USING OPTIONS IN SPECULATIVE TRADING

Introduction

Commodity Trading Advisors have an enormous range of tools and techniques available to them today. As the depth and liquidity of derivatives markets has grown, and as more traditional investment managers, such as pension funds, have increased their acceptance of futures and options, it has become incumbent upon CTAs to acquire ever-more sophisticated money management.

Many traders have used options at one time or another for various purposes, including the protection of existing profits on an underlying position, for selling premium against a perceived unsustainable move in either price or volatility, or for constructing a short-term position prior to known significant events, such as government reports. Few speculative traders, however, have employed options on a significant scale in a consistent program over a prolonged period. Reasons include the expenditures associated with being long premium, the position risks associated with being short premium, and the manpower and computer resources required to manage an option trading program.

The discussion below will address these concerns and will demonstrate the following principle:

All trades are convertible into a position whose

- **Downside is limited**
- **Upside is open**
- **Expected return can be increased over the life of the trade**

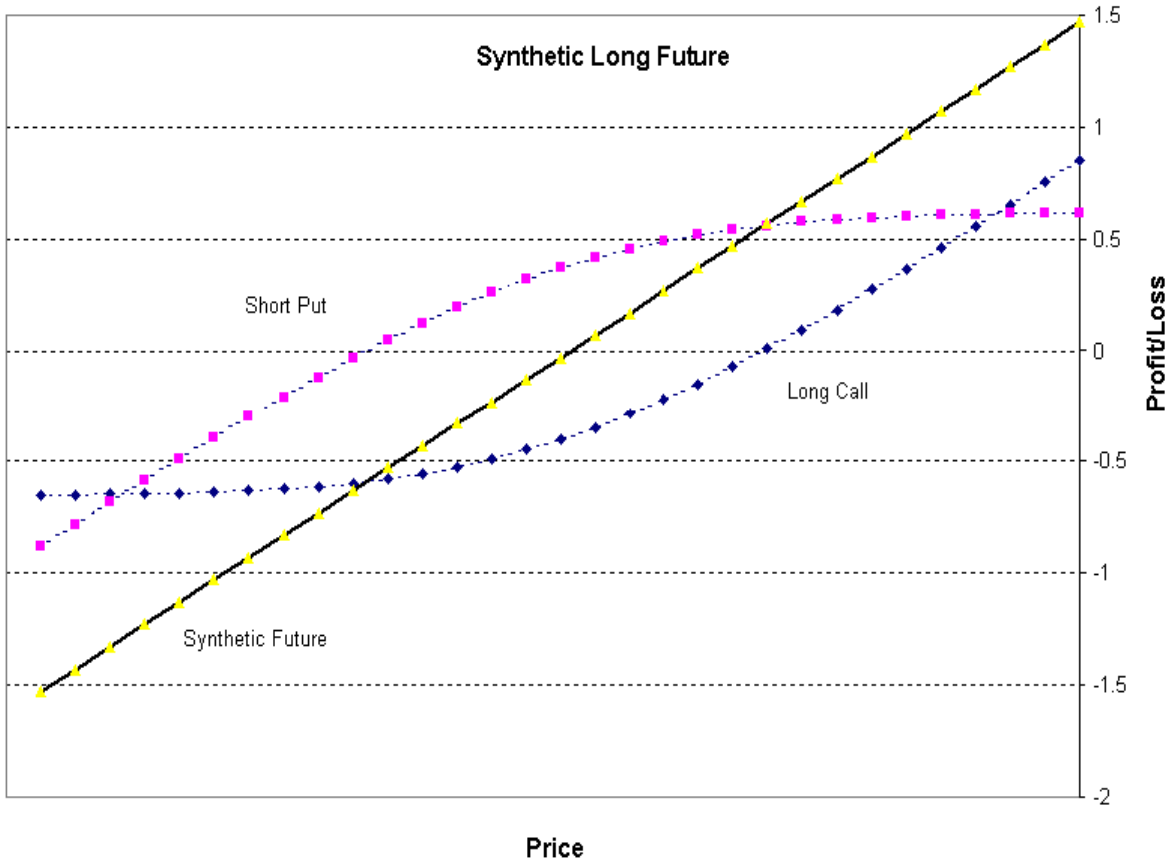
The issues of manpower and computer resources will be addressed by a sophisticated, real-time computer program, the Dynamic Option Selection System (DOSS), described at the end of this document.

