ZERODHA

Option Theory for Professional Trading - Part 1

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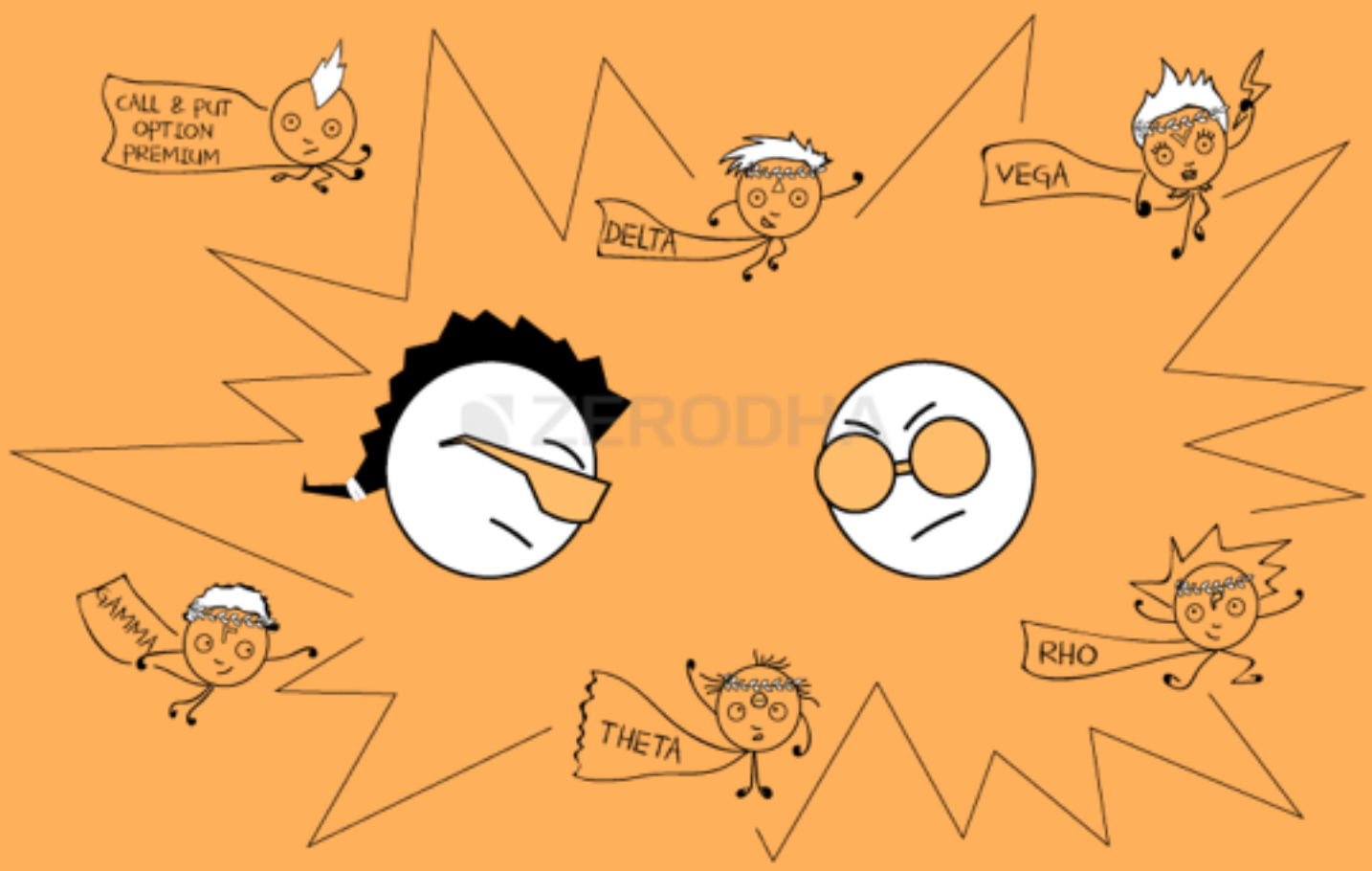

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CHAPTER 1

Call Option Basics

1.1– Breaking the Ice

As with any of the previous modules in Varsity, we will again make the same old assumption that you are new to options and therefore know nothing about options. For this reason we will start from scratch and slowly ramp up as we proceed. Let us start with running through some basic background information.

The options market makes up for a significant part of the derivative market, particularly in India. I would not be exaggerating if I were to say that nearly 80% of the derivatives traded are options and the rest is attributable to the futures market. Internationally, the option market has been around for a while now, here is a quick background on the same –

➡ Custom options were available as Over the Counter (OTC) since the 1920's. These options were mainly on commodities

➡ Options on equities began trading on the Chicago Board Options Exchange (CBOE) in 1972

➡ Options on currencies and bonds began in late 1970s. These were again OTC trades

➡ Exchange-traded options on currencies began on Philadelphia Stock Exchange in 1982

➡ Interest rate options began trading on the CME in 1985

Clearly the international markets have evolved a great deal since the OTC days. However in India from the time of inception, the options market was facilitated by the exchanges. However options were available in the off market 'Badla' system. Think of the 'badla system' as a grey market for derivatives transactions. The badla system no longer exists, it has become obsolete. Here is a quick recap of the history of the Indian derivative markets –

➡ June 12th 2000 – Index futures were launched

➡ June 4th 2001 –Index options were launched

➡ July 2nd 2001 – Stock options were launched

➡ November 9th 2001 – Single stock futures were launched.

Though the options market has been around since 2001, the real liquidity in the Indian index options was seen only in 2006! I remember trading options around that time, the spread were high and getting fills were a big deal. However in 2006, the Ambani brothers formally split up and their respective companies were listed as separate entities, thereby unlocking the value to the shareholders. In my opinion this particular corporate event triggered vibrancy in the Indian markets, creating some serious liquidity. However if you were to compare the liquidity in Indian stock options with the international markets, we still have a long way to catch up.

1.2 – A Special Agreement

There are two types of options – The Call option and the Put option. You can be a buyer or seller of these options. Based on what you choose to do, the P&L profile changes. Of course we will get into the P&L profile at a much later stage. For now, let us understand what "The Call Option" means. In fact the best way to understand the call option is to first deal with a tangible real world example, once we understand this example we will extrapolate the same to stock markets. So let's get started.

Consider this situation; there are two good friends, Ajay and Venu. Ajay is actively evaluating an opportunity to buy 1 acre of land that Venu owns. The land is valued at Rs.500,000/-. Ajay has been informed that in the next 6 months, a new highway project is likely to be sanctioned near the land that Venu owns. If the highway indeed comes up, the valuation of the land is bound to increase and therefore Ajay would benefit from the investment he would make today. However if the 'highway news' turns out to be a rumor- which means Ajay buys the land from Venu today and there is no highway tomorrow, then Ajay would be stuck with a useless piece of land!

So what should Ajay do? Clearly this situation has put Ajay in a dilemma as he is uncertain whether to buy the land from Venu or not. While Ajay is muddled in this thought, Venu is quite clear about selling the land if Ajay is willing to buy.

Ajay wants to play it safe, he thinks through the whole situation and finally proposes a special structured arrangement to Venu, which Ajay believes is a win-win for both of them, the details of the arrangement is as follows –

1. Ajay pays an upfront fee of Rs.100,000/- today. Consider this as a non refundable agreement fees that Ajay pays

2. Against this fees, Venu agrees to sell the land after 6 months to Ajay

3. The price of the sale(which is expected 6 months later) is fixed today at Rs.500,000/-

4. Because Ajay has paid an upfront fee, only he can call off the deal at the end of 6 months (if he wants to that is), Venu cannot

5. In the event Ajay calls off the deal at the end of 6 months, Venu gets to keep the upfront fees

So what do you think about this special agreement? Who do you think is smarter here – Is it Ajay for proposing such a tricky agreement or Venu for accepting such an agreement? Well, the answer to these questions is not easy to answer, unless you analyze the details of the agreement thoroughly. I would suggest you read through the example carefully (it also forms the basis to understand options) – Ajay has plotted an extremely clever deal here! In fact this deal has many faces to it.

Let us break down Ajay's proposal to understand some details –

➡ By paying an agreement fee of Rs.100,000/-, Ajay is binding Venu into an obligation. He is forcing Venu to lock the land for him for the next 6 months

➡ Ajay is fixing the sale price of the land based on today's price i.e Rs.500,000/- which means irrespective of what the price would be 6 months later he gets to buy the land at today's price. Do note, he is fixing a price and paying an additional Rs.100,000/- today

➡ At the end of the 6 months, if Ajay does not want to buy the land he has the right to say 'no' to Venu, but since Venu has taken the agreement fee from Ajay, Venu will not be in a position to say no to Ajay

➡ The agreement fee is non negotiable, non refundable

Now, after initiating this agreement both Ajay and Venu have to wait for the next 6 months to figure out what would actually happen. Clearly, the price of the land will vary based on the outcome

of the 'highway project'. However irrespective of what happens to the highway, there are only three possible outcomes –

1. Once the highway project comes up, the price of the land would go up, say it shoots up to Rs.10,00,000/-

2. The highway project does not come up, people are disappointed, the land price collapses, say to Rs.300,000/-

3. Nothing happens, price stays flat at Rs.500,000/-

I'm certain there could be no other possible outcomes that can occur apart from the three mentioned above.

We will now step into Ajay's shoes and think through what he would do in each of the above situations.

Scenario 1 – Price goes up to Rs.10,00,000/-

Since the highway project has come up as per Ajay's expectation, the land price has also increased. Remember as per the agreement, Ajay has the right to call off the deal at the end of 6 months. Now, with the increase in the land price, do you think Ajay will call off the deal? Not really, because the dynamics of the sale are in Ajay's favor –

Current Market price of the land = Rs.10,00,000/-

Sale agreement value = Rs.500,000/-

This means Ajay now enjoys the right to buy a piece of land at Rs.500,000/- when in the open market the same land is selling at a much higher value of – Rs.10,00,000/-. Clearly Ajay is making a steal deal here. Hence he would go ahead and demand Venu to sell him the land. Venu is obligated to sell him the land at a lesser value, simply because he had accepted Rs.100,000/- agreement fees from Ajay 6 months earlier.

So how much money is Ajay making? Well, here is the math –

Buy Price = Rs.500,000/-

Add: Agreement Fees = Rs.100,000/- (remember this is a non refundable amount)

Total Expense = 500,000 + 100,000 = 600,000/-

Current Market of the land = Rs.10,00,000/-

Hence his profit is Rs.10,00,000 – Rs.600,000 = **Rs.400,000/-**

Another way to look at this is – For an initial cash commitment of Rs.100,000/- Ajay is now making 4 times the money! Venu even though very clearly knows that the value of the land is much higher in the open market, is forced to sell it at a much lower price to Ajay. The profit that Ajay makes (Rs.400,000/-) is exactly the notional loss that Venu would incur.

Scenario 2 – Price goes down to Rs.300,000/-

It turns out that the highway project was just a rumor, and nothing really is expected to come out of the whole thing. People are disappointed and hence there is a sudden rush to sell out the land. As a result, the price of the land goes down to Rs.300,000/-.

So what do you think Ajay will do now? Clearly it does not make sense to buy the land, hence he would walk away from the deal. Here is the math that explains why it does not make sense to buy the land –

Remember the sale price is fixed at Rs.500,000/-, 6 months ago. Hence if Ajay has to buy the land he has to shell out Rs.500,000/- plus he had paid Rs.100,000/- towards the agreement fees. Which means he is in effect paying Rs.600,000/- to buy a piece of land worth just Rs.300,000/-. Clearly this would not make sense to Ajay, since he has the right to call of the deal, he would simply walk away from it and would not buy the land. However do note, as per the agreement Ajay has to let go of Rs.100,000/-, which Venu gets to pocket.

Scenario 3 – Price stays at Rs.500,000/-

For whatever reasons after 6 months the price stays at Rs.500,000/- and does not really change. What do you think Ajay will do? Well, he will obviously walk away from the deal and would not buy the land. Why you may ask, well here is the math –

Cost of Land = Rs.500,000/-

Agreement Fee = Rs.100,000/-

Total = Rs.600,000/-

Value of the land in open market = Rs.500,000/-

Clearly it does not make sense to buy a piece of land at Rs.600,000/- when it is worth Rs.500,000/-. Do note, since Ajay has already committed 1lk, he could still buy the land, but ends

up paying Rs 1lk extra in this process. For this reason Ajay will call off the deal and in the process let go of the agreement fee of Rs.100,000/- (which Venu obviously pockets).

I hope you have understood this transaction clearly, and if you have then it is good news as through the example you already know how the call options work! But let us not hurry to extrapolate this to the stock markets; we will spend some more time with the Ajay-Venu transaction.

