No direction? No problem.

Profiting With Delta Neutral Positions

Trading delta neutral positions is a strategy that is used by professional and nonprofessional traders to produce profits with reduced risk. The idea is to remove the directional component from the position so that profits can be made whether the underlying moves up or down. Here's how to construct delta neutral positions.

It's not easy to make money trading, but when trading equities, at least the concept is clear: buy low and sell high, or sell high and buy low. When trading options, you have more alternatives using spreads. It is not unreasonable to buy an option that you expect will lose value and will result in a loss while simultaneously selling an option that you think will lose even more value and will result in a gain. The combination of the gain and loss will yield a net profit on the spread. Oftentimes, an option trader will determine that he can't accurately predict which way a stock will move and so will want to take the directional risk out of the equation. Employing this strategy is often referred to as *delta neutral* (DN) trading.

Defining delta neutral

A DN position is an option position that may also include stock, where the sum of the deltas of the puts, calls, and stock is equal to zero or close to it. Since deltas represent the risk associated with the directional component of the position, more deltas (positive or negative) represent greater risk. When I was a market maker, I considered a position that was long or short less than 500 deltas to be DN. For retail traders, I consider a delta between -50 and +50 to be DN.

LISA HANEY

Why do you want a DN position?

When you make a position DN, you are reducing the directional risk the position carries and as you'll soon see in an example, the value of the position will not change over a small range of stock prices. You are, in effect, insuring the value of the position over a range of stock prices. This *insurance* can be thought of as an expense of the position and so the profitability of the position may be reduced. The range of stock prices where the position is protected can be extended further by also making the position gamma neutral, although I won't be discussing that in this article. By reducing the directional risk, you can base your strategy on one of the other variables that determine the value of the position—usually *volatility*, sometimes the *time to expiration*, and rarely (especially in the current economic environment) on *interest rates*.

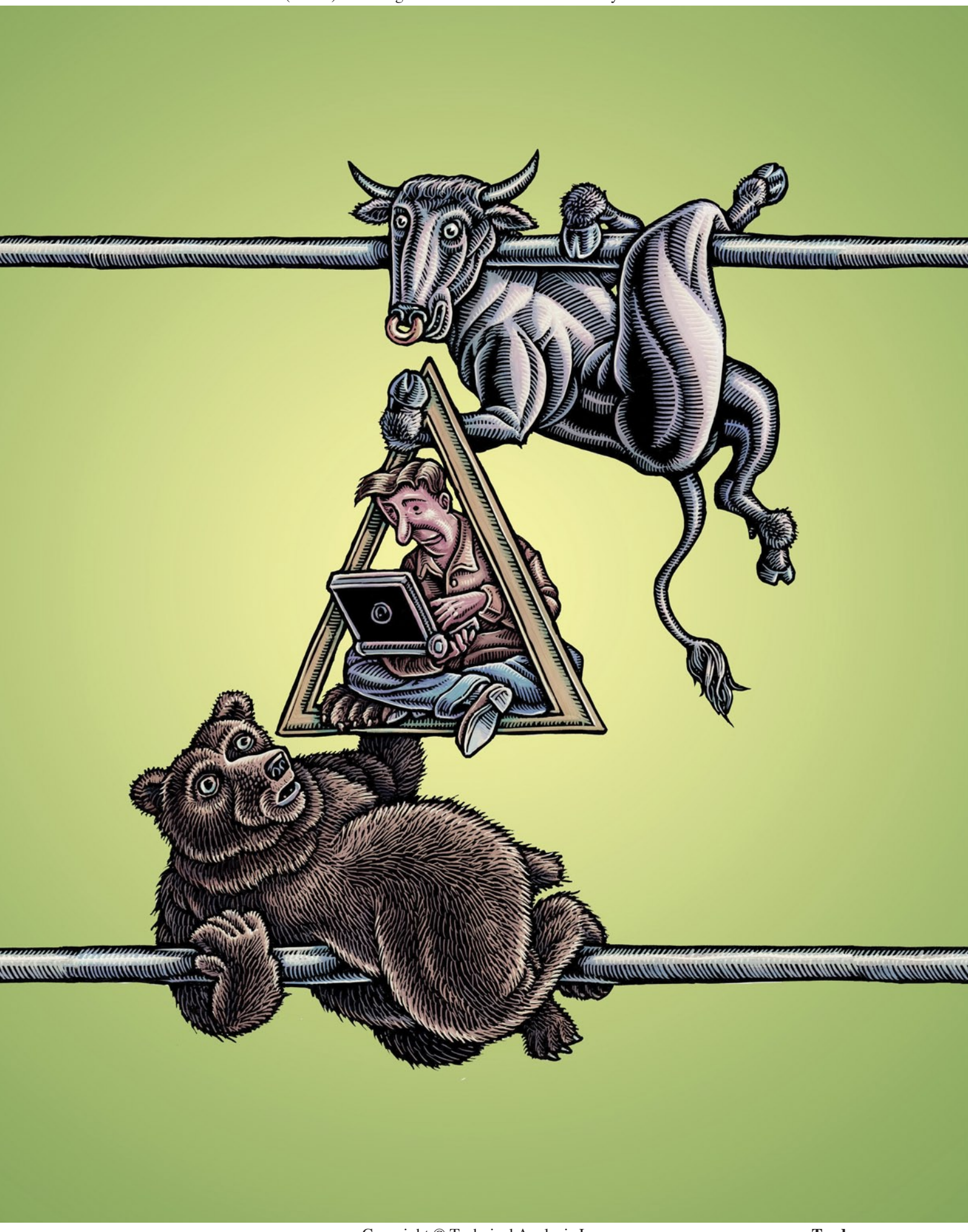
In the past, traders used DN trading to take advantage of mispriced options, although finding mispriced options in today's marketplace is not as easy as it sounds. Others will make a position DN to protect it from price swings over a short period of time. Finally, DN trading is also used in conjunction with gamma scalping, which is also beyond the scope of this article.

