CAN OPTION WRITING ADD PROFITABILITY?

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ABSTRACT

The potential for earning a profit through covered call selling and related activities is examined.. Many individuals and organizations hold substantial common stock portfolios. An active market for put and call options on many stocks is readily available. The aspect of the added option strategy process examined is the possibility of identifying a protocol allowing profitability on an existing portfolio to be increased with the addition of option writing. In essence, the question addressed is whether a typical buy-and-hold portfolio's performance can be enhanced through the addition of conservative option trading strategies.
The popular financial press and advisors often promotes using option contracts to enhance portfolio returns. Several academic studies have produced negative assessments of the process. These competing ideas are analyzed. The risk considerations that normally confound results in these studies are abstracted from through a comparison portfolio that sustains the same risk with and without the option addition. The fundamental notions of portfolio management necessary for this activity are first set forth. Then techniques for managing transactions with and without option contracts are reviewed. Replicating traditional actions such as limit orders with option contracts is demonstrated for both limit buy and limit sell orders. The benefits and costs of each alternative are analyzed. Finally, the methodology for ascertaining performance is examined and a protocol for including options is provided.

TRADITIONAL PORTFOLIO MANAGEMENT

The essential structure for managing portfolios has long been to identify a collection of securities to own, buy them and hold them until alternate securities are deemed superior. Then the inferior securities are sold and replaced by the new superior securities. The major controversy has been between a buy-and-hold strategy and an active trading strategy. That is, how frequently should portfolio managers seek to restructure their positions?

Two ingredients typically control the desirability of buying a stock, its expected dividend payments and price appreciation. Establishing a new position in an identified security is a seemingly simple practice. All one needs to do is to issue an order to an appropriate broker to buy a selected security. Getting rid of a security is simply the reverse. An investor studies the universe of available securities, evaluates and compares alternatives, and finally selects the assortment of securities and amounts for purchase. Given the available funds and selected assortment, the allocation process determines how much money to designate for each selected security. Usually the mechanics of acquiring the securities is ignored. In most cases presumably, acquisitions are made with simple market or limit orders as assessments indicate are appropriate. Below an alternate strategy for entering, managing and exiting positions in a portfolio is described. By employing this technique, earning potential is added to the security

acquisition, holding and sale processes. The introduction of option writing thus contributes to a portfolio's earning potential.

THE TECHNIQUE OF COVERED CALL WRITING

Writing covered calls is a practice that holders of large portfolios have employed for years. Long before the Chicago Board of Options Exchange (CBOE) was created investors frequently wrote covered calls. The market was unsophisticated and inefficient, but it has long existed. The basic philosophy of investors who write covered calls is that they are simply putting their investments to work in an additional way. In fact many of the covered call writers actually sold a form of straddle as they were then known. Rather than simply selling call options, these investors sold straddles that were composed of both a call and a put. In effect their belief was that they were happy to own a particular stock while it was selling at a certain price. They were willing to sell if the price went higher and willing to buy if the price went lower. Brokers in turn helped find buyers for the options. Conventional wisdom of the time was that most people investing or speculating in the market were optimistic. This notion was invoked to explain the observed market characteristic of the calls tending to sell for more money than the equivalent puts. Since there was an equal supply of both calls and puts, brokerage firms that came to be known as conversion houses bought the less expensive puts, combined them with long positions in the stock and profitably sold calls that were backed by their synthetic call position. If the stock price increased above the exercise price by expiration, the broker simply delivered the stock and received the exercise price. If the stock price fell below the exercise price by expiration the broker simply exercised the put and delivered the stock in exchange for the exercise price. Thus, no matter what happened, the conversion house received the exercise price. The conversion house steps needed were to buy the put and stock and pay for holding the stock during the interval at a cost below the call premium received to make a profit. Hans Stoll eventually showed the underlying theory of what was happening. The conversion practice however is documented at least as far back as 1906.

Call options typically entitle owners to buy one lot of stock, the underlying security, at a pre-agreed exercise price by some expiration date. The payoff to owners of call options is thus asymmetric. When a security's price is below the call's exercise price at expiration, there is no reward to owning a call. Such an option is said to be out-of-the-money. If someone desired to buy the stock, they would be better served by buying in the open market than by buying it at the higher exercise price. Under such conditions the call expires worthless. If the security at maturity is above the exercise price the payoff to call owners is the market price of the underlying security minus the exercise price. Such an option is said to be in-the-money. The call will be exercised and its owner effectively buys the shares at the lower exercise price.

Owners of call options acquire them from others in exchange for a premium. Thus profitability from owning a call option that profitably matures is the security's market price minus the exercise price minus the call premium. Call options are written by investors who may or may not own the relevant underlying security. If a call writer does not own the underlying security, he is said to be writing the call naked. Conversely, if the call writer simultaneously owns the security and writes a call on it, he is said to be writing a covered call. Thus profitability from writing a call option depends largely upon the stock's price at expiration. First consider a call that is written naked. If the stock's market price is below the exercise price at expiration, profit is the premium charged to the call buyer. If the stock's market price exceeds the exercise price, profit is the premium that was received upon selling the option minus the difference between the

stock's market price and the option's exercise price. It is quite possible that the difference between the market and exercise prices will exceed the premium. The result of that relationship is that a negative profit or rather a loss occurs. Since there is no limit on the upper price a stock can achieve the potential loss to a naked call writer is unlimited. A variety of transaction costs should also be considered.