Here are a few Q&A's about the transaction which will throw some more light on the example –

1. Why do you think Ajay took such a bet even though he knows he will lose his 1 lakh if land prices does not increase or stays flat?

a. Agreed Ajay would lose 1 lakh, but the best part is that Ajay knows his maximum loss (which is 1 lakh) before hand. Hence there are no negative surprises for him. Also, as and when the land prices increases, so would his profits (and therefore his returns). At Rs.10,00,000/- he would be making Rs.400,000/- profit on his investment of Rs.100,000/- which is 400%**.**

2. Under what circumstances would a position such as Ajay's make sense?

a. Only that scenario when the price of the land increases

3. Under what circumstances would Venu's position makes sense

a. Only that scenario when the price of the land decreases of stays flat

4. Why do you think Venu is taking such a big risk? He would lose a lot of money if the land prices increases after 6 months right?

a. Well, think about it. There are only 3 possible scenarios, out which 2 indeed benefit Venu. Statistically, Venu has 66.66% chances of winning the bet as opposed to Ajay's 33.33% chance

Let us summarize a few important points now –

➡ The payment from Ajay to Venu ensures that Ajay has a right (remember only he can call off the deal) and Venu has an obligation (if the situation demands, he has to honor Ajay's claim)

➡ The outcome of the agreement at termination (end of 6 months) is determined by the price of the land. Without the land, the agreement has no value

➡ Land is therefore called an underlying and the agreement is called a derivative

➡ An agreement of this sort is called an "Options Agreement"

➡ Since Venu has received the advance from Ajay, Venu is called the 'agreement seller or Writer' and Ajay is called the 'agreement buyer'

➡ In other words since this agreement is called "an options agreement", Ajay can be called an Options Buyer and Venu the Options Seller/writer.

➡ The agreement is entered after the exchange of 1 lakh, hence 1 lakh is the price of this option agreement. This is also called the "Premium" amount

➡ Every variable in the agreement – Area of the land, price and the date of sale is fixed.

➡ As a thumb rule, in an options agreement the buyer always has a right and the seller has an obligation

I would suggest you be absolutely thorough with this example. If not, please go through it again to understand the dynamics involved. Also, please remember this example, as we will revisit the same on a few occasions in the subsequent chapters.

Let us now proceed to understand the same example from the stock market perspective.

1.3 – The Call Option

Let us now attempt to extrapolate the same example in the stock market context with an intention to understand the 'Call Option'. Do note, I will deliberately skip the nitty-gritty of an option trade at this stage. The idea is to understand the bare bone structure of the call option contract.

Assume a stock is trading at Rs.67/- today. You are given a right today to buy the same one month later, at say Rs. 75/-, but only if the share price on that day is more than Rs. 75, would you buy it?. Obviously you would, as this means to say that after 1 month even if the share is trading at 85, you can still get to buy it at Rs.75!

In order to get this right you are required to pay a small amount today, say Rs.5.0/-. If the share price moves above Rs. 75, you can exercise your right and buy the shares at Rs. 75/-. If the share price stays at or below Rs. 75/- you do not exercise your right and you do not need to buy the shares. All you lose is Rs. 5/- in this case. An arrangement of this sort is called Option Contract, a 'Call Option' to be precise.

After you get into this agreement, there are only three possibilities that can occur. And they are-

1. The stock price can go up, say Rs.85/-
2. The stock price can go down, say Rs.65/-
3. The stock price can stay at Rs.75/-

Case 1 – If the stock price goes up, then it would make sense in exercising your right and buy the stock at Rs.75/-.

The P&L would look like this –

Price at which stock is bought = Rs.75

Premium paid =Rs. 5

Expense incurred = Rs.80

Current Market Price = Rs.85

Profit = 85 – 80 = Rs.5/-

Case 2 – If the stock price goes down to say Rs.65/- obviously it does not makes sense to buy it at Rs.75/- as effectively you would spending Rs.80/- (75+5) for a stock that's available at Rs.75/- in the open market.

Case 3 – Likewise if the stock stays flat at Rs.75/- it simply means you are spending Rs.80/- to buy a stock which is available at Rs.75/-, hence you would not invoke your right to buy the stock at Rs.75/-.

This is simple right? If you have understood this, you have essentially understood the core logic of a call option. What remains unexplained is the finer points, all of which we will learn soon.

At this stage what you really need to understand is this – For reasons we have discussed so far whenever you expect the price of a stock (or any asset for that matter) to increase, it always makes sense to buy a call option!

Now that we are through with the various concepts, let us understand options and their associated terms

Variable	Ajay – Venu Transaction	Stock Example	Remark
Underlying	1 acre land	Stock	Do note the concept of lot size is applicable in options. So just like in the land deal where the deal was on 1 acre land, not more or not less, the option contract will be the lot size

Variable	Ajay – Venu Transaction	Stock Example	Remark
Expiry	6 months	1 month	Like in futures there are 3 expiries available
Reference Price	Rs.500,000/-	Rs.75/-	This is also called the strike price
Premium	Rs.100,000/-	Rs.5/-	Do note in the stock markets, the premium changes on a minute by minute basis. We will understand the logic soon
Regulator	None, based on good faith	Stock Exchange	All options are cash settled, no defaults have occurred until now.

Finally before I end this chapter, here is a formal definition of a call options contract –

"The buyer of the call option has the right, but not the obligation to buy an agreed quantity of a particular commodity or financial instrument (the underlying) from the seller of the option at a certain time (the expiration date) for a certain price (the strike price). The seller (or "writer") is obligated to sell the commodity or financial instrument should the buyer so decide. The buyer pays a fee (called a premium) for this right".

In the next chapter we will look into a few finer details with regard to the 'Call Option'.

Key takeaways form this chapter

1. Options are traded in the Indian markets for over 15 years, but the real liquidity was available only since 2006
2. An Option is a tool for protecting your position and reducing risk
3. A buyer of the call option has the right and the seller has an obligation to make delivery
4. The option is only given to one party in the transaction (buyer of an option)
5. The option seller is also called the option writer
6. At the time of agreement the option buyer pays a certain amount to the option seller, this is called the 'Premium' amount
7. The agreement happens at a pre specified price, often called the 'Strike Price'
8. The option buyer benefits only if the price of the asset increases higher than the strike price
9. If the asset price stays at or below the strike, the buyer does not benefit, for this reason it always makes sense to buy options when you expect the price to increase
10. Statistically the option seller has higher odds of winning in an typical option contract
11. The directional view has to pan out before the expiry date, else the option will expire worthless

CHAPTER 2

Basic Option Jargons

2.1– Decoding the basic jargons

In the previous chapter, we understood the basic call option structure. The idea of the previous chapter was to capture a few essential 'Call Option' concepts such as –

1. It makes sense to be a buyer of a call option when you expect the underlying price to increase

2. If the underlying price remains flat or goes down then the buyer of the call option loses money

3. The money the buyer of the call option would lose is equivalent to the premium (agreement fees) the buyer pays to the seller/writer of the call option.

In the next chapter i.e. Call Option (Part 2), we will attempt to understand the call option in a bit more detail. However before we proceed further let us decode a few basic option jargons. Discussing these jargons at this stage will not only strengthen our learning, but will also make the forthcoming discussion on the options easier to comprehend.

Here are a few jargons that we will look into –

1. Strike Price

2. Underlying Price

3. Exercising of an option contract

4. Option Expiry

5. Option Premium

6. Option Settlement

Do remember, since we have only looked at the basic structure of a call option, I would encourage you to understand these jargons only with respect to the call option.

Strike Price

Consider the strike price as the anchor price at which the two parties (buyer and seller) agree to enter into an options agreement. For instance, in the previous chapter's 'Ajay – Venu' example the anchor price was Rs.500,000/-, which is also the 'Strike Price' for their deal. We also looked into a stock example where the anchor price was Rs.75/-, which is also the strike price. For all 'Call' options the strike price represents the price at which the stock can be bought on the expiry day.

For example, if the buyer is willing to buy ITC Limited's Call Option of Rs.350 (350 being the strike price) then it indicates that the buyer is willing to pay a premium today to buy the rights of 'buying ITC at Rs.350 on expiry'. Needless to say he will buy ITC at Rs.350, only if ITC is trading above Rs.350.

In fact here is a snap shot from NSE's website where I have captured different strike prices of ITC and the associated premium.

Option Chain (Equity Derivatives)

Underlying Stock: ITC 336.90 As on Mar 17, 2015 13:21:36 IST

View Options Contracts for: Select Index OR Search for an underlying stock: GO Filter by: Expiry Date 26MAR2015 Futures contracts

CALLS												PUTS										
Chart	OI	Chng in OI	Volume	IV	LTP	Net Chng	Bid Qty	Bid Price	Ask Price	Ask Qty	Strike Price	Bid Qty	Bid Price	Ask Price	Ask Qty	Net Chng	LTP	IV	Volume	Chng in OI	OI	Chart
	-	-	-	-	-	-	2,000	74.65	86.10	2,000	260.00	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	5,000	66.00	69.35	5,000	270.00	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	7,000	56.35	59.60	7,000	280.00	2,000	0.05	0.35	2,000	-	-	-	-	-	3,000	
	-	-	-	-	-	-	8,000	45.95	50.05	8,000	290.00	1,000	0.10	0.30	1,000	-	-	-	-	-	1,000	
	1,000	-	-	-	-	-	2,000	34.65	43.75	2,000	300.00	19,000	0.15	0.30	1,000	-	0.25	40.71	1	1,000	201,000	
	2,000	-	-	-	-	-	2,000	27.45	30.05	13,000	310.00	3,000	0.25	0.40	1,000	-0.15	0.25	31.14	11	-5,000	181,000	
	6,000	-	-	-	-	-	1,000	17.85	19.10	11,000	320.00	13,000	0.70	0.80	8,000	-0.15	0.80	28.46	112	6,000	945,000	
	253,000	-	63	28.49	10.65	0.70	1,000	10.00	10.50	11,000	330.00	11,000	2.20	2.35	8,000	-0.45	2.30	24.92	541	-2,000	1,282,000	
	1,875,000	-21,000	1,081	27.23	4.75	0.05	4,000	4.60	4.70	1,000	340.00	8,000	6.30	6.80	4,000	-0.95	6.30	24.30	522	-174,000	1,857,000	
	4,836,000	26,000	1,212	30.52	2.15	-0.15	11,000	2.10	2.20	6,000	350.00	4,000	13.85	14.20	1,000	-1.40	13.65	26.12	75	-16,000	1,438,000	
	4,126,000	-239,000	733	34.80	1.15	-0.10	19,000	1.05	1.15	13,000	360.00	2,000	22.70	23.25	1,000	-	23.00	27.05	13	-3,000	715,000	
	2,753,000	-77,000	252	38.24	0.60	-0.20	12,000	0.60	0.65	12,000	370.00	2,000	32.35	32.85	2,000	-0.15	32.35	32.34	19	4,000	244,000	
	2,482,000	-76,000	281	44.02	0.45	-0.05	9,000	0.40	0.45	35,000	380.00	12,000	39.75	42.40	1,000	-0.35	39.95	-	13	-12,000	489,000	
	1,685,000	-2,000	105	48.07	0.30	-0.05	78,000	0.30	0.35	59,000	390.00	2,000	49.65	52.35	1,000	-2.00	50.00	-	1	-1,000	360,000	
	2,411,000	-3,000	157	51.59	0.20	-0.10	224,000	0.20	0.25	49,000	400.00	1,000	61.30	62.50	1,000	-3.80	58.85	-	1	-	193,000	
	445,000	-14,000	24	57.86	0.15	-0.10	59,000	0.15	0.20	2,000	410.00	2,000	64.60	75.50	1,000	-	-	-	-	-	12,000	
	395,000	-	4	61.41	0.15	-	4,000	0.15	0.20	7,000	420.00	1,000	78.20	84.40	1,000	-	-	-	-	-	7,000	
	169,000	-1,000	5	63.72	0.10	-0.05	1,000	0.10	0.15	5,000	430.00	-	-	-	-	-	-	-	-	-	3,000	
	264,000	-	-	-	-	-	26,000	0.10	0.25	7,000	440.00	-	-	-	-	-	-	-	-	-	5,000	
	163,000	-8,000	13	74.00	0.10	-	72,000	0.05	0.20	1,000	450.00	-	-	-	-	-	-	-	-	-	-	
	19,000	-	-	-	-	-	12,000	0.05	0.20	10,000	460.00	-	-	-	-	-	-	-	-	-	-	
	3,000	-	-	-	-	-	1,000	0.05	0.40	1,000	470.00	-	-	-	-	-	-	-	-	-	-	
	3,000	-	-	-	-	-	3,000	0.10	0.90	1,000	480.00	-	-	-	-	-	-	-	-	-	-	

Top

The table that you see above is called an 'Option Chain', which basically lists all the different strike prices available for a contract along with the premium for the same. Besides this information, the option chain has a lot more trading information such as Open Interest, volume, bid-ask quantity etc. I would suggest you ignore all of it for now and concentrate only on the highlighted information –

1. The highlight in maroon shows the price of the underlying in the spot. As we can see at the time of this snapshot ITC was trading at Rs.336.9 per share

2. The highlight in blue shows all the different strike prices that are available. As we can see starting from Rs.260 (with Rs.10 intervals) we have strike prices all the way up to Rs.480

3. Do remember, each strike price is independent of the other. One can enter into an options agreement , at a specific strike price by paying the required premium

4. For example one can enter into a 340 call option by paying a premium of Rs.4.75/- (highlighted in red)

a. This entitles the buyer to buy ITC shares at the end of expiry at Rs.340. Of course, you now know under which circumstance it would make sense to buy ITC at 340 at the end of expiry

Underlying Price

As we know, a derivative contract derives its value from an underlying asset. The underlying price is the price at which the underlying asset trades in the spot market. For example in the ITC example that we just discussed, ITC was trading at Rs.336.90/- in the spot market. This is the underlying price. For a call option, the underlying price has to increase for the buyer of the call option to benefit.

