

Higher Return/Risk from Forex using Options

By Paul Stafford

Introduction

In this paper we review common methods of trading the Forex markets, and examine a new method, using Forex *options*, which offers several significant advantages over traditional methods. In this paper, I assume a basic knowledge of trading the Forex spot market.

Trading the Forex market in *any* manner has many advantages over other markets (such as equities). It is highly liquid, very large, almost impossible to manipulate, its volume driven mainly by commercial trade need (not speculation), and the relevant data is transparent and easily available (except trade volume). However, there are some real pitfalls. If we're wrong directionally and the market finds us, losses can be severe, even at lower leverages. A modicum of volatility is good for trading, as movement is what sustains a market. However, during the last year volatilities have been enormous. With a 24/5 market, you can't always be there to monitor positions. The use of stops can prevent a blown account, but they also lock in losses, sometimes needlessly.

As we will see, trading Forex with *options* preserves much of the advantages of trading Forex, and eliminates some of the downsides:

- There is no leverage in the purchase of options. Sleep at night
- There is no drawdown beyond the premium. Sleep at night
- There is less time involved (no need to monitor positions often)
- Trading with options avoids the paying of interest on leveraged positions- of special interest to Muslim investors following Sharia law, who cannot pay interest (or even receive it on the Carry).

The upside is large and can return multiples of the premium. The two disadvantages to options are 1) unlike a trade in the underlying asset, options are time-limited and 2) the spot must move enough to cover the premium and then an additional amount for a profit to be made. A trade in the underlying spot profits as soon as it moves enough to cover the broker spread. We will see that both of these factors can be accounted for and calculated so as to maximize the probability of returns.

Traditional Forex Trading

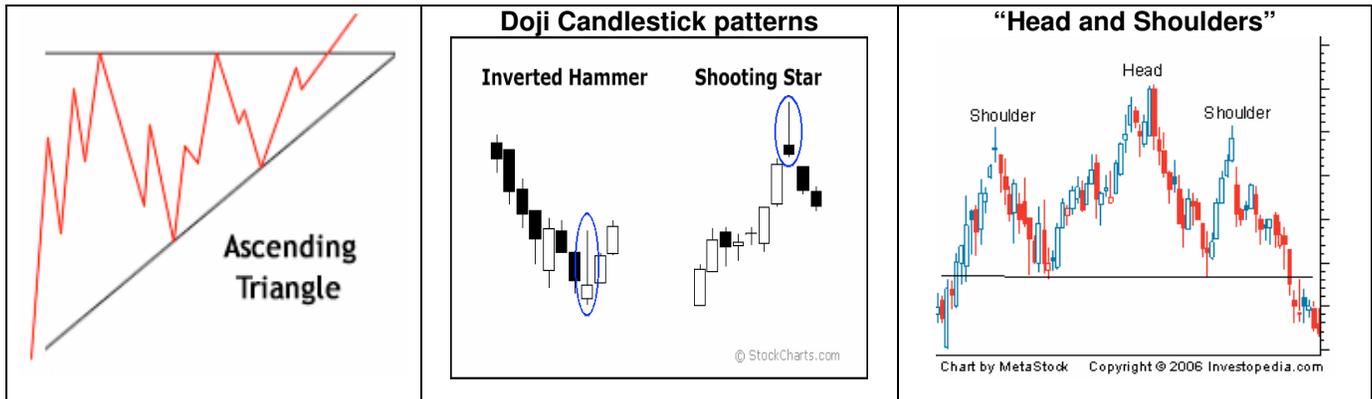
Traders use several methods to determine the future direction of an asset in order to take a position which should become profitable if their prediction occurs.

- Scalping** is a style of rapid, numerous daily trades, sometimes making use of spreads, sometimes making use of news releases. Scalpers may only make 10-30 pips per trade, but with perhaps dozens of trades per day can be profitable. Success depends on speed, accuracy, and a cooperative brokerage who allows this type of trading.
- Momentum Trading**, which uses exponential moving averages (EMA), or moving average convergence-divergence (MACD) to measure market inertia and momentum, respectively. Momentum Traders may hold their positions for minutes to perhaps an entire day.



