

Chapter 6 - Put and Call Options

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This is an effort to explain puts and calls, which are extremely complicated. To fully benefit from this explanation, you must attempt to answer completely the questions that are asked before you move on to the next step. If you fail to do that, you will get very little from this explanation. Therefore give yourself a **minimum of one hour** and possibly as much as two hours to read this assignment and answer the questions.

The entries below in **Figure 1** appeared on **September 23, 2011** on <http://finance.yahoo.com>. They show four call and put options for IBM, which ended trade on that day at **169.34** and had risen **72 cents** that day. According to the listing, the options were going to expire on **November 18, 2011**. The full list of all available options for any given stock is called an **options chain**. (If possible, the reader is advised at some point to go to <http://finance.yahoo.com> or some equivalent site to look at the full options chain for IBM).

Figure 1 – Select November IBM Put and Call Option at end of day, September 23, 2011, IBM at 169.34

Calls

Strike Price	Last	Change	Bid	Ask	Vol	Open Interest
165	11.05	0.50	11.00	11.15	452	566
180	3.67	0.02	3.70	3.80	332	1,076

Puts

Strike Price	Last	Change	Bid	Ask	Vol	Open Interest
165	7.50	0.30	7.35	7.45	528	311
180	15.30	0.90	15.15	15.35	157	449

Shaded options are in the money, white are out of the money. Source: <http://finance.yahoo.com>

These are quotations for four call and put options: IBM November 165 calls and puts and IBM November 180 calls and puts. Options used to have their own trading symbols (and technically still do) but increasingly brokerage sites just refer to calls and put by their strike price (the 165 and 180, explained below) and expiration date. This is obviously a traded security and much of the information, such as last, change, bid, ask, and volume, mean the same as they do for stocks., except the term Volume represents the number of contracts, and each single contract represents

100 shares of stock.

But what is the Strike Price? And what is meant by Open Interest? And how is the value of this security, which in the case of the 165 call, was \$11.05 in the last trade, and for which there is a current Bid of \$11.00 and Ask of \$11.15, determined?

We can start by defining a call option and a put option, although the definition may be more confusing than enlightening. So we will follow the definitions with examples.

A single **call option** gives the owner the right to **buy** 100 shares of stock (IBM in this case) at the price called the **strike price** on or before the **expiration date** from the person who sold the call.

For example, someone paid \$3.67 per share (or \$367 plus fees total) for the right to buy 100 shares of IBM for \$180 on or before November 18, 2011

A single **put option** gives the owner the right to **sell** 100 shares of stock at the price called the **strike price** on or before the **expiration date** from the person who sold the put.

For example, someone paid \$15.30 per share (or \$1,530 plus fees total) for the right to sell 100 shares of IBM for \$180 on or before November 18, 2011

But why would one do this? Again, examples with questions should make this more clear (and be sure to answer the questions in your own mind or you won't get much from the reading).

As an investor you have four investment options with puts and calls:

1. You may **write** (sell) a call option. Consider the November 180 call option listed above for \$3.67 (using the "Last" price as the relevant price). The person who wrote (sold) this option sold to the buyer the right to buy 100 shares (or some multiple) of IBM common stock for the price of \$180 (the **strike price**) per share on or before November 18, 2011 (the **expiration date**, which is always on a Friday). That right was sold for \$3.67 per share, or \$367 per contract, an amount pocketed by the seller after paying transaction fees. Thereafter the seller is contractually obliged to provide 100 shares of IBM for \$180 per share if the buyer of the call option chooses to exercise that option on or before market close on November 18, 2011. If IBM is selling below \$180 per share on the expiration date and the option has not yet been exercised, the option expires worthless to the buyer and the seller is released from any further obligation. The 180 call option, because the strike price is *above* the current IBM share price of \$169.34, is said to be "**out of the money**." The 165 call option is said to be "**in the money**" because the strike price is below the current price of the stock.

If the writer of the call option owned IBM stock at the time the call was written then she has written a **covered** call and her risk is not very substantial - in fact she may have done this to reduce risk.

Answer this question: Suppose you had written this 180 call on the day of this quotation after

you had purchased 100 shares of IBM one month earlier for \$158 per share. Why would you write this call? What happens if IBM is trading at \$171 on November 18 and had never risen above 180? Why would you be happy about what you had done?

If the call writer does not own IBM stock at the time this call is written the contract is called a *naked* call contract. This can be extremely risky.

Answer this question: Suppose you have written a single naked 180 call for \$367, which means you earned \$367 (for doing nothing except writing the contract). Suppose IBM rises to \$204 before November 18 and this contract is exercised. Will you make a profit or loss? How much?

