

g. Conversion - Reverse Conversion Positions

The net capital rule as it applies to OCC members carrying market maker accounts recognizes that the combination of certain stock and options positions and certain multiple options positions reduces the risk associated with each separate position. Accordingly, the equity requirements for offsetting stock and options positions (hedges), long options versus short options positions (spreads) and offsetting positions in puts and calls (straddles) are lower than the aggregate requirements would be for each separate component of such combinations. The risk limiting nature of certain other options combinations, however, are not currently recognized in computing the equity requirements for market makers. These combinations include a put, a call and the underlying stock, or offsetting options positions that are equivalent to long or short stock positions.

A short call, long stock and long put position (generally called a conversion position) or a long call, short stock and short put (a reverse conversion position) limits the loss or profit to a fixed amount when both the put and the call have the same exercise price and expiration date. The same risk limiting effect is true of options conversion equivalents, that is, one put and call position with the same exercise price and expiration date offset by another put and call position which has the same expiration date as the first but a common exercise price which is different from the first. Although the Commission's net capital rule

recognizes the risk limiting nature of a conversion or reverse conversion position in computing the net capital requirements for upstairs dealers trading off the floor of an exchange, they are not recognized in the net capital rule with respect to computing the equity requirements for market makers.

The net capital rule for OCC market maker clearing firms currently requires in a conversion position that the call offsetting the stock be treated as a hedge and the put treated as an uncovered position and that the options conversion equivalent be treated as two separate spreads. This treatment often results in a deduction in computing net capital that is in excess of the maximum possible loss on these options positions. For example, in the following position the maximum loss is \$187.50, but the equity requirement for the market maker holding the position currently would be \$1,047 based on the assumed premium and market values shown. If the same position was held by an upstairs dealer the net capital deduction would be \$187.50.

		Premiums Received (paid)	Current Equity Requirement
		\$	\$
Put	sell 1 JAN 280 @ 12-5/8	1262.50	946.88
Call	buy 1 JAN 280 @ 13-1/2	(1350.00)	
Stock	sell 100 IBM @ 279	27,900.00	100.00
	Net Equity Requirement		\$1046.88

Accordingly, the Options Study recommends:

THE COMMISSION SHOULD CONSIDER REVISING ITS NET CAPITAL RULE TO LIMIT THE NET CAPITAL DEDUCTION FOR MARKET MAKER OPTIONS CONVERSION, REVERSE CONVERSION OR EQUIVALENT CONVERSION POSITIONS TO THE MAXIMUM POSSIBLE LOSS ON THESE POSITIONS PROVIDED THAT IN BOTH CASES THE OFF-SETTING PUT AND CALL OPTIONS HAVE THE SAME EXERCISE PRICE AND EXPIRATION DATE AND ARE TRADED ON AN EXCHANGE.

h. Financial Requirements of Upstairs Dealer Firms

The financial requirements applicable to the options business of upstairs dealers that trade off the floor of an exchange are substantially different from those established for an OCC member carrying market maker accounts. The requirements for the market maker clearing firms' short options positions recognize that a liquid market exists where listed options are bought and sold at regularly quoted prices. The parallel requirements for upstairs dealers, on the other hand, are based on the assumption that no secondary market for the options exists and that the options will inevitably be exercised.

In computing net capital the Commission's net capital rule currently requires upstairs dealers to:

- Treat premiums received for writing transactions as income;
- Treat the cost of acquiring options positions as an expense;
- Maintain net capital on the basis that options positions will be exercised.

The Commission explained its net capital treatment for options positions held by upstairs dealers and the net capital deductions (haircuts) that resulted from this treatment as follows:

These haircuts follow existing industry practice; the Commission believes, however, that it is appropriate to review on a continuing basis the level of haircuts to be applied to options positions and to make future adjustments as more experience is gained with the operation of option markets. In particular, the provisions with respect to haircuts on long options may be reviewed to establish an appropriate relationship between haircuts applied to the securities underlying options and the relatively higher volatility of options compared to the underlying security. 40/

The existing industry practice referred to by the Commission had been developed with respect to conventional options traded in the over-the-counter market prior to listed options trading. When these net capital requirements were being analyzed the development of a listed options market was still uncertain. 41/ The Options Study compared the impact of the current requirements for upstairs dealers with those that would result from basing the net capital deductions on the requirements applicable to market maker clearing firms.

