CHAPTER 1

Essential Option Knowledge

Although many readers will have an understanding of the basics of options, it is always a worthwhile exercise to refresh the basics for those who have not traded options in some time. Option trading is not like riding a bike, when not utilized for a while, some of the knowledge that has been second nature tends to fade from a trader's mind. A well worn text book of strategies can usually be found nearby for many infrequent option traders who use it to get some reassurance when putting on a complex strategy. This first chapter will briefly cover the absolute basics of options as a refresher or an introduction, depending on the reader's experience level.

This chapter is a basic level coverage of options and spreads. For the intermediate trader, the majority of the information in this chapter should at minimum be a review. Several readers may just scan through the text to make sure they are up to speed with essential option concepts before moving forward with this book. After the first few chapters, several chapters specifically focus on individual strategies. Having a good base of knowledge to work from is the key to getting the most of out the rest of this book.

THE OPTION BASICS

There are two types of options, call options and put options. A call option is the right to own a security at a certain price. The put option is the right to sell a security at a certain price. As owners of options purchase a right,

TABLE 1.1 Call and Put Option Rights and Obligations

	Buyer	Seller
Call	Right to Buy	Obligation to Sell
Put	Right to Sell	Obligation to Buy

the seller of an option contract actually takes on an obligation. A call seller is obligated to sell a security at a certain price and a put seller is obligated to purchase a security at a certain price. If this is a little unclear, Table 1.1 might clear it up.

For example, if Trader A buys a XYZ 30 Call and Trader B is the seller of this option they now have a right and an obligation respectively. Trader A would now be long 1 XYZ 30 Call and has the right to buy shares of XYZ at 30. Trader B as the seller of the XYZ 30 Call would be short 1 of the option contracts and would have the obligation to sell shares of XYZ at 30 if the option is exercised.

If instead Trader A bought 1 XYZ 30 Put and once again Trader B is the seller of this option, Trader A would now be long 1 XYZ 30 Put. As the holder of this put option, Trader A now has the right to sell shares of XYZ at 30. Trader B would now be short 1 XYZ 30 Put and would have the obligation to buy shares of XYZ at 30 if the option is exercised. Basically, the owner of an option holds all the cards as they have the choice of when and whether to exercise the option, while the seller of the option takes on an obligation and has no control over the exercise of the option.

Each option, put or call, represents the right or obligation to sell or buy a security depending on the position a trader holds. This security is what is known as the underlying for a particular option. For instance a call option on XYZ would be the right to buy XYZ, and XYZ would represent the underlying security. This holds true for put options as well. The underlying for an option contract may be a futures contract, some sort of index, an exchange traded fund, or shares of stock. This book concentrates mainly on index, exchange traded fund, and stock options. As exchange traded funds trade in a very similar fashion to stocks, this book treats them as stocks. Also, another term for stock is equity and these terms will be used interchangeably throughout the book

An option contract will relate to a standard number of shares when related to a stock or exchange traded fund. The standard number of shares in the United States is 100 shares. Due to stock splits, mergers, and corporate actions this number varies from time to time, but in general a stock option represents 100 shares. For instance, a call option on XYZ would represent the right to buy 100 shares of XYZ. If exercised, the holder of a call option would purchase 100 shares of XYZ at a certain price and the trader with a

short position in the option contract would be forced to sell 100 shares of XYZ at the exercise price. A put option on XYZ would represent the right to sell 100 shares of XYZ, and the holder of a XYZ put option would sell 100 shares of XYZ upon exercising that option.

There are a wide variety of indexes that have options trading on them. They may represent anything from the stocks in an index to the volatility level of a certain index. Along with there being a variety of underlying indexes that have listed options trading, there are a variety of contract specifications. Throughout this book, an index option will be assumed to be an equity index option. Theoretically, an equity index option is the right to buy or sell a basket of the stocks that comprise a certain index. For example, a call option on the S&P 500 Index would be the right to buy a basket of S&P 500 Index components at a certain index level. However, instead of purchasing shares of stock, these index options are settled in a cash transfer or cash settled.

