In fact, the variety of simple options constructable from just one underlying stock is infinite.

Despite this, we have Ross' surprising proposition: *for a given set of underlying stocks, ordinary puts and calls span the same space as all simple options*. That is, nothing is lost in terms of investor opportunities to form patterns of returns, if only ordinary puts and calls are available but other simple options are not. Despite its abstraction, Ross' proposition may help explain the popularity of puts and calls.

I now turn to the second basic function of security markets, as an aid to resource allocation by firms. I have already argued that stock prices that properly reflect available information about corporate prospects assist the efficient allocation of real resources. Puts and calls, through a type of arbitrage with underlying stocks, increase the number and diversity of preferences and expectations that come to bear on equity prices. For example, if the prices of calls were to become too high, relative to the underlying stock, arbitrageurs could sell calls against a long

position in the stock. By this means, the stock price would rise, and the preferences and expectations of option investors would be reflected in the price. Options thus serve to increase the efficiency and liquidity of the stock market.

Finally, one can ask how options contribute to the third basic function of security markets, as a source of information. Like other securities the prices of options also contain implicit predictions about future events. For a given striking price and expiration date, and the current price and cash dividends of its underlying stock, the principal determinant of the value of an option is the anticipated volatility of its underlying stock return. Other things being equal, the greater the anticipated volatility, the more valuable the option. In an "efficient market", one can justifiably infer increased uncertainty surrounding the prospects of a firm if the premiums of its listed options increase [5]. The conventional method of estimating anticipated volatility is to extrapolate from observed past stock price volatility. By this reckoning, stocks which have been highly volatile in the recent past are to remain highly volatile in the future. This naive extrapolation fails to consider a myriad of events which can alter this pattern, such as capital structure changes, mergers, or increased stability of sales. In contrast, in a well-functioning market, the relevant up-to-date information relating to stock volatility will be brought to bear on, and can be inferred from the prices of options.

4. Special concerns of the Securities and Exchange Commission

Other than the gambling arguments considered above, the most common objection to option trading is that it might adversely influence the price and volume of the underlying stocks. In particular, trading activity might be diverted from underlying stocks to their associated options, and the resulting decreased liquidity might increase stock price volatility and dealer bid-ask spreads. Another hypothesis contends that the options market draws speculative capital away from the new issues market and low priced stocks. Finally, abnormal stock price behavior might be observed near expiration dates. These have been perennial concerns of the SEC.

In response, the Chicago Board Options Exchange completed its own internal studies and commissioned Robert R. Nathan Associates and more recently, Management Analysis Center, to investigate these issues by statistical procedures [6]. Both groups have concluded that the new listed options market has had little effect on other capital markets. A summary of the 1974 Nathan Report states:

The Chicago Board Options Exchange has been a useful and promising addition to the capital markets. Our study has not found any evidence that the CBOE has had an adverse effect on the markets for underlying stocks or on the markets for low-priced stocks or new issues. Rather, during a period of great uncertainty in the capital markets generally, the CBOE has attracted a number of investors to return to equity-type risks through the risk redistribution, risk limita-

tion, and various hedging strategies it makes possible. We believe this has helped improve the efficiency and fairness of the stock market itself.

However, until these findings have been confirmed by investigators wholly independent of exchange support, they cannot be viewed as definitive [7].

Beyond these statistical findings, there are sound economic reasons for presuming that options trading does not divert capital from the equity markets. Proponents of the equity shortage point of view overlook a basic economic concept. In contrast to stocks, corporate bonds, and warrants, securities such as puts and calls, whose values depend on an underlying security, tend not to divert capital away from investment in real resources. Puts and calls are issued by individuals and financial intermediaries, not by nonfinancial corporations. On the aggregate national balance sheet, stocks, corporate bonds, and warrants appear as offsetting items to real assets. However, as in the case of all forms of debt between individuals and/or financial intermediaries, options do not appear. The liabilities of option writers are cancelled by the claims of buyers so that the net investment in options is zero. Puts and calls are primarily a means of redistributing risk. A proponent of the equity shortage point of view must then answer the following question: since the funds used to purchase options are reinvested by the writers, what do they buy if not equities?

This counter-argument can be strengthened even further. Trading in puts and calls brings a greater number and variety of opinions to bear on the prices of equities. The additional information about volatility provided by options could convince some investors that the equity market involves greater risk than they otherwise believed, and others that it involves less risk. Whatever the net result, these potential influences on the equity market are socially beneficial. After all, prices in the stock market can be too high as well as too low.