The Options Study has concluded that the current net capital deductions for the upstairs dealer do not reflect the risk limiting feature of certain options strategies nor the effects on risk of

40/ Exchange Act Release No. 11497 (June 26, 1975).

41/ The Commission's first proposal to adopt a uniform net capital rule was published on December 5, 1972, Exchange Act Release No. 9891 (December 5, 1972).

a secondary trading market. The current assumption underlying the net capital rule as applied to upstairs dealers, that the options will be exercised, is no longer valid. Of the 22.4 million CBOE traded option contracts purchased by public customers and firm proprietary accounts which had a 1977 expiration date, only 1.1 million, or 5.1 percent, were exercised. 42/

The disparate treatment accorded upstairs dealers as compared to OCC market maker clearing members was shown in one example given by an upstairs dealer where the capital requirement for his options positions was \$526,400 compared with \$146,700 had the same positions been subject to the market maker requirements. 43/ Another upstairs dealer showed that his options positions were subject to a \$392,552 net capital requirement compared to a \$66,018 net capital requirement if these same positions had been held in a market maker account. 44/

This difference in the net capital requirements for options positions held by upstairs dealers and in market maker accounts can be demonstrated by the following hypothetical options spread:

<u>Options Position</u>	<u>Premiums Received or (Paid)</u>	
Long 1 July 30 @ 8	(\$ 800)	Underlying Stock selling @ 35.
Short 2 July 35 @ 5	\$1,000	
Long 1 July 40 @ 3	(\$ 300)	

42/ The Chicago Board Options Exchange, "Market Statistics", 1978.

43/ Letter from Wedbush, Noble, Cooke, Inc., dated August 10, 1976.

44/ Letter from Kaufmann, Alsborg & Co., dated April 21, 1977.

This type of position, generally called a "butterfly spread" involves the simultaneous purchase and sale of options in the same class, with the same expiration date, so that for every two options the broker-dealer sells (at the same striking price), he purchases two options - one in the price series below, and one in the price series above, the price series at which the options are sold. The spread is a thoroughly hedged position in which the most that can be lost (if the spread position is held to expiration) is the difference between the amount received from the sale of the options and the amount paid to purchase the options (\$1100-\$1000 or \$100 in the above example). The loss would occur if, at expiration, the stock sold at 30 or less, in which case all the options would be worthless, or at 40 or above, in which case the dollar gain from each of the two long positions would be offset by the dollar loss from each of the two short positions. The profit and loss on the above butterfly spread at different stock price levels is shown in the following table.

<u>Price of Stock</u>	<u>Below</u>												
	<u>30</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	<u>41*</u>
Val. of Jul 30s	0	0	1	2	3	4	5	6	7	8	9	10	11
Val. of Jul 35s	0	0	0	0	0	0	0	1	2	3	4	5	6
Val. of Jul 40s	0	0	0	0	0	0	0	0	0	0	0	0	1
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Profit/Loss:													
Long 1 July 30	-8	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3
Short 2 July 35s	+10	+10	+10	+10	+10	+10	+10	+8	+6	+4	+2	0	-2
Long 1 July 40	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-2
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Net Profit/Loss	-1	-1	0	1	2	3	4	3	2	1	0	-1	-1

* Net profit/loss at all prices above 40 will be -1.

The current net capital rule as applied to upstairs dealers makes no allowance for such spreads. Instead of treating the entire spread as a unit, the current treatment under the net capital rule only allows consideration for two elements of a spread position. In the above example, the butterfly spread of one long July 30, one long July 40 and two short July 35s is treated as two separate spreads, consisting of two elements each:

Spread I: one long July 30; one short July 35

Spread II: one long July 40; one short July 35.