- Technical Trading** is based on the belief that patterns in historical price action will predict future price action. There are hundreds of indicators, including Relative Strength Indicator (RSI), MACD, Polarized Fractal Efficiency, Keltner Channel and many others.

- Technical trading includes two subsets:
 - Pattern analysis- “triangle up” or down, “head and shoulders” etc.
 - Fascinatingly, there is a subset of this group which uses the patterns inherent in the chart symbology- candlestick pattern trading, which originated in the Japanese rice markets of the 1700s. Patterns have entertaining names like “hanging man”, “morning star”, “three black crows”.



- **News Trading:** Traders who attempt to capture small, near-instantaneous moves subsequent to news releases and may remain in a position from mere seconds to a few minutes (to the consternation of their brokerages.)
- **Fundamental Trading.** These investors analyze data such as current account balance, unemployment, budget balance, purchase price index changes, sovereign CDS (credit default swaps) rates and others to determine the relative strength of the two economies represented by a currency pair. A research-intensive method, the timeframe is typically much longer, ranging from months to years.

With the exception of the fundamental traders, all of these styles are very *time intensive*, requiring constant monitoring of positions. The fundamental investors, with a multi-month horizon, use their time mainly to study the underlying economic drivers, but without the deadlines.

Traders use leverage ranging from 1:1 to 400:1. The advantages and disadvantages of high and low leverage are readily apparent and won't be debated here.

What the pros do

Bank proprietary traders, hedge funds, family funds and real money investors (endowment funds etc), which have a lower risk profile, and yet strive for and often achieve real returns north of 25%+/year, do not trade on a day to day or even week to week basis. Whether or not they are trading RV (relative value), global macro or directionally, they trade using fundamentals, over a horizon of months to years. If we want to emulate their success and limit our risk, we should emulate their methods, *at least partially*.

As 2008 has shown, even these pros get sideswiped. Hedge funds on average decreased 18% in value in 2008. Some university endowment funds lost value for the first time in history. And of course, LTCM in 1998 showed that even the best and brightest can lose without a true risk management system in place (one that accounts for “fat tails”- better known as excess kurtosis.) Whatever method we use should still be able to profit, or at least limit losses during such “Black Swan” events.

The nature of FX markets

Currency pair values range widely (although not as much as some stocks- after all, major countries don't disappear). For example, EUR/USD (chart 1) was .8500 in 2001, and nearly 1.6000 in mid 2008- 7,500 pips! And yet that trend, manifested over 1,800 trading days, is only *4 pips per day*. Clearly, movement can be modeled as a long term trend, with daily/weekly noise superimposed.

Chart 1



Well, how about the big fall in 2008 in EUR/USD (Chart 2)? It was 1.6 on 7/16/2008, falling to 1.25 on 10/24/2008. By all accounts a huge move, 3500 pips, one half of the 7 year Yet with about 100 trading days, the *average* daily move was still only 35 pips! Yet, the intra day volatility was large- there were many days of 100-300 pip moves. Clearly, each day's price action is a large noise component, superimposed on a much smaller trend movement.

Chart 2



Many traders, especially day and momentum traders, trade the volatility (noise), following price action. Those traders have as their main tools technical analysis and indicators, and possibly even automated, rules-based trading software. This style of trading is very time intensive, as adverse price movements can rapidly hurt a position, and so must be monitored closely (or protected with stop-loss orders).

Another highly-refined method is one made popular by Dirk du Toit, aka Dr Forex, author of [Bird Watching in Lion Country](#). One key element of Dirk's methodology is to identify a range of price action (Chart 3), becoming very familiar with the fundamentals of a few economies, and (combining other important elements covered in his excellent book) go long in the bottom quadrants of the range, short in the top portions. This works well in a ranging environment, but if a swift and strong trend breaks out, the trader has a 50/50 chance of being in the wrong direction when the reversal happens. In 2008, the reversals were very dramatic and large, and unless the trader was very nimble of thought and keyboard, they were very damaging.