A cash settled index results in a transfer from the seller of an option to the buyer of an option if that option has value upon exercise. As there are a number of shares involved in the underlying for stock options, there is a dollar amount assigned to each point of an underlying index. To stick with the S&P 500 Index example, 1 S&P 500 Index point = $100. So for each point of value in an S&P 500 Index option, there is a $100 transfer from the seller of an option to a buyer of an option.

Options are contracts that have a finite life. Although there are some exceptions, equity and the majority of index options expire on the third Saturday following the third Friday of their expiration month. Being that the option market is not open on the third Saturday, the actual day options cease trading is the Friday before the third Saturday of the month. For instance a Call on XYZ expiring in August would trade in the option market until the Friday before the third Saturday of August.

Although options expire on the Friday prior to the third Saturday of the month, many options may be exercised any time until this expiration date. An option that may be exercised any time until expiration is referred to as an American-style option. The term American has nothing to do with geography, only exercise rights. All stock options and some index options traded in the United States are American-style options.

European-style options are options that may only be exercised on their expiration date. These type of options are typical of index options, with the best known being the S&P 500 Index options. Also, options that trade on the CBOE Volatility Index® (VIX®) are European style options.

Another component of both call and put options is the strike price. This strike price is the level where the holder of a call would be able to purchase the underlying security or the holder of a put would have the right to sell the underlying security. The strike price of a XYZ August 30 Call would

be 30. If XYZ is a stock and an American-style option, the holder of this option would hold the right to buy 100 shares of XYZ at 30 any time until the third Friday before the third Saturday in August. In the case that this option is European style, the holder of this call would have the right to buy XYZ only on the expiration day of the option at 30. The strike price for a put option is the level at which the holder of a put option has the right to sell a security. The holder of a XYZ August 30 Put would have the right to sell 100 shares XYZ at 30.

Equity Call Option and Put Option Settlement

Expiration Day–XYZ at 35
Holder of Long 1 XYZ 30 Call–Buys 100 Shares of XYZ at 30
Holder of Short 1 XYZ 30 Call–Sells 100 Shares of XYZ at 30

Equity Put Option Settlement

Expiration Day–XYZ at 25
Holder of Long 1 XYZ 30 Put–Sells 100 Shares of XYZ at 30
Holder of Short 1 XYZ 30 Put–Buys 100 Shares of XYZ at 30

As previously mentioned, index options are settled by a method known as cash settlement. If, for example, a S&P 500 (SPX) 950 Call Option is exercised, on expiration, when the SPX is trading at 955, the holder of the SPX 950 Call would receive a credit of $500 to their account. A seller, holding a short position in the same SPX 950 Call option would be obligated to pay $500 and have their account debited by this amount. The following illustrates the math behind this settlement process.

SPX Call Settlement

$$\text{Settlement} - \text{Strike} = \text{Option Value}$$

$$\text{Option Value} \times \text{Multiplier} = \text{Profit}$$

$$955 - 950 = 5.00$$

$$5.00 * \$100 = \$500$$

Holder of Long 1 SPX 950 Call–Receives $500.
Holder of Short 1 SPX 950 Call–Pays $500.

There is a slight difference when determining the settlement for an index put option. If a SPX 950 Put is held on expiration date and the SPX is trading at 945 the holder of the SPX 950 Put would receive $500 and the short seller of the SPX 950 Put would have to pay $500. However, the

TABLE 1.2 Components of an Option Contract

Underlying	Expiration	Strike	Type	Premium
XYZ	February	55	Call	1.50

formula for this is a little different. Instead of the strike price being subtracted from the settlement price, the formula is reversed with the settlement price being subtracted from the strike price.

SPX Put Settlement

$$\text{Strike} - \text{Settlement} = \text{Option Value}$$

$$\text{Option Value} \times \text{Multiplier} = \text{Profit}$$

$$950 - 945 = 5.00$$

$$5.00 * \$100 = \$500$$

Holder of Long 1 SPX 950 Put–Receives $500.
Holder of Short 1 SPX 950 Put–Pays $500.

