PART THREE:
Core Concepts

WHY WE USE OPTIONS

Trading stocks is reasonably easy, at least in theory. If you think a stock is going up, buy it. If you think it is going down, sell it; or sell it short if you are a real risk-taker. If you think a stock is going nowhere, sell it or avoid it in the first place. The stock price is what it is and that is what you pay. Things are not so simple with options trading. Many factors influence the value of an option contract. It is for largely that reason that most retail options traders underestimate the challenge of making money with options.

Would you like to...

- Increase your leverage without paying margin rates?
- Profit from dropping prices - with limited risk?
- Generate more income in your account?
- Get paid to enter long stock positions?
- Insure your positions or even your whole portfolio?

Options are exceptionally versatile. You can do all of the above with the use of options.

The Fine Print

An option is a standardized contract providing for the right - but not the obligation - to buy or sell an underlying financial instrument. In our context, this underlying is a stock or index (exchange traded fund, or ETF). The contract controls 100 shares, and is good until a defined expiration date. The price at which shares can be bought or sold also is defined by the contract, and is known as the strike price.

There are two types of options: calls and puts. You can buy or sell either type. If you buy an option you are the holder of the contract and considered to be "long," while if you sell an option you are the "writer" of the contract and considered to be "short."

The buyer of a call has the right to buy the underlying security (e.g. 100 shares of Google) at the strike price on or before the expiration date. The seller of a call has the obligation to sell the shares, if asked.

The buyer of a put has the right to sell the underlying security (e.g. 100 shares of Google) at the strike price on or before the expiration date. The seller of a put has the obligation to buy the shares, if assigned.

	Holder (Buyer)	Writer (Seller)
Call Option	Right to Buy	Obligation to Sell
Put Option	Right to Sell	Obligation to Buy

The sides of a trade

Option Price and Value Premium

In exchange for the right to buy (call) or sell (put) an underlying security on or before the expiration date, the purchaser of an option pays a premium. The price of the contract is known as the debit, and it is the purchaser's maximum risk. On the other side of the trade, the seller of the option receives the premium as a credit to his/her brokerage account, but is obligated to buy (in the case of a short put) or sell (in the instance of a short call) the underlying shares if the purchaser exercises the contract. Brokerages hold cash from the premium as a guarantee against short positions.

The strike price, or exercise price, of an option determines whether that contract is in-the-money, at-the-money, or out-of-the-money. If the strike price of a call option is less than the current market price of the underlying security, the call is said to be in-the-money because the holder of the call has the right to buy the stock at a price which is less than the price he would have to pay to buy the stock in the market. Likewise, if a put option has a strike price that is greater than the current market price of the underlying security, it is also said to be in-the-money because the holder of this put has the right to sell the stock at a price which is greater than the price he would receive in the market. The converse of in-the-money is, not surprisingly, out-of-the-money. If the strike price equals the current market price, the option is said to be at-the-money.

	Call	Put
In-the-Money (ITM)	Strike Price < Stock Price	Strike Price > Stock Price
At-the-Money (ATM)	Strike Price = Stock Price	Strike Price = Stock Price
Out-of-the-Money (OTM)	Strike Price > Stock Price	Strike Price < Stock Price

Where the money is

Intrinsic Value and Time Value

The premium of an option has two components, intrinsic value and time value. Intrinsic value describes the amount the stock price is above the strike price (for calls), or below the strike price (for puts). Therefore the amount by which an option is in-the-money is intrinsic value. It is also the value of the contract at expiration.

Time value is defined as the option premium minus the intrinsic value. It is the amount that you pay for the possibility that it will be worth more in the future. Therefore an at-the money or out-of-the-money option has no intrinsic value and only time value.

Calls	Puts
Intrinsic Value = Stock Price - Strike Price	Intrinsic Value = Strike Price - Stock Price
Time Value = Option Price - Intrinsic Value	Time Value = Option Price - Intrinsic Value

Value: time and intrinsic

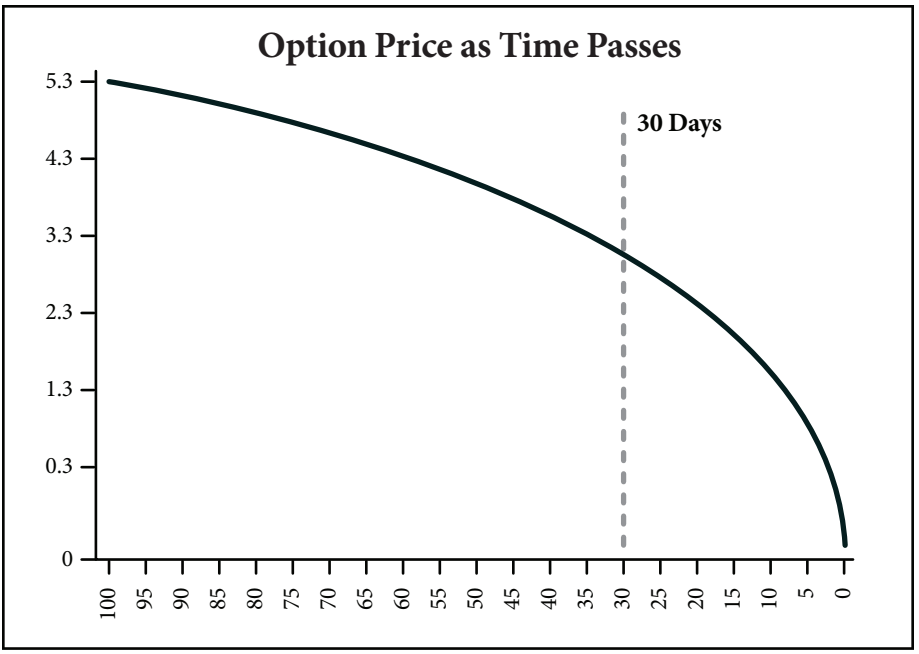
Intrinsic value is only affected by moves in the underlying security.

Time value is subject to several factors, primarily time to expiration and implied volatility. Implied volatility is the market's expectation of the future volatility of the underlying stock. It is derived from the option price itself, and represents demand for the option. The higher the implied volatility, the more expectation that the underlying stock will make big moves, increasing the option's chances of being in-the-money. This also means that the option's premiums (that is, its time value) are higher. However, the value of time decays as expiration nears: time decay increases dramatically in the last 30 days as expiration approaches.

Let's consider an example using Google (GOOG). If GOOG were trading at $500 when you bought a 490 strike call option for $25, then $10 of the option's value would be intrinsic value.

The other $15 would be time value. A 500 call purchased when GOOG is trading for $500 is at-the-money, but is all time value. It has no intrinsic value.

If the stock were at $500 when you bought a 510 call, the option is again all time value, since it has to rise $10 to be at-the-money.



Stock Price = $500	Strike Price		
	490 Call = $25	500 Call = $18	510 Call = $10
	In the Money	At the Money	Out of the Money
	$10 Intrinsic	$0 Intrinsic	$0 Intrinsic
	$15 Time Value	$18 Time Value	$10 Time Value

Intrinsic and time value enumerated

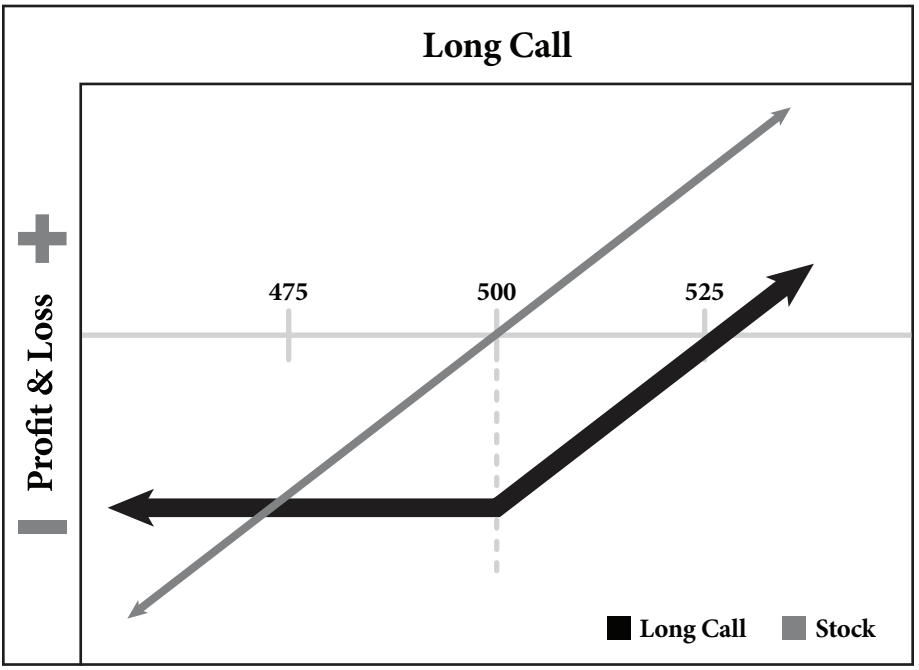
Buying Calls

You want leverage? Buying a call gives you leverage over 100 shares of an underlying stock (or ETF) at the strike price until the expiration date. Long calls are used to profit from upward moves in the underlying.

Again using Google for an example, the GOOG December 500 call option gives you the right to buy 100 shares of GOOG for $500 per share up until the expiration date in December. You would do this with the expectation that the price of the option will rise, through the rise in the price of the underlying stock. Let's say you purchased the GOOG 500 call option for $25 when the stock was

trading for $500. If GOOG goes up to $550 before expiration, then your call is worth at least $50. This gives you a 100% return on the call option based on a 10% return on the stock. That is the leverage of buying options.

The flip side is that if the stock does not move up, then the option will lose all of its value by expiration. This results from the decay of the value of the option's premium, known as time decay. That is the risk of buying calls. Since they are expiring assets, they have time value that diminishes over time. But regardless of how far the stock falls, your risk is limited to the cost of the call.



Symbol: GOOG	Stock P/L	% Return	Call P/L	% Return
$200	($300)	-60%	($25)	-100%
$500	$0	0%	($25)	-100%
$550	$50	10%	$25	100%
$600	$100	20%	$75	300%

Arithmetic of stock and a long call returns compared

Exiting Long Calls

When a call has been purchased, the position can be closed in one of three ways:

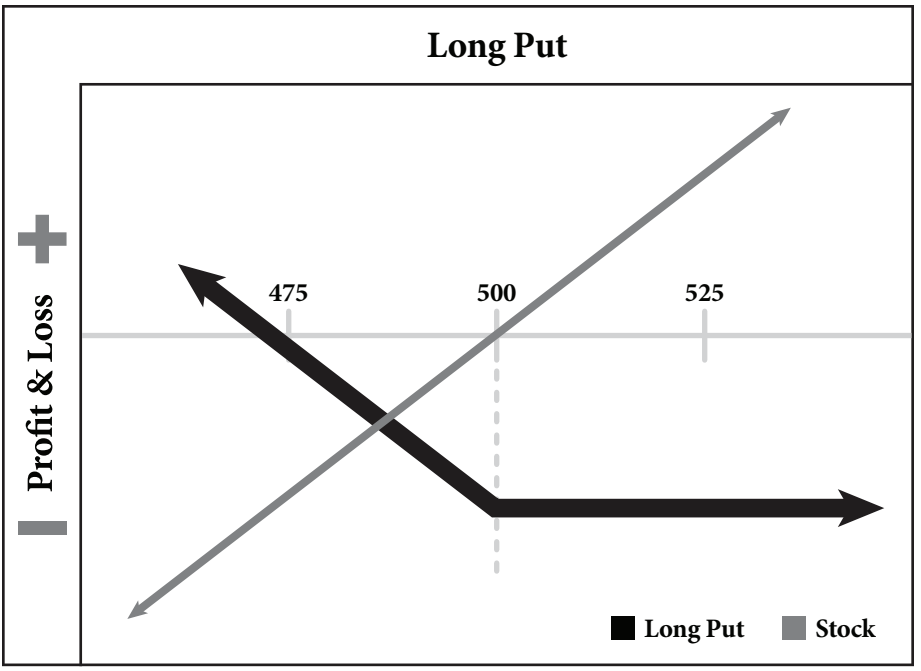
Selling the Call - Once an option is bought it can be sold at any time. This is the most common way of exiting a long position, and the only way of exiting a long call that captures any remaining time value in the option.

Letting it Expire - If a call gets all the way to expiration, it will expire worthless if it is out-of the money (when the strike price is above the stock price). If the stock price is above the strike price by $.01 or more, it will be automatically exercised and shares will be delivered to your brokerage account. Long calls are almost always sold before expiring, since at that point they will have lost all time value.

Exercising Your Call - Utilizing the "right to buy" that is inherent in the call contract is known as "exercising" the option. This results in your brokerage delivering shares of the stock to you at the strike price. Options are rarely bought with the intention of exercising the underlying right.

Buying Puts

Want to profit from the downside? Puts give the buyer the right to sell a specific number of shares (usually 100) of an underlying stock at the strike price until the expiration date. Long puts will profit if the underlying price falls, all else held equal. Buying puts therefore offers a limited-risk way to profit from the downside. This also makes them a way to protect positions as insurance (see the lesson on Protective Puts).



In this case, let's say you were concerned about the downside, so you purchased the GOOG 500 put option for $25 when GOOG the stock was trading for $500. If GOOG goes down to $450 before expiration, then your put is worth at least $50. This gives you a 100% return on the put option with a 10% loss on the stock.

Symbol: GOOG	Stock P/L	% Return	Put P/L	% Return
$400	($100)	-20%	$75	300%
$450	($50)	-10%	$25	100%
$500	$0	0%	($25)	-100%
$600	$100	20%	($25)	-100%

Arithmetic of stock and a long put returns compared

Buying puts on a stock you own can provide insurance on that position. Index puts can also be used to insure your entire portfolio. Buying puts is very much like buying insurance. You pick the deductible and the premiums.

Exiting Long Puts

When a put has been purchased, the position can be closed in one of three ways:

Selling the Put - Once a put is bought it can be sold at any time, and this is the most common way of exiting a long position. This is the only way of exiting a long position that captures any remaining time value in the option.

Letting it Expire - If a put gets all the way to expiration, it will expire, worthless if it is out-of-the-money (when the stock price is above the strike price - See Options Pricing). If the stock price is below the strike price by $.01 or more, it will be automatically exercised and shares will be "taken" from your brokerage account. Long options are almost always sold before expiring, as at that point they will have lost all time value.

Exercising the Option - Utilizing the "right to sell" that is inherent in the put contract is known as exercising the option. This delivers shares of the stock from your account at the strike price. Options are rarely bought with the intention of exercising the underlying right. Taking this course also forgoes any remaining time value in the option.

Rules for Buying

Regardless of whether you are buying calls or puts, there are some general rules to follow.

One, the expiration should give the option enough time to perform without being overexposed to time decay. Since options have an expiration date, a large part of their value is time value (for more, see our lesson on Options Pricing). This time value will deteriorate as that expiration approaches; time decay increases exponentially in the last 30 to 45 days of an options life, so this is usually not the time to own options.

Two, options should generally be bought when implied volatility, or the expected price swings of the underlying, is expected to stay flat or to rise.
Buying options is a limited-risk strategy, and all of that risk lies in the premium paid for the option. All else equal, if there is a rise in implied volatility, then there will be a rise in the option premiums. This increase can produce profits

for long options, even if the stock price doesn't move, because the chance of movement has increased. Conversely, if you buy options when implied volatility and premiums are high, such as before earnings, then the stock can move in the direction that you want and you can still lose money, because with the news out, the implied volatility generally falls.

Finally, when you buy an option, generally you will want to sell it, ideally for a still-greater premium. You do not want it to expire, since you will receive zero premium, and normally you don't want to exercise your right to purchase the underlying shares, unless that is your particular strategy (say for tax reasons).

In both of these cases, you lose whatever time value is left in the option. So with future resale value in mind, we can see why risk management rules are important, such as taking profits when your position doubles or closing out the position when it loses half of their entry value.

Selling Calls

Interested in generating income? When option premiums are high (that is, when implied volatility is high), some traders turn to selling options. Selling "naked" calls, so called because you do not own the underlying shares as a hedge in case you are assigned, is a neutral to bearish strategy. You want the market price to be below the strike of the call you sold, so that it expires worthless. Selling calls should be done when you expect the underlying stock to fall or stay flat.

Option buyers have rights, but option sellers have obligations. By selling calls, you are obligating yourself to selling the stock at the strike price when you are assigned. Assignment is the other side of an option being exercised. If a call buyer decides to exercise the long call, that exercise is put out randomly to a seller—any seller—of that call, and the individual is obligated to sell stock to the call buyer.

If you do not own the shares of the stock when assigned, then you will have to come up with them. This is the reason that brokerages require a margin account for individuals who wish to sell naked calls. It is also the reason that selling calls is considered the options strategy with the highest risk. Stocks can go up infinitely, and so the risk of a naked call is unlimited. Naked calls are the strategy that gives options a bad name among the risk averse.

By way of explanation, let's say you sold the GOOG 500 call option for $25 when GOOG was trading for $500. If GOOG is anywhere below $500 at expiration, then you keep your credit of $25. If the stock goes up to $525, however, you will be assigned at expiration, but will come out flat since you already pocketed a credit of $25. As the stock price continues upward, your losses mount.

Symbol: GOOG	Stock P/L	% Return	Call P/L
$300	($200)	-40%	$25
$500	$0	0%	$25
$550	$50	10%	($25)
$700	$200	40%	($175)

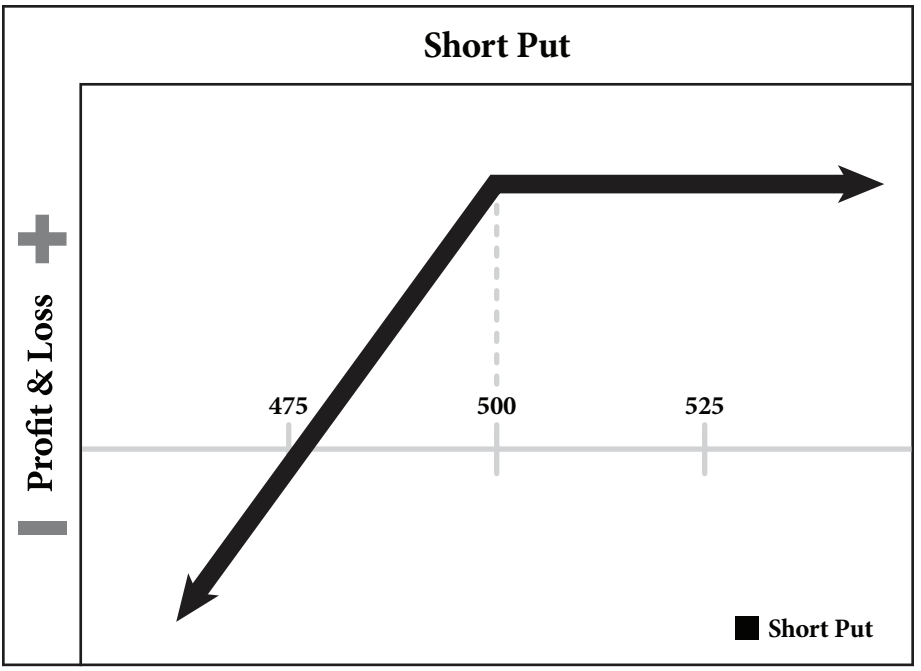
Arithmetic of stock and a short call returns compared

Because of this unlimited risk as the underlying stock price rises, selling calls is rarely done in isolation. In fact, selling calls against stock that you own, known as "covered calls" or "buy-writes," is considered by many the most conservative options strategy. (For more, see the lesson on Covered Calls.)

Selling Puts

Want to be paid to buy stock? Many stock investors use "limit orders" to get into long positions. Another way to buy stock for less than the current market price is an options strategy called cash-secured puts. Cash secured means that you have the cash in your account to buy the stock at the designated strike price. Selling puts is usually done with options that have high implied volatility. This is a neutral to bullish strategy which can be used to generate income, or to enter long stock positions.

Selling puts obligates you to buy the stock if assigned. This strategy brings income into your account, which is your profit if the stock is above the strike price at expiration. Traders sell puts if they think the stock is going to stay flat or go up slightly, but only if they are willing to buy the stock if assigned. For this reason, selling puts can be an excellent way to initiate long stock positions, and get paid to do so.