Covered call writing involves one additional position above that of naked option writing. That position is the ownership of the underlying stock. Call writers with a simultaneous position in the underlying security are thus known as covered call writers. Their payoff consequently differs from that of naked call writers. As the market price of the underlying security increases above the exercise price of the option, the value of their underlying security owned similarly increases. Thus, the gain on the stock owned almost exactly offsets the loss on the call option written. Interestingly, the net payoff to a covered call writer duplicates the payoff profile realized by a naked put writer.

Many different styles of option contracts have been developed and used. Option contracts have different intervals during which exercise is possible. For example, contracts known as European can be exercised on and only on their expiration date. Contracts known as American can be exercised anytime from their creation until their expiration date. Bermuda contracts typically have predetermined occasions between creation and expiration when they can be exercised. Thus, just as Bermuda lies between Europe and America, Bermuda options can be exercised somewhere between the exercise dates of European and American options. Canary options have exercise opportunities between those characterizing European and Bermuda options. For example, Canary options might be exercisable on quarterly dates after a set time period such as one year. A great number of other characteristics can be applied to options which are then commonly known as exotic options in contrast to the commonly observed ones known as plain vanilla options. Although most options written on U.S. stocks are American style options, it can be shown that nearly all of the time; it is preferable to not exercise them until the option's expiration. The explanation of this phenomenon is that early exercise requires payment of the exercise price, whereas the option is valued with payment of the present value of the exercise price. Consequently, the option is usually worth more if its owner waits.

Some funds have attempted to benefit from writing covered calls on segments of their portfolios. The realized effect of this approach is often claimed to reduce risk without commensurately reducing return. For example the Gateway Fund claims in their web site, "The Gateway Fund offers returns that compare favorably to the equity markets on a risk-adjusted basis — but without the high volatility. Volatility of the Fund is comparable to many bond funds and is typically less than balanced funds and low-risk sector funds." [1] Another fund that attempted to benefit from writing covered calls, the West University Fund, began business in February 1996 was liquidated in February 2000.

One of the problems encountered by mutual funds that wrote call options is the wasting nature of their net asset values. Mutual funds or open-end funds as they are also known are bought and sold at their net asset value. Such cash flows as dividends and premiums earned on option sales are not automatically incorporated into net asset value. Consequently, a bias is introduced into a mutual funds net asset value when options are written over a period of time. Assets that have calls written against them are called away from the fund when those assets adequately appreciate before maturity. Conversely, assets that have calls written against them remain in the mutual fund's portfolio when those asset's values are below the exercise price at

[1] Gateway Fund, http://www.gatewayfund.com/gateway_efficient.asp accessed 9/15/07

maturity. It would be possible for a fund to continually write call options against a security and receive premiums for those options that greatly exceeded the price decline of the security, yet still experience a net asset value decline. Even if the premiums received for the exercised calls exceed the price appreciation, the effect is to reduce the fund's net asset value. This characteristic has the potential to inappropriately diminish the seeming quality of a fund.

THE TECHNIQUE OF SECURED PUT WRITING

Another practice that is less frequent, but equally able to adjust earnings on a portfolio through creative trading is writing secured puts. Put options typically entitle owners to sell one lot of stock, the underlying security, at a pre-agreed exercise price by some expiration date. The payoff to owners of put options is thus asymmetric. When a security's price is above the exercise price at expiration, there is no reward to owning a put. If someone desired to sell the stock, they would be better rewarded by selling in the open market than by selling it at the lower exercise price. Under such conditions a put expires worthless. If the security's market price at maturity is below the exercise price the payoff to put owners is the exercise price minus the market price of the underlying security. Owners of put options acquire them from others in exchange for a premium. Thus overall profitability from owning a put option is the exercise price minus the security's market price minus the put premium. The notion of writing naked puts differs from writing naked calls. If the put writer holds the cash for purchasing the stock, he is said to be writing a secured put. The put is secured by the cash that will be used to purchase the stock if the put expires in-the-money. Thus profitability from writing a put option depends upon the stock's price at expiration. If the stock's market price is above the exercise price, profit is the premium charged to the seller. If the stock's market price is below the exercise price, profit is the premium less the difference between the stock's market price and the put's exercise price. Thus, just as with writing a naked call, writing a naked put can produce a loss. However, the maximum loss with a naked put is constrained to the exercise price less the premium. That results from the downside limit of zero on a stock's price. Again a variety of transaction costs can also be considered.