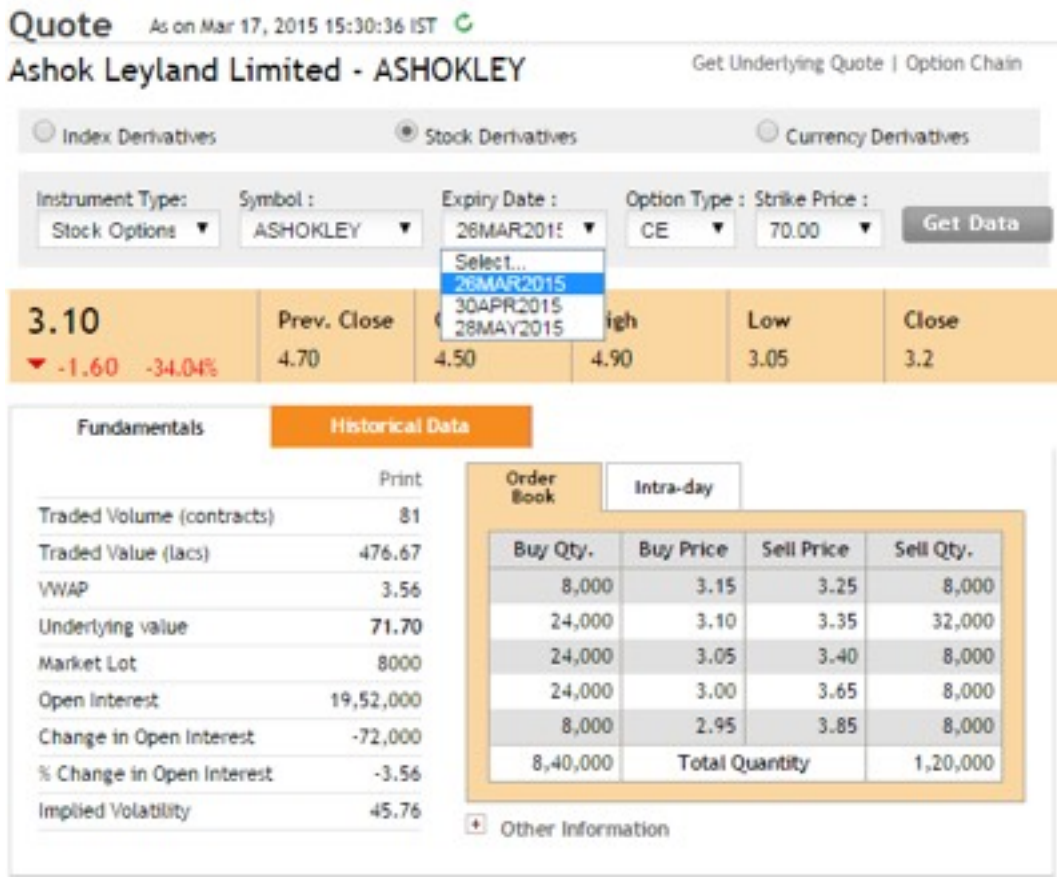
Exercising of an option contract

Exercising of an option contract is the act of claiming your right to buy the options contract at the end of the expiry. If you ever hear the line "exercise the option contract" in the context of a **call option**, it simply means that one is claiming the right to buy the stock at the agreed strike price. Clearly he or she would do it only if the stock is trading over and above the strike. Here is an important point to note – you can exercise the option only on the day of the expiry and not anytime before the expiry.

Hence, assume with 15 days to expiry one will buy ITC 340 Call option when ITC is trading at 330 in the spot market. Further assume, after he buys the 340 call option, the stock price increases to 360 the very next day. Under such a scenario, the option buyer cannot ask for a settlement (he exercise) against the call option he holds. Settlement will happen only on the day of the expiry, based on the price the asset is trading in the spot market on the expiry day.

Option Expiry

Similar to a futures contract, options contract also has expiry. In fact both equity futures and option contracts expire on the last Thursday of every month. Just like futures contracts, option contracts also have the concept of current month, mid month, and far month. Have a look at the snapshot below –



This is the snapshot of the call option to buy Ashok Leyland Ltd at the strike price of Rs.70 at Rs.3.10/-. As you can see there are 3 expiry options – 26th March 2015 (current month), 30th April 2015 (mid month), and 28th May 2015 (far month). Of course the premium of the options changes as and when the expiry changes. We will talk more about it at an appropriate time. But at this stage, I would want you to remember just two things with respect to expiry – like futures there are 3 expiry options and the premium is not the same across different expiries

Option Premium

Since we have discussed premium on a couple instances previously, I guess you would now be clear about a few things with respect to the 'Option Premium'. Premium is the money required to be paid by the option buyer to the option seller/writer. Against the payment of premium, the option buyer buys the right to exercise his desire to buy (or sell in case of put options) the asset at the strike price upon expiry.

If you have got this part clear till now, I guess we are on the right track. We will now proceed to understand a new perspective on 'Premiums'. Also, at this stage I guess it is important to let you know that the whole of option theory hinges upon 'Option Premium'. Option premiums play an extremely crucial role when it comes to trading options. Eventually as we progress through this module you will see that the discussions will be centered heavily on the option premium.

Let us revisit the 'Ajay-Venu' example, that we took up in the previous chapter. Consider the circumstances under which Venu accepted the premium of Rs.100,000/- from Ajay –

1. **News flow** – The news on the highway project was only speculative and no one knew for sure if the project would indeed come up

    a. Think about it, we discussed 3 possible scenarios in the previous chapter out of which 2 were favorable to Venu. So besides the natural statistical edge that Venu has, the fact that the highway news is speculative only increases his chance of benefiting from the agreement

2.**Time** – There was 6 months time to get clarity on whether the project would fructify or not.

a. This point actually favors Ajay. Since there is more time to expiry the possibility of the event working in Ajay's favor also increases. For example consider this – if you were to run 10kms, in which time duration are you more likely to achieve it – within 20 mins or within 70 mins? Obviously higher the time duration higher is the probability to achieve it.

Now let us consider both these points in isolation and figure out the impact it would have on the option premium.

News – When the deal was done between Ajay and Venu, the news was purely speculative, hence Venu was happy to accept Rs.100,000/- as premium. However for a minute assume the news was not speculative and there was some sort of bias. Maybe there was a local politician who hinted in the recent press conference that they may consider a highway in that area. With this information, the news is no longer a rumor. Suddenly there is a possibility that the highway may indeed come up, albeit there is still an element of speculation.

With this in perspective think about this – do you think Venu will accept Rs.100,000/- as premium? Maybe not, he knows there is a good chance for the highway to come up and therefore the land prices would increase. However because there is still an element of chance he may be willing to take the risk, provided the premium will be more attractive. Maybe he would consider the agreement attractive if the premium was Rs.175,000/- instead of Rs.100,000/-.

Now let us put this in stock market perspective. Assume Infosys is trading at Rs.2200/- today. The 2300 Call option with a 1 month expiry is at Rs.20/-. Put yourself in Venu's shoes (option writer) – would you enter into an agreement by accepting Rs.20/- per share as premium?

If you enter into this options agreement as a writer/seller, then you are giving the right (to the buyer) of buying Infosys option at Rs. 2300 one month down the lane from now.

Assume for the next 1 month there is no foreseeable corporate action which will trigger the share price of Infosys to go higher. Considering this, maybe you may accept the premium of Rs.20/-.

However what if there is a corporate event (like quarterly results) that tends to increase the stock price? Will the option seller still go ahead and accept Rs.20/- as the premium for the agreement? Clearly, it may not be worth to take the risk at Rs.20/-.

Having said this, what if despite the scheduled corporate event, someone is willing to offer Rs.75/- as premium instead of Rs.20/-? I suppose at Rs.75/-, it may be worth taking the risk.

Let us keep this discussion at the back of our mind; we will now take up the 2nd point i.e. **'time'**

When there was 6 months time, clearly Ajay knew that there was ample time for the dust to settle and the truth to emerge with respect to the highway project. However instead of 6 months, what if there was only 10 days time? Since the time has shrunk there is simply not enough time for the event to unfold. Under such a circumstance (with time not being on Ajay's side), do you think Ajay will be happy to pay Rs.100,000/- premium to Venu?. I don't think so, as there is no incentive for Ajay to pay that kind of premium to Venu. Maybe he would offer a lesser premium, say Rs.20,000/- instead.

Anyway, the point that I want to make here keeping both **news and time** in perspective is this – premium is never a fixed rate. It is sensitive to several factors. Some factors tend to increase the premium and some tend to decrease it, and in real markets, all these factors act simultaneously affecting the premium. To be precise there are 5 factors (similar to news and time) that tends to affect the premium. These are called the 'Option Greeks'. We are too early to understand Greeks, but will understand the Greeks at a much later stage in this module.

For now, I want you to remember and appreciate the following points with respect to option premium –

1. The concept of premium is pivotal to the Option Theory

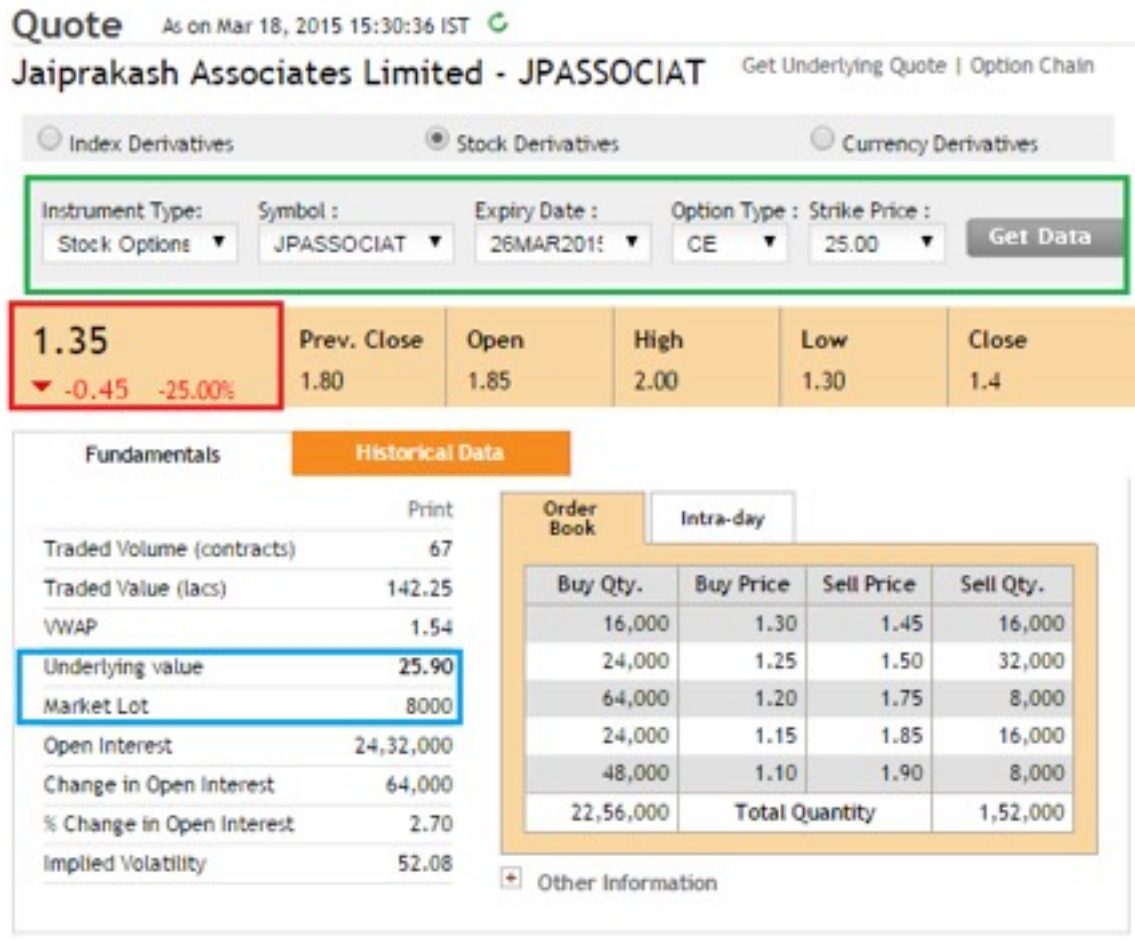
2. Premium is never a fixed rate, it is a function of many (influencing) factors

3. In real markets premiums vary almost on a minute by minute basis

If you have gathered and understood these points so far, I can assure that you are on the right path.

Options Settlement

Consider this Call option agreement –



As highlighted in green, this is a Call Option to buy JP Associates at Rs.25/-. The expiry is 26th March 2015. The premium is Rs.1.35/- (highlighted in red), and the market lot is 8000 shares.

Assume there are 2 traders – 'Trader A' and 'Trader B'. Trader A wants to buy this agreement (option buyer) and Trader B wants to sell (write) this agreement. Considering the contract is for 8000 shares, here is how the cash flow would look like –

Since the premium is Rs.1.35/- per share, Trader A is required to pay the total of

= 8000 * 1.35

= Rs.10,800/- as premium amount to Trader B.

Now because Trader B has received this Premium form Trader A, he is obligated to sell Trader A 8000 shares of JP Associates on 26th March 2015, if Trader A decides to exercise his agreement. However, this does not mean that Trader B should have 8000 shares with him on 26th March. Options are cash settled in India, this means on 26th March, in the event Trader A decides to exercise his right, Trader B is obligated to pay just the cash differential to Trader A.

To help you understand this better, consider on 26th March JP Associates is trading at Rs.32/-. This means the option buyer (Trader A) will exercise his right to buy 8000 shares of JP Associates at 25/-. In other words, he is getting to buy JP Associates at 25/- when the same is trading at Rs.32/- in the open market.