Symbol: GOOG	Stock P/L	% Return	Put P/L
$300	($200)	-40%	($175)
$450	$0	0%	($25)
$500	$50	10%	$25
$700	$200	40%	$25

Arithmetic of stock and a short put returns compared

Let's say you sold the GOOG 500 put option for $25 when the stock was trading for $500. If GOOG is anywhere above $500 at expiration, then you keep your credit of $25. If the stock is below, you will be assigned, and you will purchase the stock at the strike price. But the trade itself is profitable until $475, since you pocketed the $25 credit.

Puts can be sold cash-secured or naked. If they are cash secured, then you have the cash in your account to purchase the stock at the strike price if assigned. If naked, then a lower margin is required. This would increase the return on margin, but also increase the potential risk.

Exiting Short Positions

When an option has been sold, the position can be closed in one of three ways:

Buying Back the Option - After an option is sold, it can be bought back at any time. This is done when there is a risk of assignment that the option seller wants to avoid. For instance, if you sold a call, the stock went up through your strike, and you do not want to be assigned and forced to sell the stock, you could buy back the option to close the position.

Letting it Expire - If the option gets all the way to expiration, it will expire, worthless if it is out-of-the-money. Typically, this is what you want to have happen with options that you have sold. If it is in-the-money by $.01, it will be automatically exercised and you will be assigned, automatically selling stock if you were short a call or buying stock if you were short a put.

Assignment - American-style options (all equity and ETF options) can be exercised at any time before expiration. So you could be assigned at any time after you have sold an option. Most traders view this as a negative, but it is not necessarily so. If you are using cash-secured puts to acquire stock, then assignment means you have achieved your objective at a below-market price.

Rules for Selling

Selling options is best done when implied volatilities, and therefore option premiums, are high and expected to fall. This is because higher implied volatility brings in more premium income to your account. It is important to remember, however, that selling options involves considerable risk, and high implied volatility can always go higher.

Since we already know that time decay is greatest in the last 30 to 45 days, this is typically the best time to sell options. The ideal is to have the options expire worthless, but we usually recommend buying back short options when they get to some minimum amount (like $.15) to limit risk. Generally speaking, if we wouldn't sell it at the time, we don't want to be short. And, unless necessary, we are not interested in buying back the options we have sold.

Review of Basic Strategies with Examples

Profit from stock price gains

Example: You buy one Cisco (CSCO) 25 call with the stock at 25, and you pay $1. CSCO moves up to $28 and so your option gains at least $2 in value, giving you a 200% gain versus a 12% increase in the stock. Profit from stock price drops with limited risk and lower cost than shorting the stock.

Profit from the downside

Example: You buy one Hewlett-Packard (HPQ) 20 put with HPQ at $21, and you pay $.80. HPQ drops to 18 and you have a gain of $1.20, which is 150%. The stock lost 10%. Profit from sideways markets by selling options and generating income.

Earn extra income

Example: You own 100 shares of Oracle (ORCL). With the stock at 34, you sell one ORCL 35 call for $1.00. If the stock is still at 34 at expiration, the option will expire worthless, and you made a 3% return on your holdings in a flat market.

Get paid to buy stock

Example: Netflix (NFLX) is trading for $175, a price you like, and you sell an at-the-money put for $9. If the stock is below $175 at expiration, you are assigned, and essentially purchase the shares for $166.

Protect positions or portfolios

Example: You own 100 shares of NFLX at $190 and want to protect your position, so you buy a NFLX 175 put for $1. Should the stock drop to $120, you are protected dollar for dollar from $174 down, and your loss is only $16, not $70.

BASIC TERMINOLOGY

Calls - The right, but not the obligation, to buy a specific number of shares of the underlying security at a defined price, until the expiration date.

Puts - The right, but not the obligation, to sell a specific number of shares of the underlying security at a defined price until the expiration date.

Strike Price - The price at which option holders can exercise their rights.

Exercise - The process in which the buyer of an option takes, or makes, delivery of the underlying contract.

Assignment - The process by which the seller of an option is notified that the contract has been exercised.

Expiration - The time at which an option can no longer be exercised.

In-the-Money (ITM) - A call (put) option whose strike price is below (above) the stock price.

At-the-Money (ATM) - An option whose strike price is roughly equal to the stock price.

Out-of-the-Money (OTM) - A call (put) option whose strike price is above (below) the stock price.

American Style - An option that can be exercised at any time before expiration.

European Style - An option that can be exercised only at expiration.
(Note: These are mainly index options.)

Intrinsic Value - The amount that an option is in-the-money.

Time Value - The price of an option less the intrinsic value.

Option Chains

For any given option contract, we need to know the most recent prices and other factors. Option chains show data for a given underlying's different strike prices and expiration months.

Option Chain for Intel Corp. (INTC)

$21.25 ▼ **-0.61 (-2.79%)** **Volume: 57.96 M** **3:23 PM EDT** **January 27, 2011**

Option Filter: Composite ☑ All ☑ At The Money ☑ GO Help

Feb 11 Mar 11 Apr 11 May 11 Jun 11 Jul 11 Aug 11 Sep 11 Oct 11 Nov 11 Dec 11 Jan 11

Calls	Last	Chg	Bid	Ask	Vol	Open Int	Strike	Puts	Last	Chg	Bid	Ask	Vol	Open Int
@NQDV	9.19	0.14	8.75	8.85	2	824	12.50	@NQPV	0.02	-	-	0.02	1	2887
@NQDC	6.80	-	6.20	6.35	0	2355	15.00	@NQPC	0.02	-	-	0.03	0	3290
@NQDQ	5.15	-	5.20	5.40	0	1654	16.00	@NQPQ	0.01	0.04	0.01	0.03	10	1537
@NQDW	3.95	-0.50	3.80	3.90	212	7107	17.50	@NQPW	0.07	0.01	0.07	0.09	173	20597
@NQDT	2.54	-0.47	2.50	2.53	345	3953	19.00	@NQPT	0.23	0.07	0.22	0.24	124	13710
@NQDD	1.75	-0.47	1.72	1.74	2527	33593	20.00	@NQPD	0.45	0.15	0.44	0.45	2702	59325
@NQDU	1.10	-0.36	1.06	1.06	4466	23528	21.00	@NQPU	0.76	0.20	0.78	0.79	3405	28891
@NQDX	0.42	-0.23	0.41	0.41	3452	53399	22.50	@NQPX	1.64	0.41	1.63	1.64	1544	40392
@NQDB	0.12	-0.09	0.13	0.13	206	11807	24.00	@NQPB	2.74	0.51	2.82	2.86	31	27803
@JNQDE	0.06	-0.04	0.06	0.06	102	57633	25.00	@JNQPE	3.69	0.64	3.70	3.85	18	4220
@JNQDY	0.02	-	0.01	0.01	0	34576	27.50	@JNQPY	6.16	-	6.20	6.30	0	361
@JNQDF	0.01	-	-	-	66	30721	30.00	@JNQPF	9.00	-	8.70	8.80	0	30721

A typical options chain

At the top, we have the stock information and then different expiration months. In this case we are looking at Intel (INTC). Down the middle are the strike prices. Calls are on the left, puts on the right. Contracts in-the-money are gray, and out-of-the-money are white.

Each strike lists:

- The price of the last trade ("last")
- The price at which there are willing buyers (the "bid")
- The price at which a contract is offered for sale (the "ask" or "offer")
- The volume of the day's trading ("vol")
- The contract's "open interest" ("open int" or "oi"), which tells us how many active contracts there are for a given month and strike.

High open interest figures, generally near the at-the-money strikes, tell us there are more prospective trading partners who could accept your price. But note that volume does not equal open interest, since some trades are made to close positions.

SUMMARY

- Options are used for speculation, income generation, or hedging a position.
- Options buyers pay a premium for the right to, not the obligation, to act.
- Options sellers (writers) have an obligation (if assigned).
- There are four basic positions: buying calls, buying puts, selling calls, and selling puts.
- Option premiums are made up of intrinsic value and time value.
- Time value is largely a function of implied volatility.

LONG CALLS

Would you like to...

- Have more leverage without increasing use of margin?
- Have a low-capital, low-risk way of profiting from rising stock prices?

You think XYZ stock is going to go up in the near future. You don't really want to tie up all the capital necessary to profit, and you don't want to pay margin rates. But you still want leverage. As one top hedge fund manager said, "the only way most people really do well in the markets is to be long and leveraged". Buying calls is the best way to be "long and leveraged".

Buying calls is the one options strategy most every option trader has executed. Calls are a bet on the rise in price of the underlying stock. This is the option strategy that is most like buying stocks, and so is a popular entry into options trading. Calls are a limited-risk way to profit from rising prices in the underlying, and thus provide for leveraged speculation.

What is a Long Call?

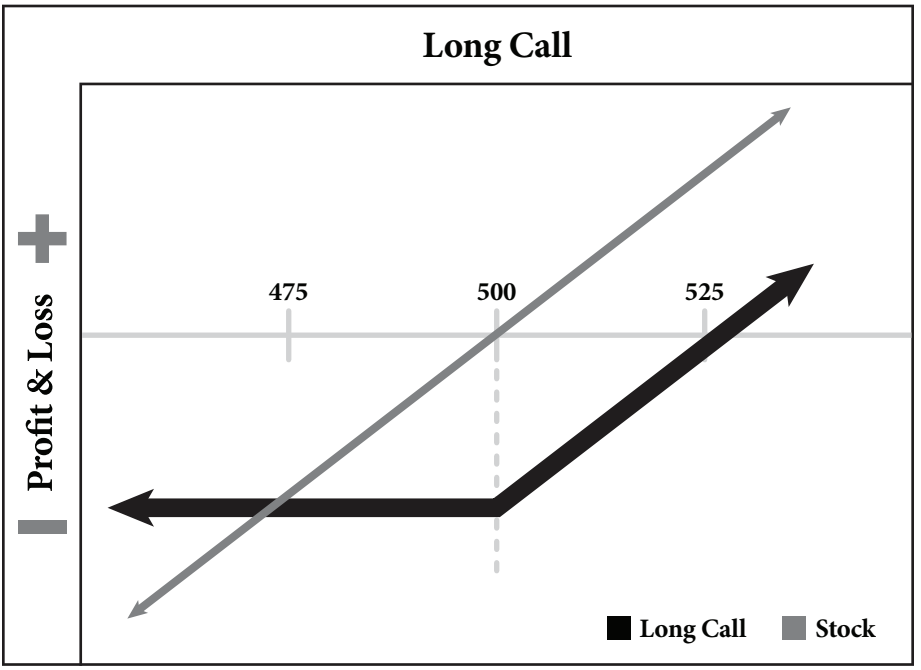
Buying calls gives you the ability to control a lot of stock without owning it, or "leverage." Equity calls give the buyer the right to buy 100 shares of an underlying stock or exchange traded funds (ETFs) at a designated strike price until the expiration date. Long calls are used to profit from upward moves in the underlying.

Buying calls is as simple as picking the strike and expiration date that you wish to buy. Call buyers often use out-of-the-money options (when the strike is above the stock price) because they are "cheap" and appear to offer the best leverage. Speculators and traders must keep in mind, however, that out-of-the-money options also offer a lower probability of profit.

Long calls have significant profit potential, as holders generally will make money as the stock moves up. Because you are paying a premium, in essence buying time value, the stock has to rise above the strike price plus the cost of the contract to be profitable at expiration. Significant upward price moves will benefit the position. Long calls also benefit from an increase in implied volatility (because the likelihood of movement, which is implied by the price of the option, is the key component of the time value of the option contract's

price). Option buyers are best served by divesting their long positions as expiration gets close, however, as that is when time decay is greatest.

The long call strategy loses if the stock price, at expiration, is below the strike price plus the premium paid. The maximum risk is the amount paid for the call. Clearly if the underlying price falls, the position will lose value. If the implied volatility drops (thus lowering the time value of the option), the position can also lose value, even if the underlying moves up. This is the reason that buying calls before earnings (or other news) can be a risky strategy. Even if the stock moves up, the drop in implied volatility that often happens after earnings are released can more than offset the gain from the move in the underlying.



Example: You purchase the GOOG 500 call option for $25 while Google stock is trading for $500. If GOOG goes up to $550 before expiration, then your call will be worth at least $50. This gives you a 100% return on the call option (before counting the cost of the option) with just a 10% gain on the stock. That is what is meant by the leverage of buying options.

The flip side is that if the stock does not move up, then the option will lose all of its value by expiration. This is the result of the decay of the premium of the option, known as time decay. That is the risk of buying calls. Since they are expiring assets, they have time value that diminishes over time. But regardless of how far the stock falls, your risk is limited to the cost of the call.

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$600	$100	20%	$75	300%

Arithmetic of stock and a long call returns compared

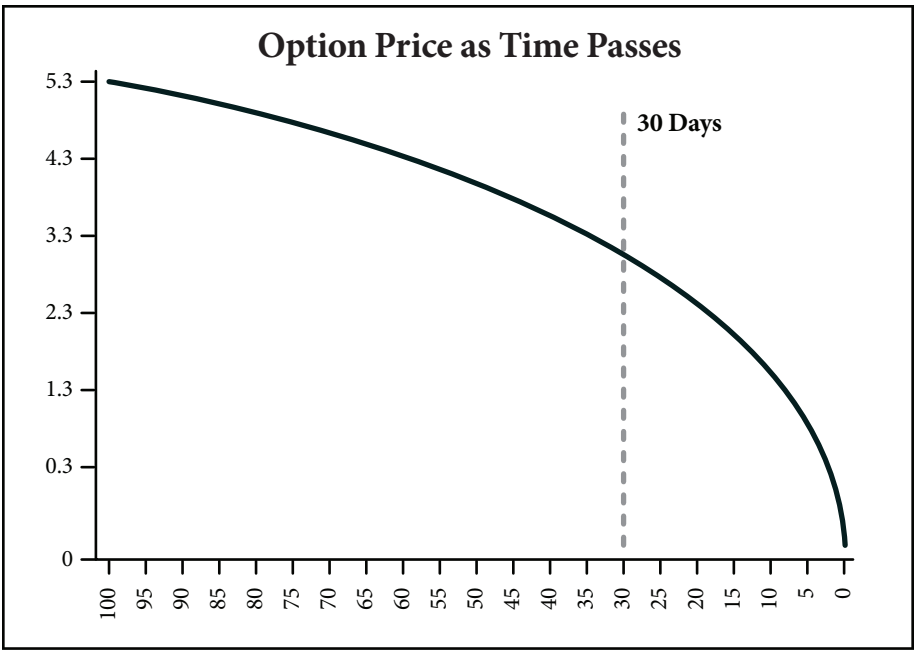
The long call will profit from the stock price rising, all else held equal. The position will lose as the stock price moves down, but that loss is capped at the $25 paid for the position. Because implied volatility is a significant part of the premium paid for an option, if implied volatility goes down, the long call will lose value, and if implied volatility goes up, it will gain. This is only the case before expiration, because at expiration profit and loss is fixed. Time is against you with a long call, so every day you are losing value from time decay.

Rules for Buying

Regardless of whether you are buying calls or puts, there are some general rules to follow.

One, the expiration should give the option enough time to perform without being overexposed to time decay. Since options have an expiration date, a large part of their value is time value (for more, see our lesson on Options Pricing). This time value will deteriorate as that expiration approaches; time decay increases exponentially in the last 30 to 45 days of an options life, so this is usually not the time to own options.

Two, options should generally be bought when the implied volatility, or the expected price swings of the underlying - is expected to stay flat or to rise. Buying options is a limited-risk strategy, and all of that risk lies in the premium paid for the option. If there is a rise in implied volatility, then there will be a rise in the option premiums. This increase can produce profits for long



Time decay

options, even if the stock price doesn't move, because the chance of movement has increased.

Conversely, if you buy options when implied volatility and premiums are high, such as before earnings, then the stock can move in the direction that you want and you can still lose money, because with the news out, the implied volatility could fall.

Finally, when you buy an option, generally you will want to sell it, ideally for a still-greater premium. You do not want it to expire, since you will receive zero premium, and normally you don't want to exercise your right to purchase the underlying shares, unless that is your particular strategy (say for tax reasons).

In both of these cases, you lose whatever time value is left in the option. So with future resale value in mind, we can see why risk management rules are important, such as taking profits when your position doubles or closing out the position when it loses half of their entry value.

Exiting Long Calls

When a call has been purchased, the position can be closed in one of three ways:

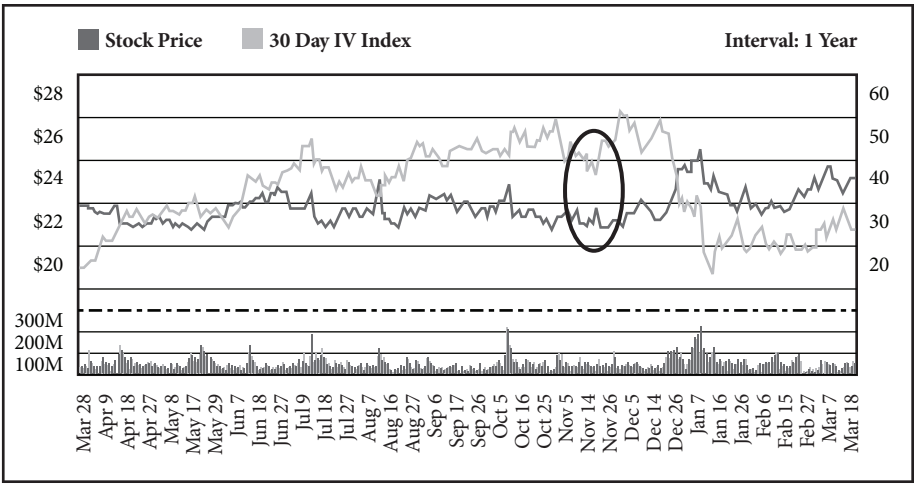
Selling the Call - Once an option is bought it can be sold at any time. This is the most common way of exiting a long position, and the only way of exiting a long call that allows one to capture any remaining time value in the option.

Letting it Expire - If a call gets all the way to expiration, it will expire, worthless if it is out-of-the-money (when the strike price is above the stock price - see Options Pricing). If the stock price is above the strike price by $.01 or more, it will be automatically exercised and shares will be delivered to your brokerage account. Long calls are almost always sold before expiring, as at that point they will have lost all time value.

Exercising your Call - Utilizing the "right to buy" that is inherent in the call contract is known as exercising the option. This delivers shares of the stock to you at the strike price. Options are rarely bought with the intention of exercising the underlying right. Taking this course also forgoes any remaining time value in the option.

Example of a Winning Trade

In the circled area (next page), the price of Intel (INTC) bounces off a low while implied volatilities, and hence option premiums, stay low. Ideally we want to buy calls on low implied volatility because that means that there is less time decay working against us.



Time decay is the greatest in the last month before expiration, so in this case, with the stock climbing back above $25 and implied volatility at 30%, we would buy three months out, February 27.5 calls for $.70.

If the underlying price rises, and implied volatility does not drop (as was the case), it is best to sell the call and not hold it all the way to expiration, thereby losing any time value.

In this case, the stock hit $28 within two weeks and implied volatility went to 34%. The option went from $.70 to $2.10.

Using disciplined position management, we would have exited this position before the full gain, taking half of the position off after a 100% gain, selling most of the rest at a 200% gain. The reason to do so is to avoid letting a winner become a loser, since we couldn't have known the future trajectory of the option.

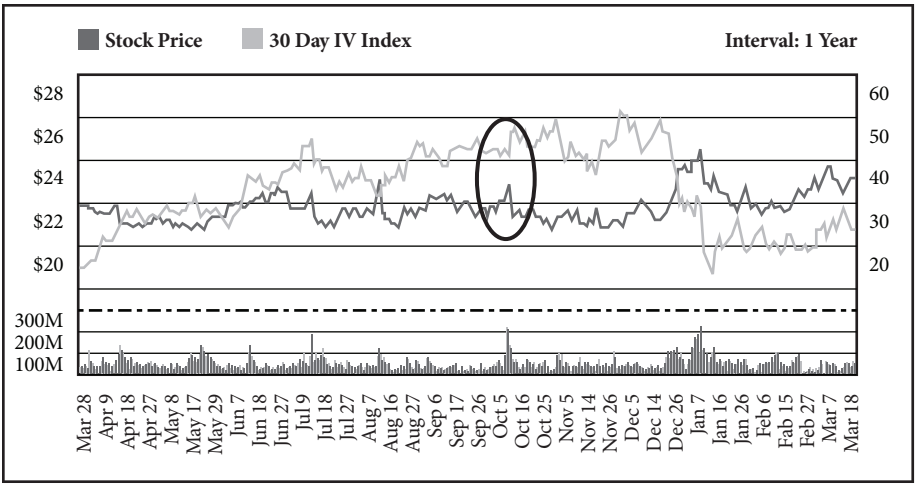
Example of a Losing Trade

Three things can go against us when buying calls: underlying direction, implied volatility, and time.