COVERED CALL AND SECURED PUT WRITING STRATEGIES

Most market participants are familiar with and use a variety of ways to establish or eliminate positions in securities. For example a market order for a security tells a broker to execute a client's transaction immediately at the best price he can get, the current market price. If the order is to buy, it will likely be executed at the ask price and if it is an order to sell it will likely be executed at the bid price. A limit order tells a broker to buy a security at no more than the stated limit price or to sell a security at no less than the stated limit price. Although market orders are executed promptly, limit orders typically have a delay and may never be executed if the stated limits are never satisfied. The purpose of a market order is to promptly establish or eliminate a position in order to realize some expected gain. It is possible for a market order to be executed at a price quite different from the immediately preceding order. The purpose of a limit order is to establish or eliminate a position if and only if certain conditions are met that may assist in producing some expected gain. The execution price of a limit order will be the specified limit itself or better. An investor may assess the immediate market price of a stock to be modestly too high. By entering a limit order to buy at a lower price, a position might be established at a satisfactory level to generate a profit. Conversely, an investor holding a position may be able to realize a profit if its price exceeds some target. By entering a limit order to sell at

that level, a profit could be generated. Market orders are most satisfactory for people who closely monitor the market. Limit orders are most satisfactory for people who are unable to closely monitor the market. Although limit orders can be entered with the restriction of execution on the day of issue or cancellation, it is also possible to specify that they are good until cancelled. A good until cancelled limit order may endure for a considerable period of time until it is executed or perhaps it will never be executed.

REPLICATING A SELL LIMIT ORDER WITH CALL WRITING

If an investor owns a stock that he would like to sell if the price were to go up and exceed some limit, he could enter a sell limit order. For example if a stock is selling at $48 per share and the investor wishes to sell if the price reaches or exceeds $50 per share a limit order specifying $50 as the limit price reasonably insures the investor of a sale under those conditions. As long as the stock remains under $50, nothing happens and the order waits until the good until cancelled order is cancelled.

An alternate way to accomplish the same outcome is to employ call options. The investor could write a one month call option on the shares with an exercise price of $50. If this hypothetical stock had a standard deviation of about 40% the popular Black and Scholes model predicts a premium of about $1.50 per share for such an option. For one round lot of stock, 100 shares, the investor would receive around a $150 premium. If the stock price exceeds the $50 per share exercise price at expiration, the owner will execute the call. Consequently, the investor will receive $5,000 for the stock. Given the earlier receipt of the $150 premium, the investor realizes $5,150 for the stock. Conversely, if the stock has not reached $50 per share by the expiration date of the call, it expires worthless. The investor keeps the $150 premium that was earned, and presumably still owns the stock whose price is below $50. At this time if conditions have not changed dramatically, the investor should be able to once again sell a call option. Another $150 might be realized for holding the position for another month. The same process repeats each month or so until the investor's stock is called away. The alternative of issuing a limit order would produce no similar gains and would only be executed if the stock price were to exceed the limit of $50 per share. Of course, the slight difference is that a limit order would be executed if the stock price temporarily exceeded $50 during the interval. Whereas, the call option would probably be executed only if the $50 exercise price were exceeded at expiration.

A closely related order to accomplish much the same thing is a stop order. The intention of a stop order differs in that its execution price is set below the current market price. If the stock falls to that price, presumably something is wrong with the stock and its future price is headed lower. Hence, the owner with that interpretation of the stock's situation wishes to sell. By implementing a stop order under these circumstances, the sale will be made at the best price possible after the stop limit is reached. In effect the stop order becomes a market order after the stop limit is reached. The purpose of a stop order is less well replicated by the sale of a call option.

REPLICATING A BUY LIMIT ORDER WITH PUT WRITING

If an investor would like to buy some stock if its price were to go down to some attractive limit, he could enter a buy limit order. For example, if a stock is selling at $52 per share a limit order specifying $50 as the limit price specifies to the broker to wait until the more attractive $50 price level is reached before buying the stock. As long as the stock price remains above $50, the transaction will not occur. Once the stock price drops to or below $50, the order will be

executed and the broker will buy the stock for the investor. The investor then pays $5,000 and receives his 100 shares of stock. In this instance the investor would have saved $200 by paying $5,000 rather than the $5,200 he would have needed to pay when the market was at its higher initial level.

An alternate way to accomplish the same outcome is to employ put options. The investor could write a one month put option on the shares with an exercise price of $50. If this hypothetical stock had a standard deviation of about 40% the popular Black and Scholes model along with the notion of put-call parity predicts a premium of about $1.45 for such puts. For one round lot of stock the investor would receive around a $145 premium. If the stock price falls below the $50 per share exercise price at expiration, the put's owner will execute the put. Consequently, the investor will receive 100 shares of the stock for $5,000, the same amount he would pay by utilizing the limit order. Of course, the investor would have also received $145 as a premium, so the net cost of establishing the position is $4,855. If the stock is not selling below $50 per share at expiration of the put, it will expire worthless. Again if conditions have not changed dramatically, the investor then keeps the $145 commission received and is able to repeat the process again for the next month. Another $145 premium might be realized by repeating the process. This same process could be repeated each month until the stock is actually obtained. If conditions do not change and the stock's price endures, the investor might enjoy a continuing stream of $145 payments every month. Of course the put seller is committed to buying the stock at $50 or a net of $48.55 regardless of how low it might have gone before the put expires. However, the buyer who uses the limit order to buy at $50 could similarly continue holding the stock at this new lower price. If, for example, the new lower price $40 were to exist, the limit order buyer would have paid $5,000 and effectively lost $1,000 whereas the put writer will have paid the same $5,000 for the shares which are worth only $4,000, but he will have received $145 for selling the put. Thus the put writer has lost only $855 in contrast to the limit order maker's loss of $1,000. The alternative of issuing a limit order would produce no similar gains to the premium and would only be executed if the stock price were to fall below the limit of $50 per share. Again, the slight difference is that a limit order would be executed if the price temporarily dropped below the $50 per share limit during the interval. In contrast the put option would probably be executed only if the market were under the $50 exercise price at expiration. A modest difference from the call option scenario described above is that there is a greater likelihood that the put option will be exercised prematurely than is true for the call option. The disadvantages of early exercise of American style puts do not duplicate those of American style calls.

