Simplified Option Selection Method

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Options traders and investors utilize methods to price and select call and put options. The models and tools range from Black-Scholes, binomial & trinomial models, Adaptive Mesh model, and the "Greeks" also known as Delta, Gamma, Vega, Theta and Rho. These methods all provide measurements of risk, time and price sensitivities. Missing from practitioner and academic literature is premium cost versus time. This paper explores a simple method of choosing a call or put option based upon its cost per unit of time to assist in selecting options with similar strike prices and different time intervals of an options chain.

INTRODUCTION

Modern day options traders and investors use various models and methods to price and select equity, index, commodity, interest and exotic options. The models and tools range from using Black-Scholes, binomial & trinomial models, the Adaptive Mesh model, and other various models including the Greeks. The Greeks are also known as Delta, Gamma, Vega, Theta and Rho. These methods all provide measurement of risk, time and price sensitivities. All the models look at one or more of the six core elements: underlying asset price, volatility, strike price, interest rate days until expiration, and dividends (Ianieri, 2009) (McMahon, 2007). Many professional traders experience call positions losing value despite a rise in the underlying security (Longo, 2006). The pricing of the derivative not meeting strong correlative changes in the underlying asset is referred to as having a low Delta and low Gamma for slow correlative changes (McMahon, 2007). Price and time are two very important considerations when purchasing an options contract. A simple tool for practitioners to utilize and not discussed in the realm of academics is premium cost versus units of time.

REVIEW OF MODELS

The Black-Scholes model, first introduced by Fisher Black and Myron Scholes (1973) has various limitations and flaws detailed in many papers and textbooks over the years. For example, limitations to pricing American style options, exercise early to collect dividends; modified versions of the Black-Scholes model have been introduced to address pricing and risk and informational issues with the original model (Ianieri, 2009). Later Cox, Ross, and Rubenstein (1979) developed the binomial model sometimes referred to as the lattice model. The model assumes up or down spot price movement in the underlying asset and forms a two branch tree model. The Binomial model does recognize early exercise. However its choices for stock price movements is very limited and does not account for neutral or very small price movements in the underlying asset. Studies indicate that most stock prices only make major movements during short periods during the course of a year (Ianieri, 2009)

Due to the limitation of the Binomial model, the Trinomial model followed adding a third movement including sideways or neutral price movements in the underlying asset. The Trinomial model can account for a non-moving underlying asset value. The Binomial model did account for early exercise while not providing for neutral asset values negating volatility smile graphing. The Trinomial model allowed for neutral underlying movement thus allowing for volatility smile graphing. An improvement upon the Trinomial model was followed by the Adaptive Mesh model which uses the Trinomials 3 branches and then adds smaller branches or nodes. The Adaptive Mesh model is easy to use like the Binomial model, more accurate than the Trinomial model and allows for more accurate volatility smiles. The overall issue with these models is the assumption of the markets moving in a normal or Gaussian distribution not accounting for fat tails also known as kurtosis and skewness which translates into a log-normal distribution (Ianieri, 2009);(Haug & Taleb, 2010).

The lack of accounting for kurtosis and skewness led to the development of the VSK (volatility, skewness, and kurtosis). The VSK is based in part upon the Black-Scholes model and is adjusted to take into consideration skewness and kurtosis since equity returns are not normally distributed. The VSK model indicated to be accurate for pricing options with volatile underlying equity assets (Ianieri, 2009).

There are many other theoretical models for which is not the purpose of this paper to review all the models. Instead, to provide a basic overview for historical and conceptual context. In Jackwerth and Rubinstein (2001) stated that options traders often attempt to predict future implied volatilities through using simple rules from observations of current implied volatilities. Two methods of volatility smiles are generally used such as the Relative Smile and the Absolute Smile. The Relative Smile relates to the implied volatility for a fixed strike price varies, the forward price varies. The Absolute Smile relates to implied volatility being a fixed strike price while the fixed strike price does not vary with the forward price (Li & Pearson, 2007).