Using the same underlying as on the previous page, if we had bought calls a month earlier, the trade might not have worked out as well. In the highlighted area we see INTC breaking out to a new high. But most options traders ignore

implied volatility and buy out-of-the-money calls only in the near months. So with the stock at $26.50 and the implied volatility at 41%, we could have bought the November 27 call for $1.10.

The price did move up to $27.50, but with time decay and the drop in implied volatility, the position showed a loss, with the value drooping to $.99. The price then fell further and took the option price down to $.55, where our 50% stop-loss limit would have been hit and we would exit the trade.



SUMMARY

- Long calls are a bullish position.
- They can be a limited-risk, leveraged way to profit from rising prices in the underlying.
- They are significantly affected by implied volatility and time decay.
- The maximum risk is limited, while the maximum gain is unlimited.

COVERED CALLS

Would you like to...

- Generate income in neutral or rising markets?
- Get paid to sell your long stock position?

You own a stock that is part of your long-term investment portfolio. You like it long term, but don't see it going anywhere over the short term and would consider selling it, given the right terms. You would also like to generate some income, but you aren't interested in selling your stock only to buy a CD with a next-to-nothing return.

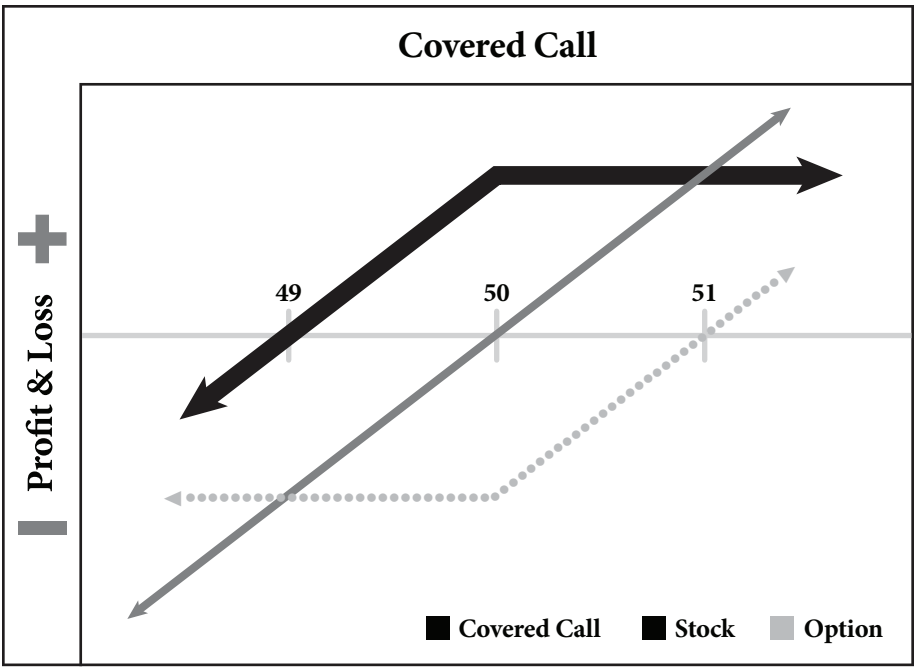
Given these conditions, many self-directed (or "retail") traders use covered calls to generate income in their accounts. It is considered to be highly conservative and is therefore widely popular. In fact, many stock traders begin trading options this way. The strategy can also be used to offset a small part of the cost of purchasing long stock positions. This approach is known as a "buy-write," when the investor buys the stock and writes (or sells) the call. A covered call is equivalent to a cash-secured put.

What is a Covered Call?

Implementing the covered call strategy involves buying (or owning) 100 shares of a stock and then selling a call that is "covered" by the stock (since 1 option contract usually controls 100 shares of stock). The sale is a credit and adds cash to your account. But while selling the call brings income to the account, it creates the obligation to sell the stock if the call is assigned. Note that this can create tax issues for stock, especially those with a low cost basis.

Covered calls are profitable within a defined range. They profit if the stock price drops by less than the amount of the sold call, and remain profitable if the stock moves up to or beyond the strike price of the call sold. The maximum gain is realized if the stock price is at the strike price. At that point, the full value of the sold call is retained while the stock has achieved its maximum without assignment.

Example: With the stock at $48, you sell a 50 call for $1. If the stock goes to $49.50, you gain $1.50 per share and keep the $1 of premium.



If the stock goes to $47.20, there is .20 of profit. Your stock would have lost $.80, but you gained $1 from selling the call option. Meanwhile, if the stock goes to $50.30 at expiration, the call will be assigned and the stock sold. You will recognize a $2.00 gain in the stock price and $1 profit from the option premium which you received; but of course you will have sold your stock. If the sold call can be bought back for a small amount before expiration, it's best to do so, in order to lock in your profit and eliminate exposure to risk.

This strategy loses if the stock price drops significantly. To exit a position, you will need to first buy back the call and then sell the stock. In a falling market,

Symbol: XYZ	Stock P/L	Call P/L	Covered Call P/L
$40	($8)	$1	($7)
$47	($1)	$1	$0
$50	$2	$1	$3
$60	$12	($9)	$3

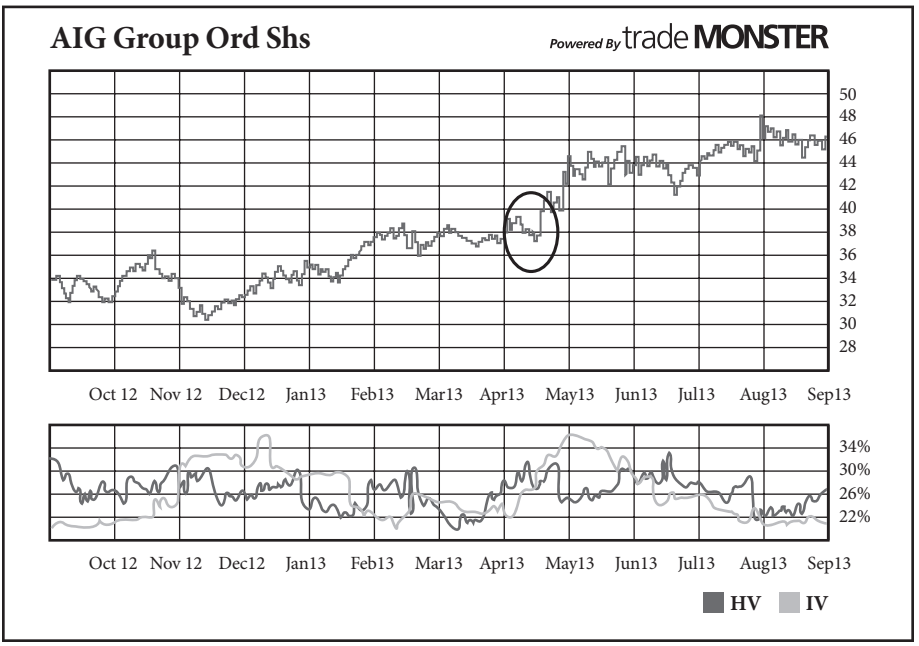
Arithmetic of stock and covered call returns compared

this can be problematic. The credit from selling the call gives you small cushion, but not real downside protection.

Alternately, if the stock takes off and moves beyond the strike price sold, the position will not partake in those gains. You still make a profit, but there is the possibility of assignment before expiration. If you are assigned, you will have to sell your stock, which can create tax issues (especially if you have held the stock for a long time). If the stock price is above the strike price at expiration, you will be assigned.

To reiterate, the covered call will profit from the stock's moving up, staying flat, or falling no more than the credit from the sold call. The position will lose as the stock price moves down beyond the amount of the credit. Because implied volatility (the volatility expectation taken from the options price) is a significant part of the premium paid for an option, if implied volatility goes down, the covered call will profit, and if implied volatility goes up, it will lose. This is only the case before expiration, because at expiration profit and loss is fixed. Time is on your side with a covered call. You have a position with positive theta and so every day you are profiting from time decay (all else held equal).

Example of a Winning Trade



In mid-April, AIG dipped to support at $38, putting in a higher low after a higher high. At the same time implied volatility hit an eight-month high around 39%. We want to sell calls on high implied volatility because that is more premium and time decay in our favor.

Time decay is the greatest in the front month, so in this case, with the stock at 38.5 and rising, we would sell one month out: May 40.5 calls for $1.

If the underlying prices falls, and/or implied volatility drops (as is the case), it is usually best to buy back the call at some pre-determined value (say $.15).

As it happened, implied volatility held up for a couple of weeks before dropping to 24%. The stock price quickly rose above $41 and then $44. So in this case it is likely best to wait for expiration and assignment, or we could close out the calls and stock together as one trade. If we had waited, we would have had the $1 profit from the option and $2 from the rise in the stock price, a gain of almost 8% for the month (minus commissions and fees).

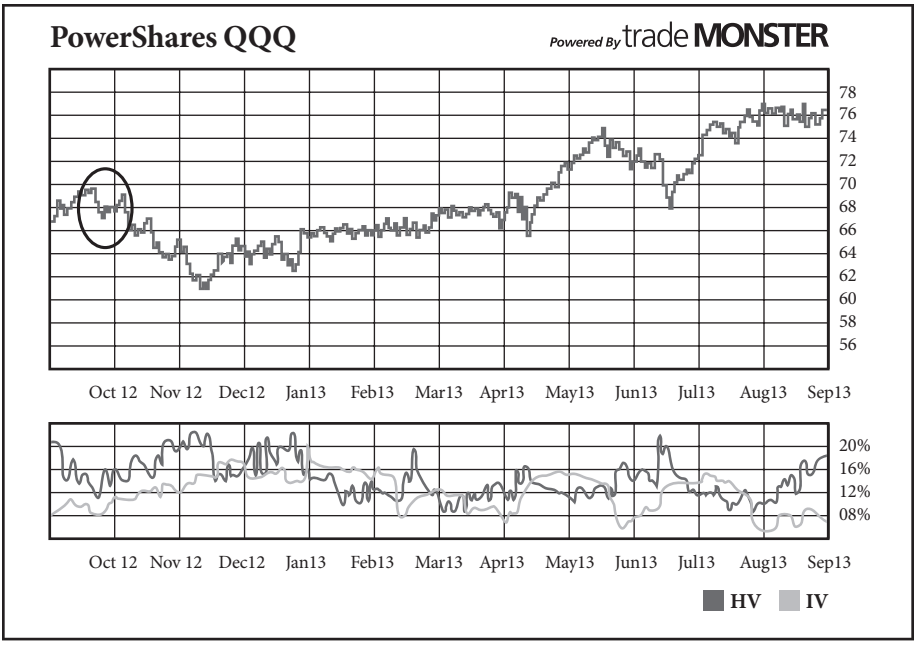
Example of a Losing Trade

Some people like to use ETFs (exchange traded funds) for covered calls to minimize risk, but that doesn't mean that there isn't any risk. Here is an example using the QQQ.

Here, in late October, we seemed to have the price bottoming out, with a spike in implied volatility. With the price at $65 and the implied volatility up to 21, we sell the November 67 call for $0.80.

The rebound doesn't happen, and the price dives down to $62 as the implied volatility holds steady. Now we have two options. If we decide that we want to get out of the entire position, then we need to first buy back the call, and then sell the stock. Otherwise we can wait until expiration if we think that the QQQ will be back up above $64.20 (our break-even point) by expiration.

We hold the position and stock is down around $62 at expiration, so we have a loss, but it is reduced by the amount of the credit of the sold call.



SUMMARY

- The covered call strategy involves owning or buying stock and selling calls against it in a 1-to-1 ratio.
- It is a slightly bullish to neutral strategy.
- It can generate extra income in your account and potentially reduce volatility.
- It is equivalent to a short put.
- The maximum gain is limited; the risk is the same as owning the stock (minus the credit for selling the calls).

PROTECTIVE PUTS

Would you like to...

- Have a limited-risk way of profiting from falling stock prices?
- Be able to buy insurance on your stocks or overall portfolio?

You insure your house. You insure your car. Why don't you insure your portfolio?

Insurance for your portfolio—or most stock positions—is available using put options. While options have the reputation of being risky assets in some circles, their original purpose was as insurance policies to protect positions, and buying puts is a limited risk way of doing just that.

What is a Protective Put?

Puts make money when the underlying stock goes down, and therefore when owned along with the underlying, provide downside protection. As a buyer you limit the risk of stock ownership. Just as with your other insurance policies, your risk is the premium you pay. And like your other insurance policies, you have it in place with the intention of not using it.

A protective put requires you to identify the strike price and the expiration date that you want, and to purchase the option. This is as easy as picking a stop-loss point, usually involving an out-of-the-money put (a put strike that is below the stock price) which restricts the loss to a size that you are comfortable with. Add the cost of the option to the difference between the stock price and the strike price, and that is your maximum loss to the downside. And for those stock traders familiar with stop-losses, there is no slippage and no "flash crashes" down past your stop price.

As options are expiring assets, they are also decaying assets. There is a time value component to the premium price of an option and every day that amount decreases. The decay rate also increases as expiration approaches. Longer-term options decay at slower rates than short-term options, so most investors use longer term puts for protection, and sell them before the decay rate increases dramatically (usually in the last 30 to 45 days).

For example, if you own 100 shares of EBAY at $31.00 and want to protect your position, you could buy a four-month 30 strike put for $2. Below $28

(the strike minus the premium cost of the option), you are protected dollar for dollar against stock declines.

We can see that EBAY would have to drop all the way to $28 to produce the maximum loss of $300. An increase in implied volatility would help the position and therefore would lower that price at which the maximum loss occurs.

If the stock moves up to $36, a gain of $300 is produced. Again this will be impacted by a rise or fall in implied volatility.

Finally, if the stock remains unchanged, time decay will eat away at the options value and will produce a small loss (the cost of insurance).

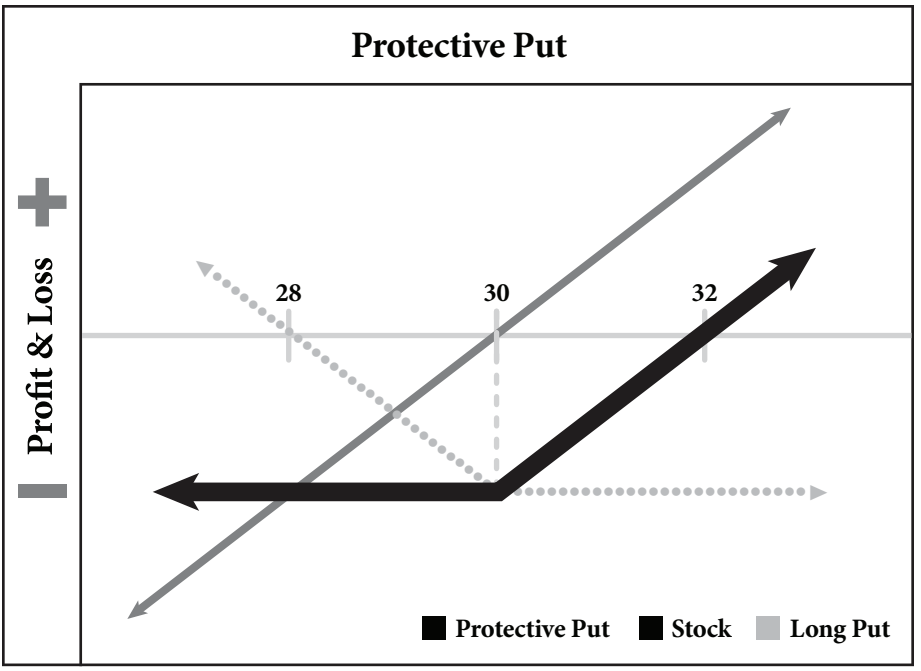
Rules for Buying

Whether you are buying calls or puts, there are some general rules:

One, the expiration should give the option enough time to perform without being overexposed to time decay. Since options have an expiration date, a large part of their value is time value (for more, see our lesson on Options Pricing). This time value will deteriorate as that expiration approaches; time decay increases exponentially in the last 30 to 45 days of an options life, so this is usually not the time to own options.

Two, options should generally be bought when implied volatility, or the expected price swings of the underlying, is expected to stay flat or to rise. Buying options is a limited-risk strategy, and all of that risk lies in the premium paid for the option. If there is a rise in implied volatility, then there will be a rise in the option premiums. This increase can produce profits for long options, even if the stock price doesn't move, because the expectation of movement has increased. Conversely, if you buy options when implied volatility and premiums are high, such as before earnings, then the stock can move in the direction that you want and you can still lose money, because with the news out, the implied volatility could fall.

Three, when you buy an option, generally you will want to sell it, ideally for a still-greater premium. You do not want it to expire, since you will receive zero premium, and normally you don't want to exercise your right to purchase the underlying shares, unless that is your particular strategy (say for tax reasons).



In both of these cases, you lose whatever time value is left in the option. So with future resale value in mind, we can see why risk management rules are important, such as taking profits when your position doubles or closing out the position when it loses half of their entry value.

Stock Price	Stock Gain/Loss	Put Gain/Loss	Total Gain/Loss
$36	$5	($2)	$3
$31	$0	($2)	($2)
$28	($3)	$0	($3)
$25	($6)	$3	($3)

Arithmetic of stock and protective put returns compared

Exiting Long Puts

When a put has been purchased, the position can be closed in one of three ways:

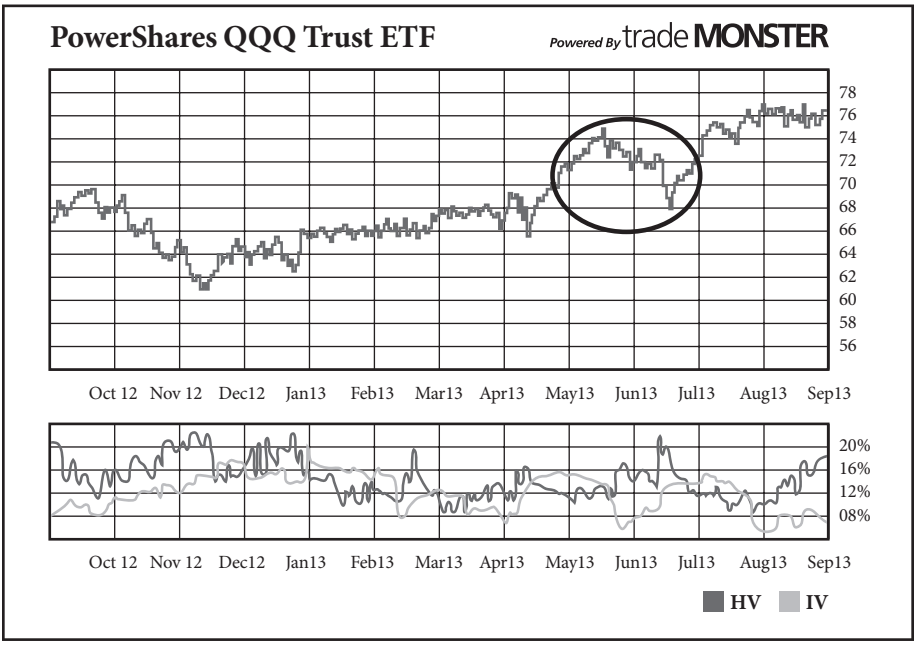
Selling the Put - Once a put is bought it can be sold at any time, and this is the most common way of exiting a long position. This is the only way of exiting a long position that captures any remaining time value in the option.

Letting it Expire - If a put gets all the way to expiration, it will expire, worthless if it is out-of-the-money (when the stock price is above the strike price - See Options Pricing). If the stock price is below the strike price by $.01 or more, it will be automatically exercised and shares will be "taken" from your brokerage account. Long options are almost always sold before expiring, as at that point they will have lost all time value.