To understand DN trading, you'll need to know the definitions of the five greeks and several of the characteristics of delta and gamma (see sidebar "Definitions.")

Characteristics of delta and gamma

Delta and gamma are generally expressed as percentages. For example, the delta for one option can be shown as 80% or 0.80, meaning that if the stock price changed by $1, the option price would change

by Stan Freifeld



by $1 x 0.80, or 80 cents. However, the delta for one option contract (representing 100 shares of stock) would be 0.80 x 100 or 80. When viewing delta this way, you can think of it as an equivalent stock position.

Deltas for long call options range from zero for far out-of-the money (OTM) options to 100 for deep in-the-money (ITM) options. Long put deltas range from zero for far OTM options to -100 for deep ITM options. Short options have the opposite sign as long options. Long calls and short puts will have positive deltas, whereas short calls and long puts will have negative deltas. The delta of long and short stock is always 100 and -100, respectively, and doesn't vary as the price of the stock changes. Here's an interesting thought question: what is the delta of cash? Answer: zero.

XYZ = 55.00			Position	
Size	Option premium	Delta	Delta	$$$
+6	Nov 50C @ 6.25	80	480	3,750
-4	Jan 45P @ 2.10	-30	120	-840
-6(00)	shares @ 55.00	100	-600	-33,000
			0	-30,090

XYZ = 55.50 (+.50)				XYZ = 54.00 (-1.00)			
		$$$	P/L			$$$	P/L
+6	Nov 50C@ 6.65	3,990	240	+6	Nov 50C@ 5.45	3,270	-480
-4	Jan 45P@ 1.95	-780	60	-4	Jan 45P@ 2.40	-960	-120
-6(00)	shares@ 55.50	-33,300	-300	-6(00)	shares @ 54.00	-32,400	600
		-30,090	0			-30,090	0

FIGURE 1: DELTA NEUTRAL EXAMPLE. As the stock price increases to $55.50 or decreases to $54.00, the dollar value of the position doesn't change, so there is no gain or loss.

The gamma of a long put and its corresponding long call is positive. In fact, the gammas are equal in value. So a position gains positive gamma when options are bought and negative gamma when options are sold. Since the delta of stock is 100 and doesn't change, and we know that gamma is the change in delta, the gamma of stock is zero.

FORMULAS FOR DELTA AND GAMMA

We can always look at an option pricing calculator to determine the greeks of our positions. However, to get a quick approximation, you can use the following formulas:

Let P = option premium, D = delta, G = gamma, and M = stock movement (+ for increase and – for decrease).

If the stock moves M, and assuming nothing else changes, the new P and D can be calculated using these formulas:

P(new) = P(old) + M * D
D(new) = D(old) + M * G

Be careful to observe the signs of D, M, and G since they can be positive or negative depending on the position. Also, remember that a negative number multiplied by a negative number yields a positive number.

HOW TO MAKE A DELTA NEUTRAL POSITION

There are a myriad of ways to make a DN position and it's relatively easy. Let's look at an example using two options and see how to combine them with and without stock to make some DN positions. On XYZ stock we see the following two options:

- Jan 50 call @ $3.00, D = 60, G = 8

(remember the D and G are for one option contract)

- Jan 40 put @ $1.10, D = -25, G = 4

To form a DN position without stock, you just need to calculate a ratio of the deltas. So 60/25 = 2.4, which means you will need to trade 12 puts for every five calls. Let's look at three ways to make DN positions.