A second general area of SEC concern has been the adequacy of surveillance of option trading at the exchange level. In particular, in its release No. 34-14056, the Commission cited the following specific concerns:

- (1) adequacy of exchange audit trails [8],
- (2) fictitious trades to influence market maker margins,
- (3) market maker wash sales for tax purposes,
- (4) proprietary trading to attract order flow,
- (5) intermarket price manipulation, and
- (6) front-running of block trades.

For each of these, I will examine the procedures used by the CBOE.

(1) Adequacy of exchange audit trails

The primary surveillance tool of the CBOE is its Market Data Report (MDR), a

computer-readable, time-stamped record of every transaction and bid-ask quote on its exchange floor. For example, the MDR might contain the following two computer records [9]:

01/05/77	12:13:01	PRD JUL 40 C	$3\frac{1}{4}$	$3\frac{3}{8}$	$37\frac{1}{2}$	
01/05/77	12:13:41	PRD JUL 40 C	5	$3\frac{1}{4}$	$37\frac{1}{2}$	RAP SIG

The first record says that on January 5, 1977, at twelve thirteen and one second Central Time, a bid-ask quote of $3\frac{1}{4}$ – $3\frac{3}{8}$ occurred for PRD/JUL/40 calls and at that time the last stock transaction price was $37\frac{1}{2}$. From the second record we learn that on the same date, forty seconds later, 5 PRD/JUL/40 calls traded at $3\frac{1}{4}$, for which the seller was RAP and the buyer SIG, and at that time, the last stock transaction price was $37\frac{1}{2}$. The exchange confirms the transaction information by subsequently compiling a Matched Trade Listing (MTL) from information on matched trades received from clearing members. These trades are then reported by the exchange to the Options Clearing Corporation. These two independently constructed versions of transactions on the floor are compared by computer, which produces the daily MDR-MTL Comparison Report. All market maker stock transactions cleared through OCC clearing members are also reported to the CBOE.

In contrast, while the New York Stock Exchange generates a computer-readable listing of stock transactions as they occur on the floor, this listing does not include the identification symbols of the floor traders [10]. Moreover, their record of cleared stock trades does not include about one-quarter of the transactions. The omitted trades are those for which both sides are cleared by the same brokerage house because it represented both the buyer and the seller, or those cleared through a regional exchange. It would appear that the CBOE audit trail is superior to the audit trail at the NYSE, despite the more complex organization of the options market (e.g., many different options on the same underlying stock and the competitive market maker system).

(2) Fictitious trades to influence market maker margins

Market maker margins have been marked according to the final ask prices for the day. If the market makers as a group tend to be on one side of the market in an option series, there may be an incentive to insert a closing ask quote considerably above or below the last trade. This may force the trade of a token single contract at a high price, if they tend to be buyers, or at a low price if they tend to be writers. Although it is unusual for the market makers to be on one side of the market, to meet this potential problem the CBOE has changed its marking system to use the last transaction if it lies between the closing bid and ask, and the closing ask if the last transaction lies below the bid and ask. Using its daily MDR, the CBOE also routinely checks the end of day market maker trades.

(3) Market maker wash sales for tax purposes

Market makers may engage in prearranged trades, which result in reported trades

on the tape, which are agreed to be reversed after the tax year. To identify this illegal behavior, on a daily, weekly, monthly, and quarterly basis, the CBOE creates computer-generated reports, constructed from the daily MTL, grouping all the trades by each market maker together. Special attention is paid to market maker-to-market maker trades and to trades executed by a floor broker on behalf of a market maker. These reports allow the exchange to detect reversals at the same price and volume, reversals at the same volume with a price differential, and other unusual trading patterns. Other reports with different formats are also used to enforce the rule requiring a market maker to complete at least fifty percent of his trades in his principal assignment and to detect violation of position limits almost immediately after they occur. The exchange has several employees whose principal task is to provide a continuous monitoring of market maker transactions utilizing these reports.

(4) Proprietary trading to attract order flow

The advent of dually listed options has created intensive competition among option exchanges. For each underlying stock, brokerage firms typically designate a single exchange as the "primary market". Unless a broker specifically indicates otherwise, the house's computer system automatically routes all orders in an underlying stock to the designated exchange. For example, although at one time both the Chicago Board Options Exchange and the Pacific Stock Exchange listed Bank America options, Merrill Lynch sent virtually all of its BankAmerica orders to the CBOE, since that was the designated primary market [11]. No attempt was made to check whether a better execution was possible on another exchange. Moreover, other brokerage firms tend to follow Merrill's lead. To earn designation as the primary market, the exchange usually selected is the one providing the greatest liquidity, often imperfectly measured by volume. Under these circumstances, members of an exchange have a strong incentive to trade solely for the purpose of creating the appearance of liquidity.