Exercising the Option - Utilizing the "right to sell" that is inherent in the put contract is known as exercising the option. This delivers shares of the stock from your account at the strike price. Options are rarely bought with the intention of exercising the underlying right. Taking this course also forgoes any remaining time value in the option.

Example of a Winning Trade

On May 17, the QQQ price hit a multi-year high at the same time that implied volatility bottomed. Ideally we want to buy puts on low implied volatility because that means lower premiums and lower time decay, which is in our favor.



Time decay is the greatest in the front month and for strikes near the money, so with the stock hitting resistance at $74 and implied volatility at 13 we would buy 2 to 3 months out, in this case the August 72 puts for $.75.

If the underlying price falls, and implied volatility rises (as was the case), the put protection kicks in.

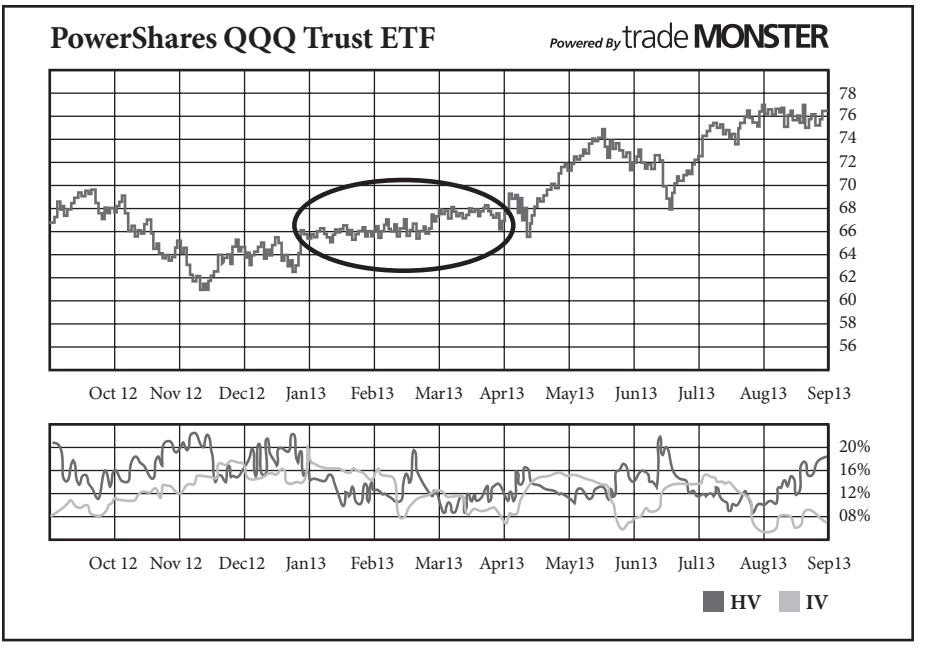
The stock hit $69 by June and implied volatility went almost to 20. The option went from $.75 to $4.05 even with a month of time decay, providing the protection we desired.

Using disciplined position management, we would have kept the put on and exited only if we felt the stock had hit a new support level and was holding that support with a high probability of bouncing back up. This would have allowed us to hold onto the long position through the sell-off, because our put offset much of our loss.

When the stock starts to recover in late June, we could have taken the put off at a profit and begun to ride the stock back up. In this case, QQQ traded up higher than where we originally established our put, trading up to $77 by the beginning of August. The put bought us time to weather the sell-off, allowing us to hold the position long enough to take advantage of the stock's breaking through the old $74 resistance and proceeding to new highs.

Example of a Losing Trade

What you don't want with protective puts is a sideways market, especially if implied volatility falls. Using the same underlying, if we had bought puts in mid to late January, the trade might not have worked out as well. In the highlighted area we see the QQQ jumping higher and implied volatility back down to 15 level.



So with the ETF at $67.25 and the implied volatility at 15, we could have bought the March 64 put for $.70.

The position showed a small profit after two weeks as the price dropped and IV went up. But then both reversed. The price went up and was at $67.75 at the expiration, and the implied volatility dropped a bit. So we made no money on the price direction and we lost money on the protective put.

SUMMARY

- Long puts can be used to protect holdings or portfolios as insurance.
- They can be a limited-risk way to profit from downside moves in the underlying.
- They are significantly affected by implied volatility and time decay.
- When long puts are used as protection for a stock holding, the combination is equivalent to a long call.
- The maximum risk is capped; the maximum gain is unlimited to the upside.

SHORT PUTS

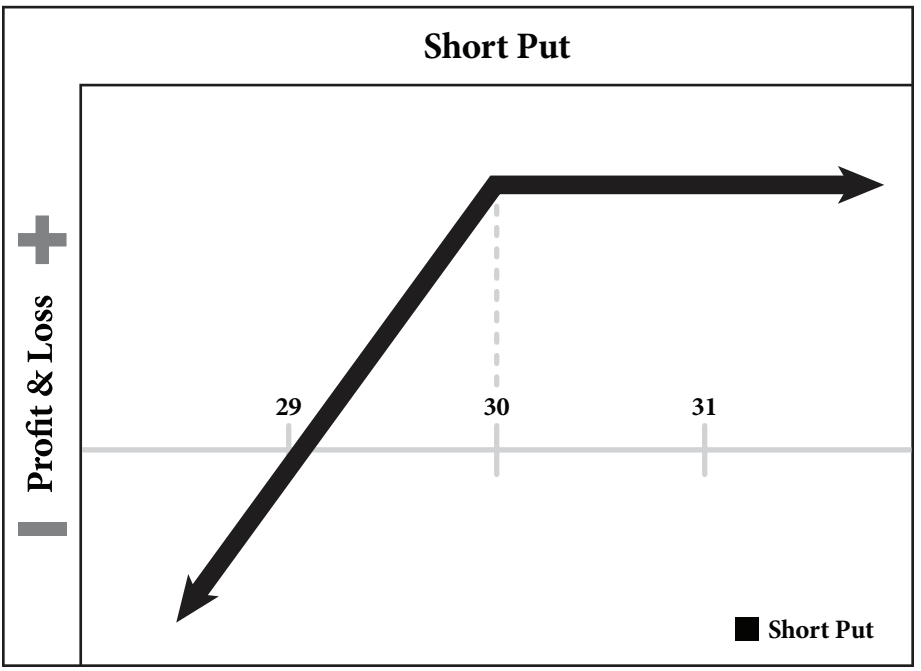
Would you like to...

- Generate income in neutral to rising markets?
- Get paid to enter "limit buy" orders for a stock you would like to own?

Many retail traders use short puts to generate income in their accounts. Short puts can also be an excellent way to acquire stock. The position is very similar to a covered call.

What is a Short Put?

Selling puts are often seen as a way to make money in a neutral market. Having chosen the strike and expiration date of an options contract, your sale is a credit and adds cash to your account. If the short put is "cash secured," which is often prudent, it means you to have enough cash in your account to purchase the stock at the designated strike. For instance, if you sold a 30 put for $1, you would have $3,000 cash in your account, in order to buy 100 shares of stock for $30 if assigned. *(Note: Your broker may require short puts to be cash secured, or may have different margin requirements.)*



Short puts profit by the amount of the credit if the stock is above the strike price at expiration: The maximum profit is the credit that you took into your account.

For example, with the stock at $31, let's say you sold the 30 put for $1. You get to keep your $1 credit if at expiration the stock is anywhere above 30. If the stock is at $29.50 at expiration, you will have made $.50, but you also will be assigned and have to purchase the stock. (This is why it's advisable to secure the put with cash.) The strategy is actually profitable down to $29, since you did get a credit. Most traders close out the position prior to expiration if they can buy back the option for a much lower price than they sold it, for instance selling the put for $1.00, and buying back for $.15.

Symbol: XYZ	Stock P/L	Short Put P/L
$24	($7)	($5)
$29	($2)	$0
$31	$0	$1
$35	$4	$1

Arithmetic of stock and short put returns compared

As you can see, using cash-secured puts can be a way to get paid to enter a limit order. In the case above, if you want to buy the stock for $30, and the stock is trading at $31, you can sell the 30 put for $1. If the stock is below $30 at expiration you will buy the stock at $30, but because of the credit, you really only pay $29.

This strategy loses if the stock price drops significantly. Below the strike price that you sold, you have the same risk as owning the stock, because essentially you do.

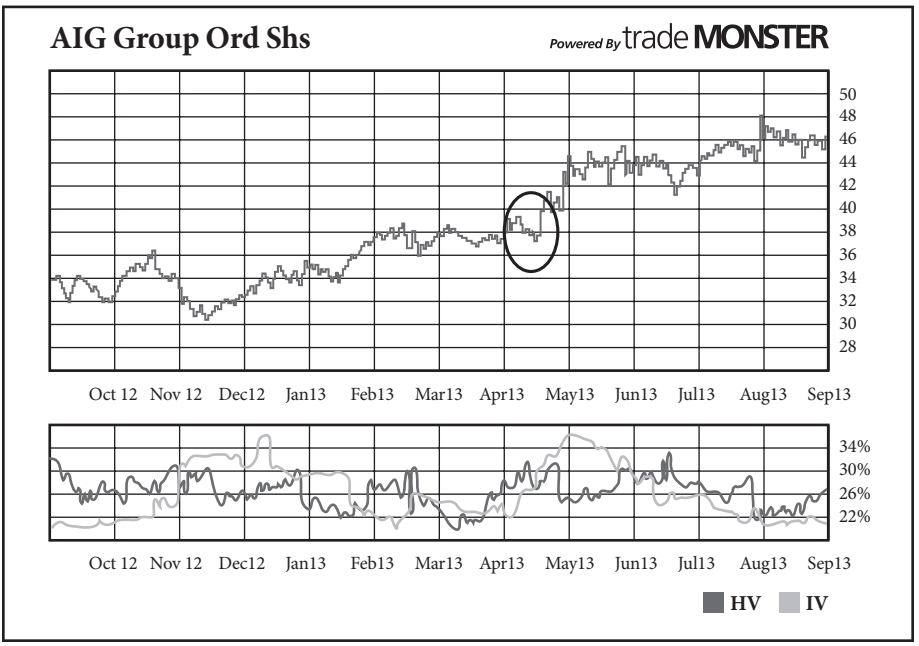
The value of a short put position will profit from the stock moving up, as the put loses value. The position will lose as the stock price moves down. Because implied volatility is a significant part of the premium paid for an option, if implied volatility goes down, the short put will profit and if implied volatility goes up, it will lose. Of course, this is only the case before expiration, because at expiration profit and loss is fixed. Time is on your side with a short put. You have a position with positive theta and so every day you are profiting from time decay (as long as the stock price doesn't drop significantly).

There are several potential advantages in selling cash-secured puts to covered calls. The first is that you pay one commission as opposed to two. (This assumes that you are not assigned, and don't incur the fees that would come with assignment.) Risk management is typically easier with the one position. Puts also usually command higher premiums than calls and therefore offer better potential returns. The best way to analyze this is by using the comparative implied volatilities.

Let's look at a real world example. Let's say the XLF (a financial sector Exchange Traded Fund) is trading at $24.98 (which is as close to at-the-money of the 25 strike as you are going to get in reality). The 25 call is selling for $1.36 and the 25 put is selling for $1.52. Going out-of-the-money one strike, the 30 call is selling for $.89 and the 20 put is selling for $1.08. Clearly the return is better in both cases selling the put.

Example of a Winning Trade

In mid-April, AIG dipped to support at $38, putting in a higher low after a higher high. At the same time implied volatility hit an eight-month high around 39%. We want to sell puts on high implied volatility because that is more premium and time decay in our favor.



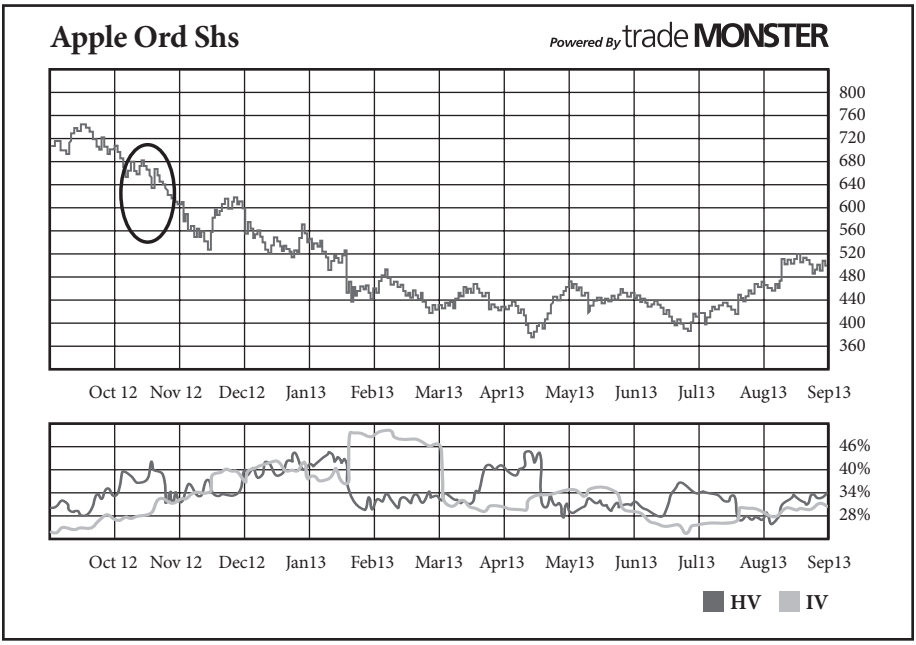
Time decay is the greatest in the front month, so in this case, with the stock at $38.50 and rising, we would sell one month out: May 37 puts for $1.05.

If the underlying price rises, and implied volatility drops (as was the case), it is best to buy back the put at some pre-determined value (say $.15).

As it happened, implied volatility held up for a couple of weeks before dropping to 24%. The stock price quickly rose above $41 and then $44. In this case, we were able to buy back the put for $.15 before expiration. This takes our profit off of the table and eliminates risk near expiration.

Example of a Losing Trade

Apple (AAPL) seemed to be putting a halt to its slide off the high in mid-October, while implied volatility spiked just before earnings. The price broke higher to $610 while the implied volatility was at 41, so we sold the December 600 put for $20.30.



While implied volatility held constant, the price of the stock slid to $527 at expiration.

Now we had two alternatives. We could have bought back the put for a loss. Or we could have waited until expiration, if we were still bullish on AAPL and didn't mind buying it at $600.

Our break-even price at expiration was $579.70, so we would have bought this put back for a loss before the stock got as low as $527.

SUMMARY

- Short puts are a bullish to neutral strategy.
- They can generate extra income in your account.
- The risk is the same as owning the stock, minus the credit for selling the put.
- They can be a good way to acquire stock.
- They are equivalent to covered calls, but may offer some advantages.
- The maximum gain is capped, while the risk is the same as owning the stock.

VERTICAL SPREADS

Would you like to...

- Be able to increase your probability of profit?
- Reduce your exposure to high premiums and implied volatility?

One of the issues with buying "naked" calls and puts is that by the time you purchase them, the premiums are potentially already very high. As options trading is a probability game, the higher the premiums are, the lower the probability of profit for buyers. So to lower your exposure to those high premiums, you should know when to spread 'em.

Vertical Spreads are used to offset premium costs when buying options, or to hedge risks when selling options. The maximum gain and risk are known from the outset of the trade, and therefore allow for very specific risk management. Verticals are usually used when implied volatility, and therefore option premiums, is high.

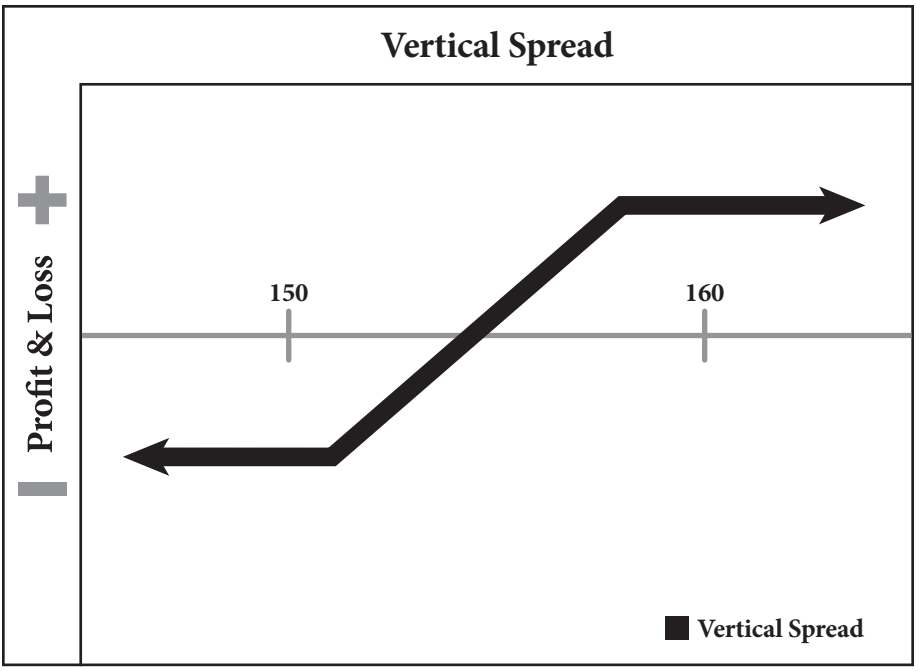
What is a Vertical Spread?

Vertical spreads, a strategy done with either calls or puts, involve buying one option and selling another option of the same type and expiration, but a different strike.

A "bull call" spread, for example, entails buying one call and selling a higher-strike, lower-priced call to offset some of the premium cost. This type of spread would be done for a debit. A "bear call" spread would entail selling the lower-strike call and buying a higher-strike call to hedge the risk. This would produce a credit in your account; cash will be held as a margin for the position.

Debit vertical spreads (bull call and bear put spreads) profit from a directional move. The position will succeed if the stock has moved past the bought strike plus the debit paid. For a full profit, the underlying needs to move beyond the sold strike by expiration. For example, if XYZ call spread is purchased, buying the 25 call and selling the 30 call for a debit of $2, then the full profit will come with the underlying anywhere above $30, and the position will profit anywhere above $27.

Credit vertical spreads involving calls will make a full profit if the underlying is below the sold strike at expiration. The break-even is the strike plus the credit.

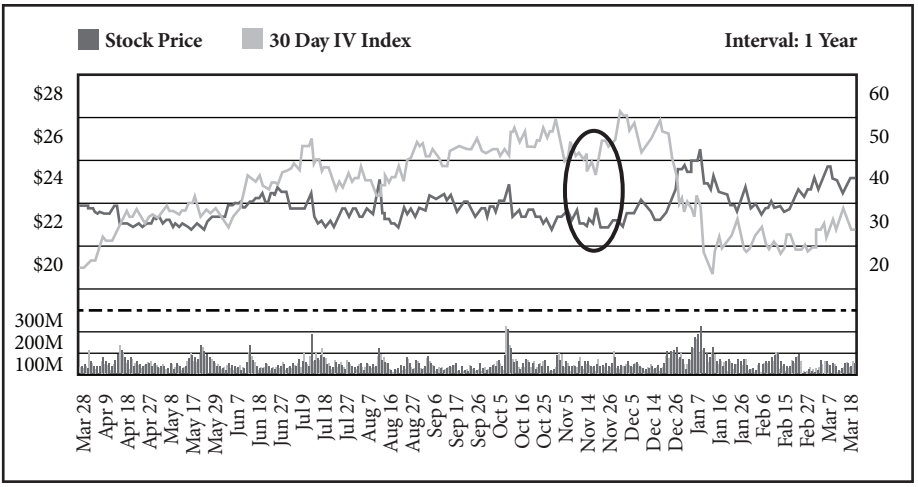


Credit spreads using puts will profit if the underlying stays above the strike sold minus the credit. Example: Sell the XYZ 30 put, buy the 25 put to hedge the risk, for a credit of 2.50. The position will profit anywhere above $27.50, and will get a full profit if XYZ is anywhere above $30 at expiration.

Vertical spreads lose if the underlying moves in the wrong direction. The maximum loss for debit spreads is the debit paid. The maximum loss for credit spreads is the difference between the two strikes used minus the credit. This is also the amount of margin held by your broker.