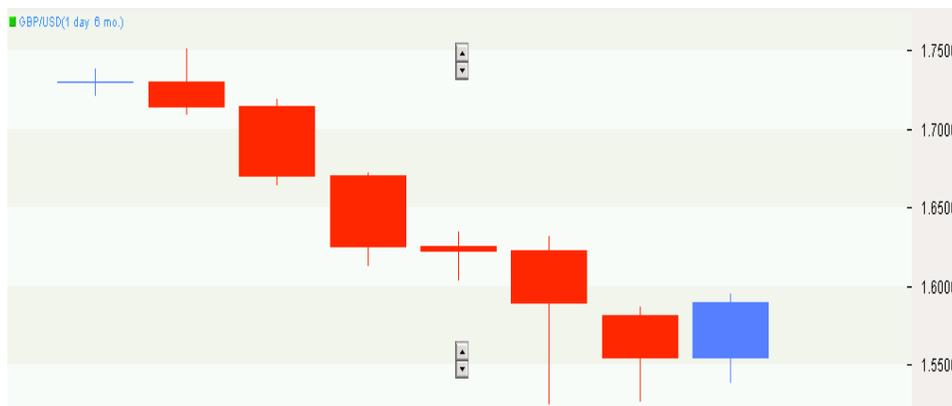
Chart 3



The fundamentals of an economy (or rather the relative fundamentals of two economies, as we trade pairs) can not change rapidly. News releases may give us indications of the directions they may be moving in, but unemployment, current account balances, government debt levels etc *cannot* change rapidly. The fundamental trend is driven by these underlying values, *and the markets perception of them (sentiment)*. A true fundamentals trader should have 3-12 months as a trading horizon, as the underlying values simply cannot change more rapidly. Currency trends bear this out, in the main, and a fundamentals trader has plenty of relative movement to make 20-50%/yr at reasonable leverages.

And yet, sometimes currencies DO change rapidly and significantly, especially in times of economic turmoil. Here, GBP/\$ dropped 2,000 pips in only 5 days (Chart 4, Oct 2008)! That's an annualized volatility of 50%! We know the fundamentals didn't change that rapidly, and yet we witnessed a week's move which might normally have taken most of a year. Fundamentals were trumped by sentiment. Sentiment is usually driven by the fundamentals, but when upheavals occur, sentiment drops all pretense and runs for cover. If we're trading fundamentals, how do we protect ourselves against sudden, irrational shifts in sentiment?

Chart 4



Practically speaking, many traders put stop loss orders on their open positions. This limits the loss to whatever is set. The downside is that temporary reversals have the very bad effect of closing out our position at a loss, when all we had to do was wait out the pain a bit longer. There is also some evidence that some

unscrupulous brokers manipulate quotes to hit stops that might not be otherwise. Many traders use "internal stops", but with a market that trades 24/5, there is the very real possibility of being unable to implement that strategy in time. There must be a better way.

A new way of trading FX

We need a method of trading Forex that captures most of the profit potential, minimizes the downside risk, minimizes the actual trading time required (at least day-to-day), and as much as possible, reduce trading stress.

This is the challenge- how do we trade using fundamentals- which ostensibly change over long periods, without exposing our accounts to devastating, unanticipated moves? We need a trading instrument which allows us to take a longer view, expressing our view of the direction the fundamentals are moving, and limit our losses if we are wrong, or get caught on the wrong side. One answer is options- calls and puts on the underlying currency pair.

A quick primer on options

There are many excellent texts (e.g. Option Volatility and Pricing by Natenburg) explaining the theory of options and we will only give an abbreviated review. In a nutshell, an option is the right but not the obligation to purchase (call) or sell (put) the underlying at a certain price (strike price). The cost of that right (the purchase price of the option) is called the premium. Options have an expiry date, beyond which they cannot be exercised. The premium consists of the intrinsic value and the time value (eg, the more in the money it is, and the more distant expiry, the more valuable). Another important element in option pricing is volatility. The higher the implied volatility (and therefore probability of the option ending in-the-money (ITM), the higher the premium will be. The topic of option pricing is very complex, and it was only after Black-Scholes-Merton (BSM) created their model that option pricing gained objectivity (if not accuracy- there are many unrealistic assumptions in their model).