Treated separately "Spread I", has a maximum three point risk of loss if the stock sells at 30 or below at expiration and "Spread II" has a maximum three point risk of loss if the stock sells at 40 or above at expiration. Under the current net capital rule the combined risk or loss from "Spread I" and "Spread II" is six points and the net capital deduction is \$600. When Spread I and Spread II are combined as a butterfly spread, however, the total risk of loss is only one point (\$100) regardless of the underlying stock price, as shown in the above table. A net capital charge of \$600 in light of the \$100 at risk is excessive. Moreover, it should be noted that had the same position been in a market maker account it would be subject to a \$50 equity requirement since the market maker

requirement is based on the net long or net short value of this position. The total long value is 11 (1 July 30 @ 8 plus on July 40 @ 3) and the short value is 10 (2 July 35s @ 35) for a net long value of 1. As previously explained this net long value would be subject to a 50 percent requirement or \$50. One upstairs dealer commented to the Options Study on the net capital requirements as follows:

[W]here new capital cannot be easily raised, it is incumbent upon the SEC to see that its rules permit the full utilization of existing capital. Unfortunately, this is not presently the case. Although many instances where rules requiring capital in excess of that needed for prudent business reasons can be cited, I will limit myself to two examples both involving option arbitrage. Both of these deal with the net capital treatment of certain types of option positions by firms other than exchange market makers. The Commission has encouraged and indeed has made it easier for market makers on the floor of the exchanges to utilize their capital more freely. We fail to see why those firms which are not acting as market makers on the floor, but have chosen to provide liquidity as upstairs traders and arbitrageurs are inhibited by net capital rules which treat their positions much more restrictively. 45/

Based on its study of the equity requirements of some 870 market maker accounts during the April market surge the Options Study believes that the net capital requirements applicable to market maker clearing firms and market makers provide an appropriate foundation upon which to develop appropriate net capital requirements for options positions held by upstairs dealers. The provisions applicable to firms carrying market maker accounts, however, take into consideration certain day-to-day early warning and control devices, assume an arm's-length

45/ Letter from Oppenheimer & Co., Inc., dated July 12, 1978.

review by an independent clearing firm, and recognize the limitation on the amount of market maker business a clearing firm may carry. The proprietary options positions held by upstairs dealers, are not subject to these controls. Accordingly, any revision to the net capital rule to recognize the limitation on risks of options combinations and options spreading strategies in the accounts of upstairs firms should provide for greater net capital requirements than are currently required for market maker accounts which are subject to these controls.

Although the approach to the options net capital requirements for upstairs dealers should be the same as that applicable to market maker clearing firms, the Options Study believes that the deduction for all short options positions not hedged by stock should be 150 percent of the market value of the options because there is no day-to-day early warning and control device or arms-length review by an independent firm as there is with respect to the market maker accounts carried by an independent market maker clearing firm. For the same reasons, if such options positions are not offset by other options positions, the net capital deduction should be five percent of the market value of the underlying stock, or 150 percent of the options market value, whichever is greater.

Accordingly, the Options Study recommends:

THE COMMISSION SHOULD CONSIDER REVISING ITS
NET CAPITAL RULE TO ESTABLISH REQUIREMENTS
FOR UPSTAIRS DEALERS THAT TAKE INTO CONSIDERATION
THE EFFECTS ON RISK OF SPREADING STRATEGIES
IN LISTED OPTIONS AND THE EXISTENCE OF A
SECONDARY MARKET IN OPTIONS.

OPTIONS SPECIALIST STOCK CREDIT

The Federal Reserve Board ("FRB") and the self-regulatory organizations have adopted margin regulations governing the amounts which broker-dealers may lend in connection with securities transactions and holdings. The Options Study is recommending that certain revisions of these regulations be made to enable options market makers to better use stock to hedge against the risks they incur in maintaining an options market in a manner which, at the same time, would prevent options market making credit from being used to speculate in stock underlying options.

Regulation T of the FRB's margin requirements prohibits a broker-dealer from financing more than a specific percentage — currently 50 percent — of a customer's initial purchase of an eligible equity security. In addition to the FRB's initial requirements, the self-regulatory organizations have adopted their own minimum margin maintenance rules to assure broker-dealers a degree of protection should the customer's securities positions they finance decline in value. These margin maintenance requirements provide that the customer must at all times maintain on deposit with the broker-dealer, cash or securities having a value at least 25 percent greater than the amounts borrowed from the broker-dealer by the customer. As a result, broker-dealers generally retain collateral in the form of securities with a value equal to or exceeding 133 percent of the amount extended to customers to finance their holdings of securities on margin.