Relationships And Concepts

A series of arbitrage relationships is critical. The first, and most important in practice, is the relationship between synthetic and natural futures:

1. Synthetic Long Future = Short Put plus Long Call
2. Synthetic Short Future = Short Call plus Long Put

This is illustrated in the chart below for the case of a synthetic long future, which involves buying a call and selling a put at the same strike within the same month. The profit profiles of a long call option, which shows a gain at higher prices, and of a short put option, which shows a loss at lower prices, can be added together to reproduce the linear, 45° profit profile of a long futures position.



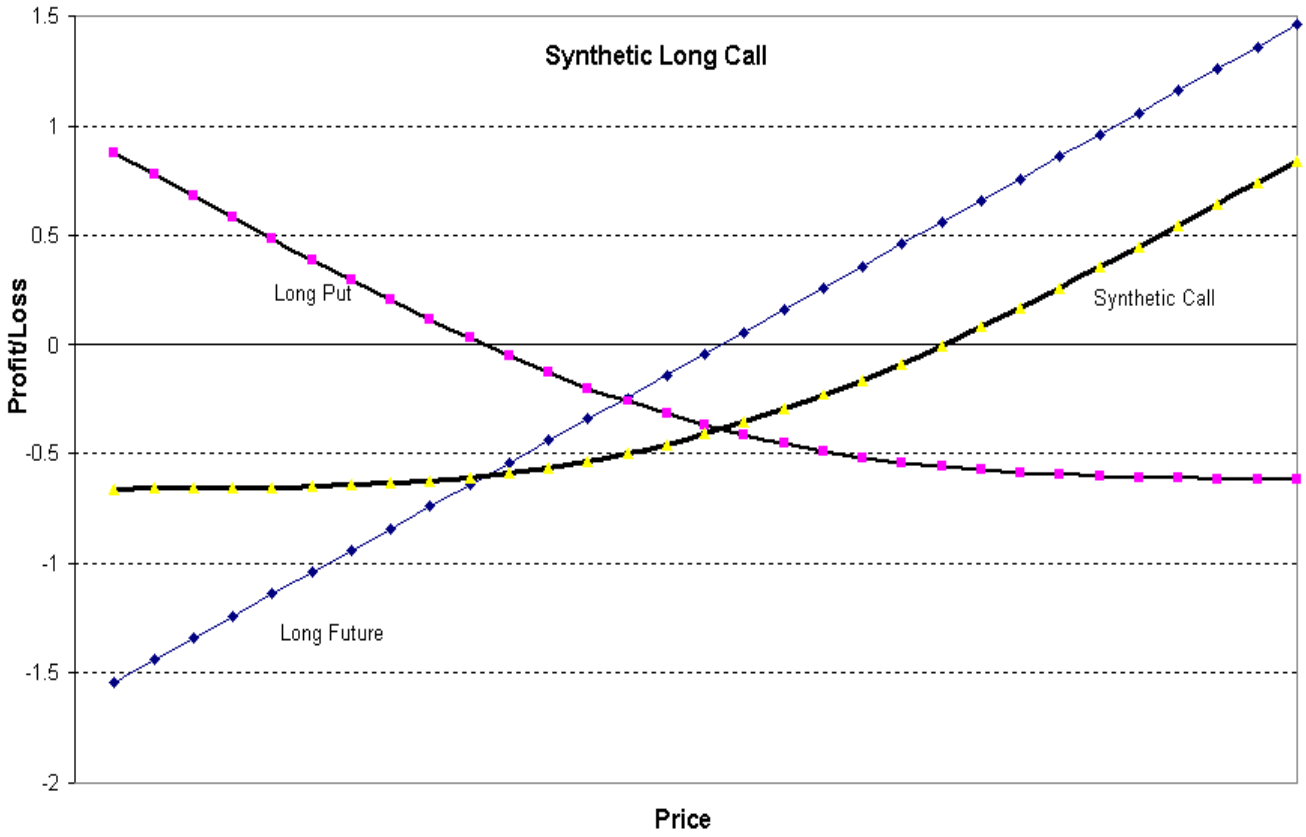
Once futures or cash forwards are seen conceptually as a special-case option spread, being long/short a pair of same-strike, same-month, puts and calls, the large number of variations on this basic theme begin to fall into place. The single purpose behind the use of different strikes, different expiration months, and different ratios is to achieve a different profit profile than a basic futures position.

As highlighted in the Introduction, the nature of these structured positions, whether they are simple options, option spreads, or futures/options/cash combinations, can allow for limited downside risk and for open upside potential. Positions can be structured, of course, that will not have these characteristics in all or part; such positions are excluded from active consideration in DOSS.

The second major relationship is the one between natural and synthetic options at a given strike:

1. Synthetic Long Call = Long Future plus Long Put
2. Synthetic Long Put = Short Future plus Long Call

This is illustrated in the chart below for the case of a synthetic long call. The gains in the put option at lower price levels offset the losses in the long futures position. At higher prices, the combination's gain mirror those of the future, less the initial cost of the put option.