The BSM model uses 5 main variables which they named from the Greek alphabet- three of which are very important:

Delta (how the option value changes as the underlying)

Gamma (the first derivative, or velocity, of Delta)

Theta (how fast the option loses value with time),

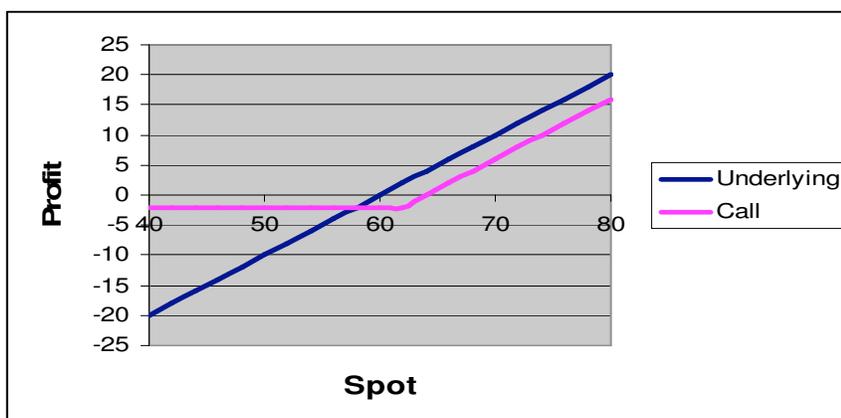
Vega (what effect a change in the underlying volatility affects the option value),

Rho (interest rate effects) is less important to traders, having only a second degree effect on option value.

In the simplest case, if we were to purchase a call with a strike above the current spot price, and the spot rises above his strike before expiration, he will be profitable. Similarly, if an investor purchases a put and the spot falls below the strike before expiry, the investor will be profitable. The option investor can collect his profits by either waiting until expiry and exercising the right, or selling the option before expiry.

While we can be either net long options (i.e., we can buy calls and puts) or short (sell calls and puts), a common theme amongst successful investors is to never be net short options (ie, never negative gamma), as the risk rises infinitely. If we are always net long options (this means you are purchasing calls and puts), the risk is always only the premium- what we paid for the option. The position may be closed ITM worth many multiples of the premium, but in the *worst* case, with the option expiring OTM (out-of-the-money), the value of the option can never drop below zero. If we are a net seller of options (i.e. short gamma), we have huge downside risks.

Chart 5



Here is an example of a bullish position, played with the underlying, and a call with a strike of 60 and premium of \$2. Note four important things (three of which we can see).

- 1) Playing the underlying becomes more profitable sooner (by the amount of the premium paid for the option.), if the direction is correct.

- 2) The call has a limited downside risk equal to the premium paid
- 3) The profitability of the option is much higher than simply investing in the underlying. In this example, if the spot moves to 70, the option is worth \$6, or 300% of the investment. If we had invested in the underlying at 60, the profit would be 10/60 or 16.6%. This assumes no leverage.
- 4) The call has a *limited lifetime*. If the move up in the spot does not occur before expiry, the call becomes worthless. *This is the main disadvantage of being long options (positive gamma).*

Options and Forex- a perfect marriage

The usually high volatility of Forex lends itself very well to options. Once an option is in the money (ITM), the value moves nearly 1:1 (excepting the time value) with the spot. Our downside risk is limited to the premium already spent. No further drawdown to your account is possible. No matter what the spot does, we can sleep at night.

Another advantage is that the *need for stops is moot*- if the spot moves away from the strike, the option value drops. However, as long as there is still time value, if the spot recovers, so does the value of the option. *This is a key advantage of options- short term price action does not imperil our equity.*

Choosing the right option

After we have identified an opportunity (eg long GBP/JPY) and are ready to trade, we will find (at least with some brokers like Saxo bank) that there are a huge range of available options (strike, expiry.) The challenge is to identify the particular option strategy that expresses your position and the particular strike and expiry which optimizes return vs. premium.