The FRB margin requirements were originally adopted in 1934 because of Congressional and FRB concern, that grew out of the 1929 stock market decline, with (1) securities speculation; (2) the large amount of loans outstanding to finance securities purchases compared to total loans extended by banks; and (3) the amount of the nation's credit being used to finance securities purchases and holdings. As a result of the rapid expansion of credit in other segments of the economy since 1929, the amount of credit extended to finance securities purchases and holdings now are less than one percent of all outstanding credit, as compared to 35 percent in 1929. But the regulation of margin is still considered important (1) to help prevent customers from over-extending their financial resources, (2) to prevent broker-dealers from becoming financially vulnerable to customer credit risks, and (3) to limit speculation in the securities markets.

Before trading began in listed options, the margin requirements for options were established by the various national securities exchanges. In early 1973, after listed option trading began, the Commission, at the request of the FRB, included options within its "Definition of the Term Equity Security" in Rule 3a 11-1, under the Exchange Act. Thereafter, the FRB amended its margin regulations to (1) prohibit broker-dealers from providing any credit for the purchase of options; (2) prohibit the use of margin required on the sale of uncovered options from also being used as margin to purchase other securities; and (3) include options under its credit regulations applicable to bank loans secured by securities, FRB Regulation U.

No margin is required on the sale of an option if the option is covered by the customer's underlying stock position. Beginning January 1, 1976, the FRB required broker-dealers to obtain a margin deposit for uncovered short options positions equal to 30 percent of the market value of the underlying security increased by the amount the option was in-the-money and decreased by the amount the option was out-of-the-money, with a minimum requirement of \$250. The proceeds of the sale of the option may be used toward meeting this margin deposit requirement.

1. SPECIALIST ACCOUNTS

Broker-dealers maintaining a market on the floor of a national securities exchange are subject to different margin regulations than those described above. A broker-dealer which is engaged in maintaining a market on the floor of a national securities exchange may maintain a separate "specialist account" in which are carried all transactions resulting from his market making activities. The maximum loan value of specialist securities carried in the specialist account, including any margin securities deposited in that account, may be determined by a creditor of the market maker in the creditor's own good faith judgment. As long as the market value of the securities in the account exceeds the liabilities in the account — that is, as long as the specialist account liquidates to a positive equity balance rather than to a deficit — the market maker is not required by FRB

regulations to make any margin deposit to the account. Any securities transaction by a market maker which is not in accordance with his market making responsibilities, however, does not qualify for this special margin treatment and must be carried by the market makers' creditor in a separate general account subject to the FRB's current 50 percent margin requirement applicable to customers generally.

The FRB has never defined the range of market making transactions eligible for good faith credit under its margin regulations. Instead it has relied on the definition of these responsibilities contained in the Exchange Act, Commission rules and regulations, and the rules of the national securities exchanges which register market makers as specialists.

The Commission's Rule 11b-1, "Regulation of Specialists", under the Exchange Act, provides that a national securities exchange may permit an exchange member to register as a specialist, as long as the rules of that exchange require the specialist to (1) maintain adequate minimum capital; (2) assist in the maintenance of a fair and orderly market in the course of its dealings for its own account; (3) restrict his dealings to those reasonably necessary to maintain a fair and orderly market, and (4) conform to general exchange provisions setting out the responsibilities of a specialist. In addition, the national securities exchanges must have procedures for the effective surveillance of the specialist's activities. 46/

46/ 17 CFR 240.11b-1 (1977).

Under these guidelines the CBOE, the PSE and the MSE designated their competing options market makers as "specialists". The AMEX and PHLX designated as "specialists" their unitary specialists in options as well as other members dealing for their own account on the floor with specified market making obligations, referred to by these exchanges as "registered options traders".