The importance of this relationship lies in the fact that *assets linked by an arbitrage pricing relationship at initiation will not behave identically over the life of the trade*. For example, if one has a weakly bullish outlook with a contingency that any price break will be sudden and severe, the synthetic call, with its put option component, may be the preferred instrument to own.

The decision as to which instrument to employ given a market outlook now becomes important. Moreover, as one's market outlook changes over the life a trade, the position can be modified and rebalanced.

The third major relationship is the put-call parity theorem contained in the Black-Scholes option pricing model:

1. Call - Put = Present Value[Futures - Strike]

The importance of this relationship, once again, lies in the ability to substitute positions within defined price zones for specific purposes. For example, a net long put position and a net short call position both can be used as a substitute for a short futures position, but they will have entirely different profit profiles outside of the target price zone.

The fourth major relationship is the one between delivery months of a futures contract:

1. Back Month = Front Month plus Capital Costs plus Physical Storage Costs

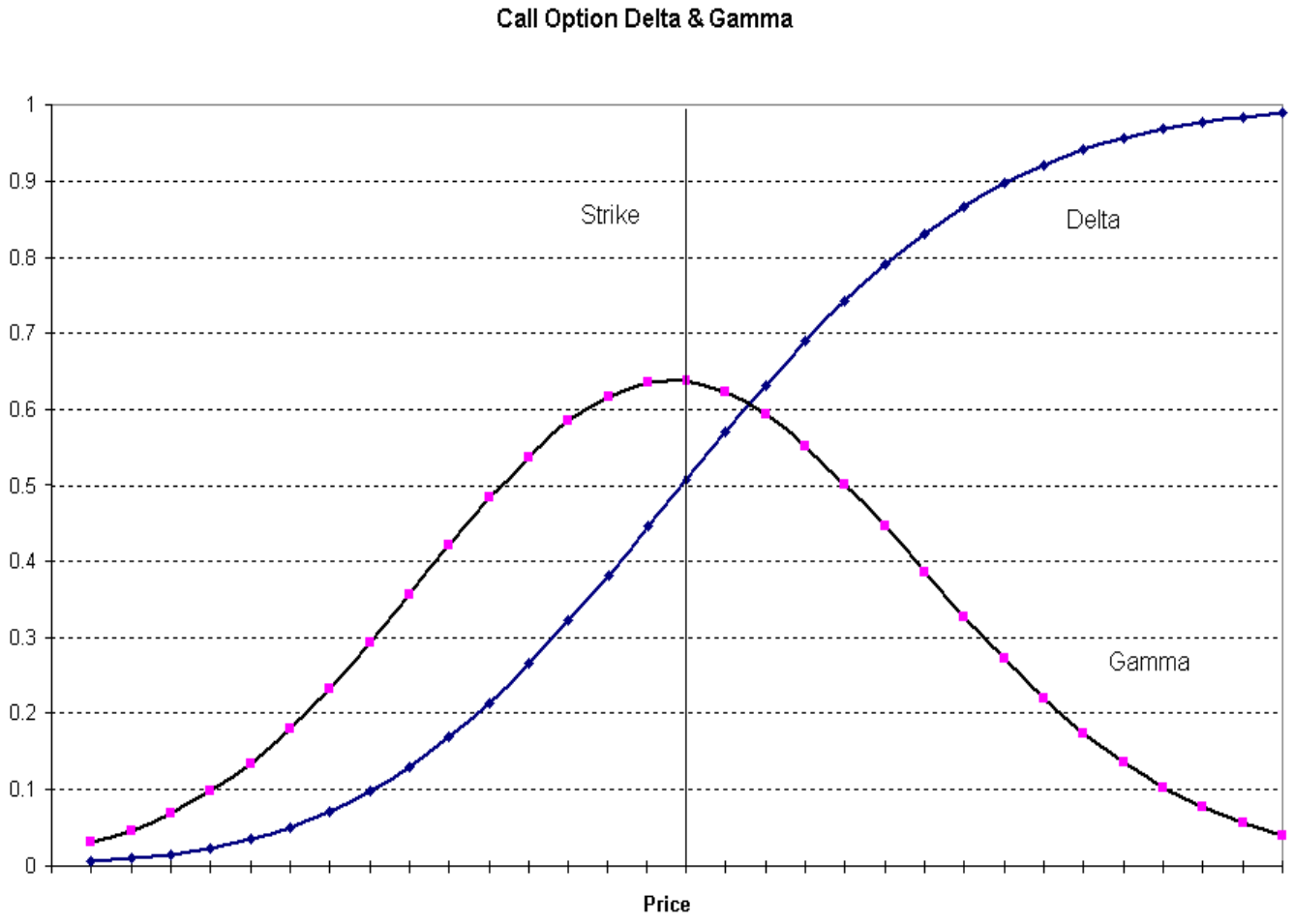
The importance of this relationship once again lies in the expected behavior of a trading instrument over the life of a position. Since options on the near month are subject to more rapid time decay than those on the back month, calendar spreads can be constructed for any

given outlook on price, volatility, and the intermonth spread.