An argument could be advanced that if a limit order purchase were executed, and the stock price continued to fall precipitously, the new owner could enter a stop order or simply sell the stock before its price reached 40. The counter argument to this point is that just as the stock could be sold, accepting a part of the loss from $50 on its way to $40, the put could be sold, with a comparable loss.

ALTERNATE FORMS OF ORDERS

When dealing with option contracts the assortment of orders in enriched. Commonly two orders are combined into a single stipulation. For example such a combination order may be appropriate when an investor has funds to invest in a security that he immediately wishes to write call options against. Such an order is often called a buy-write order. In fact the process of writing covered calls is sometimes referred to as buy-writes. Not all brokerage firms allow

customers to execute buy-write orders. Some brokers who do provide this service limit its use to only larger transactions. For example, an order may need to be for at least 500 shares of stock and 5 option contracts for a broker to accept buy-write orders. The dual step transaction is fully specified by one number, the net credit or net debit of the trade. The transaction is considered a net credit transaction if the investor receives the funds and a net debit transaction if he must pay the funds upon completion of the transaction. Thus an investor who wishes to purchase a stock and immediately write a call against it would employ a net debit transaction. For example consider an investor who wishes to buy 1000 shares of stock and that stock is selling at $40 per share while a one month call option with a $40 exercise price is trading at $2.00. The transaction the investor would specify has a $38 net debit amount. Effectively, this broker is buying the stock for $38 and offering it to the call purchaser for $40 during the next month interval. If the stock's market price exceeds $40 at the month's end, the call is assigned and the investor must turn it over to the call owner for $40. This sequence of transactions produces a return to the buy-write investor of 100(($40 / $38) – 1) = 5.26%. Given that this process could potentially be followed every month, the annualized compound rate of return would be 85%. These kinds of returns are frequently observed among buy-write transactions. Consequently, it is not surprising to see that covered call writing is often described in grandiose terms. If the stock's market price is below $40 at the month's end the call will expire worthless. The buy-write investor will now own the stock free and clear. Although its price is below the $40 that existed when he entered this position, the investor will have effectively paid only $38 per share. Under these circumstances the buy-write investor will have gained or lost nothing on the transactions. At this point the investor can take advantage of the options market by selling another call on the stock. The popular Black and Scholes model might predict a premium of about $1.90 for such a call option. If the investor writes another call option with an exercise price of $40, he realizes this $1.90 premium and will continue holding the stock at the end of the month when the price is below $40 per share. If the stock's market price exceeds $40, the call will be assigned and the investor will earn 100(($40 + $1.90)/$38-1)=10.26% over the two months. This amount compounds to 78.7% annually. Of course in these examples if the stock price falls below the amounts assumed, the percentage returns will be lower and perhaps negative.

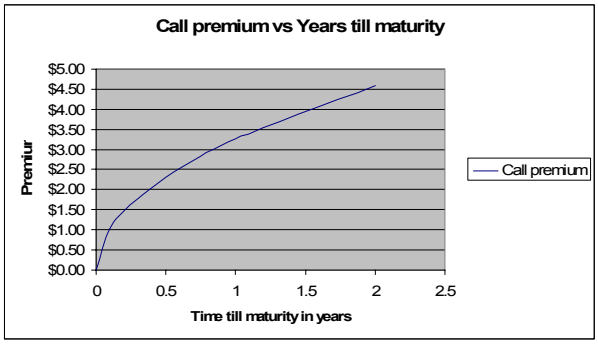
Buy-write orders employed to generate a credit accomplish the opposite effect. If an investor already holds a covered call position, he can eliminate it with an appropriate buy-write credit transaction. For example if a stock sells for $45 per share and the investor has sold a call option against that stock which now trades at a premium of $5.25, the following could be done. Enter into a buy-write order to sell the stock and buy the outstanding call option to close the open call position. Using these numbers, the net credit transaction could be entered for $39.75. Executing these combined transactions effectively eliminates the investor's two positions. The stock is effectively sold for $40 and the call is effectively purchased for $5.25 with a single credit of $39.75. Actually, the market would present the investor with two prices for each transaction the bid and ask prices. The investor could buy the call at its ask price and sell the stock at its bid price. The investor could also set a limit between these prices by specifying a suitable single credit price. If this position had initially been established when the stock sold for $40 and the call premium sold for $2 it would have cost the investor $38 and he will have received $39.75. Thus his return would be, (($39.75 / $38) – 1) = 4.61%. Again this value could be annualized. Note, however, this position presumably was not held until the end of the calls expiration period. It might be possible to repeat the process with another security. That accelerated process could result in an annualized return that exceeds the 85% calculated earlier.