Normally, this is how the cash flow should look like –

➡ On 26th Trader A exercises his right to buy 8000 shares from Trader B

➡ The price at which the transaction will take place is pre decided at Rs.25 (strike price)

➡ Trader A pays Rs.200,000/- (8000 * 25) to Trader B

➡ Against this payment Trader B releases 8000 shares at Rs.25 to Trader A

➡ Trader A almost immediately sells these shares in the open market at Rs.32 per share and receives Rs.256,000/-

➡ Trader A makes a profit of Rs.56,000/- (256000 – 200000) on this transaction

Another way to look at it is that the option buyer is making a profit of Rs.7/- per shares (32-25) per share. Because the option is cash settled, instead of giving the option buyer 8000 shares, the option seller directly gives him the cash equivalent of the profit he would make. Which means Trader A would receive

= 7*8000

= Rs.56,000/- from Trader B.

Of course, the option buyer had initially spent Rs.10,800/- towards purchasing this right, hence his real profits would be –

= 56,000 – 10,800

= Rs.45,200/-

In fact if you look at in a percentage return terms, this turns out to be a whopping return of 419% (without annualizing).

The fact that one can make such large asymmetric return is what makes options an attractive instrument to trade. This is one of the reasons why Options are massively popular with traders.

Key takeaways from this chapter

1. It makes sense to buy a call option only when one anticipates an increase in the price of an asset
2. The strike price is the anchor price at which both the option buyer and option writer enter into an agreement
3. The underlying price is simply the spot price of the asset
4. Exercising of an option contract is the act of claiming your right to buy the options contract at the end of the expiry
5. Similar to futures contract, options contract also have an expiry. Option contracts expire on the last Thursday of every month
6. Option contracts have different expiries – the current month, mid month, and far month contracts
7. Premiums are not fixed, in fact they vary based on several factors that act upon it
8. Options are cash settled in India.

CHAPTER 3

Buying a Call Option

3.1 – Buying call option

In the previous chapters we looked at the basic structure of a call option and understood the broad context under which it makes sense to buy a call option. In this chapter, we will formally structure our thoughts on the call option and get a firm understanding on both buying and selling of the call option. Before we move ahead any further in this chapter, here is a quick recap of what we learnt in the first chapter –

1. It makes sense to be a buyer of a call option when you expect the underlying price to increase

2. If the underlying price remains flat or goes down then the buyer of the call option loses money

3. The money the buyer of the call option would lose is equivalent to the premium (agreement fees) the buyer pays to the seller/writer of the call option

We will keep the above three points in perspective (which serves as basic guidelines) and understand the call option to a greater extent.

3.2 – Building a case for a call option

There are many situations in the market that warrants the purchase of a call option. Here is one that I just discovered while writing this chapter, thought the example would fit well in the context of our discussions. Have a look at the chart below –

The stock in consideration is Bajaj Auto Limited. As you may know, they are one of the biggest manufacturers of two wheelers in India. For various reasons the stock has been beaten down in the market, so much so that the stock is trading at its 52 week low price. I believe there could be an opportunity to initiate a trade here. Here are my thoughts with respect to this trade –

1. Bajaj Auto is a quality fundamental stock, there is no denying on that

2. The stock has been beaten down so heavily, makes me believe this could be the market's over reaction to volatility in Bajaj Auto's business cycle

3. I expect the stock price to stop falling sometime soon and eventually reverse

4. However I do not want to buy the stock for delivery (yet) as I'm worried about a further decline in the stock

5. Extending the above point, the worry of M2M losses prevents me from buying Bajaj Auto's futures as well

6. At the same time I don't want to miss an opportunity of a sharp reversal in the stock

To sum up, I'm optimistic on the stock price of Bajaj Auto (the stock price to eventually increase) but I'm kind of uncertain about the immediate outlook on the stock. The uncertainty is mainly due the fact that my losses in the short term could be intense if the weakness in the stock persists. However as per my estimate the probability of the loss is low, but nevertheless the probability still exists. So what should I do?

Now, if you realize I'm in a similar dilemma that was Ajay was in (recall the Ajay – Venu example from chapter 1). A circumstance such as this, builds up for a classic case on an options trade.

In the context of my dilemma, clearly buying a call option on Bajaj Auto makes sense for reasons I will explain shortly. Here is a snapshot of Bajaj Auto's option chain –

Option Chain (Equity Derivatives)

Underlying Stock: BAJAJ-AUTO 2026.90

View Options Contracts for: Select Index OR Search for an underlying stock: 60 Filter by: Expiry Date 26MAR2015 Futures contracts

CALLS												PUTS									
Chart	OI	Chng in OI	Volume	IV	LTP	Net Chng	Bid Qty	Bid Price	Ask Price	Ask Qty	Strike Price	Bid Qty	Bid Price	Ask Price	Ask Qty	Net Chng	LTP	IV	Volume	Chng in OI	OI	Chart
	-	-	-	-	-	-	1,500	413.10	439.70	1,500	1600.00	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	1,875	369.35	389.70	1,875	1650.00	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	1,875	319.35	339.70	1,875	1700.00	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	2,250	263.30	289.65	2,250	1750.00	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	2,250	219.55	239.70	2,250	1800.00	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	2,250	169.65	189.70	2,250	1850.00	-	-	-	-	-	-	-	-	-	-	
	125	-	-	-	-	-	125	123.70	199.90	250	1900.00	125	0.35	2.50	1,000	-4.50	0.50	43.28	5	-125	875	
	125	-	-	-	-	-	2,250	64.95	89.90	2,250	1950.00	625	1.05	2.25	125	0.85	1.85	36.71	66	5,500	10,875	
	7,625	125	11	35.22	37.35	-3.45	250	29.85	34.05	250	2000.00	875	3.95	5.60	125	-0.20	4.00	22.67	58	2,250	20,625	
	26,750	-7,750	196	25.01	6.35	-5.15	125	5.70	6.35	250	2050.00	1,625	24.65	28.25	250	-1.85	23.15	10.17	24	-875	6,375	
	59,125	-1,625	61	32.13	1.50	-1.55	125	1.25	1.95	375	2100.00	625	68.65	82.05	375	16.20	79.00	48.39	14	-1,125	9,500	
	33,125	-4,750	63	44.32	1.00	-0.10	500	0.80	1.65	375	2150.00	2,000	106.00	124.35	375	15.15	122.00	-	38	-3,500	15,000	
	69,625	1,000	42	54.20	0.65	-0.35	500	0.55	0.85	125	2200.00	2,250	160.50	172.50	125	16.25	172.00	-	4	-500	7,000	
	29,750	-500	11	72.14	1.10	0.05	625	0.40	1.05	1,000	2250.00	125	217.80	230.50	2,250	54.05	225.00	83.09	12	-1,125	1,125	
	30,500	-500	18	67.52	0.20	0.10	1,875	0.20	0.60	500	2300.00	1,875	259.50	279.40	2,000	82.25	269.40	-	3	-375	7,750	
	6,625	-	-	-	-	-	750	0.05	1.60	375	2350.00	-	-	-	-	-	-	-	-	-	500	
	11,625	-	-	-	-	-	125	0.05	1.00	500	2400.00	1,500	360.10	492.00	125	-	-	-	-	-	375	
	875	-	2	137.31	2.75	2.70	250	0.10	1.95	250	2450.00	500	419.15	428.00	1,500	12.05	426.90	149.90	20	-1,375	1,125	
	625	-	-	-	-	-	-	-	1.80	500	2500.00	250	467.30	482.65	1,125	3.55	469.00	-	1	-	375	
	125	-	-	-	-	-	-	-	0.75	125	2700.00	-	-	-	-	-	-	-	-	-	-	

As we can see the stock is trading at Rs.2026.9 (highlighted in blue). I will choose to buy 2050 strike call option by paying a premium of Rs.6.35/- (highlighted in red box and red arrow). You may be wondering on what basis I choose the 2050 strike price when in fact there are so many different strike prices available (highlighted in green)?. Well, the process of strike price selection is a vast topic on its own, we will eventually get there in this module, but for now let us just believe 2050 is the right strike price to trade.

3.3 – Intrinsic value of a call option (upon expiry)

So what happens to the call option now considering the expiry is 15 days away? Well, broadly speaking there are three possible scenarios which I suppose you are familiar with by now –

Scenario 1 – The stock price goes above the strike price, say 2080

Scenario 2 – The stock price goes below the strike price, say 2030

Scenario 3 – The stock price stays at 2050

The above 3 scenarios are very similar to the ones we had looked at in chapter 1, hence I will also assume that you are familiar with the P&L calculation at the specific value of the spot in the given scenarios above (if not, I would suggest you read through Chapter 1 again).

The idea I'm interested in exploring now is this –

1. You will agree there are only 3 broad scenarios under which the price movement of Bajaj Auto can be classified (upon expiry) i.e. the price either increases, decreases, or stays flat

2. But what about all the different prices in between? For example if as per Scenario 1 the price is considered to be at 2080 which is above the strike of 2050. What about other strike prices such as 2055, 2060, 2065, 2070 etc? Can we generalize anything here with respect to the P&L?

3. In scenario 2, the price is considered to be at 2030 which is below the strike of 2050. What about other strike prices such as 2045, 2040, 2035 etc? Can we generalize anything here with respect to the P&L?

What would happen to the P&L at various possible prices of spot (upon expiry) – I would like to call these points as the "Possible values of the spot on expiry" and sort of generalize the P&L understanding of the call option.

In order to do this, I would like to first talk about (**in part and not the full concept**) the idea of the 'intrinsic value of the option upon expiry'.

The intrinsic value (IV) of the option upon expiry (**specifically a call option for now**) is defined as the **non – negative value** which the option buyer is entitled to if he were to exercise the call option. In simple words ask yourself (assuming you are the buyer of a call option) how much money you would receive upon expiry, if the call option you hold is profitable. Mathematically it is defined as –

IV = Spot Price – Strike Price

So if Bajaj Auto on the day of expiry is trading at 2068 (in the spot market) the 2050 Call option's intrinsic value would be –

= 2068 – 2050

= 18

Likewise, if Bajaj Auto is trading at 2025 on the expiry day the intrinsic value of the option would be –

= 2025 – 2050

= -25

But remember, IV of an option (irrespective of a call or put) is a non negative number; hence we leave the IV at 0.

= 0

Now our objective is to keep the idea of intrinsic value of the option in perspective, and to identify how much money I will make at every possible expiry value of Bajaj Auto and in the process make some generalizations on the call option buyer's P&L.

3.4 – Generalizing the P&L for a call option buyer

Now keeping the concept of intrinsic value of an option at the back of our mind, let us work towards building a table which would help us identify how much money, I as the buyer of Bajaj Auto's 2050 call option would make under the various possible spot value changes of Bajaj Auto (in spot market) on expiry. Do remember the premium paid for this option is Rs 6.35/–. Irrespective of how the spot value changes, the fact that I have paid Rs.6.35/- remains unchanged. This is the cost that I have incurred in order to buy the 2050 Call Option. Let us keep this in perspective and work out the P&L table –

Please note – the negative sign before the premium paid represents a cash out flow from my trading account.

Serial No.	Possible values of spot	Premium Paid	Intrinsic Value (IV)	P&L (IV + Premium)
1	1990	(-) 6.35	1990 – 2050 = 0	0 + (– 6.35) = – 6.35
2	2000	(-) 6.35	2000 – 2050 = 0	0 + (– 6.35) = – 6.35
3	2010	(-) 6.35	2010 – 2050 = 0	0 + (– 6.35) = – 6.35
4	2020	(-) 6.35	2020 – 2050 = 0	0 + (– 6.35) = – 6.35
5	2030	(-) 6.35	2030 – 2050 = 0	0 + (– 6.35) = – 6.35
6	2040	(-) 6.35	2040 – 2050 = 0	0 + (– 6.35) = – 6.35
7	2050	(-) 6.35	2050 – 2050 = 0	0 + (– 6.35) = – 6.35
8	2060	(-) 6.35	2060 – 2050 = 10	10 +(-6.35) = + 3.65
9	2070	(-) 6.35	2070 – 2050 = 20	20 +(-6.35) = + 13.65
10	2080	(-) 6.35	2080 – 2050 = 30	30 +(-6.35) = + 23.65
11	2090	(-) 6.35	2090 – 2050 = 40	40 +(-6.35) = + 33.65
12	2100	(-) 6.35	2100 – 2050 = 50	50 +(-6.35) = + 43.65

So what do you observe? The table above throws out 2 strong observations –

1. Even if the price of Bajaj Auto goes down (below the strike price of 2050), the maximum loss seems to be just Rs.6.35/-

a. **Generalization 1** – For a call option buyer a loss occurs when the spot price moves below the strike price. However the loss to the call option buyer is **restricted** to the extent of the premium he has paid.

2. The profit from this call option seems to increase exponentially as and when Bajaj Auto starts to move above the strike price of 2050

a. **Generalization 2** – The call option becomes profitable as and when the spot price moves over and above the strike price. The higher the spot price goes from the strike price, the higher the profit.

3. From the above 2 generalizations it is fair for us to say that the buyer of the call option has a limited risk and a potential to make an unlimited profit.

Here is a general formula that tells you the Call option P&L for a given spot price –

P&L = Max [0, (Spot Price – Strike Price)] – Premium Paid

Going by the above formula, let's evaluate the P&L for a few possible spot values on expiry –

1. 2023
2. 2072
3. 2055

The solution is as follows –

@2023

= Max [0, (2023 – 2050)] – 6.35

= Max [0, (-27)] – 6.35

= 0 – 6.35

= – 6.35

The answer is in line with Generalization 1 (loss restricted to the extent of premium paid).