You may get out of this option contract prior to the expiration date by buying a call option (effectively canceling your sale of the same) at the prevailing market price, which will likely be different from the \$367 that you earned to write this call.

2. You may *buy* a call option written by someone else. In this case you may have been the person who bought the November 180 IBM call. If so, you have paid \$3.67 per share for the right to buy 100 (or some multiple) shares of IBM for \$90 on or before the November 18. Or you might have bought the November 165 call for \$11.05 per share. This would give you the right to buy IBM for \$165 on or before the expiration date. This in-the-money call is obviously much more valuable because it has some intrinsic worth - IBM stock is selling for \$4.34 more than the price that you have the right to pay if you want to buy it. If you do buy the stock, you are said to be *exercising* your option.

Answer this question: Why would you buy the 180 call? What will happen if the price of IBM rises to \$188 per share before November 18 and you decide to exercise your option? Given that you originally invested \$367, will you make a profit or a loss? How much?

Answer this question: Why is the in-the-money call much more valuable than the out-of-the-money call?

3. You may *write* a put option. Consider the November 165 IBM put option listed above for \$7.50 per share. The writer of this put option gave the buyer of the put option to right to sell you 100 (or some multiple) shares of IBM for \$165 per share on or before the November 18, and you are being paid \$7.50 per share for this right. The buyer will exercise this option only if IBM stock is selling for *below* \$165 per share on or before the expiration date. If it is, then you must buy the stock at a price above its market price and take a loss.
4. You may *buy* a put option written by someone else. In this case, you may be the person who bought the IBM November 165 put option for 100 shares for \$750. This means you have the right to sell 100 shares of IBM to the writer of this put option for \$165 per share on or before the November 18, regardless of whether you currently own that stock. Because this is an out-of-the-money option, if IBM stock remains above \$165 per share prior the expiration date, this option will expire worthless. The other put option listed, the November 180 that last sold for \$15.30 is an in-the-money put option. Obviously in either case, the buyer of a stock option

anticipates that the price of the underlying stock will fall.

Answer this question: What must happen for you to make a profit if you have bought the November 165 put? What will this put be worth if IBM falls to \$158 per share by the November 18? Why will this put option be worthless if IBM is trading at \$169 per share on the expiration date and has never gone below 165?

By now it should be obvious that if you **buy a call** you hope that the **price of the stock will rise** and if you **buy a put** you hope that the **price will fall**.

Frequently Asked Questions:

Q: Why do these markets exist? What economic function do they perform?

A: You can use put and call options for **hedging** - protecting an investment by reducing its risk. For example, if you own stock in a certain company, you can protect against a sudden drop in the price of the stock by buying a put option (as the price drops, the put option rises in value, neutralizing the loss). You can hedge a short position by buying a call option. They are also good (albeit risky) vehicles for speculation - they provide a form of leverage. An increase in the price of a common stock of 20% can cause the price of a related call option to triple, quadruple, or more.

Q: What are the primary disadvantages of options?

A: Transactions fees (brokerage costs) are high on options as a percentage of the bet, especially for out-of-the-money options, unless you are trading in large positions. Also there is sometimes a large spread between Bid and Ask (see the examples above). Spreads are narrower for heavily traded options and for some hugely traded options are sometimes only a penny. Options when bought and sold directly are risky, even though they offer high returns when the investor makes the right bet.

Q: Who determines what options will be listed and what strike prices will be listed.

A: The exchanges who list stock options (the largest is the **Chicago Board Options Exchange - CBOE**) determine which stocks are traded actively enough to generate markets in options, then make markets in these stocks. Strike prices are created on a sliding scale above and below the actual market price of the stock as it rises and falls.

Q: Why would one write a covered call (first buy the stock, then write an out-of-the-money call option)?

A: **Writing** a call option can potentially raise the return of a stock investment. First, you are paid to write the option and you get to keep the proceeds. If the stock price rises and the strike price of the call that you have written is above your purchase price of the stock, when the option is called you earn capital gains on the stock **plus** whatever you were paid to write the option, though possibly not as much as might have been made had the option

not been written. For example, suppose you had bought IBM for \$158 per share, it is currently trading at \$169.34 and you had written the November 180 call for \$3.67 per share. If IBM rises above \$180 per share and the option is exercised, you will have earned \$3.67 per share for writing the option and a \$22 capital gain per share, for a total of \$25.67 per share. And if the stock never rises above the strike price before the expiration date (say it falls back to the purchase price of \$158 per share), you have still earned \$3.67 per share for writing the option. On the other hand, your maximum gain is capped at \$25.67 per share. If IBM rises to \$200 per share, you are required to sell it to the option buyer for \$180.