SELECTING OPTIONS AND EXERCISE PRICES

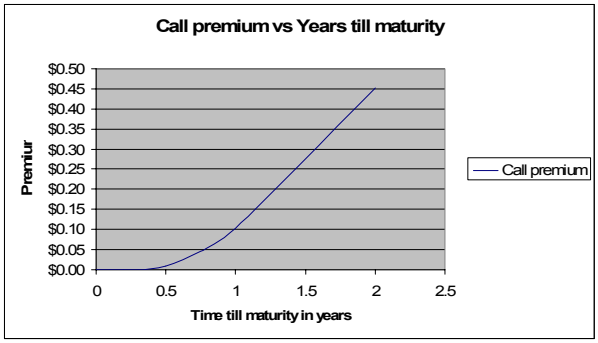
Investors normally have an assortment of investment alternatives available for covered call writing. The relevant factors for selecting the best options need to be examined. Options are typically segregated into two classes, puts and calls. A put entitles its owner to sell a stock at an agreed exercise price according to a prescribed timing. A call entitles its owner to buy a stock at an agreed exercise price according to a prescribed timing. In fact there is little fundamentally different between puts and calls. The equivalence of these classes is most apparent in currency options. For example a currency call option that entitles an American owner to buy euros in exchange for delivering dollars is exactly the same as a European investor's currency put option that allows for delivery of euros and receipt of dollars. The similarity when dealing in puts and calls for stocks is less obvious. However one should remember the corresponding positions in currency options and realize that the names are merely dependent upon the investor's point of view. Options today trade on selected securities according to some prescribed principles.

During the era before the advent of the CBOE, option contracts were normally written with an exercise price equal to the existent market price. For example, if an investor wished to purchase a call option on a stock which then sold in the market for $27, the exercise price would be set at $27. Once such an option was purchased, its owner found no viable secondary market. If for any reason the investor no longer wished to retain his option position the only action he could take was to re-approach the broker who handled the original transaction. Two alternate responses could be expected. If the call were out-of-the-money its owner was stuck with it. That is, there was normally nobody reasonably available to buy it. If the call were in-the-money the broker would as a service to the client, purchase the call from them at its intrinsic value. Brokers might later resell these repurchased options, but the original owners realized no benefits.

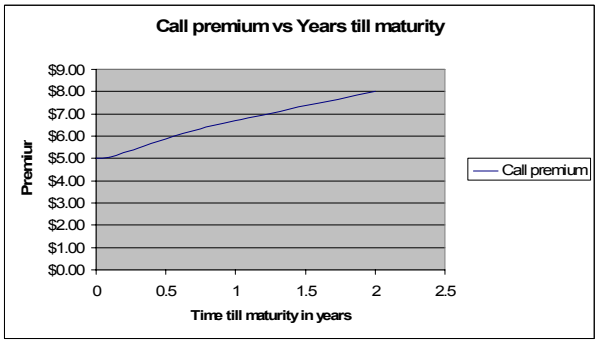
Black and Scholes in 1973 developed the basics of today's most popular option pricing models. Five inputs determine a call option's premium in their model. These inputs are the stock's market price, the call's exercise price, the stock's standard deviation, the risk free interest rate and the time until the call expires. Combinations of these ingredients can be examined to ascertain the most desirable buy-write positions available. The risk-free interest rate is uniform among all options of a given maturity. Consequently, it merits little attention. Furthermore, the model is not highly sensitive to interest rate changes. The time until expiration imposes the same pattern on alternative option maturities. Specifically, the decay in an option's price is not linear. Rather, it decays slowly for a long time and as maturity approaches within a few weeks, the decay accelerates. The graph below illustrates the call premium's decay as the time until maturity approaches 0.



The call represented by the graph is presumed to be on a security that remains exactly at its exercise price throughout the call's life. If the call were far-out-of-the-money the decay would occur much sooner. The graph below illustrates a call that is far-out-of-the-money.