THE GREEKS

In reviewing the Greeks for option sensitivities, a tertiary discussion is required to add some context and may be used in conjunction with the model proposed in this paper to better choose or select options contracts, based on the various six core factors as well as cost over time. All the Greek formulations use past information to make decisions into the present and future which provides for the difficulty of predicting future volatility, pricing, and returns.

The first Greek is Delta. Delta is the measurement of change in the options value versus the underlying asset price. A delta ranges from 0 to 1.0 and the higher the Delta the higher the relationship of price movement. An option with a Delta of 0.80, with an underlying asset moves $1.00 in value equates to the option changing 0.80 cents in value. Generally options with higher Deltas are more expensive, in the money and closer to expiration (McMahon, 2007);(Ianieri, 2009).

The Gamma is many times used in conjunction with Delta, which provides how fast an options Delta responds to underlying price movements expressed as a percentage. Options with high Gammas have highly responsive Deltas. (McMahon, 2007);(Ianieri, 2009).

The next Greek is Theta, Theta relates to time decay and sensitivity. All options lose value over time as the option moves closer to expiration. Theta is not constant and time decay can have different effects based upon whether the option is in, at, or out of the money. Options with low Theta values decay slower and generally have more time to expire than higher Theta measurements (McMahon, 2007); (Ianieri, 2009). In regard to time, the proposed model in this paper accounts for time as part of the formulation. The cost of a contract based upon units of time evaluates the time aspect as it relates to costs spread out over time. Longer expiration contracts have generally lower Theta and lower costs per unit of time which can add additional value for longer term investors. This can translate into better sustained value over longer periods of time and potentially lower costs over time.

An additional measurement is Vega. The Vega relates to measuring rates of volatility changes. Two types of volatility exist: historical and implied. Historical volatility is a measurement of price movements over time providing a sort of standard deviation proxy. Implied volatility, used in many options pricing models, is basically a measure of pricing effected by supply and demand for the option (McMahon, 2007);(Ianieri, 2009).

The last major Greek measurement is Rho. Rho provides a measurement of the option value based upon interest rate movements. Because interest rates change slowly over time this measurement is used more for longer term options such as long term equity anticipation securities, also known as LEAPs (McMahon, 2007);(Ianieri, 2009).

The model being proposed in this paper is not competition to the various other models or claimed to be superior in a single element. However, the proposed model should be viewed and used as a compliment and enhancement tool for selecting option contracts from a chain or group of options and may be used as a bottom up or top down method to better select options for purchase. This paper also discusses the uses and components of the proposed model and how it may enhance option selection. While this is a qualitative paper and provides a conceptional framework, the usefulness of the proposed model may be a complementary tool to select options. The practitioner and academic literature does not address a simplified method for identifying options based upon the cost over units of time. While this is viewed as a common sense and logical approach, most of the academic literature uses continually more complicated methods based on volatility and corrections for skewness, kurtosis, and probability; to select and price options (Haug & Taleb, 2010).

The basic option value is the price or premium of the actual option contract that an investor purchases. The option price or premium is bifurcated into intrinsic value and extrinsic value. The extrinsic value is the difference or additional portion of the premium beyond the intrinsic value to provide the premium price. For example, an option that has a premium price of $5 and an intrinsic value of $3 has an extrinsic value of $2. The intrinsic value is spot price minus the strike price (S-K) if a call option or strike price minus the spot price (K-S) if a put option. A negative value is provided as a zero intrinsic value since the option is out of the money and not in or at the money (Vine, 2005);(Williams & Hoffman, 2001).

An option, if purchased as a put or call, can never have a negative value, unlike selling put or call options since investors would simply choose to not exercise an out of the money option, and the most an investor will lose is the premium paid (Ianieri, 2009);(Vine, 2005). However, the idea does not take into account that purchasing an out of the money option may be a way to purchase an undervalued option, based on time and lower premium costs, which could be profitable over time. In time, the added cost or benefit of the out of the money option should be weighed against the time element and not valued as zero when negative at the time of purchase. Since a positive outcome for intrinsic value reduces the premium to an extrinsic remainder and a negative intrinsic outcome, if greater than the premium, provides an added cost to the premium. Provides the catalyst to consider premium plus intrinsic value divided by a unit of time for initial option selection to decide which option(s) have the lowest cost per unit of time for initial purchases assuming the options are exercised.