Debit vertical spreads are used to offset the premium cost of the purchased option, especially when implied volatilities are high. This increases the probability of profit for the trade, but does limit the potential gains. Credit spreads are used when one wants to be a net seller of options, but wants to hedge the risk. Option selling can have a very high probability of profit, but also the potential for large losses, and using a credit spread limits that exposure. With the stock at $149, the 150 call is purchased for $10, and to offset some of that cost, the 160 call is sold for $6, for a net debit of $4.

This is a directional trade, so the bull call spread will profit from the stock moving up and lose from the underlying moving down. The maximum gain and risk are known from the outset of the trade and therefore allow for very specific risk management. The spread is used to limit exposure to implied volatility, so changes in implied volatility will have little effect.



Example of a Winning Trade

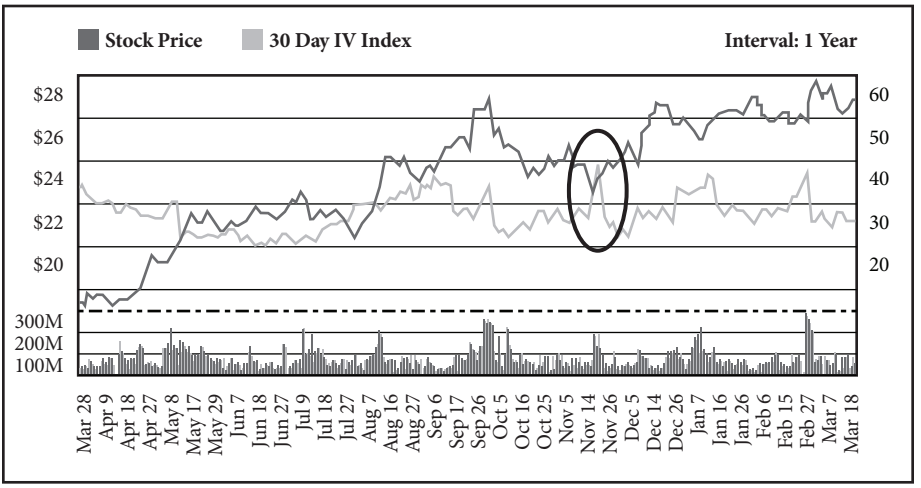
Intel's (INTC) price puts in a higher low at the same time that implied volatility spikes on November 15. We usually look to call spreads on higher implied volatility to offset the premium cost.

With the stock at $21.50 and rising and implied volatility up to 27%, we would buy the May 22 calls for $.55 and sell the 23 calls for $.27, for a net debit of $.28.

The maximum risk is the $28 we paid (remember: the multiplier is 100 as one option is for 100 shares of stock) realized if the stock is below $23. The maximum gain is $73 if shares are above $23.

In this case, INTC went up to $24, so the trade worked out perfectly, giving us a 200% return.

Example of a Losing Trade



Here the price of the QQQ moved against our position.

In late October, we seemed to have the price bottoming out, with a spike in implied volatility. With the price at $65 and the implied volatility up to 21, we buy the 65 calls for $1.55 and sell the November 67 call for $.80. The net debit is $.75, which is our maximum risk.

The rebound doesn't happen, and the price dives down to $62 as the implied volatility holds steady. We would have sold the spread before expiration for $.35 given our risk rules and gotten out of the trade.

SUMMARY

- Vertical spreads provide known and fixed maximum gains and losses.
- They are usually used with high implied volatility and/or high premiums.
- They can be credit or debit spreads.
- They increase the probability of profit with directional trades, but limit the upside.

CALENDAR SPREADS

Would you like to...

- Be able to profit from range-bound markets?
- Take advantage of the different time decay rates in different expiration months?

Anyone who has traded options for a while has a feel for how time decay can eat away at an option's value, especially as expiration gets closer. Options positions can in fact profit from time decay, but this entails selling options and can involve significant risk. Long calendar spreads provide a limited-risk way to take advantage of time decay inherent in different expiration dates.

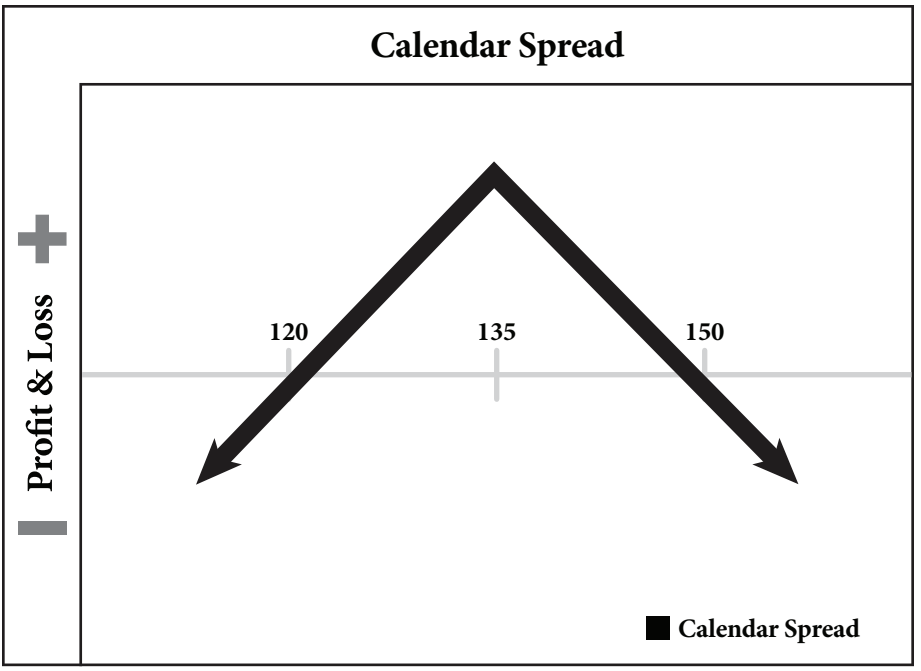
Long calendar spreads profit within a given range. They can also profit from a rise in implied volatility and are therefore a low-cost way of taking advantage of low implied volatility options. This is considered a more advanced options strategy, but usually has lower risk and a better probability of profit than outright call or put buying.

The maximum risk is known from the outset of the trade, and is equal to the debit paid for the spread, up until the near-month option that you sell gets to expiration, at which point exposure becomes the risk inherent in the option you bought.

What is a Calendar Spread?

Calendar spreads can be done with calls or puts and, if using the same strike, put and call calendar spreads are virtually equivalent. Implementing the strategy involves buying one option and selling another option of the same type and strike, but with different expiration. A long calendar spread would entail buying an option (not a "front month" contract) and selling a nearer-expiration option of the same strike and type. Long calendar spreads are traded for a debit, meaning you pay to open the overall position.

This strategy profits in a limited range around the strike used. The trade can be set up with a bullish, bearish or neutral bias. The greatest profit will come when the underlying is at the strike used at expiration. Calendar spreads also profit from a rise in implied volatility, since the long option has a higher vega than the short option.



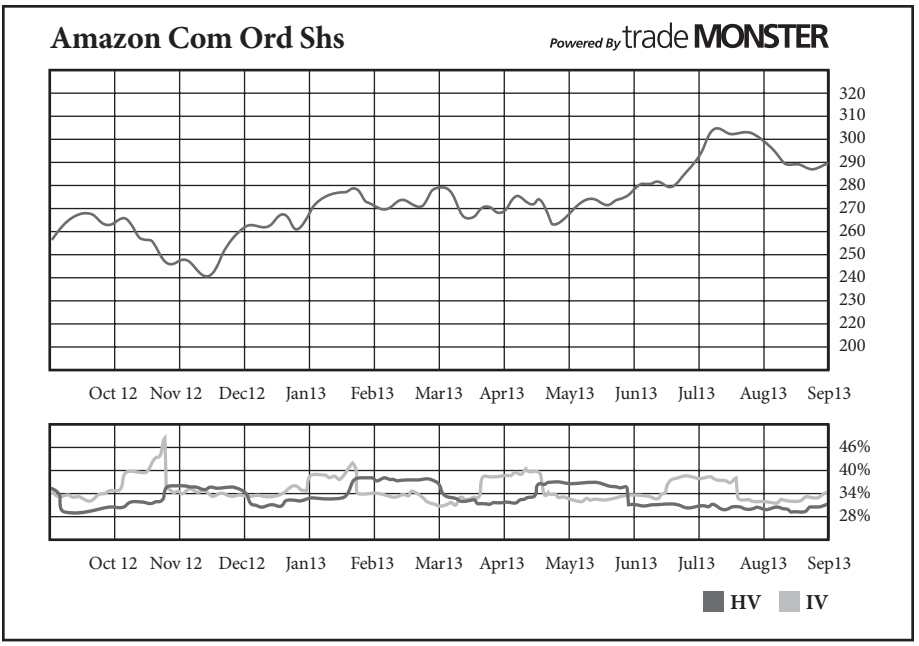
Calendar spreads lose if the underlying moves too far in either direction. The maximum loss is the debit paid, up until the option you sold expires. After that, you are long an option and your further risk is the entire value of that option.

Options in nearer-month expirations have more time decay than later months (they have a higher theta). The calendar spread profits from this difference in decay rates. This trade is best used when implied volatility is low and when there is implied volatility "skew" between the months used, specifically when the near-month sold has a higher implied volatility than the later-month bought.

In this example, with the stock at $135.13, the September 135 call is purchased for $15.45, and the July 135 call is sold for $10.45, for a net debit of $5, which is the maximum risk.

This is a neutral trade used when the outlook is for a range-bound underlying. The maximum risk is known from the outset of the trade, and is equal to the debit paid (until the first expiration). If the implied volatility does not change, the position profits from roughly $121 to $154. Rises in implied volatility will increase the profit and the range. Time decay is on your side with this trade.

Example of a Winning Trade



Amazon (AMZN) moved up to $271 in early March, while implied volatility pushed down to a 52 week low of 19%.

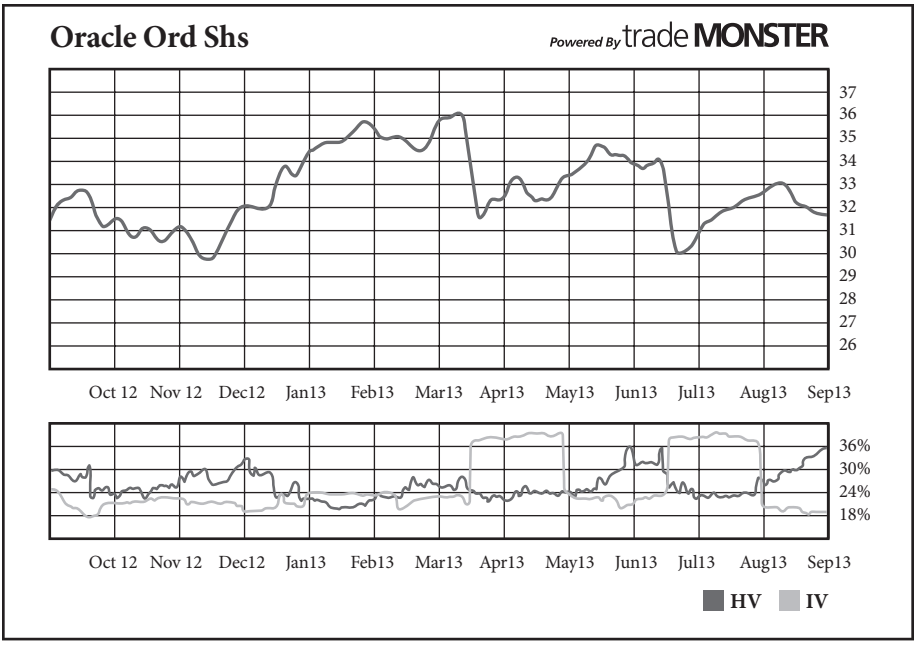
With the stock at $271, we would buy the May 270 calls for $9.50 and sell the April 270 calls for $7.30, for a net debit of $2.30.

The maximum risk is the $230 we paid (remembering that options contacts come in lots of 100). The risk would be realized if the stock moves "too far" in either direction.

In this case, AMZN was at $270 three days before that April expiration and at $260 at expiration. Implied volatility was up to 40. So the April 270 call expired worthless, while the May 270 call was worth $7.80, for a 200% return.

Example of a Losing Trade

Looking at Oracle (ORCL) charts, we see that establishing a spread before the March earnings would not have worked out. In early March, we saw the price hovering just below $35 and implied volatility around 25%. The May 25 call was



purchased for $1.55 and the April 35 call sold for $1.15, for a net debit of $.40. After earnings, the price plummeted down below $32 while implied volatility held steady. The April calls expired worthless, but given the price drop, the May calls were worth just $.15 at that time.

SUMMARY

- Calendar spreads provide known and fixed maximum loss up until the expiration of the short option.
- They are usually used with low implied volatility and the expectation of range-bound trade.
- Call calendars are virtually identical to put calendars, when using the same strike.
- They take advantage of the difference in time decay for different expirations
- They can be set up with a bullish or bearish bias.

DIAGONAL SPREADS

Why?

Long diagonal spreads are a form of calendar spread which combines a calendar spread with a vertical spread. They are used to take advantage of the difference in time decay between different expiration dates (the nearest month always has the most time decay), as well as taking a limited directional stance. The maximum risk is known from the outset of the trade until the near month option that you sold gets to expiration. Diagonal spreads can be done for a debit or a credit. If done for a debit, the maximum risk is the initial debit. If done for a credit, then there is a margin requirement similar to a credit vertical spread.

This is considered a more advanced options strategy, but usually has lower risk and a better probability of profit than outright call or put buying.

Diagonal spreads can be implemented using puts or calls and using the same strikes are virtually equivalent.

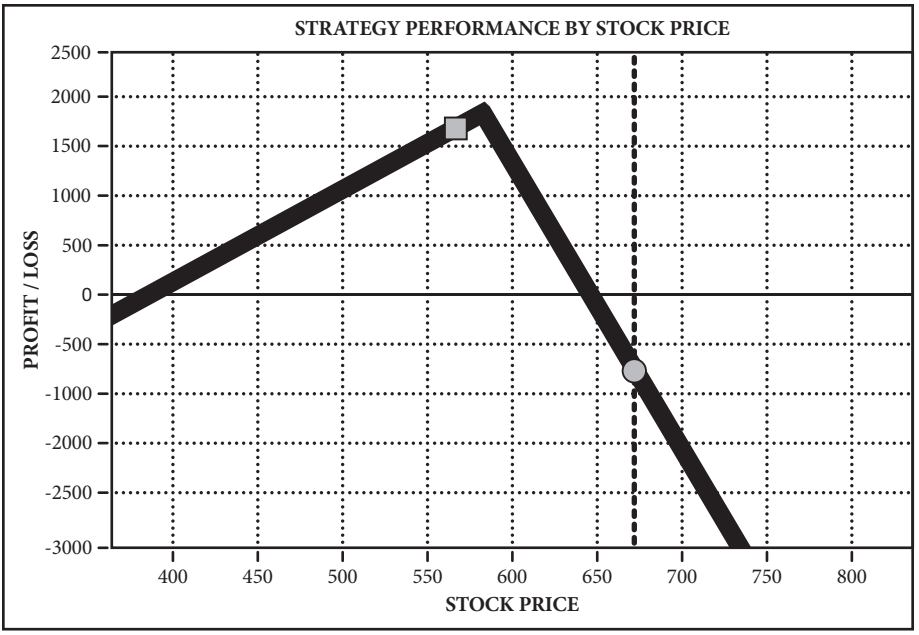
What?

Diagonal spreads can be done with calls or puts. Implementing the strategy involves buying one option and selling another option of the same type (call or put), but a different expiration and different strike. A long diagonal spread would entail buying an option (not the front month) and selling a nearer expiration option. An example would be buying the GOOG December 600 call and selling the GOOG September 560 call.

Diagonal spreads can be tailored to profit in a variety of ranges around the strike used. The trade can be set up with a bullish, bearish or neutral bias. The greatest profit will come if the underlying is at the sold strike at expiration. These also profit from a rise in implied volatility (the long option has a higher vega than the short option).

Diagonal spreads lose if the underlying moves too far from the strike sold. They are usually structured so that they will only produce a loss if the underlying moves too far in one direction (calendar spreads take a loss with a significant move in either direction).

Nearer-month expirations have more time decay than later months (they have a higher theta). The diagonal spread profits from this difference in decay rates. This trade is best used when implied volatility is low and when there is implied volatility skew between the months and strikes used (the option sold has a higher implied volatility than the option bought).



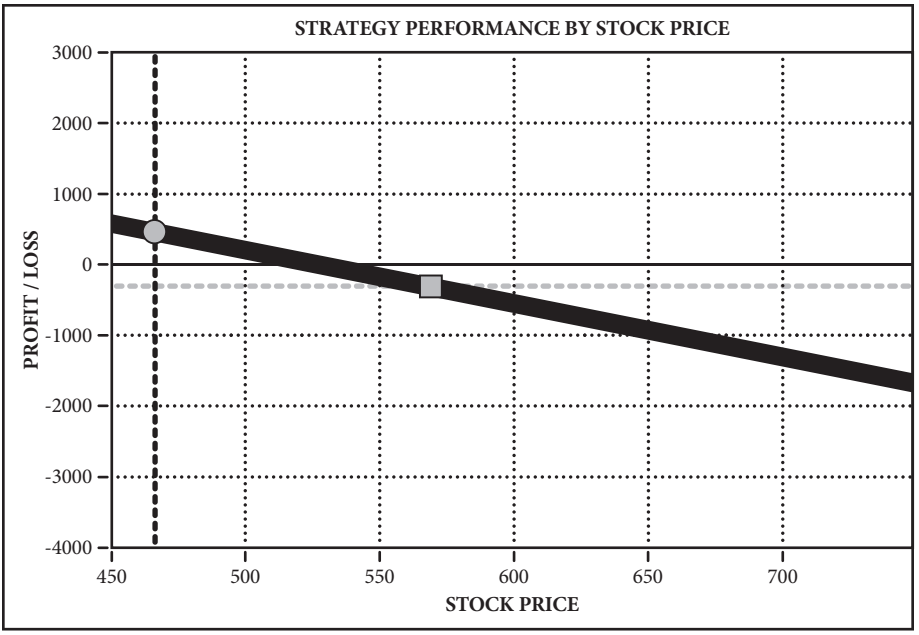
The theoretical risk profile of a diagonal spread

Example

With GOOG at $568.80, the September 620 call is purchased for $24.80, and the July 580 call is sold for $25.90. This is done for a credit of $1.10, but the margin requirement (cash required to hold the trade) is $38.90.

The initial profit/loss graph and credit/margin do not seem to make this an attractive trade. But time decay (theta) is a positive for this trade.

The trade has been structured to take a maximum profit if the price rises. A drop to the downside, regardless of how far, will produce some profit, while a significant rise will produce a loss.



The risk profile at trade initiation

The spread profits from a rise in implied volatility, raising both the peak gain, as well as the upside break-even (increasing the price to which the price would have to rise to produce a loss). Time decay is on your side with this trade.

Winners

XYZ rallies to $108 in late February at the same time that volatility drops to below 50%. With the stock at $108 per share, the trader buys the April 125 calls for $1.50 and sells the March 120 calls for $1.70. The net credit is $0.20 per contract.

At March expiration, XYZ is trading at $119 per share, with volatility up to 65%. The March 120 call expires worthless, for a gain of $1.70, and the April 125 call is worth $2.25, a gain of $0.75. The net gain is $245 ($1.70 + $.75 = $2.45 X 100 contracts).

The trader now has the choice of closing the position and taking profits, or holding the long April 125 calls in the hopes the stock will continue to go up. This involves risk because volatility could fall and/or the stock could rise but not enough to put the April 125 calls in the money.

Losers

Before an earnings announcement, we see the price rallying up through $220 per share and volatility at 62%. The October 250 call is purchased for $9.60 and the September 240 call is sold for $7.90 – a net debit of $1.70 per contract. After the earnings announcement, the stock's price plummets down into the $80 range and implied volatility drops below 50%.

The volatility drifts upwards until the September expiration, when the short option goes out worthless. However, the stock's price has moved so far below the strike of the October calls that they too have lost virtually all of their value.

SUMMARY

- Diagonal spreads provide known and fixed maximum loss up until the expiration of the short option.
- They are usually used with low implied volatility and the expectation of range bound trade.
- They are usually hedged to one side (they will not produce a loss regardless of how far the market moves in one direction).
- Call calendars are virtually identical to put calendars at the same strike.
- They take advantage of the difference in implied volatility and time decay (theta) for different expirations and strikes.