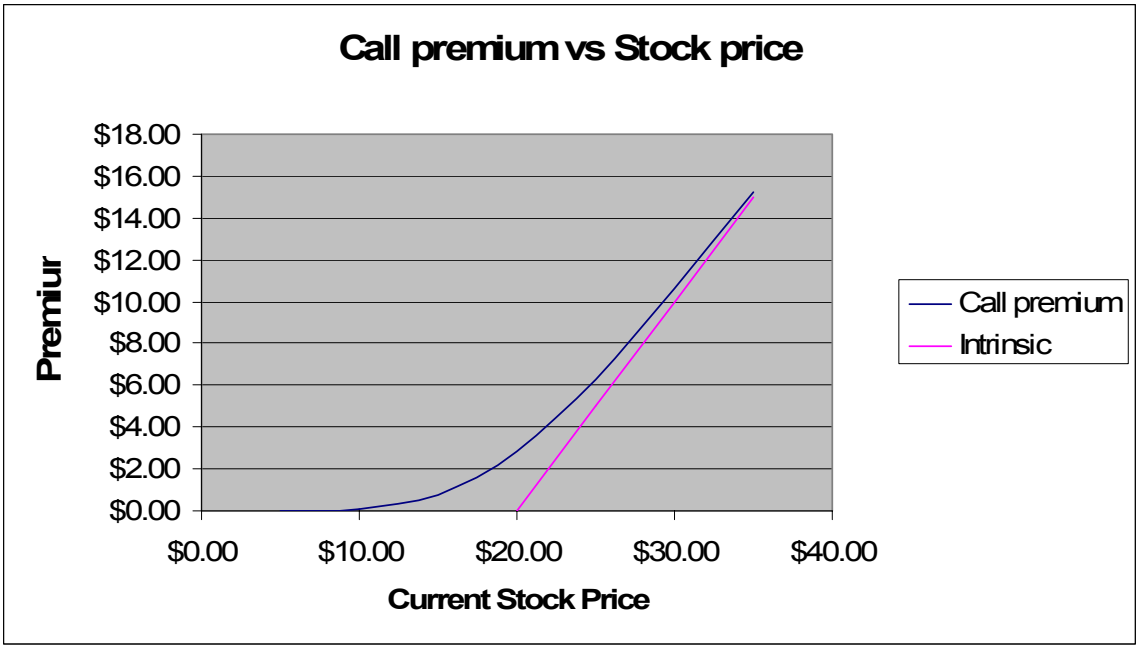


On the other hand, if a call option is in-the-money it will only decay to its intrinsic value.. That decay will not accelerate in the pronounced manner that an at-the-money call decays. The graph below illustrates the decay for a call that is $5 in the money.

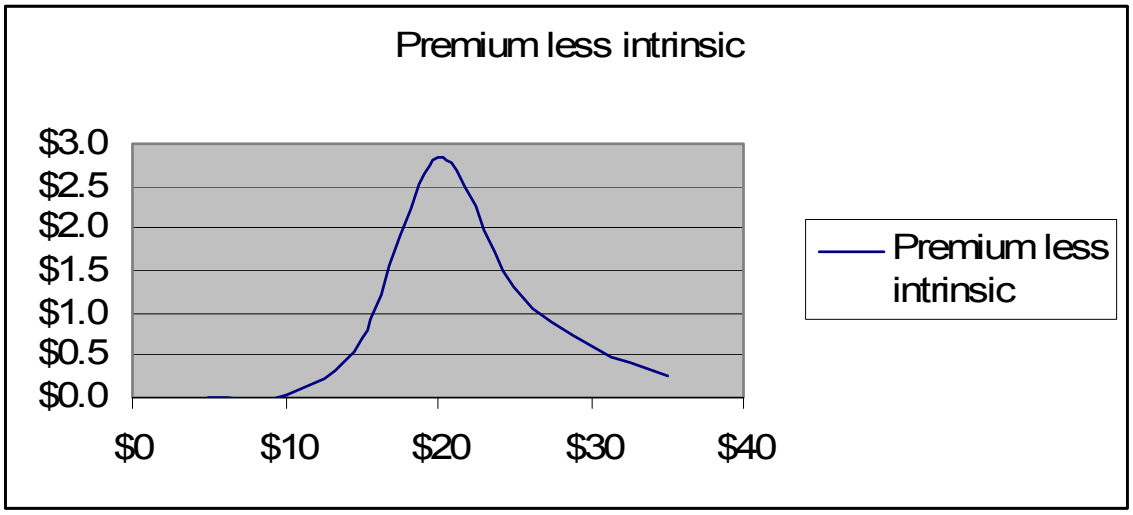


All of the above graphs assume a $20 exercise price, a 40% standard deviation and relatively low interest rates, that is around 4%.

An overarching effect of this decay pattern is overwhelming interest in relatively short term options. Before the creation of much of today's security regulation such short term call options were popular and often called "Two cigar options." The reasoning was that they typically cost about the same amount of money as did two cigars. For many years following the Great Depression of the Roosevelt era such options were prohibited in the U.S. The advent of the CBOE ultimately allowed for options to be initially created for longer periods of time, but continue trading in the secondary market for periods of eve just a few days. The primary variables of interest remaining for examination are the stock's market price, the option's exercise price and the volatility or standard deviation of the underlying stock. Aspects of these inputs can be observed on the chart below.



The curved line illustrates the expected premiums for options when existent at one of the given underlying stock prices surrounding the $20 exercise price of this hypothetical call option. The straight line emanating from the $20 point on the Current Stock Price axis represents the intrinsic value of an option with a $20 exercise price at various security market prices above $20. The vertical distance between the curved line showing predicted premiums and either the horizontal axis or the intrinsic value line as relevant represents the speculative and time value of the call option. Notice that when the underlying security is priced near $10 per share, there is virtually no premium. Similarly, when the underlying security is priced near $30 per share the difference between the estimated premium and the intrinsic value is negligible. The magnitude of the option premium attributable to speculative and time value achieves a maximum near the exercise price of $20 per share in this example. The graph below illustrates this point.



If an investor wishes to exploit covered call writing clearly, the closer a stock sells to a call option's exercise price, the better. Calls far out-of-the-money offer little in the way of benefits to such writers. Calls deep in-the-money similarly offer little in the way of benefits to covered

writers. The greatest available decay in a call options speculative and time premium occurs when the stock's market price is close to the call's exercise price. Furthermore, the greatest magnitude of decay over time of the call premium occurs during the calls last few weeks. Thus the greatest potential gains available to covered call writers are for at-the-money calls during their last two weeks.