2. GOOD FAITH CREDIT

When trading in listed options began, certain of the options exchanges believed that a transaction by an options market maker in the underlying stock to hedge a market making options position was eligible for good faith credit. These exchanges permitted their clearing firms to finance these stock transactions on a good faith credit basis. The staff of the FRB disagreed and the FRB proposed to amend its rule governing credit for exchange specialists and market makers, first in December 1976, and later revised in April 1977.

Under the FRB April 1977 rule proposal an options market maker is eligible to obtain good faith credit for the following securities positions:

- All option positions resulting from transactions executed on the floor of the exchange where the market maker is registered as a specialist.
- All margin securities deposited in the market maker's specialist account.

Although the proposed amendments have not been adopted, the Commission has permitted OCC clearing firms to finance the market maker accounts they carry in accordance with the April 1977 FRB rule proposal as if it were in effect. 47/

The options market maker must deposit 25 percent margin for the following securities:

- Stock acquired to hedge an options position provided that there is no offsetting options position to the option position hedge and the option is not out-of-the-money by more than 5 percent.

The options market maker has five business days in which to deposit additional margin or liquidate a stock position in the following circumstances:

- A stock position acquired as a bona fide hedge becomes ineligible as a bona fide hedge (1) because of a move in the stock price which results in the hedged option being out-of-the-money by more than 5 percent, or (2) because the market maker acquires an options position which offsets the options position that is hedged with the stock (unless the stock again becomes a bona fide hedge under this definition during the next five day period). If the stock is not liquidated and the market maker had made an initial margin deposit of 25 percent, the additional margin required is 25 percent of the then market value of the stock.
- The market maker exercises a long options position or is assigned an exercise notice against a short options position.

47/ Letter to John T. McLoughlin, Vice President, AMEX, dated June 20, 1977, with copies to other securities exchanges.

- The market maker acquires stock underlying an option listed on the exchange where the market maker is registered as a specialist, and the acquisition is made while the market maker is on the floor of that exchange.

If a market maker engages in options transactions from off the floor of the exchange where the market maker is registered as a specialist, including transactions in dually listed options on another exchange, the options market maker is treated as a public customer and required to meet public customer margin requirements, except for transactions to close out an open options position.

The options market maker need meet only the FRB initial margin requirements with respect to his transactions and is not required to meet options exchange margin maintenance requirements as long as his account does not liquidate to a deficit. If the market maker's specialist account liquidates to a deficit he must eliminate that deficit by the next business day under the FRB April 1977 proposal.

Stock specialists are eligible for good faith credit on their specialist stock positions. The FRB April 1977 proposal requires stock specialists who are permitted to use options to hedge their specialist positions to deposit margin of 25 percent of the purchase price of the option.

3. FREE-RIDING AND BONA FIDE HEDGING

The practice of acquiring a stock position and liquidating it within five business days without making a required margin deposit is

called "free-riding". The FRB does not prohibit free-riding but all self-regulatory organizations have adopted rules which prohibit their broker-dealer member firms from permitting a public customer to engage in free riding. These self-regulatory organization regulations, however, have not been applied to market maker stock transactions. For that reason, an options market maker has five business days within which to liquidate a stock position without making any margin deposit when the stock was originally acquired as a bona fide hedge of an options position.

Some options market makers have made a practice of selling their stock within this five day period and then immediately repurchasing the stock to retain their stock position to avoid the necessity of putting up a margin deposit. This practice permits the options market maker to speculate in the stock underlying an option without being required to maintain a margin deposit and tends to create artificial volume in the stock markets to avoid maintaining a margin deposit. The Options Study does not believe that this type of activity contributes to an orderly market or to the financial integrity of the options market. Nevertheless, the Options Study understands that this practice is engaged in by some market makers for hedging purposes and is done to circumvent the restrictive FRB April 1977 proposal that permits a reduced 25 percent margin deposit for only those stock hedges which offset options that are five percent or less out-of-the-money.

Permitting a market-maker reduced margin only if stock is used to hedge an options position which is out-of-the-money by no more than five percent has been strongly criticized by the options exchanges because it restricts the ability of options market makers to use stock to hedge the risks of out-of-the-money options positions. This limitation also affects stock positions initially eligible for the reduced margin treatment because the market maker is required to increase the margin deposit to 50 percent, or to liquidate the stock position, if, either during the remainder of a day or at a later date (1) stock price movements results in "hedged" options becoming more than five percent out-of-the-money or (2) the "hedged" options are offset by other options acquired by the market maker.