BUTTERFLIES AND CONDORS

Would you like to...

- Be able to profit from range-bound markets?
- Take advantage of high option premiums?

Butterflies and Condors are trades intended to take advantage of a neutral outlook and/or high implied volatility. They involve selling two options and buying two options of different strikes around them, at a net debit. They establish a position which profits if the underlying stays within a given range.

The maximum risk and reward are known from the outset of the trade. The risk is equal to the debit paid for the trade and is incurred if the underlying moves too far in either direction. These strategies are considered more advanced because of the more complex construction. Essentially they combine two vertical spreads, one being a credit spread and the other a debit spread. Butterflies and condors have lower risk than call and put selling.

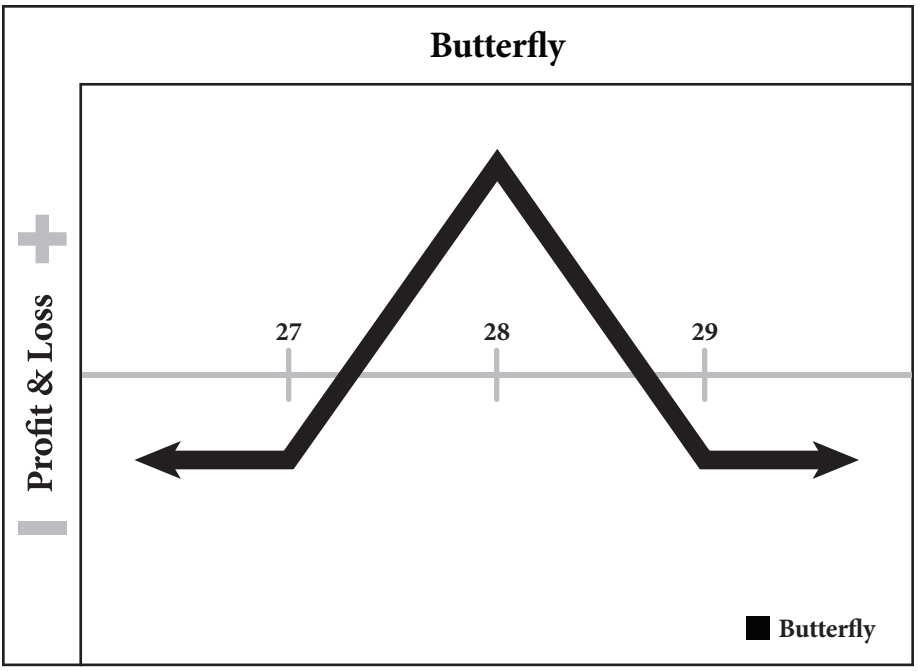
What are Butterflies and Condors?

Butterfly and Condor spreads can be done with calls or puts. Long butterflies using calls involve three strikes: you sell two calls at a middle strike and buy one call above and one call below that strike. Thus, you are combining a vertical bull call spread and a bear call spread with the short calls at the same strike.

Condors also combine a bull call spread with a bear call spread, but separate the sold calls by at least one increment. Condors have a wider range of profit, but cost more. Both spreads are done for a debit.

For example, a MSFT butterfly would entail buying a 27 call, selling two 28 calls, and buying a 29 call. A MSFT condor would involve buying a 26 call, selling a 27 call, selling a 28 call, and buying a 29 call.

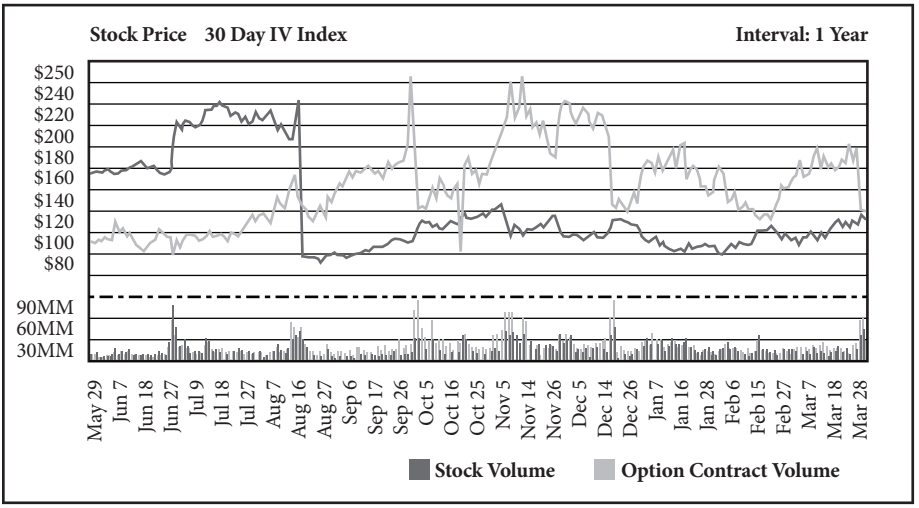
Butterflies and condors profit in a limited range around the strikes of the options sold. The trade can be set up with a bullish, bearish, or neutral bias. The spread profits from a fall in implied volatility before expiration. Time decay is on your side, and increases profit. The greatest profit will come if at expiration the underlying is at the butterfly's short strike price, or anywhere between the two short strikes used for the condor.



These spreads lose if the underlying moves too far in either direction. The maximum loss is the debit paid, and is incurred if the underlying moves beyond the strike of either of the long calls.

As an example, with the stock at $27.65, a trader could establish a butterfly by purchasing the a June 27 call and a June 29 call, while selling two June 28 calls, all for a net debit of $.25, which is the maximum risk. The maximum gain at expiration is $.75, if the price is right at $28

Example of a Winning Butterfly Trade



The stock and volatility rises but not the level of the short strike, so the position gains.

Let's say the above butterfly payoff diagram was bought for a net debit of $25: If Microsoft (MSFT) is $27.64 at expiration (that is, unchanged), the profit would be approximately $400.

If MSFT is at $28.75 or $27.25, the profit would be $0. These are the break-even points. The maximum risk is the $250 we paid, and would be realized if the stock is above $29 or below $27.

Example of a Losing Condor Trade

Now let's say we have bought the 26 call, sold the 27, sold the 28, and bought the 29 for a net debit of $.45.

If MSFT is between $27 and $28 at expiration, the maximum profit of $55 will be realized.

If MSFT is at $26.45 or $28.55, then the profit is $0 (break even). The maximum risk is the $45 paid, realized if the stock is above $29 or below $26.

SUMMARY

- Butterflies and Condors spreads provide known and fixed maximum gain and loss.
- They are usually used in cases of high implied volatility and expectations of range-bound underlyings.
- They can be implemented using puts or calls.
- Condors have a wider range of profit, but cost more.
- They take advantage of high implied volatility (seen as likely to fall) and time decay.

STRADDLES AND STRANGLES

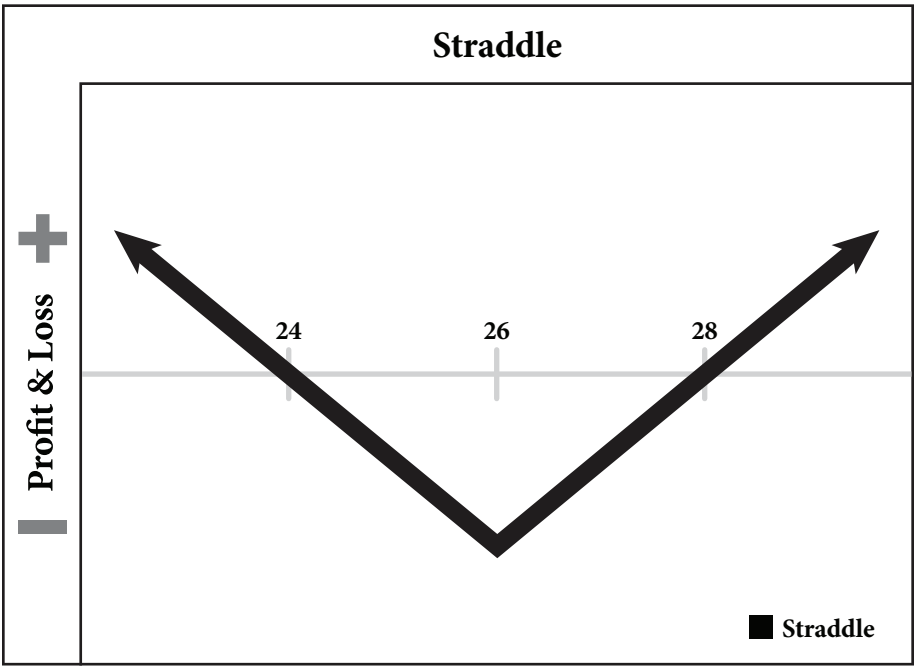
Would you like to...

- Be able to profit from big moves—up or down?
- Take advantage of increasing volatility?

There are times when you just know that a big move in a stock is coming - the problem is that you don't know which direction. Wouldn't it be nice to have a strategy that could profit from such moves regardless if they were up or down?

Long "straddles" and "strangles" fit the bill. The strategies profit from volatility —sharp moves in the underlying, either up or down. They involve owning both calls and puts on the same underlying asset. These are some of the most expensive options strategies, but the maximum risk is known and fixed. Time decay and drops in implied volatility are the biggest threats to the strategy.

What are a Straddle and a Strangle?



A straddle entails buying an at-the-money call and the same at-the-money put. The idea is that should the underlying significantly increase or significantly decrease, such that the new value of the call or the put can be sold for more than the cost to purchase the two positions, you profit.

A strangle takes the same approach, but uses an out-of-the-money call and an out-of-the-money put, to reduce the cost. This is a lower-cost trade, but requires an even greater move to be profitable.

Straddles and strangles profit from significant moves up or down in the underlying. A rise in the implied volatility will also increase the value of a straddle or strangle. Because you are paying two premiums, buying time value on both sides, the stock usually has to move considerably to produce big profits. Implementing the strategy simply involves buying a put and call with an expiration that gives the trade enough time to work, and straddle/strangle buyers are best served by not holding their positions as expiration gets close, as that is when time decay is greatest. Finally, the best time to buy options is when implied volatility is low.

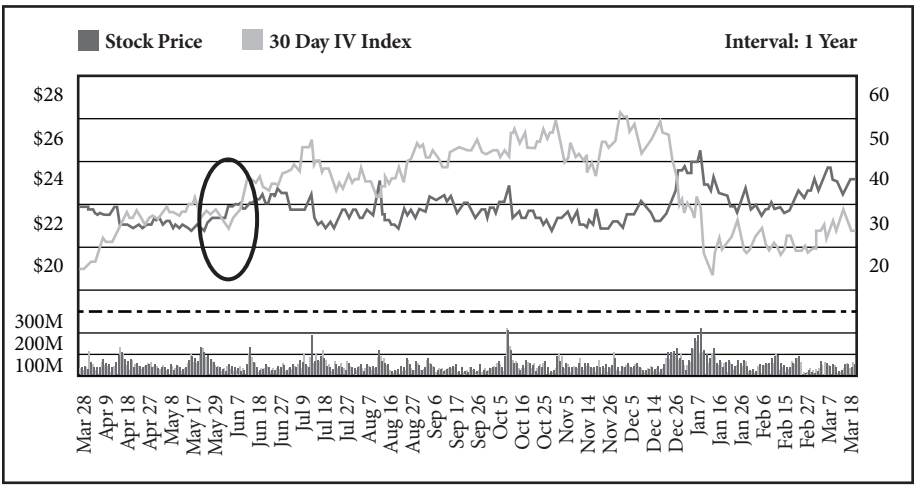
This strategy loses if the stock price does not move enough to offset the time decay, or a fall in implied volatility. The maximum risk is the debit paid. If the implied volatility drops, the position can also lose value, even if the underlying moves. This is the reason that buying straddles or strangles before earnings (or other news) can be a risky strategy. Even if the stock moves, the drop in implied volatility that often happens after earnings are released can more than offset the gain from the move in the underlying.

This example uses a 26 straddle bought for $2.23, with the stock at $26.25. (Note that the option strike is unlikely to be exactly the same as the share price.) The position shows a profit if as expiration nears the stock price has moved beyond the strike prices used, plus or minus the debit paid to establish the call and put positions ($26 +/- $2.23).

The position will profit from significant moves up or down in the share price. The longer the move takes to happen, the bigger it needs to be, to offset time decay in the option price. Because implied volatility is a significant part of the premium paid for an option, if implied volatility goes down, the straddle will lose value and if implied volatility goes up, it will gain. This is only the case before expiration, because at expiration profit and loss is fixed.

Time is against you with a straddle or strangle. You have a position with significant negative theta and so every day you are losing value from time decay.

Example of a Winning Trade



The negative effect of time decay

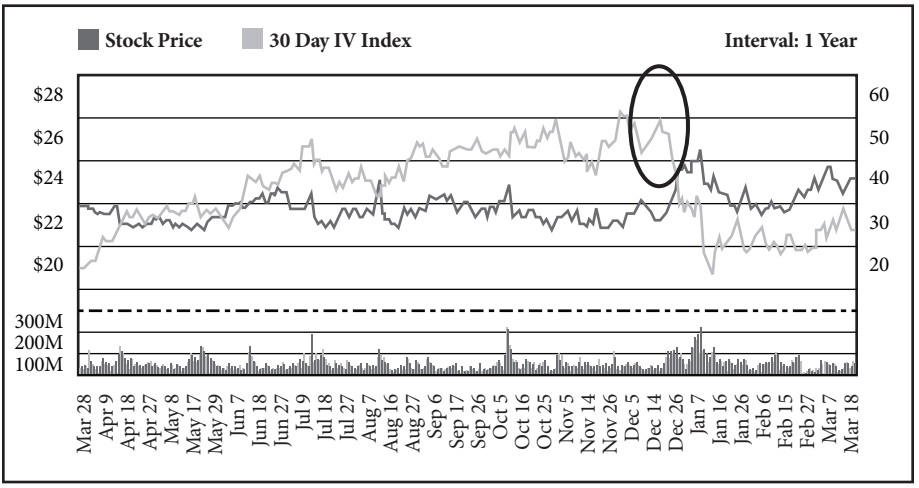
In the circled area, the price of Intel (INTC) bounces off a low while implied volatility stays low. Ideally we want to buy straddles on low implied volatility. Time decay is the opponent of the straddle and the greatest in the last month before expiration, so we need to give ourselves time to be right. In this case, with the stock climbing back above $23 and implied volatility at 30, we would buy three months out, choosing the August 23 straddle.

Within two weeks, the stock hit $24 and implied volatility went up to 40. The call tripled in value, while the put lost much of its value.

To exit the position, the straddle could have been sold in its entirety for a nice gain. When a position doubles in value, we generally consider closing half the position, so that no matter what happens next, we would break even.

Alternatively, the call could have been sold and the put held, in case there was a pullback. As can be seen, in fact the stock fell as low as $21 before the August expiration, meaning the put also would have given a 300% gain.

Example of a Losing Trade



The negative effect of time decay

If we had bought a straddle a month earlier, the trade would not have worked out as well. Two things can go against us in buying straddles: implied volatility can go down, and time decay can eat away at the position.

In the highlighted area we see INTC breaking out to a new high. Enticed by current moves, many options traders ignore implied volatility and buy out-of-the-money options only in the near months.

So with the stock price at $27 and the implied volatility at 55, we would have bought the February 27 straddle.

The price did move up to $27.50, but with time decay and the drop in implied volatility, the position showed a loss. The price then fell and took the straddle value down to a 50% loss.

At that point, we would have exited the trade, since we generally consider that any position should be closed when it loses 50% of its value.

SUMMARY

- Straddles and strangles are delta-neutral, meaning we don't care if the price goes up or down, so long as it moves big in one direction or the other..
- They are a limited risk, but very expensive strategy.
- They are significantly affected by implied volatility and time decay.
- The maximum risk is limited; the maximum gain is theoretically unlimited.

BACKSPREADS

Why?

Backspreads are volatility trades that are used to take a directional, though hedged position. The position will have unlimited upside potential, but will also profit (if done for a credit) if the market stays flat or goes the wrong direction. The maximum risk is known from the outset of the trade and therefore allows for very specific risk management. The trade is a combination of a credit spread and long option.

This is considered a more advanced options strategy, but usually has lower risk and a better probability of profit than outright call or put buying.

What?

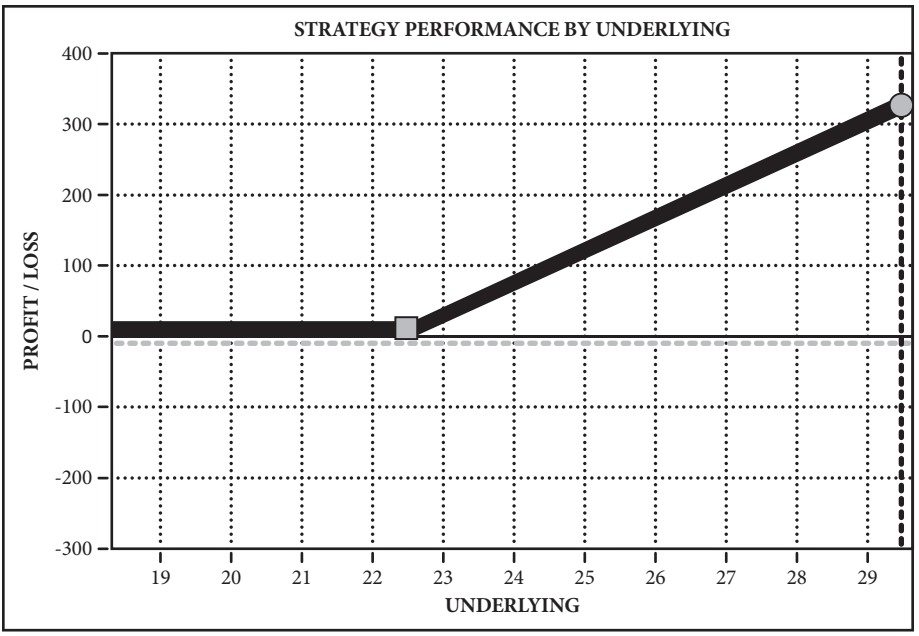
Backspreads can be done with calls or puts. Implementing the strategy involves selling an option and buying multiples of a of further out-of-the-money option of the same type and expiration, but a different strike. An example would be buying two 45 calls and selling one 40 call. This type of spread can be done for a debit, but most traders try to utilize backspreads when they can be done for a credit. Cash will be held as a margin for the position.

Backspreads are designed to profit from a strong direction move. Because the position is long more options than it is short, it will also profit from an increase in implied volatility. If done for a credit, the position will also profit if the stock price does not move, or even if it moves in the wrong direction.

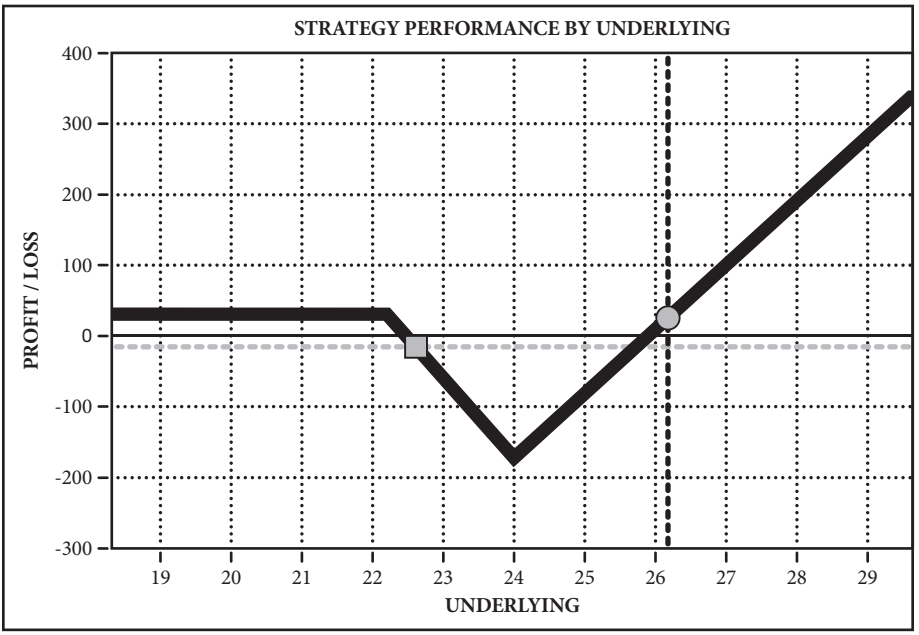
Backspreads lose if the underlying moves up to the strike of the purchased options. The maximum loss occurs if the stock is at that strike at expiration, as the long options expire worthless and the short option also produces a loss. There is a margin held against the position.