Option Characteristics: An Overview

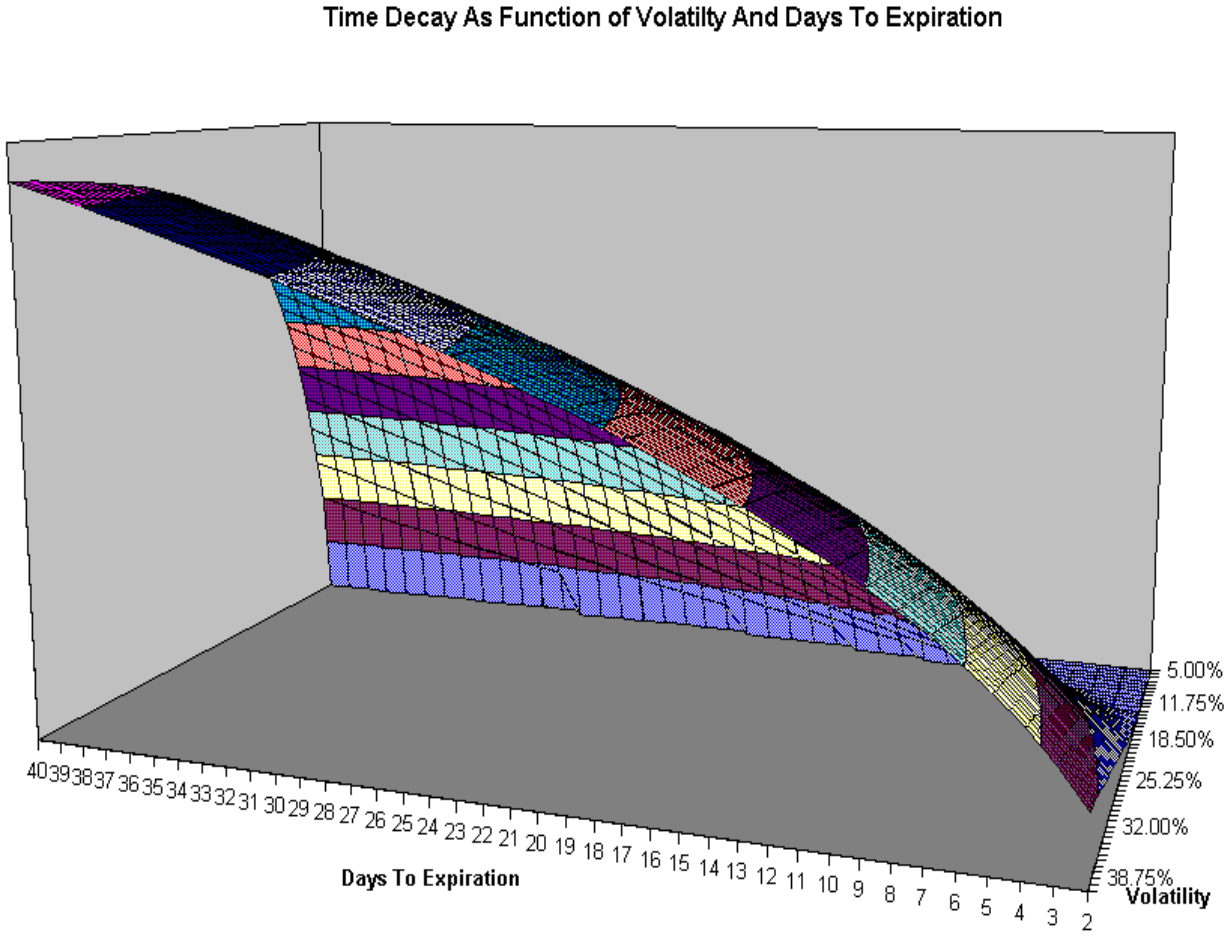
In order to understand the basis of DOSS, a brief review of the characteristics may be in order. The most important, and most commonly understood characteristic is **delta**, or the expected change in an option price relative to the change in the price of the underlying future. The delta of a put option ranges from -1 to 0, while that of a call option range between 0 and 1. By definition, the delta of a short future is -1, and the delta of a long future is 1. As a result, a ratio of options to futures, (1/delta), is required to match exposures.