DIVIDEND CAPTURING TECHNIQUES

An alternative way to capture benefits through covered call writing derives from the way dividend payments are handled by contemporary listed option contracts. During the era preceding the existence of the CBOE over-the-counter options traded regularly. As noted earlier, these option's exercise prices were traditionally set to the existing market price of the stock when the option was created. Call buyers were presumably entitled to shares of stock according to the company's existing situation. When the company issuing the stock paid a dividend the action was considered to change the character of the stock itself. Specifically, it became a lower priced stock and a dividend. Widely known empirical evidence showed that the stock price declined by approximately the amount of the dividend when the stock traded ex-dividend. Equitable treatment of the participants in the call option contract was deemed to require an appropriate adjustment. The adjustment was accomplished by changing the exercise price according to the dividend paid. For example, if a stock were selling at $43 per share when a call option was written on it, the initial exercise price would have been set to $43. Then, if the company paid a $1 per share dividend, the exercise price would be adjusted to $42. Since there was no uniformity among exercise prices of that era, this adjustment caused no problems. These options were consequently knows as dividend protected options. When the CBOE introduced the idea of an active secondary market for calls and later for puts, it standardized the exercise prices. Rather than having calls initially written with an exercise price at the market price, a number of rounded values were employed. So if new call options for this example were created according to the current CBOE procedures the initial exercise price would not be $43. Rather it would be set to $45 or $40. Later if the company paid a $1 per share dividend, no adjustment is made in its exercise price. Thus, the newer style options are said to not be dividend protected. The rationale for these changes was to aid the creation of an active secondary market for options. If the prior system persisted, the scenario described here would have produced call options trading with exercise prices of $43 and $42. Furthermore, over time calls would be written for nearly every imaginable exercise price around these values. The resulting market would be filled with numerous close, but not identical option contracts. Since the contracts would be close but not identical one could not be exchanged readily for another. Such contracts would not be fungible. If an active secondary market was to develop for call options, the contracts needed to be fungible. Otherwise, there would be too much variety among contracts for the same security. Unifying the exercise prices at round numbers such as $40 and $45 resulted in vastly more contracts being written for relatively few exercise prices.

A result of the removed dividend protection from option contracts is the possibility of systematically capturing some of those dividends. The basic procedure is to purchase a stock shortly before it goes ex-dividend. Simultaneously, a deep-in-the-money call option is sold. Ownership of the stock entitles the investor to receive the dividend. The sold call however does not convey ownership of the dividend to the call purchaser. The stock owner thus gets and keeps the dividend. The stock price typically adjusts for the payment of the dividend on the ex-dividend date by decreasing by an amount commensurate with the loss of that dividend. Since

the call is deep-in-the-money, the call premium closely follows the price change in the underlying stock. The measure of the call premium change with respect to the underlying stock's market price change is known as the call's delta. As the graph above showing the call premium and its intrinsic value shows, the delta value is nearly one for deep-in-the-money calls. Delta measures the change in the call's premium, the curved line, as the price of the underlying stock changes as illustrated by the straight line or intrinsic value line. That is both slopes are nearly identical.

Taking the same numbers used earlier, assume an investor purchased a stock selling for $43 and simultaneously sold a call option with an exercise price of $35. The call premium would depend on various factors, but assume it to be approximately $8.25. If the company pays a $1 per share dividend the stock's market price can be expected to decline to $42 on the ex-dividend date. The call's premium will consequently also decline to a value some where around, $7.30. Notice, the intrinsic value of the call was initially $43 - $35 = $8. After the dividend is paid its intrinsic value becomes $42 - $35 = $7. Since the market price moves lower toward the exercise price you can expect some increase in the speculative or time value of the option, hence the premium declined by less than the full dollar that was paid as a dividend. Consider the effect of these changes on the covered writer. He has received a $1 dividend. He owns stock whose value had declined by $1 from $43 to $42. He has written a call option on that stock which immediately prior to the dividend's payment was worth $8.25. After the dividend is paid the call option's value dropped to $7.30. The covered writer thus experiences a loss of $1 in the stock position and since his negative position in the call premium went from effectively -$8.25 to -$7.30 he has gained $0.95 in the covered call position. The net effect of the two changes in the written position nearly offset each other. The covered writer in this example loses a mere $0.05. However, there is no commensurate offset to the $1 dividend that has been captured. Presumably, the covered writer is able to unwind the covered position and move on to something else. Unfortunately, tax treatments of these transactions can interfere with such plans and make quick entry and exit from such positions unattractive.

MOTIVATION FOR COVERED CALL WRITING

The common incentive that motivates most covered call writers is the potential to enhance portfolio returns. Any reasonably diversified portfolio contains a number of securities that change little over modest time periods. Writing covered calls on these securities provides investors with a way to "rent these securities" and have some benefit from owning them when prices stagnate. The question that must be answered is whether the tradeoff between the extra money earned as premiums justifies the extra returns foregone to buyers of the call options. When stock prices increase dramatically, stocks with call options written against them are inevitably called away.