The final piece of an option is the premium or price of an option contract. If a XYZ August 30 Put is quoted at 1.50 and this is an equity contract with a standard $100 multiplier, the premium is 1.50 or $150. The contract would cost $150 to purchase. The multiplier for an index option would be based on the multiplier also. Again, S&P 500 Index options have a multiplier of $100 so a July SPX 1200 Call quoted at 7.50 would have a cost of $750. Table 1.2 is a quick summary of all of the components of an option.

IN-AT-OUT OF THE MONEY

An option may be what is referred to as in the money, at the money, or out of the money. This reference relates to where the underlying security is relative to the type and strike of the option. Being in the money means that an option has some sort of value if the option was exercised at that very moment. For example, if a trader owns a call option with a 30 strike price and the underlying security is trading at 35, this option would be referred to as being in the money. If a stock is trading higher than the strike of a call option, that call option is in the money.

In the case of a put option, an equity put option is in the money when a stock is trading lower than a put option's strike price. For example, if a

TABLE 1.3 Summary of In-At-Out Of The Money

	In The Money	At The Money	Out Of The Money
Call Option	Underlying greater than strike	Underlying equal to strike	Underlying less than strike
Put Option	Underlying lower than strike	Underlying equal to strike	Underlying greater than strike

stock is trading at 25 and the strike price of the put option is 30, the holder of this put option has the right to sell the stock at 30 while the stock is at 25, then there is value in this option as the right to sell a stock at 30 when it is trading at 25 is immediately worth $5 of profit.

At the money is exactly what it sounds like. An option is at the money when the underlying security has the same price as the strike price of the option. This holds true for both put and call options. So if a stock is trading at 30, both the 30 Call and 30 Put would be at the money. To slightly confuse this term, some traders will refer to the closest strike to the underlying price as being the at the money option. If a stock is trading at 31 and the closest strike prices are 30 and 35, the 30 Call and 30 Put options may be called the at the money options.

Finally, an out of the money option is an option that has no value if exercised. If a stock is trading at 35 and a trader holds the 40 Call, there is no value in exercising the 40 Call and purchasing shares at 40. In fact, there is negative value by exercising this call option and this transaction would automatically be a $5 loss. For call options, if the underlying stock price is lower than the strike price of the option, it would be considered out of the money.

With a put option, when the price of the underlying security is higher than the option's strike price, the option is considered out of the money. There is no value in exercising a put option with a strike price of 35 if the underlying stock is trading at 40. Once again, there is actually negative value in exercising this option. Table 1.3 is a quick review of the three states of an option; in, at, or out of the money.

INTRINSIC AND TIME VALUE

The value of an option is determined first by market forces. The price for an option is the level where a buyer and seller have come together to trade the option. At times the value of an option is depicted by a bid

and ask, the bid being a price that a trader is a willing buyer of the option and the ask being a price that another trader is a willing seller of the option. In either case the value of the option is determined by the market. Once this value has been determined, the price of the option indicates how much time value and how much intrinsic value the market is giving to this option.

The value of an option is divided into two components. The first is the intrinsic value, which is the value of the option if it is exercised. As in the previous section this is also the amount an option is in the money. If a call option with a 30 strike is owned and the underlying security is trading at 35, the intrinsic value of this option would be 5, or 35 – 30. However, it is very possible this call option would be trading at a level higher than 5. The trading price of this option that is greater than the intrinsic value is called the time value of the option.

For instance, in the previous paragraph where an option had an intrinsic value of 5, if the trading price of this option were 6, the time value of this option would be 1, or 6–5. Any value above the intrinsic value of an option is known as the time value. In cases where an option is out of the money and has no intrinsic value, 100 percent of the value of the option is time value. In the case of a stock trading at 30 and the 35 strike call option trading at 1.50, the 1.50 represents time value and no intrinsic value. Table 1.4 is a more extensive example of intrinsic and time value for both call and put options.

