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OPTION PREMIUM INDEX**

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For many years investors have used stock market indexes in a wide variety of applications calling for a summary measure of stock price levels. The development of exchange-traded call options has created a similar need for an option premium index to measure the general level of call option premiums. This index would answer such questions as: (1) Are current premium levels higher or lower than in some prior period? (2) What has been the trend in premium levels? We here respond to this need.

The call option premium index reported here is derived from two sources. May 1973 through December 1975 values are computed from an econometric model developed by Analytic Investment Management, Inc. Subsequent values are published by the Chicago Board Options Exchange.

The Analytic Model has the following functional form:

$$y = a_0 + a_1 x + a_2 x^2 + a_3 s + a_4 t^{\frac{1}{2}}$$

where

y = option price/exercise price
x = stock price/exercise price
s = volatility of stock
t = days to expiration

This functional form recognizes the non-linearity of option premiums with both the stock price and time to expiration and explains 90% to 97% of the variability of option price for the samples and time periods we examined. (See S.T. Kassouf, *A Theory and an Econometric Model for Common Stock Purchase Warrants*, 1965, pp 38-55).

For each month-end commencing May 1973 (the first full month of exchange-traded options) a sample was selected from actively traded options. Excluded from consideration were those observations where $x > 1.2$ or $x < .8$, thus eliminating very deep in or out-of-the-money options. Thus, our sample consisted of stocks with varying volatility characteristics, varying times to expiration, and varying striking prices relative to stock prices. A least squares linear regression yielded estimates of the a_i for each month end. Using these estimated coefficients we calculated the premium for a stock of moderate volatility (e.g. American Cyanamid, General Electric) with $x = 1$ and $t = 180$.

The CBOE Call Option Index (commencing in January 1976) is computed weekly using Thursday closing prices. The computation is done as follows: For each stock with call options listed on the CBOE a premium is imputed to a hypothetical six-month, at-the-money option using a weighted average¹ of the four call option series which most closely bracket this hypothetical option. This imputed premium is then expressed as a percentage of the current market price of the underlying stock. The Index is the average of these percentage premiums for all CBOE underlying stocks, with each stock given equal weight. The Index value for the Thursday closest to the month-end is taken as the month-end Index value.

The accompanying table displays the month-end Call Option Premium Index commencing in May 1973. A number of observations should be made regarding this index. (1) There is no clear relationship between option premium levels and the returns from an optioned equity portfolio (see Analytic's actual results in our most recent QUARTERLY REPORT). These returns are determined by numerous factors, only one of which is the general level of option premiums (see EXPECTED RETURNS FROM OPTIONED EQUITIES). (2) Option premiums fluctuate dramatically over time. Since May 1973 the average premium on a six-month, at-the-money call option has ranged from a high of 16.7% (November 1974) to a low of 6.9% (April 1977). From mid-1976 through mid-1979 the premium index has fluctuated in a narrow band between 6.9% and 10.6%. (3) The popular option evaluation models (such as the Black-Scholes Model) offer very little explanation for these observed premium fluctuations. These fluctuations are in part a reflection of changing interest rates, underlying stock volatility, and investor expectations and risk attitudes. While these models recognize the influence of interest rates and stock volatility on option premiums, they fail to recognize their dependence on investor expectations and risk attitudes.

1. For details, see *The CBOE Call Option Index: Methodology and Technical Considerations*, available upon request from the research department, The Chicago Board Options Exchange, LaSalle at Jackson, Chicago, Illinois, 60604.