@2072

= Max [0, (2072 – 2050)] – 6.35

= Max [0, (+22)] – 6.35

= 22 – 6.35

= **+15.65**

The answer is in line with Generalization 2 (Call option gets profitable as and when the spot price moves over and above the strike price).

@2055

= Max [0, (2055 – 2050)] – 6.35

= Max [0, (+5)] – 6.35

= 5 – 6.35

= -1.35

So, here is a tricky situation, the result what we obtained here is against the 2nd generalization. Despite the spot price being above the strike price, the trade is resulting in a loss! Why is this so? Also if you observe the loss is much lesser than the maximum loss of Rs.6.35/-, it is in fact just Rs.1.35/-. To understand why this is happening we should diligently inspect the P&L behavior around the spot value which is slightly above the strike price (2050 in this case).

Serial No.	Possible values of spot	Premium Paid	Intrinsic Value (IV)	P&L (IV + Premium)
1	2050	(-) 6.35	2050 – 2050 = 0	0 + (– 6.35) = – 6.35
2	2051	(-) 6.35	2051 – 2050 = 1	1 + (– 6.35) = – 5.35
3	2052	(-) 6.35	2052 – 2050 = 2	2 + (– 6.35) = – 4.35
4	2053	(-) 6.35	2053 – 2050 = 3	3 + (– 6.35) = – 3.35
5	2054	(-) 6.35	2054 – 2050 = 4	4 + (– 6.35) = – 2.35
6	2055	(-) 6.35	2055 – 2050 = 5	5 + (– 6.35) = – 1.35
7	2056	(-) 6.35	2056 – 2050 = 6	6 + (– 6.35) = – 0.35
8	2057	(-) 6.35	2057 – 2050 = 7	7 +(- 6.35) = + 0.65
9	2058	(-) 6.35	2058 – 2050 = 8	8 +(- 6.35) = + 1.65
10	2059	(-) 6.35	2059 – 2050 = 9	9 +(- 6.35) = + 2.65

As you notice from the table above, the buyer suffers a maximum loss (Rs. 6.35 in this case) till the spot price is equal to the strike price. However, when the spot price starts to move above the strike price, the loss starts to **minimize**. The losses keep getting minimized till a point where the trade neither results in a profit or a loss. This is called the **breakeven point**.

The formula to identify the breakeven point for any call option is –

B.E = Strike Price + Premium Paid

For the Bajaj Auto example, the 'Break Even' point is –

= 2050 + 6.35

= 2056.35

In fact let us find out find out the P&L at the breakeven point

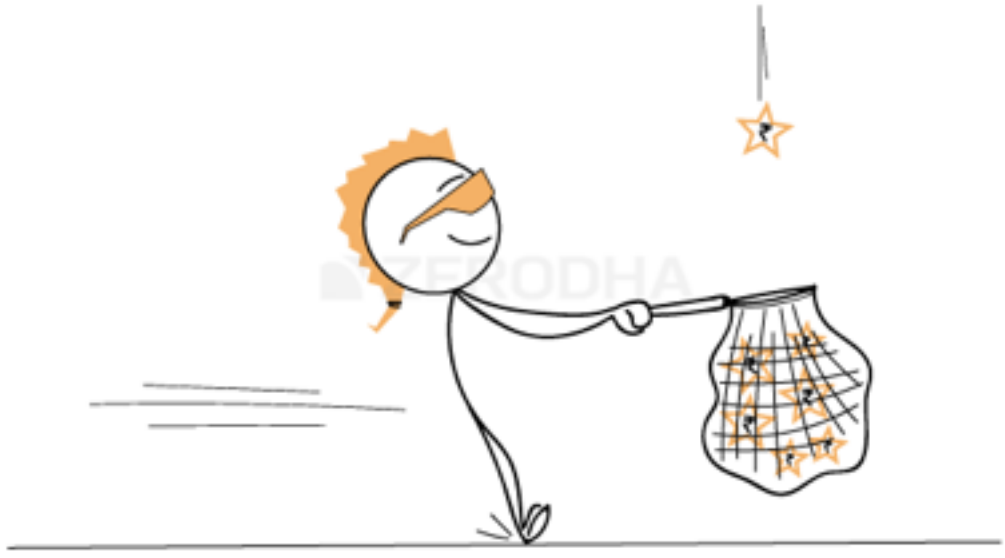
= Max [0, (2056.35 – 2050)] – 6.35

= Max [0, (+6.35)] – 6.35

= +6.35 – 6.35

= 0

As you can see, at the breakeven point we neither make money nor lose money. In other words, if the call option has to be profitable it not only has to move above the strike price but it has to move above the breakeven point.



3.5 – Call option buyer's payoff

So far we have understood a few very important features with respect to a call option buyer's pay-off; I will reiterate the same –

1. The maximum loss the buyer of a call option experiences is, to the extent of the premium paid. The buyer experiences a loss as long as the spot price is below the strike price

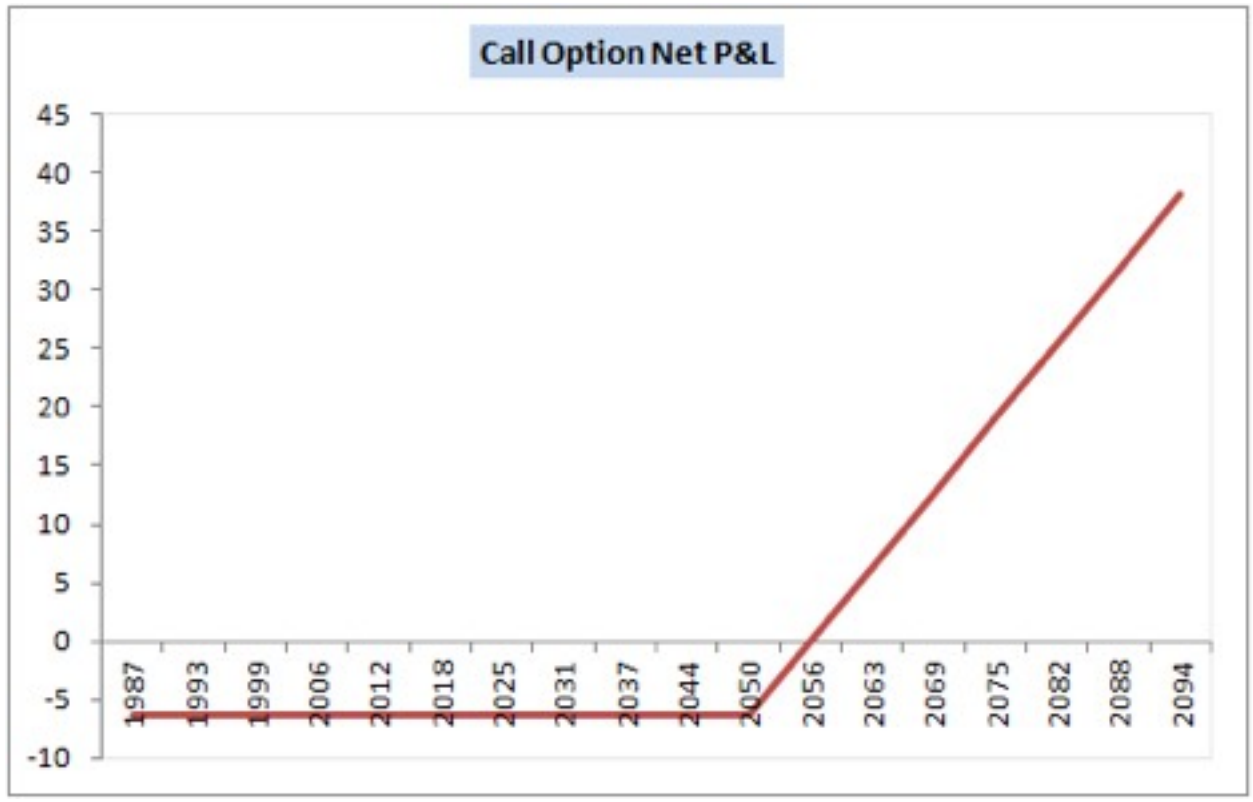
2. The call option buyer has the potential to realize unlimited profits provided the spot price moves higher than the strike price

3. Though the call option is supposed to make a profit when the spot price moves above the strike price, the call option buyer first needs to recover the premium he has paid

4. The point at which the call option buyer completely recovers the premium he has paid is called the breakeven point

5. The call option buyer truly starts making a profit only beyond the breakeven point (which naturally is above the strike price)

Interestingly, all these points can be visualized if we plot the chart of the P&L. Here is the P&L chart of Bajaj Auto's Call Option trade –



From the chart above you can notice the following points which are in line with the discussion we have just had –

1. The loss is restricted to Rs.6.35/- as long as the spot price is trading at any price below the strike of 2050

2. From 2050 to 2056.35 (breakeven price) we can see the losses getting minimized

3. At 2056.35 we can see that there is neither a profit nor a loss

4. Above 2056.35 the call option starts making money. In fact the slope of the P&L line clearly indicates that the profits start increasing exponentially as and when the spot value moves away from the strike

Again, from the graph one thing is very evident – A call option buyer has a limited risk but unlimited profit potential. And with this I hope you are now clear with the call option from the buyer's perspective. In the next chapter we will look into the Call Option from the seller's perspective.

Key takeaways from this chapter

1. It makes sense to be a buyer of a call option when you expect the underlying price to increase

2. If the underlying price remains flat or goes down then the buyer of the call option loses money

3. The money the buyer of the call option would lose is equivalent to the premium (agreement fees) the buyer pays to the seller/writer of the call option

4. Intrinsic value (IV) of a call option is a non negative number

5. IV = Max[0, (spot price – strike price)]

6. The maximum loss the buyer of a call option experiences is to the extent of the premium paid. The loss is experienced as long as the spot price is below the strike price

7. The call option buyer has the potential to make unlimited profits provided the spot price moves higher than the strike price

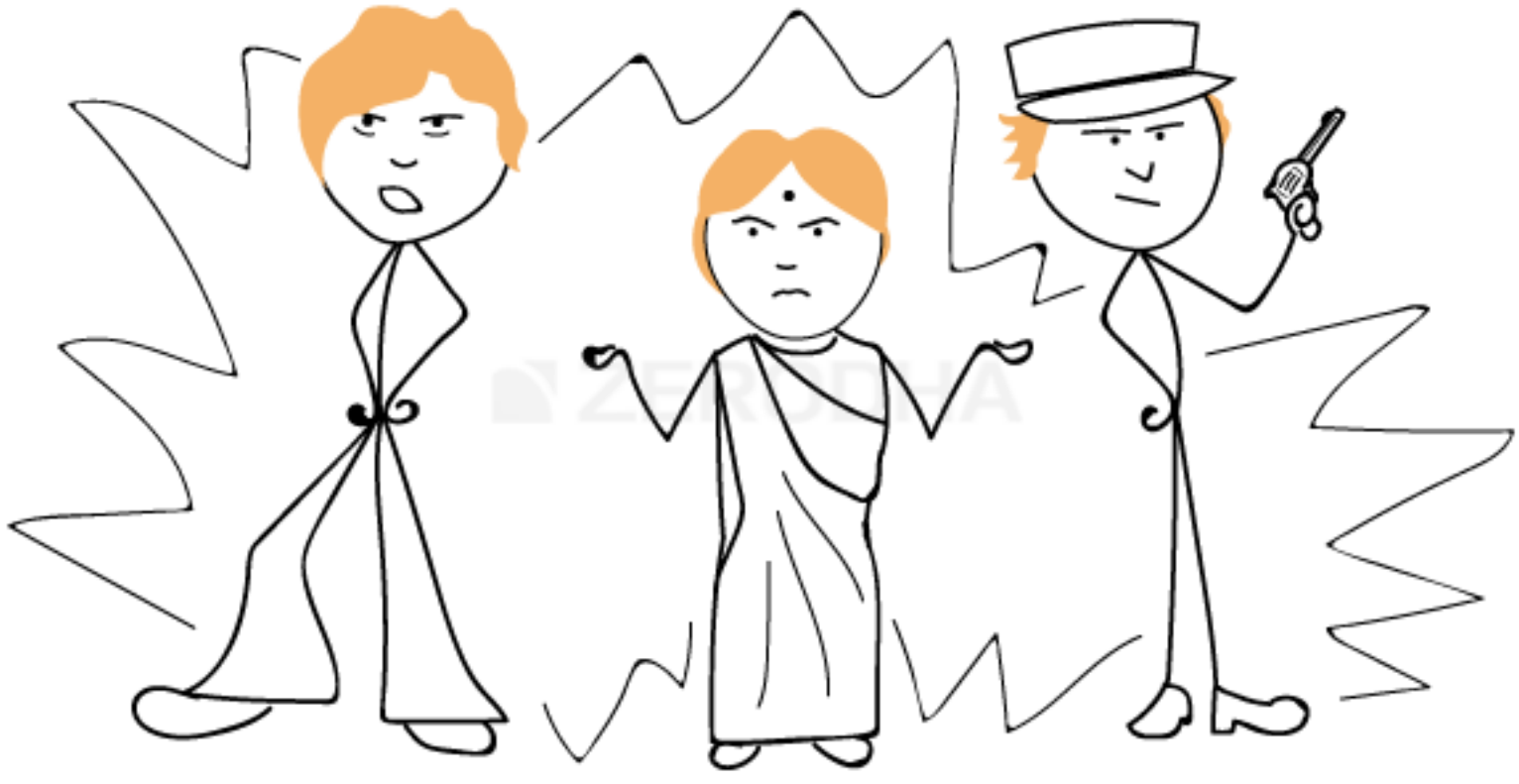
8. Though the call option is supposed to make a profit when the spot price moves above the strike price, the call option buyer first needs to recover the premium he has paid

9. The point at which the call option buyer completely recovers the premium he has paid is called the breakeven point

10. The call option buyer truly starts making a profit only beyond the breakeven point (which naturally is above the strike price).