To properly evaluate options, we will need analytic tools to help estimate future and implied volatility and future value of an option (and the Greeks, if we choose to trade spreads or other non-directional strategies). There is an excellent excel plug in available from Peter Hoadley (<http://www.hoadley.net/options/options.htm>), which provides a very complete set of functions to measure all the Greeks, calculate implied and estimate future volatility, and calculate option values as a function of spot, strike, expiry, volatility, etc.

1) Choosing the Strike Price

We can buy ITM, ATM or OTM options. Generally, if the option is ITM or close to it, you'll pay for excess delta- but a higher probability of *finishing* ITM. However, the premiums are quite high for high gamma options (those near the money), and if you have a strong directional play, OTM options will generate a higher return. Then, the question becomes- how far away from the strike? We must integrate multiple factors for this decision. First, is the volatility high enough? Second, are there underlying fundamental changes that will drive it to some level (say to Purchasing Price Parity), and Thirdly, mean reversion.

2) Choosing the Expiry date

Obviously, the more distant the expiry, the more probability of profit (but you will pay for the excess theta). To maximize your profitability (or minimize the loss if the option expires worthless), *at a minimum*, we should calculate and analyze *our* estimate of the future volatility of the underlying, to determine if there is a good chance for the spot to move far enough to make the option ITM. Volatility is defined as one standard deviation price change, in percent, at the end of a one year period. For example, if the EUR/USD is at 1.4 and has a volatility of 10%, then approximately 68% of the time (one std deviation) it should be trading in a band 1.26 to 1.54 in a one year period, and between 1.12 and 1.68 95% of the time. Since the BSM assumes a lognormal roughly symmetrical distribution, we must add our own directional bias.

A simple excel function can calculate volatility from a time series of prices very easily. But is it very predictive? There is a newer method of calculating volatility, called Generalized Autoregressive Conditional Heteroskedasticity or GARCH, as a blessedly shorter acronym. (Heteroskedasticity is a \$100 word referring a condition which exists when the differences between actual and forecast values do not have a constant variance across an entire range of time series.) GARCH has many advantages over the standard measure of volatility, as it accounts for *volatility clustering* and other non linear characteristics. The Hoadley toolkit includes it. Use it.

Having a good estimate for the future volatility of the spot is absolutely necessary to using options successfully. While using an estimate based simply on past price action is a beginning, our fundamental analysis plays an important role here. For example, we may think GBP/JPY has been oversold- that the UK banking system has already been fully discounted, and that further, the Bank of Japan may intervene for a weaker yen to boost exports. With that in mind, we may believe that this pair (always excessively volatile) is ready for a large retracement of recent losses, and may estimate its volatility at 30%. Let's examine some of the available options,

Here is a table of some calls for GBP/JPY, with an Oct 2009 expiry (10 months away as of this writing).

Calls				Theor Edge "+ = cheap"	Delta	Vega
Strike	Bid (Sell)	Ask (Buy)	Implied vol			
135.00	8.76	9.28	22.6%	3.2866	0.5318	0.4414
140.00	6.56	7.09	22.1%	3.4772	0.4742	0.4419
145.00	4.81	5.33	21.8%	3.5044	0.4191	0.4336
150.00	3.50	4.02	21.7%	3.3256	0.3674	0.4181
155.00	2.53	3.05	21.9%	3.0266	0.3195	0.3966
160.00	1.83	2.35	22.2%	2.6531	0.2758	0.3709
165.00	1.32	1.84	22.6%	2.2611	0.2365	0.3423

The broker has used an implied volatility of about 22-23%.