ASSESSMENTS OF CONSERVATIVE OPTION STRATEGIES

Several studies report that writing covered options is a losing proposition. Others contend it to be highly rewarding. Leggio and Lien describe covered calls as a "Lose/Lose Investment." [2] Some of the claims that covered call writing is profitable are wildly optimistic. Groenke for example claims on the cover of his book, that you can "Create your own stock options money tree." Coval and Shumway apply a traditional analysis with CAPM logic to

[2] Leggio and Lien, "Covered calls: a lose/lose investment?" 2005

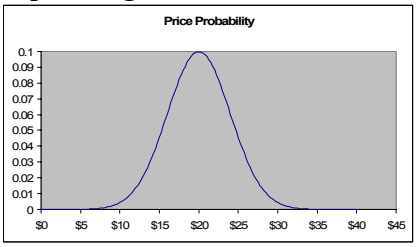
option contracts and conclude that, "…option returns largely conform to most asset-pricing implications."[3] In other words to earn more, you must take more risk. Leggio and Lien compare an index portfolio with a covered call portfolio.[4] They conclude that there is evidence supporting the idea that covered call portfolios earn superior returns to a stock index. One of the challenges is assessment of the option containing portfolio's performance. You cannot simply compare covered call performance to risk free performance. Similarly you cannot simply compare covered call performance to market index performance. By their very nature options introduce various asymmetric characteristics into a portfolio's return distribution. The notion of an unusual pattern in a security's potential return distribution is not new. Harry Markowitz noted the pitfalls of this prospect in his famous 1953 article about the problems of portfolio selection. He suggested the employment of semi-variance as a resolution. In the aftermath of Markowitz's work, most analysts have ignored the potential asymmetry of return distributions. The commonality of symmetric distributions led to the widespread use of variance or standard deviation to assess risk. Some people have ignorantly suggested that investors have a target return and the potential for greater returns is equally undesirable to lesser returns. Most people simply recognize that with symmetric distributions it really doesn't matter if you use standard deviation or semi variance calculated from the mean. Adoption of CAPM principles, Sharpe's ratio and alternate tools such as the Sortino Index have failed to dispense all questions about portfolio assessment. The upside performance ratio advocated by Leggio and Lein offers some advantages, but seems incomplete.

The fundamental problem encountered in studies of option performance relates to the complexity of the expected return distribution. How can risk be identified and assessed in order to ascertain if the realized return on a derivative containing portfolio properly adjusts for risk?

STUDY DESIGN

The intention of this study is to identify ways to select and evaluate securities amenable to return enhancement with added option techniques. In particular perturbations of the typical ogive observed for cumulative return distributions and their implications are examined. Specifically, the addition of call or put options to a portfolio truncate distributions in exchange for payments known with near certainty. These tradeoffs are assessed along with their risk implications. Consider first the distribution evidenced by a typical security.

The graph below shows a payoff diagram for a stock which is currently trading at $20 with no expected growth and a standard deviation of $4.

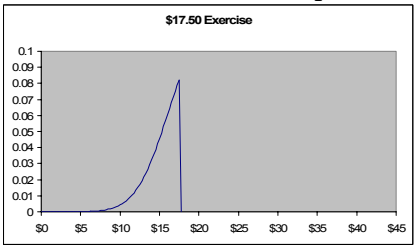


Given that the existing price of this security is $20, an investor can expect outcomes somewhere along this curve. Permutations of the standard normal curve have been suggested and offer merit, but for purposes here, the standard normal is used.

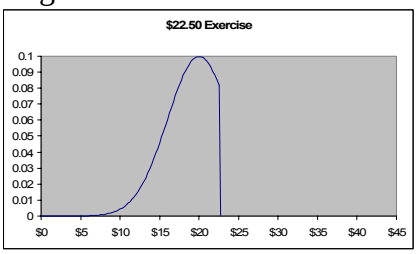
[3] Coval and Shumway 2001 p 1008

[4] Leggio and Lien, Is covered call investing wise?

When an option contract is combined with the above illustrated distribution it is truncated in some way. The next graph shows a payoff diagram for the same situation if a call option is written with an exercise price of $17.50.



If the stock is priced at $20 in the market and a call is written with a $17.50 exercise price, the call is said to be in-the-money. The call writer relinquishes a considerable fraction of the probability of the distribution to the buyer. A third graph of the distribution shows a payoff diagram for the same situation if a call option is written with an exercise price of $22.50.



At this level the call is out-of-the-money. The call writer sustains some potential for price appreciation from the existing $20 per share up to the exercise price of $22.50 per share. Potential returns at higher stock prices are foregone.

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RESULTS

The goal of this study has been to design an analysis that allows one to determine if profit can be earned by writing covered call options. The technique and a number of related activities have been examined. A diversified portfolio held for a long period of time has widely been shown to outperform actively managed portfolios. Mutual fund performance typically falls short of market indices. This characteristic of investments has led to a proliferation of index funds. That is, many mutual funds have been devised to enable investors to buy a representative cross section of the market with no intention of earning better than average returns. A considerable influence on these observations has been exerted by transaction costs. Hence, in this study transaction costs need to be fully examined along with the payoffs realized from the prospective trades. The base condition taken for comparison should be an underlying buy-and-hold portfolio strategy that accurately reflects the amount of risk existent in the covered portfolio. If greater return can be generated on a given portfolio with the addition of options, the benefit of the technique is verified. By using the buy-and-hold underlying portfolio for comparison, the study effectively abstracts from the risk considerations. The key to sustaining identical risk is comparing portfolio returns based upon one writing covered calls and one simply holding the identical securities over the same interval without any derivative contracts. Simulation studies of the same problem are inadequate to explain the distinction between these alternatives. By defining the parameters of the simulation you automatically define the outcome which may bear no resemblance to reality.

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