CHAPTER 4

Selling/Writing a Call Option



4.1 – Two sides of the same coin

Do you remember the 1975 Bollywood super hit flick 'Deewaar', which attained a cult status for the incredibly famous 'Mere paas maa hai' dialogue :-) ? The movie is about two brothers from the same mother. While one brother, righteous in life grows up to become a cop, the other brother turns out to be a notorious criminal whose views about life is diametrically opposite to his cop brother.

Well, the reason why I'm taking about this legendary movie now is that the option writer and the option buyer are somewhat comparable to these brothers. They are the two sides of the same coin. Of course like the Deewaar brothers there is no view on morality when it comes to Options trading; rather the view is more on markets and what one expects out of the markets. However, there is one thing that you should remember here – whatever happens to the option seller in terms of the P&L, the exact opposite happens to option buyer and vice versa. For example if the option writer is making Rs.70/- in profits, this automatically means the option buyer is losing Rs.70/-. Here is a quick list of such generalizations –

➡ If the option buyer has **limited risk** (to the extent of premium paid), then the option seller has **limited profit** (again to the extent of the premium he receives)

➡ If the option buyer has **unlimited profit** potential then the option seller potentially has **unlimited risk**

➡ The breakeven point is the point at which the option buyer starts to make money, this is the exact same point at which the option writer starts to lose money

➡ If option buyer is making Rs.X in profit, then it implies the option seller is making a loss of Rs.X

➡ If the option buyer is losing Rs.X, then it implies the option seller is making Rs.X in profits

➡ Lastly if the option buyer is of the opinion that the market price will increase (above the strike price to be particular) then the option seller would be of the opinion that the market will stay **at or below** the strike price…and vice versa.

To appreciate these points further it would make sense to take a look at the Call Option from the seller's perspective, which is the objective of this chapter.

Before we proceed, I have to warn you something about this chapter – since there is P&L symmetry between the option seller and the buyer, the discussion going forward in this chapter will look very similar to the discussion we just had in the previous chapter, hence there is a possibility that you could just skim through the chapter. Please don't do that, I would suggest you stay alert to notice the subtle difference and the **huge impact** it has on the P&L of the call option writer.

4.2 – Call option seller and his thought process

Recall the 'Ajay-Venu' real estate example from chapter 1 – we discussed 3 possible scenarios that would take the agreement to a logical conclusion –

1. The price of the land moves above Rs.500,000 (good for Ajay – option buyer)
2. The price stays flat at Rs.500,000 (good for Venu – option seller)
3. The price moves lower than Rs.500,000 (good for Venu – option seller)

If you notice, the option buyer has a statistical **disadvantage** when he buys options – only 1 possible scenario out of the three benefits the option buyer. In other words 2 out of the 3 scenarios statistically benefit the option seller. This is just **one** of the incentives for the option writer to sell options. Besides this natural statistical edge, if the option seller also has a good market insight then the chances of the option seller being profitable is quite high.

Please do note, I'm only talking about a natural statistical edge here and by no way I'm suggesting that an option seller will always makes money.

Anyway let us now take up the same 'Bajaj Auto' example we took up in the previous chapter and build a case for a **call option seller** and understand how he would view the same situation. Allow me repost the chart –

➡ The stock has been heavily beaten down, clearly the sentiment is extremely weak

➡ Since the stock has been so heavily beaten down – it implies many investors/traders in the stock would be stuck in desperate long positions

➡ Any increase in price in the stock will be treated as an opportunity to exit from the stuck long positions

➡ Given this, there is little chance that the stock price will increase in a hurry – especially in the near term

➡ Since the expectation is that the stock price won't increase, selling the Bajaj Auto's call option and collecting the premium can be perceived as a good trading opportunity

With these thoughts, the option writer decides to sell a call option. The most important point to note here is – the option seller is selling a call option because he believes that the price of Bajaj Auto will NOT increase in the near future. Therefore he believes that, selling the call option and collecting the premium is a good strategy.

As I mentioned in the previous chapter, selecting the right strike price is a very important aspect of options trading. We will talk about this in greater detail as we go forward in this module. For now, let us assume the option seller decides to sell Bajaj Auto's 2050 strike option and collect Rs.6.35/- as premiums. Please refer to the option chain below for the details –

Option Chain (Equity Derivatives)

Underlying Stock: **BAJAJ-AUTO 2026.90**

View Options Contracts for: Select Index ▼ OR Search for an underlying stock: GO Filter by: Expiry Date 26MAR2015 ▼ Futures contracts

CALLS												PUTS										
Chart	OI	Chng in OI	Volume	IV	LTP	Net Chng	Bid Qty	Bid Price	Ask Price	Ask Qty	Strike Price	Bid Qty	Bid Price	Ask Price	Ask Qty	Net Chng	LTP	IV	Volume	Chng in OI	OI	Chart
	-	-	-	-	-	-	1,500	413.10	439.70	1,500	1600.00	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	1,875	369.35	389.70	1,875	1650.00	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	1,875	319.35	339.70	1,875	1700.00	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	2,250	263.30	289.65	2,250	1750.00	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	2,250	219.55	239.70	2,250	1800.00	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	2,250	169.65	189.70	2,250	1850.00	-	-	-	-	-	-	-	-	-	-	
	125	-	-	-	-	-	125	123.70	199.90	250	1900.00	125	0.35	2.50	1,000	-4.50	0.50	43.28	1	-125	875	
	125	-	-	-	-	-	2,250	64.95	89.90	2,250	1950.00	625	1.05	2.25	125	0.85	1.85	36.71	66	5,500	10,875	
	7,625	125	11	35.22	37.35	-3.45	250	29.85	34.05	250	2000.00	875	3.95	5.60	125	-0.20	4.00	22.67	58	2,250	20,625	
	26,750	-7,750	196	25.01	6.35	-5.15	125	5.70	6.35	250	2050.00	1,625	24.65	28.25	250	-1.85	23.15	10.17	24	-875	6,375	
	59,125	-1,625	61	32.13	1.50	-1.55	125	1.25	1.95	375	2100.00	625	68.65	82.05	375	16.20	79.00	48.39	14	-1,125	9,500	
	33,125	-4,750	63	44.32	1.00	-0.10	500	0.80	1.65	375	2150.00	2,000	106.00	124.35	375	15.15	122.00	-	38	-3,500	15,000	
	69,625	1,000	42	54.20	0.65	-0.35	500	0.55	0.85	125	2200.00	2,250	160.50	172.50	125	16.25	172.00	-	4	-500	7,000	
	29,750	-500	11	72.14	1.10	0.05	625	0.40	1.05	1,000	2250.00	125	217.80	230.50	2,250	54.05	225.00	83.09	12	-1,125	1,125	
	30,500	-500	18	67.52	0.20	0.10	1,875	0.20	0.60	500	2300.00	1,875	259.50	279.40	2,000	82.25	269.40	-	3	-375	7,750	
	6,625	-	-	-	-	-	750	0.05	1.60	375	2350.00	-	-	-	-	-	-	-	-	-	500	
	11,625	-	-	-	-	-	125	0.05	1.00	500	2400.00	1,500	360.10	492.00	125	-	-	-	-	-	375	
	875	-	2	137.31	2.75	2.70	250	0.10	1.95	250	2450.00	500	419.15	428.00	1,500	12.05	426.90	149.90	20	-1,375	1,125	
	625	-	-	-	-	-	-	-	1.80	500	2500.00	250	467.30	482.65	1,125	3.55	469.00	-	1	-	375	
	125	-	-	-	-	-	-	-	0.75	125	2700.00	-	-	-	-	-	-	-	-	-	-	

Let us now run through the same exercise that we ran through in the previous chapter to understand the P&L profile of the call option seller and in the process make the required generalizations. The concept of an intrinsic value of the option that we discussed in the previous chapter will hold true for this chapter as well.

Serial No.	Possible values of spot	Premium Paid	Intrinsic Value (IV)	P&L (IV + Premium)
1	1990	+ 6.35	1990 – 2050 = 0	6.35 – 0 = + 6.35
2	2000	+ 6.35	2000 – 2050 = 0	6.35 – 0 = + 6.35
3	2010	+ 6.35	2010 – 2050 = 0	6.35 – 0 = + 6.35
4	2020	+ 6.35	2020 – 2050 = 0	6.35 – 0 = + 6.35
5	2030	+ 6.35	2030 – 2050 = 0	6.35 – 0 = + 6.35
6	2040	+ 6.35	2040 – 2050 = 0	6.35 – 0 = + 6.35
7	2050	+ 6.35	2050 – 2050 = 0	6.35 – 0 = + 6.35
8	2060	+ 6.35	2060 – 2050 = 10	6.35 – 10 = – 3.65
9	2070	+ 6.35	2070 – 2050 = 20	6.35 – 20 = – 13.65
10	2080	+ 6.35	2080 – 2050 = 30	6.35 – 30 = – 23.65
11	2090	+ 6.35	2090 – 2050 = 40	6.35 – 40 = – 33.65
12	2100	+ 6.35	2100 – 2050 = 50	6.35 – 50 = – 43.65

Before we proceed to discuss the table above, please note –

1. The positive sign in the 'premium received' column indicates a cash inflow (credit) to the option writer

2. **The intrinsic value of an option** (upon expiry) remains the same irrespective of call option buyer or seller

3. The net P&L calculation for an option writer changes slightly, the logic goes like this

a. When an option seller sells options he receives a premium (for example Rs.6.35/). He would experience a loss only after he losses the entire premium. Meaning after receiving a premium of Rs.6.35, if he loses Rs.5/- it implies he is still in profit of Rs.1.35/-. Hence for an option seller to experience a loss he has to first lose the premium he has received, any money he loses over and above the premium received, will be his real loss. Hence the P&L calculation would be 'Premium – Intrinsic Value'

b. You can extend the same argument to the option buyer. Since the option buyer pays a premium, he first needs to recover the premium he has paid, hence he would be profitable over and above the premium amount he has received, hence the P&L calculation would be ' Intrinsic Value – Premium'.

The table above should be familiar to you now. Let us inspect the table and make a few generalizations (do bear in mind the strike price is 2050) –

1. As long as Bajaj Auto stays at or below the strike price of 2050, the option seller gets to make money – as in he gets to pocket the entire premium of Rs.6.35/-. However, do note the profit remains constant at Rs.6.35/-**.**

a. **Generalization 1** – The call option writer experiences a maximum profit to the extent of the premium received as long as the spot price remains at or below the strike price (for a call option)

2. The option writer experiences an exponential loss as and when Bajaj Auto starts to move above the strike price of 2050

a. **Generalization 2** – The call option writer starts to lose money as and when the spot price moves over and above the strike price. Higher the spot price moves away from the strike price, larger the loss.

3. From the above 2 generalizations it is fair to conclude that, the option seller can earn limited profits and can experience unlimited loss

We can put these generalizations in a formula to estimate the P&L of a Call option seller –

P&L = Premium – Max [0, (Spot Price – Strike Price)]

Going by the above formula, let's evaluate the P&L for a few possible spot values on expiry –

1. 2023
2. 2072
3. 2055

The solution is as follows –

@2023

= 6.35 – Max [0, (2023 – 2050)]

= 6.35 – Max [0, -27]

= 6.35 – 0

= **6.35**

The answer is in line with Generalization 1 (profit restricted to the extent of premium received).

@2072

= 6.35 – Max [0, (2072 – 2050)]

= 6.35 – 22

= -15.56

The answer is in line with Generalization 2 (Call option writers would experience a loss as and when the spot price moves over and above the strike price)

@2055

= 6.35 – Max [0, (2055 – 2050)]

= 6.35 – Max [0, +5]

= 6.35 – 5

= 1.35

Though the spot price is higher than the strike, the call option writer still seems to be making some money here. This is against the 2nd generalization. I'm sure you would know this by now, this is because of the 'breakeven point' concept, which we discussed in the previous chapter.

Anyway let us inspect this a bit further and look at the P&L behavior in and around the strike price to see exactly at which point the option writer will start making a loss.

Serial No.	Possible values of spot	Premium Paid	Intrinsic Value (IV)	P&L (IV + Premium)
1	2050	+ 6.35	2050 – 2050 = 0	6.35 – 0 = 6.35
2	2051	+ 6.35	2051 – 2050 = 1	6.35 – 1 = 5.35
3	2052	+ 6.35	2052 – 2050 = 2	6.35 – 2 = 4.35
4	2053	+ 6.35	2053 – 2050 = 3	6.35 – 3 = 3.35
5	2054	+ 6.35	2054 – 2050 = 4	6.35 – 4 = 2.35
6	2055	+ 6.35	2055 – 2050 = 5	6.35 – 5 = 1.35
7	2056	+ 6.35	2056 – 2050 = 6	6.35 – 6 = 0.35
8	2057	+ 6.35	2057 – 2050 = 7	6.35 – 7 = – 0.65
9	2058	+ 6.35	2058 – 2050 = 8	6.35 – 8 = – 1.65
10	2059	+ 6.35	2059 – 2050 = 9	6.35 – 9 = – 2.65

Clearly even when the spot price moves higher than the strike, the option writer still makes money, he continues to make money till the spot price increases more than **strike + premium** received. At this point he starts to lose money, hence calling this the **'breakdown point**' seems appropriate.