When the CBOE became aware of this behavior, it took several steps to end it, including improved surveillance of market maker transactions, and published volume data separating public from proprietary trades.

(5) Intermarket price manipulation

It is frequently suggested that exchange members, with substantial short option positions, manipulate the price of the underlying security near the expiration date to prevent profitable exercise. This procedure is known as "capping". However, attempted capping is fraught with risk, and success is probably rare if not impossible, particularly in very active stocks. Nonetheless, the exchange makes a daily check on market makers with both substantial option positions and transactions in the underlying stocks.

(6) Front-running of block trades

"Front running" occurs when a firm or individual, knowing in advance that a

large block of stock is about to be traded, buys or sells options to profit from this information. When the CBOE first became aware of this practice, it filed a proposed new rule with the SEC, which would prevent exchange members from executing proprietary orders in options when they possess nonpublic information concerning an agreed block transaction (*i.e.*, 10,000 shares or more) in underlying securities. This prohibition would also apply to an exchange member who passes on nonpublic information concerning block transactions to a customer, who then trades on the basis of the information. The CBOE audit trail provides the capability for enforcement.

A similar strategy, "tape racing", occurs when a firm or individual knows of a price change in an underlying stock before it prints on the tape. To a great extent, this problem was eliminated when, at the request of the CBOE, the NYSE installed a high-speed tape.

The surveillance procedures of the CBOE are considerably more extensive than this brief survey can cover. Indeed, some aspects of these procedures are, for obvious reasons, confidential. Of course, all violations of Options Clearing Corporation and exchange rules cannot be completely eliminated or detected, and the rules themselves can no doubt be improved. Nonetheless, if judged by comparison with the current practice across the entire organized market for securities in the United States, it appears that the exchange has developed very sophisticated procedures for dealing with these problems and has been very sensitive to the peculiar aspects of option trading.

A final area of SEC concern involved the brokerage industry. In its release, the Commission claimed it was aware of broker conduct in selling listed options involving communication of deceptive sales literature, churning of customer accounts, and recommendation of transactions unsuited to customers' financial means and investment objectives.

To reduce deceptive sales practices, each exchange member firm doing option business with public customers must appoint a registered options principal, who must be an officer or partner in the firm and qualify by passing a written examination on options. Before a registered representative (*i.e.*, a broker) of the firm can trade listed options for public customers, he must also pass an examination. Moreover, for each public customer, the registered representative must receive specific approval for listed options trading from his firm's registered options principal, and written approval by the firm's registered options principal is required for each discretionary [12] option order. Each public customer must submit a written agreement, acknowledging that his account will be handled in accordance with the rules of the Options Clearing Corporation and the options exchanges. In particular, he must agree not to violate the position and exercise limits.

Before commencement of trading, the registered representative is required to deliver the prospectus of the Option Clearing Corporation to his customer, and the prospectus must accompany any distribution of option sales literature, market

letters, research reports, or exchange educational materials. Moreover, all distributed information generated by the firm must first be approved by the firm's registered options principal and then by the options exchanges.

Unfortunately, none of these precautions can assure that the customer will read the prospectus, let alone understand the risk-return implications of option trading. Even after more than six years since the opening of the CBOE and extensive exchange efforts to educate the public, options remain an arcane and complex subject to most investors. The high commissions per dollar invested, the ability to generate more transactions through covered positions which conserve margin, and the forced turnover due to the relatively short maturities of options can lead, without careful management, to excessive transactions costs and little hope of profit commensurate with the risk borne. These conditions, together with the high risk potential of indiscriminately selected option positions, can make investments in options dangerous for uninformed investors.

Because of the potential for options to generate high commissions, an uninformed investor becomes particularly vulnerable if he permits his broker to trade his account on a discretionary basis. To be sure, the customer is sent a record of every transaction, but this information is often incomplete or difficult to summarize. Brokerage firms are charged with policing the suitability of options transactions, particularly for discretionary accounts. Nonetheless, there have been several instances of intentional churning of discretionary option accounts which, for various reasons, have been permitted to continue for two or three years before reaching the customer's attention.