Example

The risk profile of a call backspread is shown on the next page. With XYZ at $22.55, 2 of the 24 calls are bought for $.55 each and one of the 22 calls is sold for $1.45. The credit is $.35. The margin held is $2.00 – $.35 credit received, which is also the maximum risk ($22 - $24 = -$2.00 + $.35 = -$1.65).



The risk profile at trade initiation



The theoretical risk profile of a backspread at expiration

Most traders will not hold the position until expiration, unless the price has dropped.

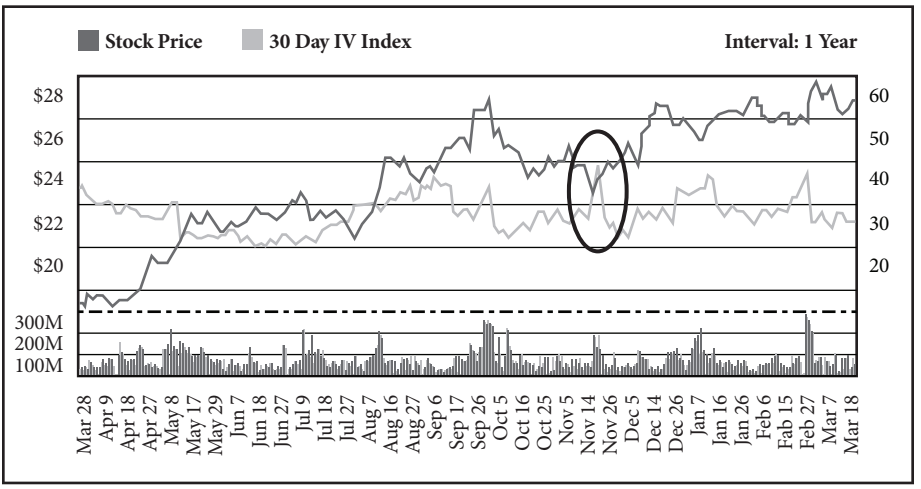
This is a directional trade, so the backspread will have the maximum profit from the stock moving up strongly. If the stock goes down the position is hedged and will still profit. The maximum loss occurs if the stock price moves up to the strike of the long options.

The position will profit from an increase in implied volatility up until expiration, when profit and loss is fixed.

Above the strike sold, time decay is against the trade. Below the strike sold (below $22), time decay is actually helpful.

Winners

XYZ price bounces off resistance at the same time that implied volatility spikes.



Using price and volatility together to spot a buying opportunity

With the stock at $23.50 and rising in mid-November, we will sell the December 22.50 call for $2.00 and buy two December 25 calls for $.85 for a net credit of $0.30.The maximum risk is $220, realized if the stock is at $25 at expiration.

In this case, XYZ went up to $26 fairly quickly enabling us to profit. Had the stock plummeted we still would have made $0.30 from the credit received when we put on the trade.

Losers

Had XYZ moved to $25 and stayed in that vicinity at expiration, the position would have produced a loss.

SUMMARY

- Backspreads profit from a strong directional move, but provide a hedge if wrong.
- They are usually used with low implied volatility.
- They are usually set up as credit spreads.
- They provide known and fixed maximum loss.

COLLARS

Why?

Collars provide protection for stock positions at low cost. This strategy is often used to lock in profits on an existing position. By combining a covered call with a protective put, both the upside and downside are capped.

The collar is constructed by being long stock + short out-of-the-money call + long out-of-the-money put in a 1-to-1-to-1 ratio. The collar is synthetically equivalent to the bull spread.

What?

Implementing the strategy involves buying or owning 100 shares of a stock and then selling a call that is "covered" by the stock and buying a put to protect the downside. The income from the call is used to purchase a lower strike put for protection. This can often be done for no cost, or even a credit, if the income from the sale of the call equals or outweighs the cost of the put. Selling the call does create the obligation to sell the stock if the call is assigned. This can create tax issues for stock with a low cost basis.

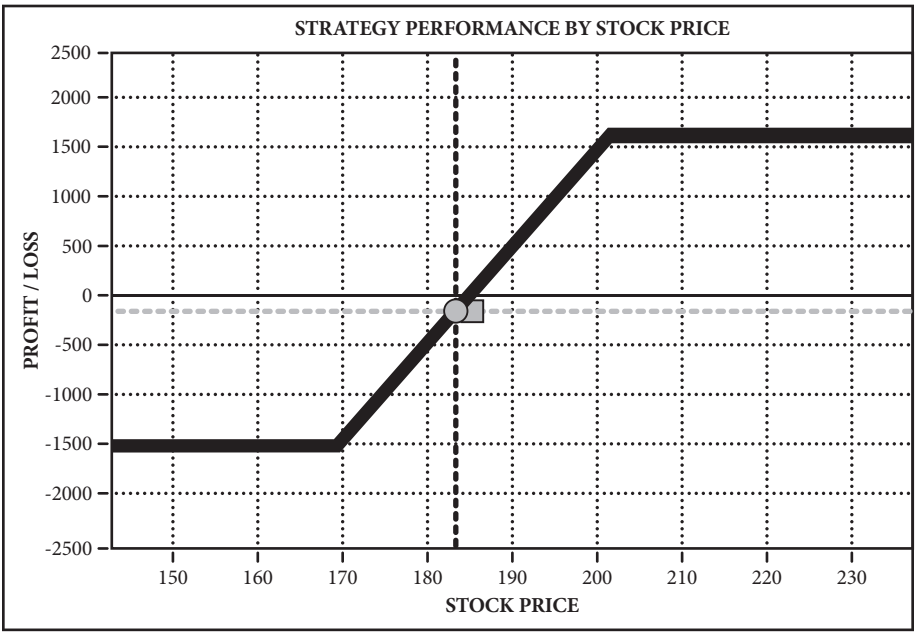
Collars profit up to, but not beyond the strike price sold. The maximum gain is realized if the stock price is right at, or above the strike price of the call sold. At that point the full value of the sold call is retained and the stock achieves its' maximum gain. For example: You sell a 50 strike call for $1 with the stock at 48. You use the credit to buy a 46 put, also for $1. You make money with any stock gains up to $50. The most you can make is $2 if the stock is at or above $50 at expiration.

The most you can lose is also $2, if the stock is anywhere below $46. The maximum loss occurs at the strike price of the purchased put. Below that level, the put will profit dollar for dollar with the stock and the loss remains constant.

A collar against stock is essentially identical to a vertical bull spread. The profit and loss is the same, but the amount of margin required is much larger for the collar. For this reason, the collar is usually applied to an already existing equity position to provide limited length downside protection. When considering a collar, it may also make sense to sell the stock and buy a vertical spread to reduce the margin requirement.

Examples

Here we see the risk profile of Apple with the stock at $184. A 200 strike call is first sold for $15 and a 170 put is purchased for $13.50. This is clearly a bullish position, and the position will rise and fall with the stock price, but not dollar for dollar.



This is what the risk profile looks like at trade initiation

Detail

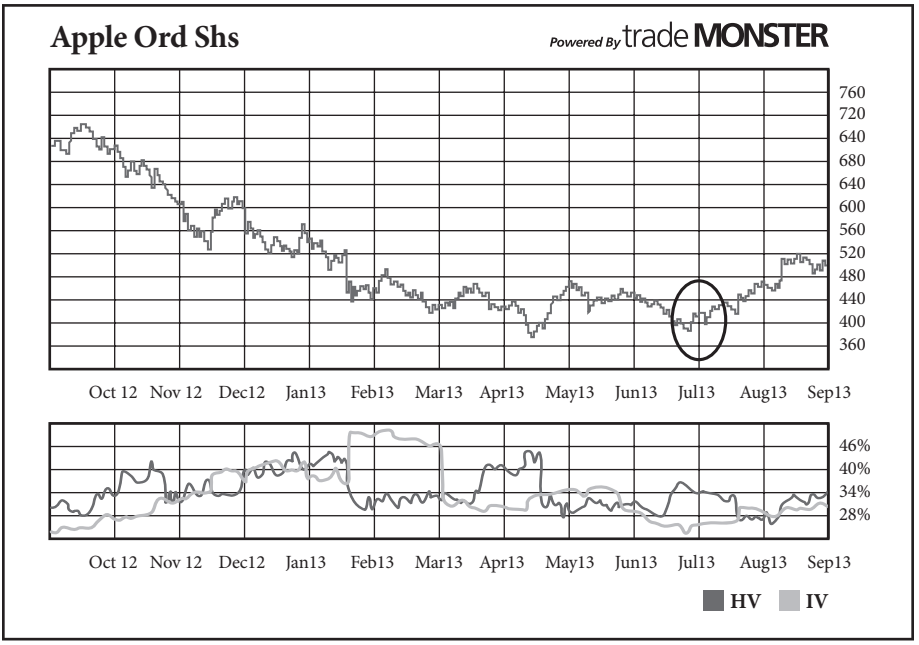
Clearly the position profits with a rise in the price of AAPL, but profits are limited up to the 200 strike, and assignment will happen above that. This position will profit if the stock does not move, as we have created a credit of $1.50. The maximum loss occurs at $170 and stays constant from there down.

The collar will perform just as the stock in the limited range between the strikes. The upside and downside are capped at those strikes.

Implied volatility has little effect, as you are both long and short an option and therefore have little to no exposure to changes in IV.

Time decay, as can be seen in comparing the above graphs, also has only a small effect, depending on whether the collar was put on for a credit (we benefit from time decay) or a debit (time decay is working against us).

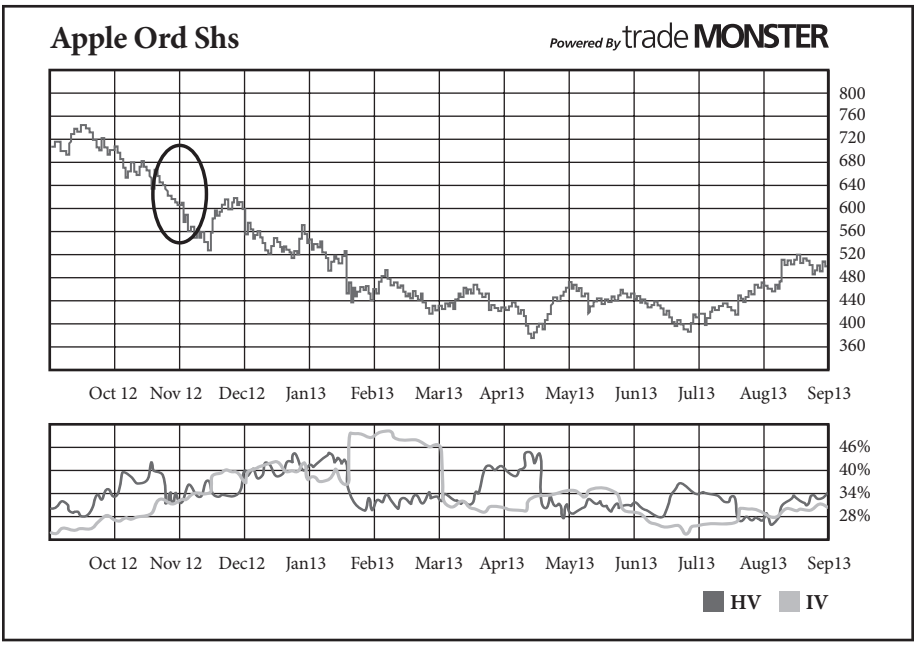
Winners



You purchased 1,000 AAPL shares at $400 as the stock rebounded off July lows. You put on a July collar, selling the 430 calls and buying the 370 puts for a credit of $.10. At July expiration, the stock finished at $424.95, producing a gain in the stock and allowing you to continue to hold the shares as the collar expires worthless.

On Monday after expiration, you put on another collar selling the 450 call and buying the 400 put for even money (the credit from the calls exactly equals the cost of the puts—a "no cost" collar). In this case, AAPL runs up through $450, all the way up to $500 by expiration. This is actually where a collar underperforms just owning stock. You have three choices in this case. You could buy back the short call as the stock climbs to it, you could roll up the collar, or you could hold the position, take the gains and lose the stock through the assignment of the short calls that are in-the-money.

Losers



You purchased AAPL for $550 in November. You put on a collar in January to get through the end of the year, selling the $600 call, buying the $500 put for $1. The price drops right to $500 at expiration. The collar expires worthless, but you have the loss of $50 in the stock.

On Monday after expiration, you sell the 550 call, and buy the 450 put for even. The stock drops again, closing at $460. You lose another $40. This is the same as if you just owned the stock, but the protection you purchased had its own costs and did not even kick in as protection.

SUMMARY

- The collar involves owning or buying stock, selling out-of-the-money calls against it and buying out-of-the-money puts for protection. .
- It is a slightly bullish to neutral strategy.
- It is a low cost protective position.
- It is equivalent to a vertical bull spread.
- The maximum gain and loss are known and limited.
- The strategy can often be done for a credit.

OPTIONS PRICING

Option prices are derived from the Option Pricing Model. Along with the all-important theoretical value, the Option Pricing Model also provides us with a family of risk management tools known as the Greeks and, through some reverse engineering, the implied volatility. The model, although reasonably sophisticated in its math, is really just a probability model looking for an expected value (theoretical value). There are many different pricing models out there. The first was the Black Scholes model in 1973. Considered the grandfather of pricing models, Black Scholes won its creators the 1997 Nobel Prize in Economics.

Through the years, inadequacies in Black Scholes led to an evolution in option pricing models, making them much more accurate today. But, despite all the changes and adjustments that were made through the years, the factors or inputs to the model have mostly stayed the same. They are stock price, strike price, days to expiration, volatility, interest, and dividend. These factors combine to produce an option's theoretical value, incorporating both intrinsic and extrinsic value.

In this model, the stock price and the strike price work together to determine whether the option has any intrinsic value and how much value it may have. Meanwhile, the other factors, most notably volatility and days to expiration, combine to determine the amount of extrinsic value. Adding the intrinsic value and extrinsic value together, the total price of the option can be determined.

By knowing and understanding the inputs of the Option Pricing model, we can begin to understand how changes in these inputs will bring changes in the price of the option. A change in the stock price will obviously bring about a change in the price of the option. The amount of the price change that the option will see is described to us by a Greek known as delta.

> **Example:** You buy an XYZ $65 call for $2.05 with the stock at $65.50. The stock trades up $2.00 to $67.50. The value of your call increases to $3.35.

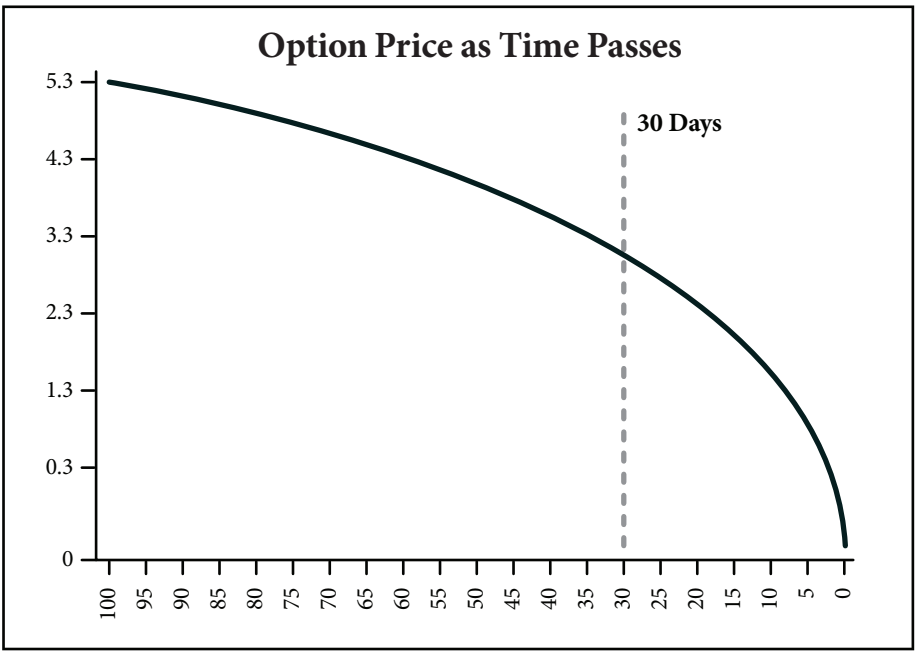
When you first bought the call, the $2.05 consisted of $.50 of intrinsic value and $1.55 of extrinsic value. With the stock up $2.00 to $67.50, the value of your call (now $3.35) consists of $2.50 of intrinsic value and $.85 of extrinsic

value. The option saw a small decrease in extrinsic value but an even larger increase in intrinsic value.

Now, this is where delta enters the picture. Since the increase in the option's price was $1.30 with the stock increasing $2.00, we can assume a delta of roughly 65. This is because the delta tells us how much the option's price will change per a $1.00 move. With this $2.00 move in the stock, we must divide by 2 to get the delta. It is important to note that delta only tells us the sensitivity of the options price to a movement in the underlying. It does not determine of the option's price.

More specifically, the stock price and strike price are the primary components in the intrinsic value of the option. Volatility and time are the major factors in the calculation to determine the extrinsic value of the option. This is why the model asks for a volatility assumption and the amount of days until expiration.

Options are considered a "wasting asset." This is not because options are considered to be a waste of money, but because options have a limited life. Options are limited in the fact that their life is limited. They have an expiry date.



Accelerating time decay

Therefore, an options price is going to be susceptible to the passage of time. As time passes, an option's value decreases.

> **Example:** With the stock at $65.50 and a volatility assumption of 30, the June 65 calls (with 18 days until expiration) are worth $2.05. At the same time, the July 65 calls (with 46 days until expiration) are worth $3.15 while the October 65 calls (with 137 days until expiration) are worth $5.25.

As you can see, all other things being equal, the more time that the option has until expiry, the higher the option's value. The intrinsic value of the option over time remains the same. June 65, July 65, and October 65 calls all have $.50 of intrinsic value. But, their prices are all different. This is due to the fact that time affects the option's extrinsic value. The more time that exists in the option, the more extrinsic value in the option and therefore the higher the option price.

Looking at this from the other side, the option will lose value as it gets closer to expiration, as the time to expiry decreases. This is where another Greek, theta, comes in. Theta tells us how much the option's extrinsic value decays per day.

The important thing we need to know about theta is that theta is non-linear. That means that the option's extrinsic value does not decay at the same rate through the life of the option. As we get closer to expiration, the daily decay rises on a daily basis. Like delta, it is important to note that theta is not a component of option pricing: days to expiration is. Theta simply shows us the sensitivity of the option's price to the passage of time from day to day.

Extrinsic value is also a product of volatility. The higher the volatility level is, the higher the amount of extrinsic value and thus the higher the option price. As volatility increases, the prices of all options increase. Vice versa, as volatility decreases, the price of all options decreases as the amount of extrinsic value in the options decreases.

> **Example:** With the stock at $65.50 and a volatility assumption of 30, the June 65 calls are worth $2.05. If volatility were to increase 10 ticks to a level of 40 volatility, the price of the option would increase to $2.60.

As volatility increases, the expected range of the stock subsequently increases. That will increase the amount of extrinsic value due to the added uncertainty of which option will finish in-the-money and which options will not. Conversely,

as the volatility level decreases, the amount of extrinsic value in options decreases, the price of all options decreases.

Another Greek, vega, tells us the sensitivity of the options price to the movement in volatility. Vega is given to us in cents. Vega tells us how much the option price will change with a one tick movement in volatility. When volatility increases, all option prices go up, and when volatility goes down, all option prices go down. Vega tells us how much. Keep in mind, like the other Greeks, vega does not determine an options price. Volatility does. Vega only tells us what the change in that price will be when the volatility assumption changes.

Example: With the stock at $65.50, a volatility assumption of 30, and a vega of 0.05, the June 65 calls are worth $2.05. If volatility were to increase 1 tick to a level of 31 volatility, the price of the option would increase to $2.10. If volatility went up two ticks to 32, then the option price would go up $.10 to $2.15. If volatility went down, the mechanism would work the same way, but decreasing the price of the option.