Breakdown point for the call option seller = Strike Price + Premium Received

For the Bajaj Auto example,

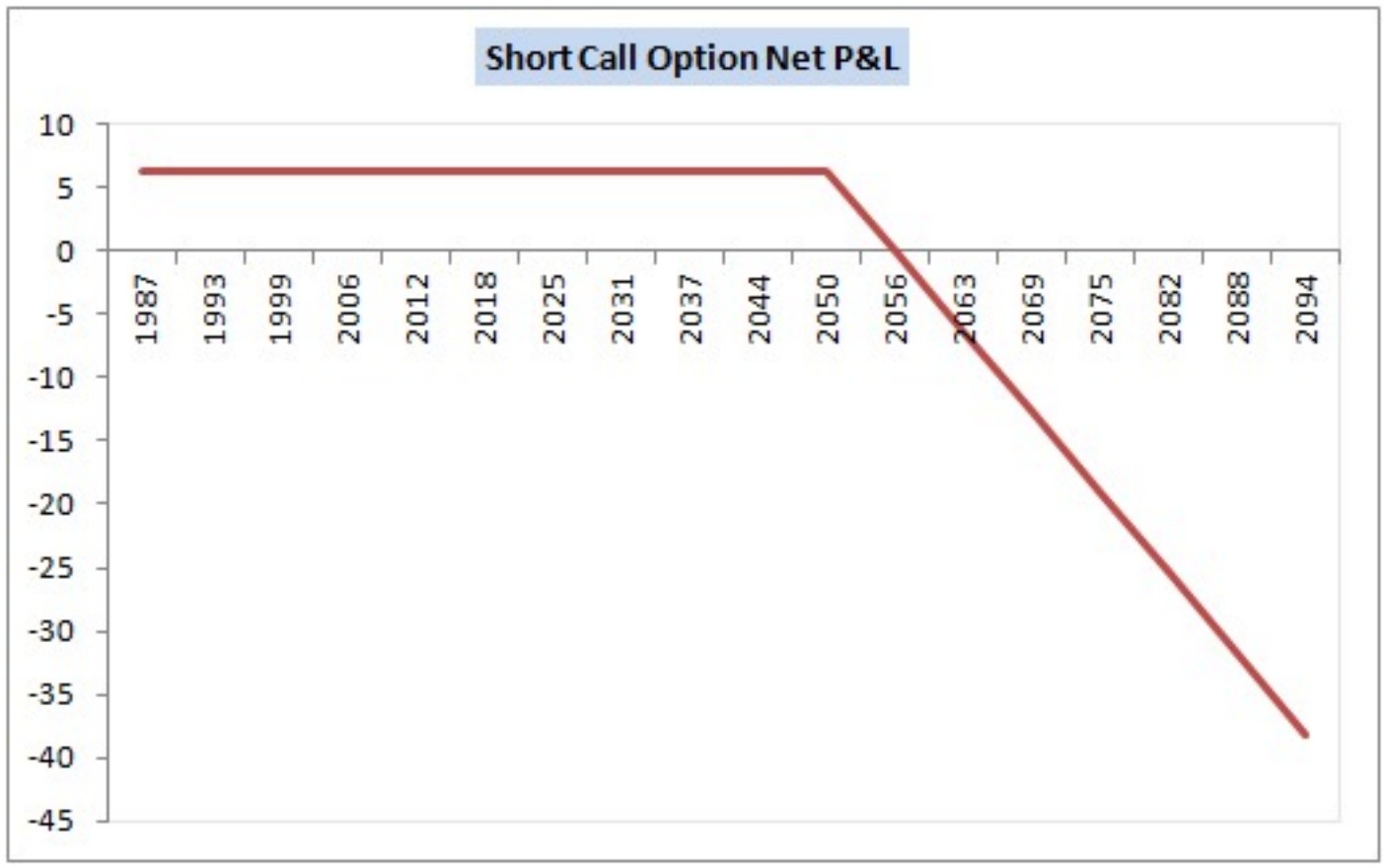
= 2050 + 6.35

= 2056.35

So, the breakeven point for a call option buyer becomes the breakdown point for the call option seller.

4.3 – Call Option seller pay-off

As we have seen throughout this chapter, there is a great symmetry between the call option buyer and the seller. In fact the same can be observed if we plot the P&L graph of an option seller. Here is the same –



The call option sellers P&L payoff looks like a mirror image of the call option buyer's P&L pay off. From the chart above you can notice the following points which are in line with the discussion we have just had –

1. The profit is restricted to Rs.6.35/- as long as the spot price is trading at any price below the strike of 2050

2. From 2050 to 2056.35 (breakdown price) we can see the profits getting minimized

3. At 2056.35 we can see that there is neither a profit nor a loss

4. Above 2056.35 the call option seller starts losing money. In fact the slope of the P&L line clearly indicates that the losses start to increase exponentially as and when the spot value moves away from the strike price

4.4 – A note on margins

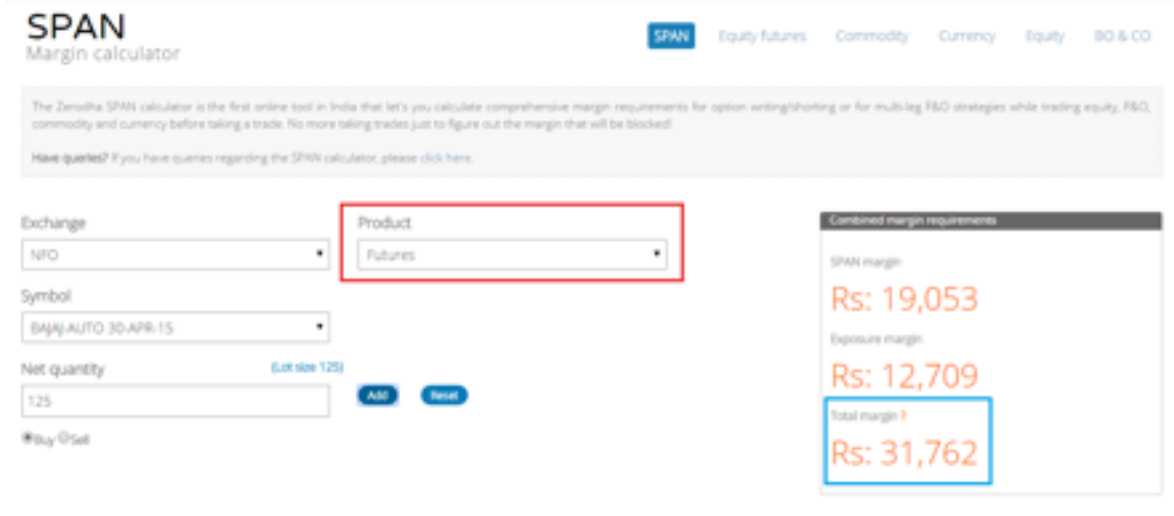
Think about the risk profile of both the call option buyer and a call option seller. The call option buyer bears no risk. He just has to pay the required premium amount to the call option seller, against which he would buy the right to buy the underlying at a later point. We know his risk (maximum loss) is restricted to the premium he has already paid.

However when you think about the risk profile of a call option seller, we know that he bears an unlimited risk. His potential loss can exponentially increase as and when the spot price moves

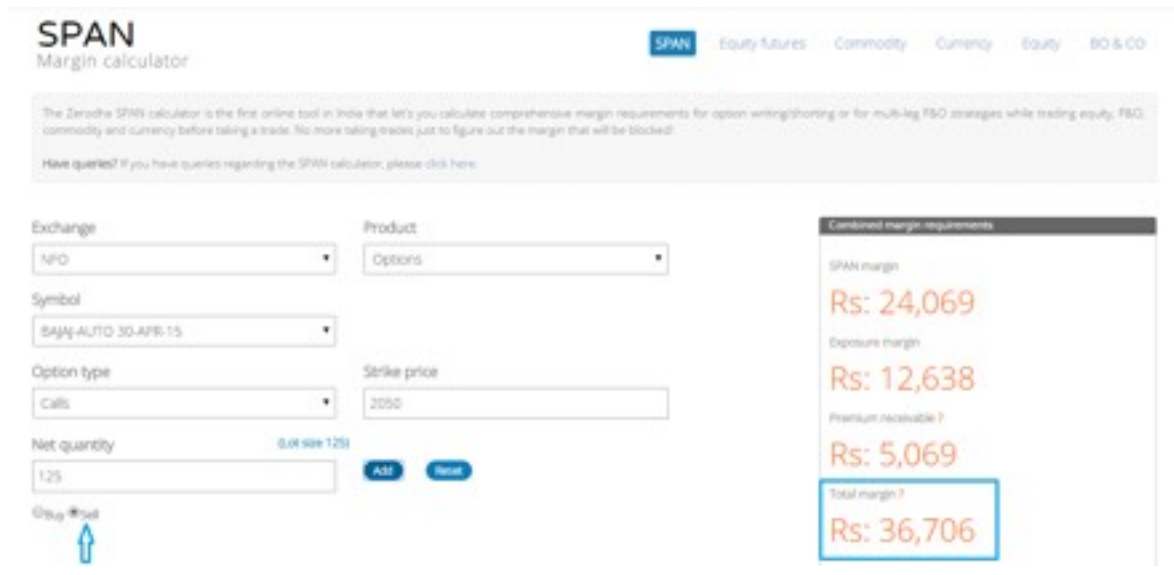
above the strike price. Having said this, think about the stock exchange – how can they manage the risk exposure of an option seller in the backdrop of an 'unlimited loss' potential? What if the loss becomes so huge that the option seller decides to default?

Clearly the stock exchange cannot afford to permit a derivative participant to carry such a huge default risk, hence it is mandatory for the option seller to park some money as margins. The margins charged for an option seller is similar to the margin requirement for a futures contract.

Here is the snapshot from the Zerodha Margin calculator for Bajaj Auto futures and Bajaj Auto 2050 Call option, both expiring on 30th April 2015.



And here is the margin requirement for selling 2050 call option.



As you can see the margin requirements are somewhat similar in both the cases (option writing and trading futures). Of course there is a small difference; we will deal with it at a later stage. For now, I just want you to note that option selling requires margins similar to futures trading, and the margin amount is roughly the same.

4.5 – Putting things together

I hope the last four chapters have given you all the clarity you need with respect to call options buying and selling. Unlike other topics in Finance, options are a little heavy duty. Hence I guess it makes sense to consolidate our learning at every opportunity and then proceed further. Here are the key things you should remember with respect to buying and selling call options.

With respect to option buying

➡ You buy a call option only when you are bullish about the underlying asset. Upon expiry the call option will be profitable only if the underlying has moved over and above the strike price

➡ Buying a call option is also referred to as 'Long on a Call Option' or simply **'Long Call'**

➡ To buy a call option you need to pay a premium to the option writer

➡ The call option buyer has limited risk (to the extent of the premium paid) and an potential to make an unlimited profit

➡ The breakeven point is the point at which the call option buyer neither makes money nor experiences a loss

➡ P&L = Max [0, (Spot Price – Strike Price)] – Premium Paid

➡ Breakeven point = Strike Price + Premium Paid

With respect to option selling

➡ You sell a call option (also called option writing) only when you believe that upon expiry, the underlying asset will not increase beyond the strike price

➡ Selling a call option is also called 'Shorting a call option' or simply **'Short Call'**

➡ When you sell a call option you receive the premium amount

➡ The profit of an option seller is restricted to the premium he receives, however his loss is potentially unlimited

➡ The breakdown point is the point at which the call option seller gives up all the premium he has made, which means he is neither making money nor is losing money

➡ Since short option position carries unlimited risk, he is required to deposit margin

➡ Margins in case of short options is similar to futures margin

➡ P&L = Premium – Max [0, (Spot Price – Strike Price)]

➡ Breakdown point = Strike Price + Premium Paid

Other important points

➡ When you are bullish on a stock you can either buy the stock in spot, buy its futures, or buy a call option

➡ When you are bearish on a stock you can either sell the stock in the spot (although on a intraday basis), short futures, or short a call option

➡ The calculation of the intrinsic value for call option is standard, it does not change based on whether you are an option buyer/ seller

➡ However the intrinsic value calculation changes for a 'Put' option

➡ The net P&L calculation methodology is different for the call option buyer and seller.

➡ Throughout the last 4 chapters we have looked at the P&L keeping the expiry in perspective, this is only to help you understand the P&L behavior better

➡ One need not wait for the option expiry to figure out if he is going to be profitable or not

➡ Most of the option trading is based on the change in premiums

➡ For example, if I have bought Bajaj Auto 2050 call option at Rs.6.35 in the morning and by noon the same is trading at Rs.9/- I can choose to sell and book profits

➡ The premiums change dynamically all the time, it changes because of many variables at play, we will understand all of them as we proceed through this module

➡ Call option is abbreviated as 'CE'. So Bajaj Auto 2050 Call option is also referred to as Bajaj Auto 2050CE. CE is an abbreviation for 'European Call Option'.

4.6 – European versus American Options

Initially when option was introduced in India, there are two types of options available – European and American Options. All index options (Nifty, Bank Nifty options) were European in nature and the stock options were American in nature. The difference between the two was mainly in terms of 'Options exercise'.

European Options – If the option type is European then it means that the option buyer will have to mandatory wait till the expiry date to exercise his right. **The settlement is based on the value of spot market on expiry day**. For example if he has bought a Bajaj Auto 2050 Call option, then for the buyer to be profitable Bajaj Auto has to go higher than the breakeven point on the day of the expiry. Even not it the option is worthless to the buyer and he will lose all the premium money that he paid to the Option seller.