The Options Study believes that, under existing circumstances, options market makers should have more flexibility in establishing stock positions to hedge the options risks they assume in carrying out their market making activities. Generally, an options market maker will attempt first to hedge his options positions with other options positions because he has time and place advantage on the floor of the options exchange in executing options transactions, and because of his low execution and carrying costs in options. At times, however, a suitable options hedge may not be practicable either because of a lack of liquidity in an appropriate put or call option, particularly an out-of-the-money option, or because the

market maker believes the premiums on the appropriate options hedge exceeds the costs to him of a stock hedge, or because an appropriate put option is not listed. Should additional put classes be permitted, this need to resort to stock to hedge options positions may be less.

The Options Study believes that the credit provisions should be revised to permit the options market maker to finance his bona fide hedging stock transactions through his clearing firm on a good faith credit basis even if the option is out-of-the-money. This type of financing is herein called "Specialist Stock Credit."

The amount of Specialist Stock Credit available to the options market maker through his clearing firm must be carefully defined to prevent Specialist Stock Credit from being used to finance stock speculation. To accomplish this goal, Specialist Stock Credit should be strictly limited to finance no more than the number of shares necessary to offset the decrease or increase in the market value of the hedged options position. In this way, Specialist Stock Credit will not be available to the market maker to speculate in stocks underlying listed options because any gain on the stock would most probably be offset by an equivalent or greater loss or gain on his options positions.

To determine whether a stock position represents a bona fide hedge of the risks of an options position, the ratio of expected options price movements to underlying stock price changes can be calculated using a mathematical formula based upon: (1) the current

risk free interest rates (United States government securities); (2) the exercise price of the option; (3) the market price of the stock; (4) the time to expiration of the option; and (5) the volatility of the stock computed from past stock price movements. This formula can be used to predict the number of shares of stock necessary to offset price movements in related options and is called an "options pricing formula". The Options Study believes that any position in an underlying stock obtained or retained in a market maker account in excess of that necessary, as indicated by an options pricing formula, to hedge an options position, or any stock position which does not underlie a qualified options position should be immediately subject to the full 50 percent initial margin requirement and be subject to the same margin maintenance requirements that apply to public customers.

4. OPTIONS PRICING FORMULA

The amount of premium for an option is influenced by many factors, including relatively stable factors such as interest rates, exercise price of the option, the time to expiration of the option and the historical volatility of the underlying stock. After these more stable factors have been considered by the market place, the premium for an option becomes directly related to the price of the underlying stock. A change in the price in the underlying stock will normally

cause a change in the price in the option. The amount of change in the price of the option compared to the stock, however, reflects the relationship of the stock price to the exercise price, the probability of exercise based on the historical volatility of the underlying stock and the time to maturity. Because of a low probability of exercise of a deep out-of-the money option, a small change in the price of the stock will have little, if any, effect on the options price. A deep in-the-money option, however, will move practically point for point with the stock since listed options can be exercised at any time.

The greater the price volatility of the underlying stock and the longer the time to expiration, the greater the chance that an out-of-the money option will move into the money. As time to maturity decreases, the likelihood of exercise also decreases. The opposite is true of an in-the-money option. The greater the volatility and the longer the time to expiration of an in-the-money option, the greater the probability that the option will move out-of-the-money before expiration. But as time to maturity decreases, the likelihood of exercise increases for an in-the-money option.

This relationship of price, volatility, time to expiration and short term interest rates can be mathematically demonstrated by mathematical formula, such as the Black-Scholes options pricing model set forth in TABLE VII-I, which determines the actuarial price of an option given the current stock price, options' exercise price, stock volatility, time to expiration and interest rate.