1. You can buy five calls for every 12 puts and the position will look like this:

+5 calls,	D = 300,	G = 40
+12 puts,	D = -300,	G = 48
	0	88

2. Or you can also sell five calls for every 12 puts and the position will look like this:

-5 calls,	D = -300,	G = -40
-12 puts,	D = 300,	G = -48
	0	-88

3. Alternatively, if you are willing to add stock to the position, you can easily make any position DN:

+5 calls,	D = 300,	G = 40
+8 puts,	D = -200,	G = 32
-100 shares	D = -100,	G = 0
	0	72

Note that even though each of these positions is DN, the gamma (and also the theta, vega, and rho) will be different in each case.

In the DN example in Figure 1, you'll notice that the dollar value of the position doesn't change as the $55 stock moves up to $55.50 or down to $54. This is a nice and neat example meant to illustrate a point. Of course, in real trading the deltas are changing as the stock price changes due to gamma and so

the gain or loss may not be exactly zero.

Now let's look at an example of how you can use DN to make some profit in real trading. Here's the setup:

- XYZ = $53
- Implied volatility normally trades between 35–55%
- Earnings are coming out tomorrow
- IV is high at 60% and you project it will fall to 50% after earnings are released
- Jan 60 call = $2.27, D=33.3

You can put on a position like this:

		Position delta	Cost
+100 shares @ $53,	D = 100	100	$5,300
-3 Jan 60 calls @ $2.27,	D = 33.3	-100	-681
		0	$4,619

The next day, IV does drop to 50% as predicted. You can see from the chart in Figure 2 that the position will be profitable over a wide range of price changes, from down 10% to up 15%. This results in a nice annualized rate of return for this one-day trade.

BE AWARE OF THESE PITFALLS

Does this mean you've found the holy grail of trading? I don't think so. The first obvious problem is that the stock can move too far to the upside or downside. Then you also have the volatility projection. If volatility doesn't come in enough, or worse yet, increases, which may happen due to a swift price move to the downside, the position can suffer losses. Since two of the three short calls in the example are naked, there is a margin requirement and you will need the highest option trading approval level from your broker. Because of those naked calls, this particular strategy cannot be used in retirement or cash accounts and you also have the usual commissions, spreads, and other expenses eating into the profits.

As a final note, those of you who are familiar with synthetically equivalent positions may realize that the results obtained in the example can be duplicated without having to purchase stock. The equivalent position would be to sell the January 60 straddle and to sell one additional Jan 60 call.

Stan Freifeld is a former market maker and white badge floor official on the American Stock Exchange. He is a frequent speaker at trading shows and now runs a one-on-one option mentoring program at McMillan Analysis Corp. He can be reached via email at stan@optionstrategist.com.

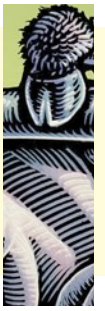
FURTHER READING

Gopalakrishnan, Jayanthi [2014]. "Learning The Ropes With Stan Freifeld," interview, *Technical Analysis of* STOCKS & COMMODITIES, Volume 32: February.

XYZ	Change	Stock	Calls	Position	P/L
45	-15%	4,500	0.24	4,428	-191
47.68	-10%	4,768	0.50	4,618	B/E
49	-8%	4,900	0.68	4,696	77
50	-6%	5,000	0.85	4,745	126
51	-4%	5,100	1.05	4,785	166
52	-2%	5,200	1.28	4,816	197
53	0	5,300	1.55	4,835	216
54	+2%	5,400	1.85	4,845	226
55	+4%	5,500	2.18	4,846	227
56	+6%	5,600	2.55	4,835	216
57	+8%	5,700	2.96	4,812	193
60.84	+15%	6,084	4.88	4,620	B/E
61	+15%	6,100	4.97	4,609	-10

FIGURE 2: RESULTS. Here you see the results one day after earnings are released. One day later after earnings are released, the IV dropped to 50% as predicted.

An option trader may not be able to accurately predict which way a stock will move and so will want to take the directional risk out of the equation.



DEFINITIONS

Delta—The change in an option's premium relative to a change in the price of the stock.

Gamma—The change in an option's delta relative to a change in the price of the stock.

Theta—The change in an option's premium relative to a change in the time to expiration.

Vega—The change in an option's premium relative to a change in the volatility.

Rho—The change in an option's premium relative to a change in the risk-free interest rate.

Note that with the exception of gamma, each of the greeks relates to a change in the option's premium. Gamma relates to a change in delta.