In the examples in Table 1.4, the only options with intrinsic value are the 30 Call and the 40 Put. The underlying stock is trading at 35, so both the 35 Call and 35 Put options have no intrinsic value, but all time value. The far out of the money 30 Put and 40 Call both have no intrinsic value and are made up of all time value.

TABLE 1.4 Breakdown of Intrinsic and Time Value with Stock Trading at 35

Option	Market Price	Intrinsic Value	Time Value
30 Call	5.65	5.00	0.65
30 Put	0.60	0.00	0.60
35 Call	2.45	0.00	2.45
35 Put	2.40	0.00	2.40
40 Call	0.85	0.00	0.85
40 Put	5.75	5.00	0.75

SPREAD BASICS

A spread trade, either with options or another type of trading vehicle, involves taking two or more positions that should be considered by the trader as a single position. There are numerous methods of putting on spreads, possibly buying and selling two stocks that usually trade in a similar fashion or in commodities such as long corn and short soybeans. This book will focus on spread trades involving options and their underlying securities.

Spreads using options may be classified in a few different ways. An option may be traded against the underlying security, two similar options may be traded against each other, two different options may be combined together, and then two options with different types and expirations may be combined.

Using an option in combination with an underlying security is one of the more common methods of using options. These types of spreads are discussed in Chapters 2 and 3, but for example one is discussed here. Probably one of the best trades to use as an initiation to trading options is called the covered call. A covered call is when a short position is taken in a call option while a long position exists in the underlying security, usually a stock. Selling this call option would obligate the trader to sell the underlying security at the strike price of the call option. A holder of the underlying stock is now obligated to sell their shares at the strike price. If this is a level they would be a willing seller, then this would be a smart method to take in a little more income for selling this stock at that strike price.

In a case where both puts and calls are used together, a variety of potential payouts may result. A call and similar put may be bought in a case where a trader expects a large move up or down, but is uncertain what direction that move may be. More similar puts and calls may be combined for an unlimited number of payouts. These types of trades are covered in a simple fashion in Chapters 5 and 6, then more exotic spreads are covered in Chapters 9 and 10.

Another common spread method is using options of the same type, call or put, and same expiration, but with different strike prices. A call would be sold with a call being purchased, both on the same security. These types of spreads that use just a pair of options are covered extensively in Chapters 7 and 8. The idea behind one of these spreads, that just uses a pair of options, is that by having a long and short position in similar options, the potential loss is limited as well as the potential gain. Chapters 9 through 12 cover spreads that use all calls or all puts and have the same expiration, but use more than just a pair of options.

Finally, some spreads may involve options that have the same underlying security, but have different expiration dates. For example, a call option

that expires in 30 days may be sold and a call option that expires in 90 days, on the same underlying security, may be purchased. Chapters 14 and 15 extensively cover how traders use different expiration dates.

THE GREEKS

Chapter 4 will comprehensively cover the option Greeks and how they apply to individual and spread trades. Also, throughout this book, the Greeks will come in to play when discussing a variety of spread trades. There are five of the Greeks that option traders focus on when initiating trades. In general the Greeks, along with the price action of the underlying security, influence the value of options. These five Greeks are: Delta, Gamma, Theta, Vega, and Rho.

Delta is the most commonly referred to Greek and probably the easiest to understand. The Delta of an option indicates how much the price of an option should change in response to a one dollar change in the underlying security. Since a call option benefits when the underlying rises in price, the Delta for a call is positive. Conversely, since a put option loses value when the underlying rises in price, the Delta for a put option is negative.

Gamma is directly related to Delta. As a stock moves around, the Delta will move higher or lower. Gamma indicates how much Delta changes with a one dollar change in the underlying security. Unlike Delta, Gamma is positive for both call options and put options. This is function of a rise in the underlying forcing the Delta of both calls higher, and puts or a decrease in the underlying to push Delta lower for both call and put options. When a put option Delta is pushed higher, it becomes less negative and when it goes lower it is more negative. Therefore the sign of Gamma is always positive.