OPTION SELECTION MODEL

The author proposes a new way to look at option selection based upon initial costs and divide by a unit of time. Part of the consideration is using intrinsic value as either a premium reduction or a premium additive to the cost structure assuming the option is exercised and does not waste away and retire worthless, resulting in the loss of the premium. Another consideration is transactional costs such as commissions or spreads can be added as additional costs to the premium. In or at the money options have intrinsic value priced into the premium however out of the money options in some cases may not fully price the intrinsic value into the premium since it is out of the money. An example would be an option with a $3 premium and a strike price of 100 and the underlying spot price is $90 which leave the option $10 out of the money yet the premium reflects a $3 cost. Assuming an exercise may occur, using the premium and intrinsic cost provided for $3 + $10 = $13 cost if exercised as a hurdle for profitability.

FORMULA FOR OPTION SELECTION METHOD

For purchasing a money call or put option, the formula is as follows:

$$Option\ Premium / Unit\ of\ Time$$

It is simple as taking the premium of the option and dividing it by a unit of time which could be any time measurement standardized to compare other options such as using weeks. An example: compare two call options with the same strike price, one with a premium of $5 for 13 weeks versus $10 for 48 weeks. Take option 1 and formulate $5/13 weeks which equals $0.3846 and option 2 formulates $10/48 weeks which equals $0.2083. The most cost effective purchase if held to or near maturity is option two. European style settled options are held through maturity, exercised or expire worthless unless sold before expiration. The American style settlement option can be exercised at any time which based on various market conditions and technical events could be exercised at anytime or allowed to expire with only the premium lost. There is no method to accurately determine in the future an options traders actions or changes in economic or market conditions. All pricing models have various flaws and disadvantages. For selecting option(s) from an options chain, with the same strike price and different time periods using the option selection model provides a tool to select lower cost option premiums over time especially for LEAPs options and European settlement style options.

An out of the money put or call option, which has a negative intrinsic value, should be added to the premium as an added cost if assuming exercise and going beyond the premium loss assumption is helpful.

Purchase Out-of the-Money Call Option:

$$P + (S - K) / T$$

Purchase Out-of the-Money Put Option:

$$P + (K - S) / T$$

P = Premium paid for option (include transaction costs)
S = Spot Price of underlying asset
K = Strike price of option
T= Time

The next logical step is pricing which call or put option to sell within the same strike price to select within an option chain may be accomplished. The same basic formula of the premium divided by time unit(s) is required except premium received divided by a unit of standardized time is utilized. Since the seller of the call or put depends on the premium as income, the opposite holds true for the ratio outcome. The seller of the call or put option seeks a higher ratio not lower since the premium is income, not an expense to the seller. Predicting the market changes and exercise probability is not accurate and irrelevant to this basic point of initial option selection based upon initial premium and time.

CONCLUSIONS AND LIMITATIONS

The limitations using the model proposed for option selection, much like many of the pricing and sensitivity models discussed as a precursor, include using present information to make a future decision. An American settlement style option provides for early exercise may disrupt the premium cost over time since the time period may be shorter if an early exercise of the American style settlement option. Future research can include using the proposed selection model in actual purchase and sales of random contracts of various maturities and back-testing to see if the model provides for lower costs or better selection for profits if exercised over various time periods. Additional quantitative testing may include using the proposed model along with various Greek methods for a top down or bottom up selection process and use in conjunction with various pricing models. There is a large amount of quantitative finance studies in the area of volatility smiles and pricing and volatility influence. Further research into the influence of the proposed selection model in this paper in conjunction with volatility smiles may be found to have an influence and could add further to the body of knowledge in this area of options research.

Further research into how this foundation papers option selection model may identify maximization or efficiency with option selection using Theta as a measurement and price maximization. In addition more research may be conducted to measure other Greek measurement outcomes using the proposed option selection ratio. For the practitioner this method may provide a selection and pricing advantage and identify shifts or changes in profit and risk outcomes.

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