The rate of change in delta is called **gamma**. The relationship between delta and gamma for a call option is shown in the chart below. Delta increases most rapidly, and is exceeded by gamma, as the futures price approaches the strike price; this relationship reverses after the strike price is exceeded. The gamma of a long options position, put or call, is always positive. A negative gamma on a position indicates the writing of insurance; most of the "horror stories" of sudden and massive losses in options trading can be traced to negative gamma.



Because options represent both a loan and a probability that a price will be reached by expiration, they decay over time. The rate of decay is called **theta**. Theta accelerates as expiration approaches, and this acceleration is greater for out-of-the-money options and at higher levels of volatility. The effects of volatility on theta are illustrated in the chart below.

DOSS makes heavy use of the different rates of time decay between months and across strikes in the same month in order to achieve the optimal position structure for the desired application.



The most difficult characteristic of options is volatility, the degree of uncertainty in a market. Because volatility is inherently unpredictable and because it has a linear effect on option prices, volatility probably has produced more windfall gains and frustrating losses than any other aspect of option trading. DOSS makes no attempt to either forecast volatility or to characterize it as being either “too high” or “too low;” it does, however, take into volatility's effects upon the price-value relationship in options and its effects upon relative option values.

Position Management

As mentioned in the Introduction, the principle of increased expected return over the life of the trade is critical to the successful application of on options trading program. This is achieved in three general ways:

1. Selling excess position delta in order to maintain desired exposure.
2. Adjusting strike prices in order to maximize the gamma of the position.
3. Restructuring the position to accommodate changes in market conditions and in market outlook.

Selling excess delta derives from the equivalence relationship between options and futures. This process is illustrated in the table below:

	Initiation		Adjustment	
Exposure		(600)		(600)
Futures Price		$ 14.54		$ 14.00
Put Delta		(0.47)		(0.62)
Puts Bought		1288		-
Equivalent		(600)		(794)
Put Price		$ 0.61		$ 0.85
Puts Sold		-		315
Cash Out		$786,105		-
Cash In		-		$268,200

In this example, 1288 May $14.50 crude oil puts with a delta of (.47) were purchased to achieve a target exposure of 600 short crude oil futures. The cost at initiation was $786,105. Five days later, the price of crude oil drops to $14.00. The delta of the puts falls to (.62), making the position equivalent to 794 short futures. Unless you have a pyramiding or add-on system, you are now shorter than you either need or wish to be. This can be remedied simply by selling 315 puts, at a revenue of $268,200. This is equivalent to taking $0.45 profit on the $0.54 move, while remaining short the equivalent of 600 futures contracts, and reducing the maximum potential loss on the position to $0.86 per contract, a very important consideration should the price of crude oil subsequently rebound.

The second method of position management is strike adjustment. If, for example, in another three days the price of crude oil fell to $13.50, owning $14.50 puts would be inefficient for several reasons, including the low gamma of the position and the large amount of in-the-money premium now at risk.

In such an instance, the remaining 973 $14.50 puts could be sold at $0.85 for a credit of $796,450, and 1,250 $13.50 puts could be purchased at $0.51 for a debit of $637,500. In the process, another $159,950 of the original purchase expenditure would be recouped, the gamma of the position would be improved from .24 to .31, and the exposure would still be equivalent to short 600 crude oil futures.

The third method of position management is restructuring the position to accommodate changes in the market and in market outlook. This is the function of DOSS.

DYNAMIC OPTION SELECTION SYSTEM

System Overview

DOSS is a real-time device for the construction and tailoring of a customized, optimal derivative position to achieve a desired goal within user-specified parameters according to a proprietary formula designed to provide maximum return at minimal risk and cost. The unique features of the system are:

- Separate but consistent algorithms for selecting which strike within a month to employ for the basis building blocks of strategies; i.e., which call to be long in a bullish strategy, or which strike to sell a straddle against;
- An algorithm for ranking different strategies -- forty-four at present –- according to formula referred to above;
- The ability to look forward and backward across different strikes in time;
- The ability to have either price premia or volatility serve as the key variable for real-time analysis; and

- The ability to modulate positions according to a bullish or bearish outlook, and to impose support/resistance bounds on price movement.

Use of DOSS in a speculative trading program will result in a portfolio of lower-risk positions, each sculpted according to a more dimensions than just price, and each achieved at a lower cost than a simple option purchase program, and each designed to avoid the limited gain/unlimited risk problems associated with simple option writing programs.