Theta relates to the effect that the passage of time will have on the value of an option. Theta has a negative impact for both call and put options due to the passage of time decreasing the value of an option, be it a call or put. The value of Theta indicates how much value an option will lose from day to day or sometimes over a number of days. In the case of Theta, the unit to change could be based on something other than one day.

Vega focuses on the effect a change in implied volatility has on the value of an option. Option prices reflect many factors and one is the implied volatility the market price of options projects onto the underlying security. Implied volatility is determined by an option pricing model and is measured as a percent. Based on buying and selling pressure on options, the implied volatility of options varies from day to day.

Vega indicates how much the price of an option will increase or decrease with a one percent increase or one percent decrease in the implied

volatility of the option contract. Vega works the same for both call options and put options, with an increase in implied volatility increasing the value of a call or put option or a decrease in implied volatility having a negative impact on the value of calls and puts. A final note on Vega: It is considered a Greek, but is not an actual Greek letter. Vega in some academic circles and textbooks may be referred to as Kappa, which is a Greek letter.

Finally, Rho indicates how much an option will increase or decrease in value based on a one percent change in the risk-free interest rate. Rho is the least discussed of the five option Greeks mainly because it usually has a very minimal impact on the value of options, especially options that have a shorter time to expiration. Long Term Equity Anticipation Securities (LEAPS), and longer dated options will see more influence from the change in interest rates. The influence of interest rate changes is more pronounced on options that have a longer life due to the increased impact of the cost of money over the life of this option.

Call options increase in value based on an increase in interest rates and put options decrease in value with an increase in interest rates, so Rho is positive for calls and negative for put options. Do keep in mind that Rho indicates the change in an option based on a full percent change in interest rates. Usually interest rates move up or down in quarter or half point increments, so Rho really does not have much of an impact of the life of most options.

PAYOFF TABLES AND DIAGRAMS

A payoff table is basically a spreadsheet that depicts the payoff of a position at expiration or possibly any time in the future. To keep things simple, each component of the option trade or spread trade is broken out in the table, from the price paid to enter the whole position to the payoff of each individual component of the trade at expiration. By keeping things this simple, it is easier to tell where the profit or loss from a potential trade comes from, especially in cases where the plan is to exit a trade before expiration.

Table 1.5 shows the payoff for a simple long call transaction. For example, a trader buys a XYZ 30 Call for 1.50. At expiration, this option would have no value with XYZ at or below 30. The first column represents the closing price for XYZ stock in five-point increments. Moving to the right, the second column is the value of the XYZ 30 Call at each price to the left. Premium represents the 1.50 paid for the position. This −1.50 is the same at all levels of expiration. Finally the Profit/Loss column is the sum of the value of the option and the premium paid at expiration. This final column represents the payoff for the entire position at expiration.

TABLE 1.5 Call Payoff at Expiration

XYZ	XYZ 30 Call	Premium	Profit/Loss
20	0.00	−1.50	−1.50
25	0.00	−1.50	−1.50
30	0.00	−1.50	−1.50
35	5.00	−1.50	3.50
40	10.00	−1.50	8.50
45	15.00	−1.50	13.50

For a summary of the trade at any level from 30 higher, the XYZ 30 Call would have some value. At expiration, if XYZ is at 30 or lower, the buyer of this option would realize a loss of 1.50. Any level above 30, the XYZ 30 Call option would have value and the result of this trade would be the value of that option minus the price paid for this option.

A payoff diagram is a graphical depiction of the payoff of an option position at expiration. The exercise of taking the numbers from the payoff table and graphing them either with a program or even by hand is worthwhile when considering an option trade, regardless of how basic or complex. Figure 1.1 is a payoff diagram for the trade from the previous table.