As these improper brokerage practices meet with judicial remedy, new standards will be needed to gauge excessive turnover in option-oriented accounts. For equity accounts, a turnover rate of more than six times per year has been regarded as *prima facie* evidence of churning [13]. From an economist's point of view, this standard is unfortunate. Since different types of securities, or even the same securities traded under different conditions, have different commission rates, turnover does not adequately reflect the level of commissions in the account. It would be better if the courts focused on the ratio of annual commissions to the average market value of the account during the year. This measure indicates the rate of return required in the account simply to break even (*i.e.*, cover commissions). With a one percent one-way commission rate on stock, an annual turnover of six times is equivalent to a twelve percent annual commission cost-to-value ratio. Since option commissions per invested dollar are about two and a half times stock commissions, the turnover standard for an option-oriented account should be *lower* than for a pure equity account. For example, if equity and option transacted dollars are split two-thirds and one-third respectively, then an annual turnover of only about three and one-third times would be needed to produce a twelve percent annual commission cost-to-value ratio. In this case, to be consistent with treatment of equity accounts, a turnover of three and one-third times per year would be *prima facie* evidence of churning.

5. Conclusion

In an era of unprecedented development of organized option markets, we have seen that there are sound economic reasons for the increasing popularity of options. Options considerably enrich the menu of available investment opportunities, they should increase the allocative efficiency of the securities market both for the individuals and firms, and they provide valuable predictions of certain aspects of future economic activity. Moreover, in many cases they accomplish this with less capital required and lower transaction costs than comparable positions in common stock.

The arguments that option trading adversely influences the price and volume of underlying stocks, or that the options market draws speculative capital away from the new issues or venture capital markets, are economically weak and empirically unsupported. Compared with other sectors of the securities market, the self-regulatory rules and procedures of the Chicago Board Options Exchange appear to be quite sophisticated and sensitive to the peculiar aspects of option trading.

The single weak strand in this fiber is the failure of some brokerage firms to provide adequate protection for their customers, particularly those with discretionary accounts.

Notes

[1] A *call* is an option to *buy* a fixed number of shares of a specified common stock at a fixed price at any time until a fixed date. A *put* is similar except that it is an option to *sell* shares. The fixed price is termed the *striking price* and the fixed date, the *expiration date*.

[2] This interpretation of an option first appeared in the already classic article on option pricing, Black and Scholes, *The Pricing of Options and Corporate Liabilities*, 81 *Journal of Political Economy* 637 (1973).

[3] For an analytical comparison of stock and option margin requirements and transactions costs see Rubinstein and Cox, *Options Markets*, chap. 3 (Prentice-Hall, forthcoming 1980).

[4] Ross, *Options and Efficiency*, 90 *Quarterly Journal of Economics* 75 (1976).

[5] Among option investors, one often hears that it is a good time to buy options because option prices are low relative to the past. A believer in "efficient markets" would, instead, infer that volatilities on typical optioned stock are low relative to the past. He would therefore not conclude that options are underpriced. His conclusion would be strengthened if interest rates had remained unchanged.

[6] See Robert R. Nathan Associates, Inc., *Review of Initial Trading Experience at the Chicago Board Options Exchange* (December, 1974); Management Analysis Center, *The Impact of Exchange-Traded Options on the Market for New Issues of Common Stock of Small Companies* (June, 1977).

[7] The SEC itself conducted a study of these matters but did not release its findings for public scrutiny. However, reports in the press indicate the study more or less confirms the CBOE supported studies.

[8] An audit trail is the information in available records for reconstructing a transaction from its inception to its completion. A complete audit trail makes it possible to identify all parties to, and the timing of the steps in, a transaction.

[9] For ease in reading, the information in each record has been somewhat reorganized. Transaction prefixes indicating that a record is out of sequence, part of a spread order, *etc.* may also appear on each record.

[10] The NYSE record also only time-stamps the trade to the minute.

[11] Subsequently, the PSE has found it economically advisable to delist its BankAmerica options.

[12] In a discretionary account, the registered representative can place orders without prior approval of his customer. However, the customer is required to provide prior written authorization for any discretionary power he delegates.

[13] Wolfson, Phillips and Rusio, Regulation of Brokers, Dealers and Securities Markets, sec. 2.11 (1977). Turnover is the dollar value of purchases during a period divided by the average net market value (*i.e.*, net equity) of an account. This measure would be improved, particularly for option-oriented accounts, if purchases were replaced with half of purchases plus sales.

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