Using the GARCH methodology, we find this estimation of future volatility:

3 months	2 months	1 month
32%	31%	30%

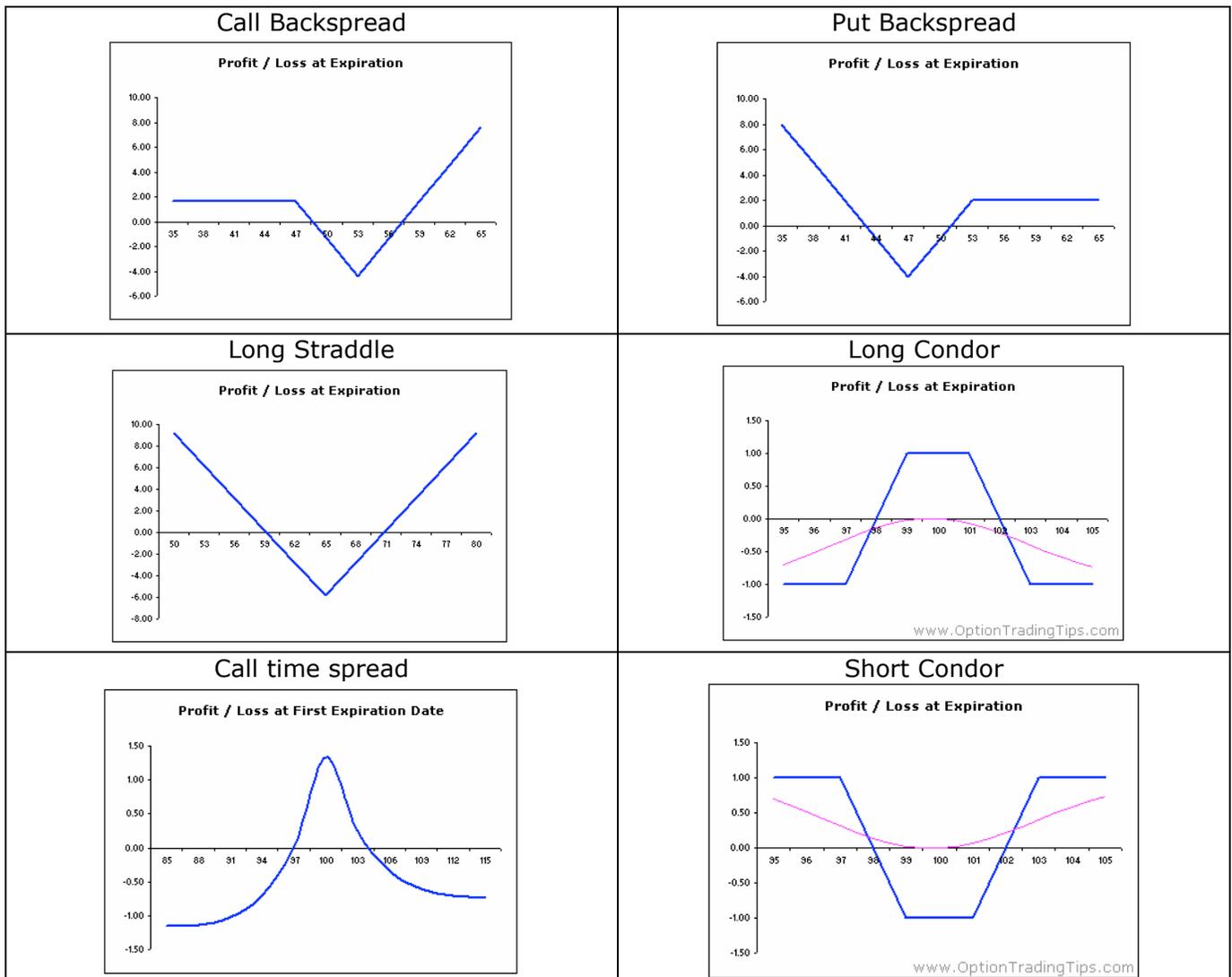
The estimated volatility is substantially higher than the brokers implied volatility. That implies we have a *theoretical edge*- we can buy these options at a discount to what we believe they are worth.