Q: Once I buy or write a put or call option, am I obliged to remain in the contract until the option expires?

A: No. You can always exit an option contract by making an offsetting transaction (called an *offset*) at the prevailing market price for that option. If, for example, you buy the November 180 call, you can later offset the transaction by selling the same call. If it has risen in value (in this case because the stock rose in value and the option followed it up) you will make a profit. Obviously if it has fallen in value you will make a loss. If it has fallen to a value of zero (which happens often with out-of-the-money options) then the loss is absolute and the option expires worthless. If you have written a naked call or put (one not backed by a long or short position in the stock) then the potential for loss is theoretically unlimited. For this reason, brokers seldom allow clients to write naked options.

Q: What do the Volume and Open Interest columns represent?

A: Options are sold in blocks of 100 shares each. The **Volume** number represents the number of 100-share contracts traded that day. For example, the 452 in the volume column for the November 165 call means that 452 of these 100-share call contracts were traded on this day, representing a call contract commitment on 45,200 shares of IBM stock at the 165 strike price. The *Open Interest* column represents the total number of such contracts outstanding and still in force. For example, the 566 open interest number for the same call indicates that there are presently 566 active call contracts at this strike price at the end of the day.. Because an ever larger number of traders ultimately **offset** their positions as expiration approaches, this number begins to decline in the final days, approaching zero before contract expiration. This number is typically above the volume number, but need not be.

Q: What happens if I write a covered call and the price of the stock rises above the strike price? When will this option be exercised and when will I be required to sell my stock at the strike price?

A: The owner of the option may exercise the option at any desired time so long as the price of the stock is above the strike price. Once the owner of the option expresses his desire to exercise the option, your broker will automatically sell your stock at the strike price. It

will just disappear from your account.

Q: If I own a call option and it goes into the money, am I *required* to buy the stock? After all, the 180 option only cost me \$367, but if I end up buying 100 shares of IBM, *that* would cost me \$18,000. That's a lot of money. What if I don't have \$18,000 in my account?

A: No, of course not. You will offset the transaction before expiration if the option is in the money, selling it for whatever it is worth on that day. **However** if you fail to offset and forget that you own the option, then on expiration the stock is automatically sold to you whether you want it or not, If you don't have the money in your account you are going to have some real problems with your broker.

Only a small percentage of options contracts are ever exercised. Most are offset.

Option Premiums

Again, a call option is said to be in the money if the Strike Price is lower than the current price of the stock. A call option is said to be out of the money if the Strike Price is higher than the current price of the stock. In the example above, the two options that are in the money are the 165 call and the 180 put. The other two options are out of the money.

By inspection, an in-the-money option already has intrinsic value. It's worth something even if the stock remains unchanged in value. For example, the November 165 call option is intrinsically worth \$4.34 (169.34 minus 165). But the option is trading, at \$11.05, at a price higher than the intrinsic value. This difference between the **in-the-money** option price and its intrinsic value is called the option **premium**.

The **premium** is the value that the buyer is paying for the right to take the option gamble - in the case of the 165 call, for example, it's the amount *extra* that the buyer is paying above mere difference between the price of the stock and option's strike price.

Here are the formulas for the **premium** on an **in-the-money** option (using the 165 call and 180 put as examples):

$$\begin{aligned} \text{Call Premium} &= \text{Option Price} - (\text{Stock Price} - \text{Strike Price}) \\ \$6.71 &= 11.05 - (169.34 - 165.00) \end{aligned}$$

$$\begin{aligned} \text{Put Premium} &= \text{Option Price} - (\text{Strike Price} - \text{Stock Price}) \\ \$4.64 &= 15.30 - (180.00 - 169.34) \end{aligned}$$

Out-of-the-money options have an intrinsic value of zero and so it is either said that their entire

value is the premium or that such options have no premium.

Trading Options

Compared to the stocks to which they are linked, options are relatively illiquid (trade on very low volume in most cases) and there is typically a large spread between **Bid** and **Ask**. For this reason, options should always be purchased with **limit orders** rather than **market orders**.

If you were to place a market order to buy an November 180 call option contract (which you have just been advised not to do) the relevant purchase price for you would be the **Ask**, or \$3.70 per share (or a contract price of \$380 plus commission). If you were to place a market order to sell the same option, the relevant price is the **Bid**, or \$3.70 per share. That's a \$10 spread for the same option, and for less popular stocks the spread can be much higher. If buying, it makes much more sense to submit a limit order for \$3.70 or \$3.75 per share, in which case the order will be placed in its proper location at the top of the Bid queue.