Summary

- The price of an option is derived from the Option Pricing model.
- The factors that are entered into the model are stock price, strike price, days to expiration, volatility, interest, and dividend.
- The model also produces a family of risk management tools called the Greeks that measure the sensitivity of changes to the inputs of the model to the option.

THE GREEKS

Option prices can change due to directional price shifts in the underlying asset, changes in the implied volatility, the passage of time, and even changes in interest rates. Understanding and quantifying an option's sensitivity to these various factors is not only helpful — it can be the difference between boom and bust.

The option "Greeks" are a family of statistical references that identify and quantify an option's risk for an investor. Delta, gamma, theta, vega, and rho are generated from the Option Pricing model and are available to us prior to making a trade. This greatly aids the individual investor's risk management. Delta, gamma, theta, and vega are the Greeks that most concern option investors.

Delta

Delta measures the option's sensitivity to changes in the underlying stock price. It measures the expected price change of the option given a $1 change in the underlying. Using delta, investors can anticipate what the value of the option will be at a future given stock price. Delta can also be used to help determine the proper option to buy or sell under a specific situation. Calls have positive deltas and puts have negative deltas. For example, with the stock price of Oracle (ORCL) at $21.48, let's say the ORCL Feb 22.5 call has a delta of .35. If ORCL goes up one dollar to $22.48, the option price should increase by $.35.

The delta also measures the probability that an option will expire in-the-money. In the above example, the 22.5 call has a 35% probability of expiring in-the-money at expiration.

But note: Delta does not give us the probability that the stock price will be above the strike price any time during the options life, only at expiration.

Delta can be used to evaluate alternatives when buying options. At-the-money options have deltas of roughly .50. This is sensible, as statistically they have a 50% chance of going up or down.

Deep in-the-money options have very high deltas, and can be as high as 1.00, which means that they will essentially trade dollar for dollar with the stock. Some traders use these as stock substitutes, though there are different risks involved. Far out-of-the-money options have very low deltas and therefore

change very little with a $1 move in the underlying. Factoring in commissions and the bid/ask spread, low delta options may not make a profit despite large moves in the underlying. Thus we see that comparing the delta to the option's price across different strikes is one way of measuring the potential returns on a trade.

Strike Price	June	July	October	January
50	100	99	94	90
55	100	95	85	81
60	91	81	72	70
65	56	56	57	58
70	18	30	41	46
75	3	13	28	35
80	0	4	18	26

Delta chart calls, 30 volatility, stock price $65.50

Strike Price	June	July	October	January
50	0	-1	-6	-10
55	0	-5	-15	-19
60	-9	-19	-28	-30
65	-44	-44	-43	-42
70	-72	-70	-59	-54
75	-97	-87	-72	-65
80	-100	-96	-82	-74

Delta chart puts, 30 volatility, stock price $65.50

Option sellers also can use the delta as a way to estimate the probability that they will be assigned. Covered call writers usually do not want to be assigned and so can use the delta to compare that probability with the potential return from selling the call.

Advanced traders often use "delta neutral" strategies, creating positions where the total delta is close to zero. The idea is two-fold. First, short option traders who are banking on lack of movement (stagnation) don't want to get caught leaning in one direction or the other. Second, investors who are expecting a large rapid movement in the stock (perhaps by result of an earnings announcement)

but do not know which direction the stock may go, do not want to be leaning in the wrong direction when the movement occurs. Each approach carries risks, including the frequent adjustments necessary to remain delta neutral.

To review, delta is the option's sensitivity to the underlying price. The delta tells us how much an options price will change with a $1 move in the underlying. At-the-money options have a delta of roughly 50 and therefore will change roughly $.50 for every $1 change—up or down—in the underlying stock.

Gamma

As the stock moves, the delta of the option changes. Gamma measures the change in the delta for a $1 change in the underlying. Gamma is given to us in the amount of deltas. For instance, say you have a 60 delta call with a gamma of 3. If the stock were to trade up $1 then the delta would increase by 3 (the amount of gamma), creating a new delta of 63. If the stock had dropped $1 then the delta of your call would decrease by 3 (the amount of gamma), bringing it down to 57. Gamma works the same way for puts as it does for calls, except in the other direction.

Strike Price	June	July	October	January
50	0	.1	.7	.9
55	.1	.8	1.5	1.5
60	1.8	2.8	2.4	2.0
65	7.2	5.0	3.0	2.3
70	7.7	5.2	3.2	2.4
75	2.8	3.7	2.9	2.3
80	.4	1.8	2.3	2.1

Gamma chart, 30 volatility, stock price $65.50

Theta

Theta measures the option's sensitivity to the passage of time. It is a direct measure of the time decay of the option's extrinsic value. Theta is the given to us as a dollar amount of decay per day. This amount increases rapidly as expiration approaches because Theta is non-linear, meaning as the option approaches expiration the amount of decay increases on a daily basis.

Another characteristic of theta is that it is always highest at-the-money (ATM), and decreases as it moves away from the ATM option, in either direction. The greatest loss caused by time decay occurs in the last month of the option's life. The more theta you have, the more risk you have if the underlying price does not move in the direction that you want.

Strike Price	June	July	October	January
50	0	.007	.006	.005
55	.013	.013	.010	.007
60	.041	.033	.019	.011
65	.059	.042	.026	.018
70	.055	.038	.024	.016
75	.028	.024	.017	.009
80	.018	.020	.011	.006

Theta chart, 30 volatility, stock price $65.50

Option sellers use theta to their advantage, collecting time decay on a daily basis. The same is true of any strategy, including spreads, that produces a negative theta. Both vertical spreads and calendar spreads whose combined theta is negative are considered premium collectors. This means that with all other things being equal the passage of time will produce a profit. For instance, say we look at the June 40 calls worth $2.00 and having a .03 theta. The passage of one day will result in a decrease in the value of the call by $.03. So, the next day, the call will be worth $1.97. If you were long the call, you would experience a $.03 loss. If however, you were short the call, you would experience a $.03 gain.

Vega

Vega measures the option's sensitivity to changes in implied volatility. A rise in implied volatility creates a rise in option prices, and thus will increase the value of all the calls and puts. Vega is always highest ATM and decreases as it moves away from ATM in either direction. With each expiration (that is, further out in time), vega increases the amount of the extrinsic value of the option.

Strike Price	June	July	October	January
50	0	.001	.035	.080
55	0	.013	.076	.129
60	.011	.047	.123	.174
65	.050	.087	.156	.205
70	.053	.092	.164	.215
75	.018	.063	.149	.207
80	.003	.030	.120	.186

Vega chart, 30 volatility, stock price $65.50

Like theta, vega is given in dollar amounts. Vega will move the price of an option by that dollar amount per a one-tick movement in implied volatility. For example, the May 55 call is worth $3.00 at a 30 volatility. The option has $.05 vega. If implied volatility were to move up 1 tick to 31 volatility, the new value of the option would be $3.05. Conversely if implied volatility had dropped one tick from 30 to 29 then the new value of the May 55 call would be $2.95.

Rho

Rho is the option's sensitivity to changes in interest rates. Most traders have very little interest in this measurement. This is for two reasons. Interest rates play a very low weighted role in the Option Pricing model. Second, interest rates don't change very often and when they do it is in very small increments.

Using the Greeks to Buy an Option

Buying and selling stock is a relatively easy process. If you think the stock is going up, you buy the stock. If you think the stock is going down then you short the stock. But, when you decide to use options in place of the stock you bring a couple of other factors into the equation, namely time and volatility. These two additional factors are critical in determining the best strike and month to use to construct the strategy you determine to be optimal for the opportunity you identified.

Here lies the hidden value of the Greeks. As stated before, the main function of the Greeks is defensive, providing risk management analysis on your position. But here, the Greeks can also become offensive, providing you with information

that helps you determine both optimal strategy and optimal construction of that strategy.

First and foremost, if the opportunity is a directional one, delta can play a major role. We know that delta tells us how much our option will change with a one-dollar movement in the stock. Delta really gives us an idea of mimicking power. A higher delta option will mimic the stock more closely than a lower delta option. So, if we want a strategy that is going to act like buying or selling the stock, then delta can help you zero in on the right option for your strategy.

Now, if you want to play an unsure direction, gamma can be of great value to you. As you remember, gamma tells you how much your delta changes with a one dollar movement in the stock. So, if you want to start acquiring delta to play a directional move when you don't know in which direction the movement will be, then an option with high gamma will provide a good sign as to which option will fit this situation.

When buying an option, we are obtaining both intrinsic and extrinsic value, the latter being susceptible to time decay. As an option buyer, this can be a disadvantage. But, if we knew where time decay is highest and lowest, we could do a good job in controlling our exposure to this daily decay of value. Many say you should never buy an option with less than 30 days until expiration; however, we know that theta is highest at-the-money and decreases as we move away from at-the-money in either direction. With this information, we can pick an option that fits our strategy and mitigates our decay risk at the same time.

As stated, when buying an option, we acquire extrinsic value that is affected by the passage of time (theta) in a negative way. But, the movement of implied volatility also affects the amount of extrinsic value and therefore must be accounted for and managed. Vega shows us which option will be more or less affected by the movement of implied volatility. If we decide that the specific opportunity we are looking at will most likely cause an increase in implied volatility then purchasing a higher vega option would be optimal. If you anticipate a decrease in implied volatility then the purchase of a lower vega option would be more appropriate.

SUMMARY

- The Greeks are risk measures that can help you choose which options to buy and which to sell. With options trading you must have an idea of the direction of the underlying as well as a view of the direction of implied volatility, and then factor in the timing of the potential opportunity.
- The Greeks can help you tailor your strategy to your outlook. Spreads, for instance, can help option buyers reduce theta and vega risk.

VOLATILITY

All options traders deal with volatility in every trade, whether they realize it or not. Volatility is a very important factor both in option pricing and the profitability of any trade. A call buyer is interested not only in the stock trading up, but in the stock going up enough to cover volatility's contribution to the option's extrinsic value. A covered call seller, to use another example, is betting that the stock does not move more than the amount of the extrinsic value which volatility contributes. So, to be a successful option trader, it is very important to understand volatility.

Types of Volatility

There are several types of volatility. The first is the actual volatility of the stock. This is called historic volatility or statistical volatility. Historical volatility measures the amount the stock moves over a one-year period. Although given as a yearly percentage, volatility can be measured over any time frame, allowing you to use it in any type of trading: day trading, swing trading, or even position trading.

Future volatility is the actual volatility of a forthcoming time period. Obviously, we can't know for certain what future volatility will be until after it becomes historic volatility, so we must venture an educated guess as to what future volatility will be. (This is a bit theoretical, but stick with us.)

Forecast volatility is the name for our private, educated guesses of what future volatility will be. Everyone has their own forecast volatility: It is to be different from person to person as everyone has their own opinion. This difference in the volatility assumption is the difference between being a buyer or a seller.

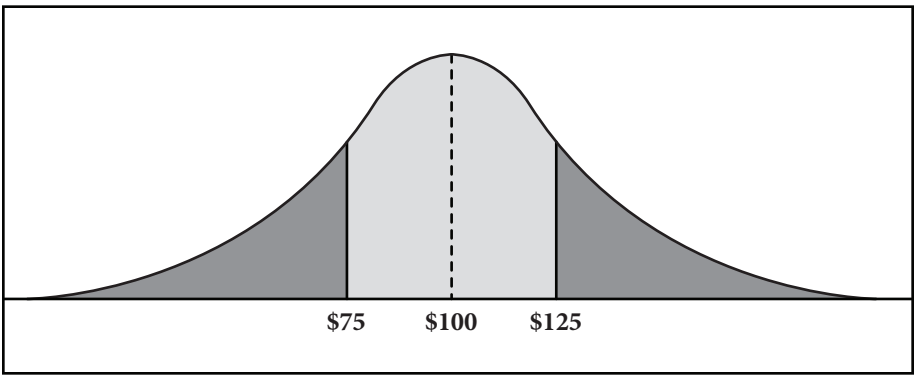
Implied volatility is the volatility expectation that is priced into every individual option. The implied volatility of an option is actually backed out of the pricing model. Being that all of the rest of the inputs of the options pricing model are known and the same to both parties, the only true variable is volatility. So, with that we can take any option price, plug it into the model as theoretical value and solve backwards for volatility. By doing this, we can determine the volatility of any option price. This is the option's volatility as implied by the model, hence implied volatility.

The importance of implied volatility cannot be understated. In the options world, relative value is not distinguished by total dollar amount. It can't be.

Different options have different strike prices and different expiration months so each option is like its own separate security. That would make comparisons between the two nearly impossible, like comparing apples to oranges. But, the level of implied volatility allows us to do this comparison. It enables us to decide which option is cheap and which is expensive. Implied volatility is factor that evaluates relative value in the option market.

As stated, volatility is a statistical percentage of a potential yearly stock movement encompassing one standard deviation. Thus, a stock with a higher volatility will have a wider range of potential stock prices over the course of a one-year period than a stock with a lower volatility.

> **Example:** If we have a stock trading at $100 with a volatility of 25%, the options are implying that the stock will be higher or lower by 25% within one standard deviation. (One standard deviation equals 68% in a normal distribution.) So the stock has a 68% probability of being between $75 and $125 in a one-year period.



Volatility gives us reasonable expectations of daily price action

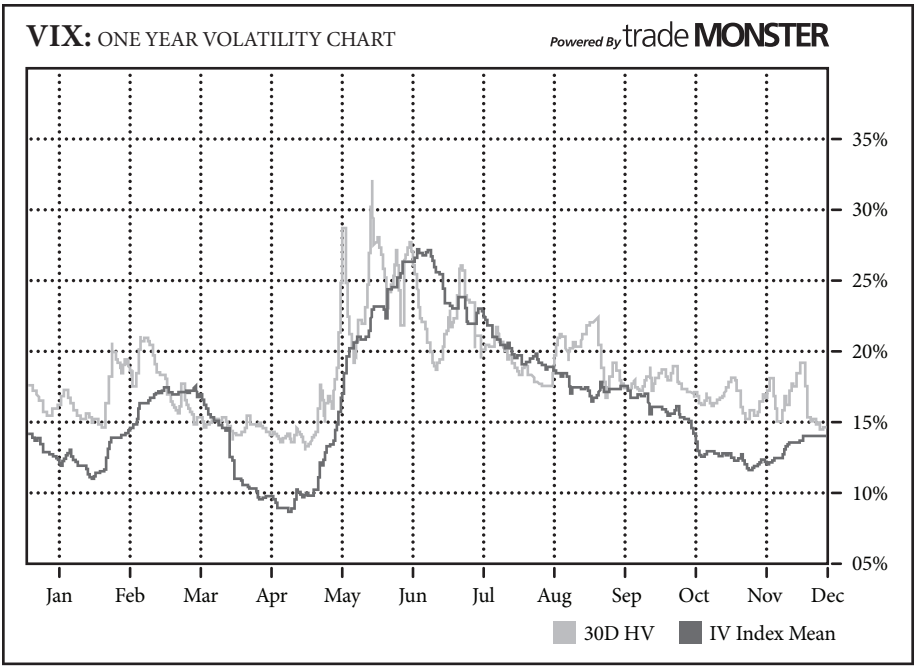
While the volatility data that we usually look at is an annual figure (the given number is a yearly percentage), you can also get monthly or daily numbers. The daily data can be obtained by dividing the volatility figure by the square root of the number of trading days in a year, which is usually accepted as 252. So if the volatility is 32%, the daily moves should be 2% (32 divided by the square root

of 252, or approximately 16). That means that 68% of the time the daily moves should be 2% or less.

Volatility Charting

Most traders worry less about standard deviations and more about measuring the implied volatility of an option against past implied volatility and/or the historical volatility. This is where volatility charts are very useful, because they show the historical volatility against the average implied volatility.

Theoretically, the implied volatility for all options of a given underlying should be the same, but that isn't the case. So implied volatility averages can be used for given months or given time frames. This allows one to get a single number for implied volatility that can be charted. Often the 30-day average implied volatility is used, as is the case with the CBOE Volatility Index (VIX). Below is a chart of the 30-day historical volatility and the average implied volatility for the S&P 500 Index (SPX).



A look at the implied volatility of the S&P 500 Index

Valuing Options

There are several ways to use volatility data to value options. The basic premise is the same with volatility as it is for stocks: Buy low and sell high. The first is to simply compare the implied volatility to the historical volatility. Note that some stocks may have a historical volatility that is always (or near always) lower than the implied volatility of its options. If so, you may need to use a comparison (convergence/divergence) of the distance between the two.

The theory is that if the historical volatility is greater than the implied, then the option is cheap; if the historical is less than the implied, it is expensive. This can be done using the daily spot data, but that often presents an incomplete picture. As can be seen from the above chart, under this theory options appear expensive in early January but get much more expensive. And they appear cheap in late February and early March but get much cheaper.

Volatility charts allow traders to do more thorough analysis. Comparing the implied volatility of an option to past implied volatility and historical volatility allows for trades with higher probability of success.

Appropriate Strategies

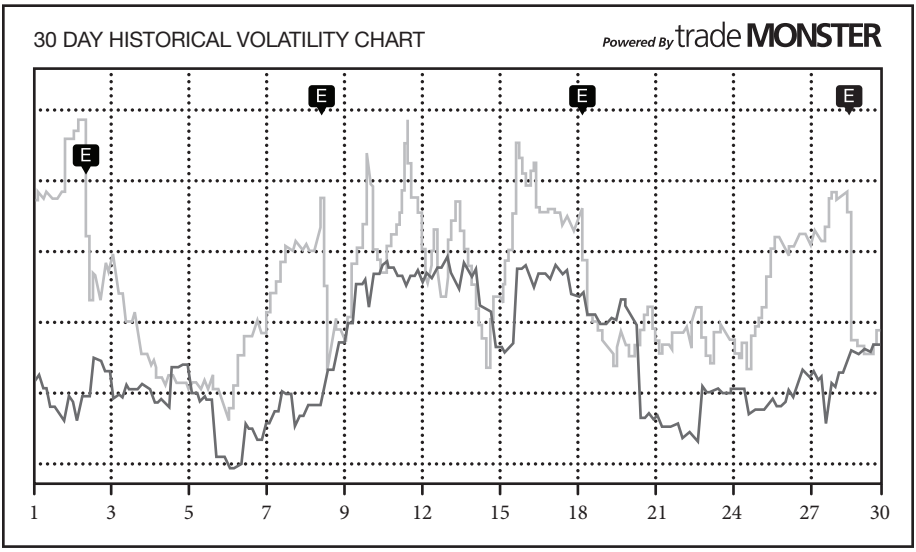
Many option traders focus specifically on volatility. The thesis that changes in volatility are much easier to predict than changes in the underlying asset prices has attracted a lot of academic interest. Volatility is, after all, mean-reverting and bounded both to the upside and downside. But even directional traders, who only want to use calls and puts for leverage or protection, can benefit greatly from a basic knowledge of volatility.

Volatility is a relative measure. Having a volatility number means nothing without knowing the average or mean volatility of the asset you are looking at. With a mean volatility, we can now identify what is considered high volatility and what is low volatility.

When the implied volatility is low, it's a good time to buy an option. When implied volatility is high, it can be a good time to sell or use a spread strategy. Those who stick with directional trades are best served by using call or put spreads when implied volatilities are high. Those using covered calls are best served selling calls when they are relatively "overpriced" from a standpoint of volatility.

It is important to know how implied volatility can react to upcoming events. The implied volatility often gets inflated leading up to news releases or earnings announcements. After the news is out—when the unknown becomes known, implied volatility tends to drop sharply. This is the reason that many traders who have bought an option before such an announcement, and been right on the direction, still lose money. The money made by choosing the right direction in the stock was overwhelmed by the decrease in volatility.

The following chart shows how implied volatility (the light gray line) gets inflated and deflated around earnings announcements (the darker gray line is the 30-day historical volatility).



The divergence of implied and historical volatility

SUMMARY

- Historical volatility is a measure of how much the underlying asset has been moving in the past.
- Implied volatility is a function of an option's price and is backed out of the Option Pricing Model.
- Implied volatility shows the expectation of future volatility.
- Volatility charts one standard deviation, usually on an annual basis.
- Volatility charts are invaluable for getting an idea of the relative value of an option.
- Using both historical and implied volatility is helpful.