TABLE VII-I

The Black-Scholes Options Pricing Model

$$w(x,t) = xN(d_1) - c e^{-r(t-t^*)} N(d_2)$$

$$d_1 = \frac{\ln x/c + (r + 1/2 v^2)(t^* - t)}{v \sqrt{t^* - t}}$$

$$d_2 = \frac{\ln x/c + (r - 1/2 v^2)(t^* - t)}{v \sqrt{t^* - t}}$$

x = current stock price

c = exercise price

v² = the variance rate of return on the stock

t* = expiration date

t = current time

r = riskfree short-term interest rate

N(d) = the cumulative normal density function

w(x,t) = the option price at time t with stock price x

$e^{-r(t-t^*)}$ = value of discounted riskless bond with a face value of one that matures on the same date the option expires

v = value of the equity in the hedged position

ln = logarithm

N(d₁) is also the rate of change in option price with respect to the change in underlying stock price, and is used as an estimate of dollar delta.

The model assumes that:

- (1) The short-term interest rate is known and is constant.
- (2) The distribution of possible stock price is log-normal and the variance rate of return on the stock is constant.
- (3) The stock pays no dividend.
- (4) There are no transaction costs.
- (5) It is possible to borrow at the short-term interest rate.
- (6) There are no restrictions on short selling of securities.

The rate of change in the options price in relationship to stock price can be estimated by using a derivative of the Black-Scholes Options Pricing Model to provide an estimate of the change in an option's price given a \$1 change in the underlying stock price. This estimated rate of change, the "equivalent share delta," can be used to estimate the amount of stock that would theoretically hedge an options position against small price movements over a brief period of time. For example, a deep in-the-money near-term option most likely would have a "delta" of one -- meaning a ratio of one for one -- and would require a position of 100 shares of the underlying stock to fully hedge one options contract exercisable with respect to 100 shares. The equivalent share delta will never exceed one. On the other hand, an out-of-the-money call would have a delta of less than one; how much less would depend on the historical volatility of the underlying stock and time to expiration. If an option had a delta of .50 then 100 shares of stock would be necessary to hedge two options exercisable with respect to 200 shares.

The delta hedge formula only predicts small price changes over a short period of time. It is not designed to predict sudden and large movements in price during the day. Nevertheless, when sudden and large price movements do occur a newly-computed delta hedge ratio using the day's closing prices will automatically take the day's price changes into consideration to again predict small price movements for the next day.

The use of an options pricing formula to determine the equivalent share position that can be financed with Specialist Stock Credit requires the development by the Commission of a uniform formula to be used for regulatory purposes. Regulations regarding Specialist Stock Credit using an equivalent share delta will need to take into consideration that the equivalent share delta will be computed daily to reflect, among other factors day-to-day price changes in the underlying stock and time to expiration, and that the current equivalent share delta must be communicated to OCC clearing firms and market makers to permit them to adjust their stock and options positions.

Many options professionals use an equivalent share delta to adjust their risk positions to reflect the effects of changes resulting from price movements or other factors. In addition, some OCC members now perform a delta analysis of the market maker accounts they carry as a service to the market maker and as a means to assess their risk exposure as a creditor and guarantor of the market maker positions they carry. Further, many market makers, as well as upstairs dealers trading off the floor of the exchange, use an options pricing formula to determine equivalent share positions in establishing options spread positions and to determine whether some options are overpriced or underpriced in relation to the premiums for other options. There are also independent service bureaus and information processors that provide

their users with an options pricing formula. Accordingly, the Options Study believes that facilities exist for computing and disseminating a daily equivalent share delta for use by market makers and market maker clearing firms.

Because the equivalent share delta changes from day-to-day, a market maker may, without changing his positions, end up with a stock position that does not qualify for good faith credit, although it was fully qualified the previous day. To afford the market maker time to adjust his positions, the Options Study believes that market makers should be permitted to carry qualified securities in their specialist account in accordance with the greatest amount permitted as of that day or as of the preceding business day or such time period as may be demonstrated to the Commission as being necessary to permit market makers to adjust positions provided that the market maker only acquired or increased his positions in the stock in conformance with the equivalent share delta on the day of the transaction.

If a stock position exceeds the permissible amount that could be carried on a good faith credit basis due to a change in the equivalent share delta, the market maker should be permitted to liquidate his excess positions or adjust his positions rather than be required to make a margin deposit. Allowing the market maker his choice of liquidating or adjusting positions will give him maximum flexibility in using his capital in his market making activities.