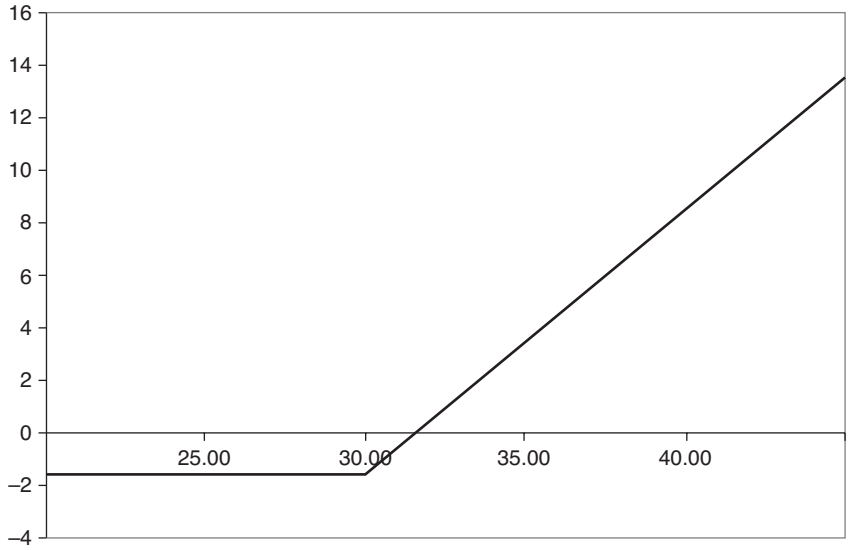

FIGURE 1.1 Payoff Diagram at Expiration

OPTION PRICING CALCULATORS

An option pricing calculator is an essential tool for any option trader. An option pricing calculator takes the variables that constitute an option's value; style (American or European), underlying price, strike price, type of option, days to expiration, volatility, and cost of money (dividends and interest rates), and determines the fair value for an option contract. In addition to the fair value for the option price, the Greeks are also determined and displayed.

Many brokerage firms include a free option calculator with their software and the CBOE offers a free pricing calculator at www.cboe.com. Table 1.6 is a demonstration of what an option calculator may look like with inputs and the outputs.

The variables on the left side of this example are all determined by the underlying security, the market, or the specifics of the option contract, with the exception of implied volatility. Implied volatility of options is a reflection of the buying and selling pressure on option contracts. As it varies and is based on the market price of an option, the price of an option may also be a variable to determine implied volatility. For instance, in the above example, if the quoted price of the option was .50 and all other variables are the same, the implied volatility may be determined. In Table 1.7, all the variables are entered including the option price and the output is the level of implied volatility being priced by the option market.

TABLE 1.6 Option Pricing Calculator Determines Option Price and Greeks

Input	
Type	American
Call/Put	Call
Underlying Price	29.00
Strike Price	30.00
Days to Expiration	15
Implied Volatility %	35.00%
Interest Rate %	1.00%
Dividends	0.15
Output	
Price	0.4292
Delta	0.3296
Gamma	0.1759
Theta	−0.0249
Vega	0.0213
Rho	0.0060

TABLE 1.7 Option Pricing Calculator Determines Implied Volatility

Input	
Type	American
Call/Put	Call
Underlying Price	29.00
Strike Price	30.00
Option Price	0.50
Days to Expiration	15
Interest Rate	1.00%
Dividends	0.15
Output	
Volatility	38.29%

As the call price is a little higher than the call fair value determined in Table 1.7, implied volatility increases a bit also. Using a pricing calculator to determine the future value of an option based on expected changes in the underlying price, time, or implied volatility will come in handy when deciding on what spread to put on when considering a trade. Using the calculator also may lead a trader to consider passing on a trade. The impact of changes in implied volatility as well as all variables will be discussed further in the chapter on evaluating potential trades.

That covers some of the basic knowledge needed to move on with this book and start mastering a variety of spread trades. Each of the topics covered in this chapter will be discussed more extensively as they apply to spreads in each chapter. However, for now, having a basic understanding is sufficient.