Complex combinations

When we do not have a clear idea of directionality, a single put or call is not the right position. Remarkably, options in combination can express many other market expectations. For example, if we expect the underlying to move a large amount, but we're not sure whether up or down, a long straddle (simultaneously buying a put and call at the same strike price) can be profitable. If, on the other hand, we expect the spot to remain relatively fixed, perhaps +/- 1000 pips, we can construct a "long condor" (consisting of 4 options- long ITM call, short ITM call, short OTM call, long OTM call) which will return a fixed profit and limited downside risk. Put and Call Backspreads allow us to have a bias, and yet profit even if the spot moves sufficiently in the other direction!

There are literally dozens of option combinations (call bear spreads, put time spreads, long butterflies) to express almost any market sentiment. See Chart 6 for a few examples of the many combinations (some of these consist of 4 or more separate puts and calls of differing strikes and expirations).

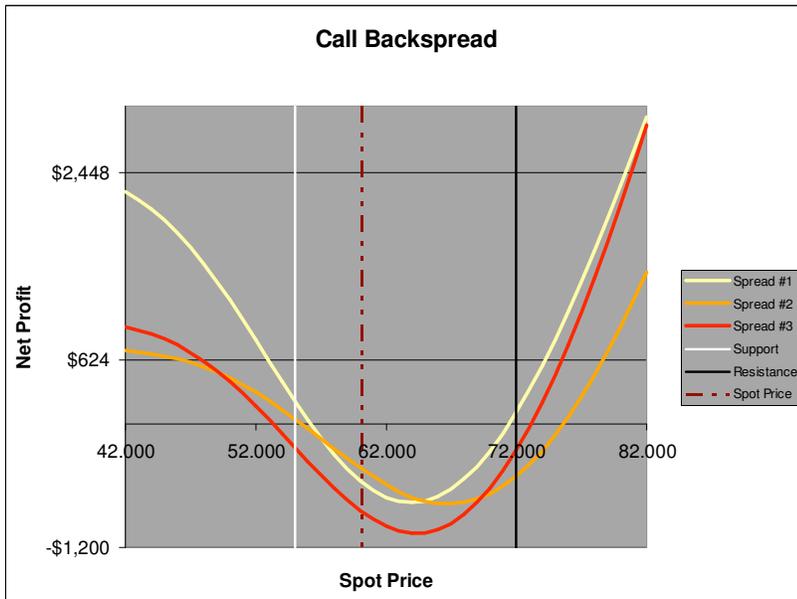
Chart 6



A key to implementing these hedging strategies is knowledge of the Greeks- the variables in the BSM option pricing model. One common element is to keep the positions “Delta neutral”. For example, a call Backspread on AUD/JPY could be implemented by selling 10 calls with a strike of 54, and buying 14 calls with a strike of 62. This produces a delta of -0.076, a credit of \$2,498, and a theoretical edge of 4.019. Here is an excerpt from a spreadsheet I use to analyze possible spreads. Note a very high theoretical edge, a very low Delta, and reasonably low Vega for Spread #1. The same strikes in Spread 2, but note the ratio of positions (10,-13 rather than 10, 14) produces a much larger, negative delta. Using *goal search* in Excel makes finding the right ratio of positions easy.

# pos	Spread #1		# pos	Spread #2	
10	sell Call#	54	10	sell Call#	54
14	buy Call#	62	13	buy Call#	62
	cost (- = credit)	-\$2,498		cost (- = credit)	-\$2,921
	theoretical edge	8.038			7.016
	delta	-0.076			-0.590
	gamma	0.154			0.127
	vega	0.941			0.775

Chart 7



Conclusion

Some of the main dangers and frustrations of traditional Forex trading methods (downside risk, unexpected sentiment changes, time-intensive) can be avoided by using options to express our market position. The timeframe is ideally suited to those trading on fundamentals, rather than any of the more technical, shorter time frame methods, as those tend to be useful on a much shorter timeframe- not long enough for the trend to pay off the premium. Limited risk, a high profit potential, no use of leverage, not time-intensive, and no need for stop loss orders all make for a *winning strategy*.