American Options – In an American Option, the option buyer can exercise his right to buy the option whenever he deems appropriate during the tenure of the options expiry. **The settlement is dependent of the spot market at that given moment and not really depended on expiry.** For instance he buys Bajaj Auto 2050 Call option today when Bajaj is trading at 2030 in spot market and there are 20 more days for expiry. The next day Bajaj Auto crosses 2050. In such a case, the buyer of Baja Auto 2050 American Call option can exercise his right, which means the seller is obligated to settle with the option buyer. The expiry date has little significance here.

For people familiar with option you may have this question – 'Since we can anyway buy an option now and sell it later, maybe in 30 minutes after we purchase, how does it matter if the option is American or European?'.

Valid question, well think about the Ajay-Venu example again. Here Ajay and Venu were to revisit the agreement in 6 months time (this is like a European Option). If instead of 6 months, imagine if Ajay had insisted that he could come anytime during the tenure of the agreement and claim his right (like an American Option). For example there could be a strong rumor about the highway project (after they signed off the agreement). In the back of the strong rumor, the land prices shoots up and hence Ajay decides exercise his right, clearly Venu will be obligated to deliver the land to Ajay (even though he is very clear that the land price has gone up because of strong rumors). Now because Venu carries addition risk of getting 'exercised' on any day as opposed to the day of the expiry, the premium he would need is also higher (so that he is compensated for the risk he takes).

For this reason, American options are always more expensive than European Options.

Also, you maybe interested to know that about 3 years ago NSE decided to get rid of American option completely from the derivatives segment. **So all options in India are now European in nature,** which means the buyer can exercise his option based on the spot price on the expiry day.

We will now proceed to understand the 'Put Options'.

Key takeaways from this chapter

1. You sell a call option when you are bearish on a stock
2. The call option buyer and the seller have a symmetrically opposite P&L behavior
3. When you sell a call option you receive a premium
4. Selling a call option requires you to deposit a margin
5. When you sell a call option your profit is limited to the extent of the premium you receive and your loss can potentially be unlimited
6. P&L = Premium – Max [0, (Spot Price – Strike Price)]
7. Breakdown point = Strike Price + Premium Paid
8. In India all options are European in nature

CHAPTER 5

The Put Option Buying

5.1 – Getting the orientation right

I hope by now you are through with the practicalities of a Call option from both the buyers and sellers perspective. If you are indeed familiar with the call option then orienting yourself to understand 'Put Options' is fairly easy. The only change in a put option (from the buyer's perspective) is the view on markets should be bearish as opposed to the bullish view of a call option buyer.

The put option buyer is betting on the fact that the stock price will go down (by the time expiry approaches). Hence in order to profit from this view he enters into a Put Option agreement. In a put option agreement, the buyer of the put option can buy the right to sell a stock at a price (strike price) irrespective of where the underlying/stock is trading at.

Remember this generality – whatever the buyer of the option anticipates, the seller anticipates the exact opposite, therefore a market exists. After all, if everyone expects the same a market can never exist. So if the Put option buyer expects the market to go down by expiry, then the put option seller would expect the market (or the stock) to go up or stay flat.

A put option buyer **buys the right to sell** the underlying to the put option writer at a predetermined rate (Strike price. This means the put option seller, upon expiry will have to buy if the 'put option buyer' is selling him. Pay attention here – at the time of the agreement the put option seller is selling a right to the put option buyer where in the buyer can 'sell' the underlying to the 'put option seller' at the time of expiry.

Confusing? well, just think of the 'Put Option' as a simple contract where two parties meet today and agree to enter into a transaction based on the price of an underlying –

- ➡ The party agreeing to pay a premium is called the 'contract buyer' and the party receiving the premium is called the 'contract seller'
- ➡ The contract buyer pays a premium and buys himself a **right**
- ➡ The contract seller receives the premium and **obligates** himself
- ➡ The contract buyer will decide whether or not to exercise his right on the expiry day

➡ If the contract buyer decides to exercise his right then he gets to sell the underlying (maybe a stock) at the agreed price (strike price) and the contract seller will be obligated to buy this underlying from the contract buyer

➡ Obviously the contract buyer will exercise his right only if the underlying price is trading below the strike price – this means by virtue of the contract the buyer holds, he can sell the underlying at a much higher price to the contract seller when the same underlying is trading at a lower price in the open market.

Still confusing? Fear not, we will deal with an example to understand this more clearly.

Consider this situation, between the **Contract buyer** and the **Contract Seller**

➡ Assume Reliance Industries is trading at Rs.850/-

➡ Contract buyer buys the right to sell Reliance to contract seller at Rs.850/- upon expiry

➡ To obtain this right, contract buyer has to pay a premium to the contract seller

➡ Against the receipt of the premium contract seller will agree to buy Reliance Industries shares at Rs.850/- upon expiry but only if contract buyer wants him to buy it from him

➡ For example if upon expiry Reliance is at Rs.820/- then contract buyer can demand contract seller to buy Reliance at Rs.850/- from him

➡ This means contract buyer can enjoy the benefit of selling Reliance at Rs.850/- when it is trading at a lower price in the open market (Rs.820/-)

➡ If Reliance is trading at Rs.850/- or higher upon expiry (say Rs.870/-) it does not make sense for contract buyer to exercise his right and ask contract seller to buy the shares from him at Rs.850/-. This is quite obvious since he can sell it at a higher rate in the open market

➡ A agreement of this sort where one obtains the right to sell the underlying asset upon expiry is called a 'Put option'

➡ Contract seller will be obligated to buy Reliance at Rs.850/- from contract buyer because he has sold Reliance 850 Put Option to contract buyer

I hope the above discussion has given you the required orientation to the Put Options. If you are still confused, it is alright as I'm certain you will develop more clarity as we proceed further. However there are 3 key points you need to be aware of at this stage –

➡ The buyer of the put option is bearish about the underlying asset, while the seller of the put option is neutral or bullish on the same underlying

➡ The buyer of the put option has the right to sell the underlying asset upon expiry at the strike price

➡ The seller of the put option is obligated (since he receives an upfront premium) to buy the underlying asset at the strike price from the put option buyer if the buyer wishes to exercise his right.

5.2 – Building a case for a Put Option buyer

Like we did with the call option, let us build a practical case to understand the put option better. We will first deal with the Put Option from the buyer's perspective and then proceed to understand the put option from the seller's perspective.

Here is the end of day chart of Bank Nifty (as on 8th April 2015) –

Here are some of my thoughts with respect to Bank Nifty –

1. Bank Nifty is trading at 18417

2. 2 days ago Bank Nifty tested its resistance level of 18550 (resistance level highlighted by a green horizontal line)

3. I consider 18550 as resistance since there is a price action zone at this level which is well spaced in time (for people who are not familiar with the concept of resistance I would suggest you read about it **here**

4. I have highlighted the price action zone in a blue rectangular boxes

5. On 7th of April (yesterday) RBI maintained a status quo on the monetary rates – they kept the key central bank rates unchanged (as you may know RBI monetary policy is the most important event for Bank Nifty)

6. Hence in the backdrop of a technical resistance and lack of any key fundamental trigger, banks may not be the flavor of the season in the markets

7. As result of which traders may want to sell banks and buy something else which is the flavor of the season

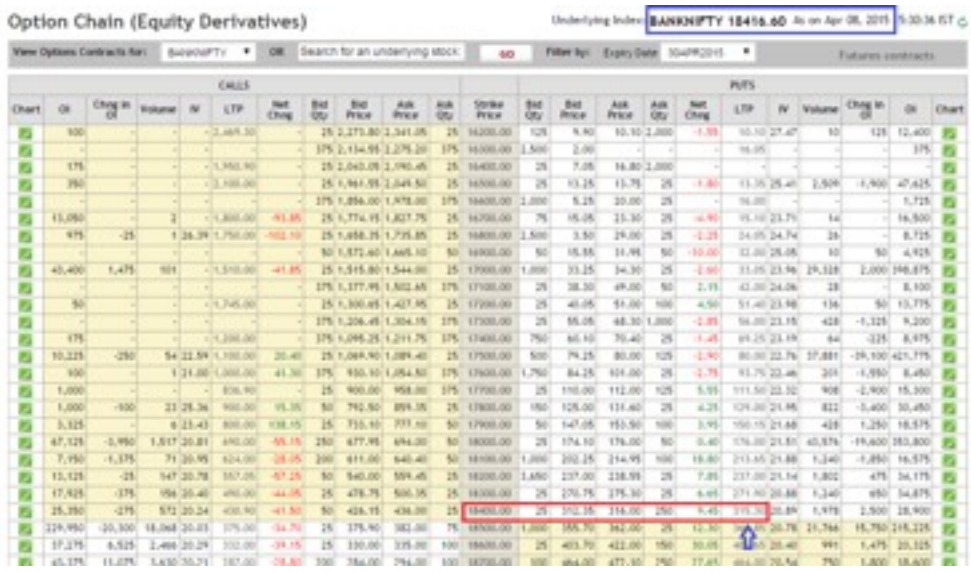
8. For these reasons I have a bearish bias towards Bank Nifty

9. However shorting futures maybe a bit risky as the overall market is bullish, it is only the banking sector which is lacking luster

10. Under circumstances such as these employing an option is best, hence buying a Put Option on the bank Nifty may make sense

11. Remember when you buy a put option you benefit when the underlying goes down

Backed by this reasoning, I would prefer to buy the 18400 Put Option which is trading at a premium of Rs.315/-. Remember to buy this 18400 Put option, I will have to pay the required premium (Rs.315/- in this case) and the same will be received by the 18400 Put option seller.



Of course buying the Put option is quite simple – the easiest way is to call your broker and ask him to buy the Put option of a specific stock and strike and it will be done for you in matter of a few seconds. Alternatively you can buy it yourself through a trading terminal such as Zerodha Pi We will get into the technicalities of buying and selling options via a trading terminal at a later stage.

Now assuming I have bought Bank Nifty's 18400 Put Option, it would be interesting to observe the P&L behavior of the Put Option upon its expiry. In the process we can even make a few generalizations about the behavior of a Put option's P&L.

5.3 – Intrinsic Value (IV) of a Put Option

Before we proceed to generalize the behavior of the Put Option P&L, we need to understand the calculation of the intrinsic value of a Put option. We discussed the concept of intrinsic value in the previous chapter; hence I will assume you know the concept behind IV. Intrinsic Value represents the value of money the buyer will receive if he were to exercise the option upon expiry.

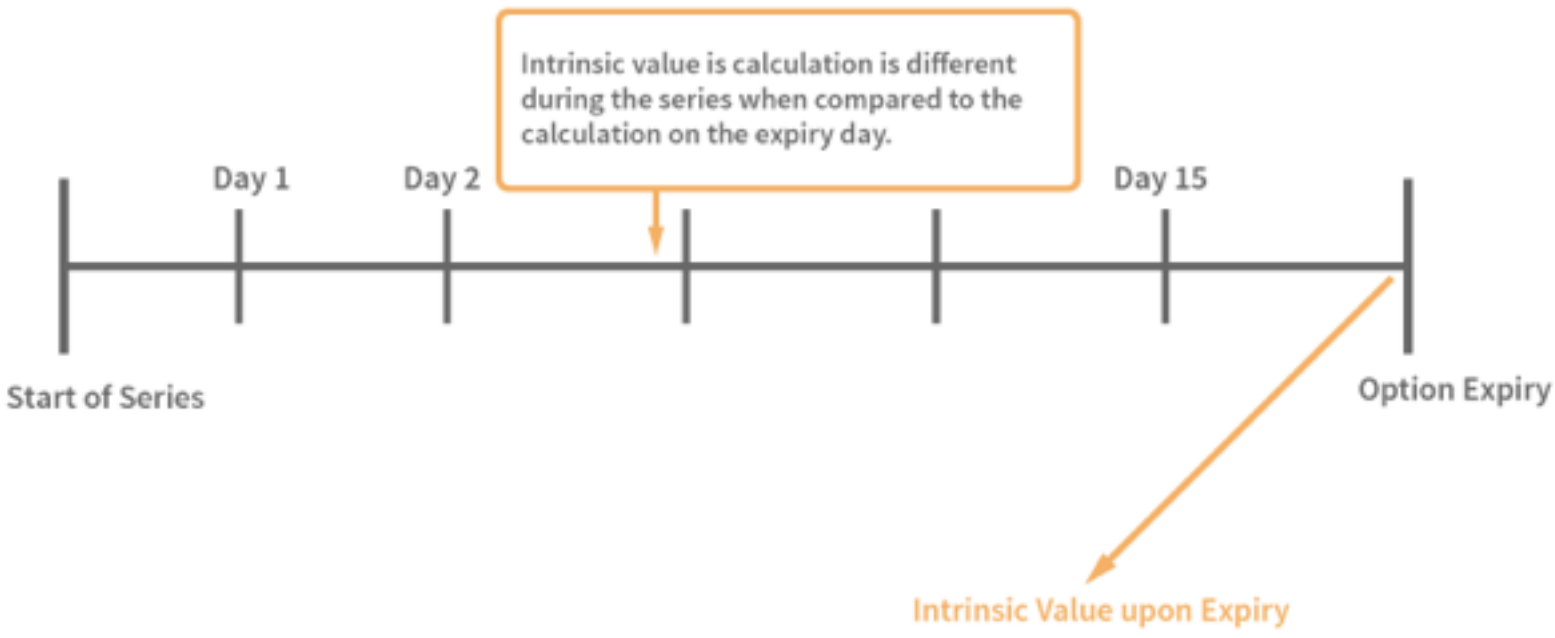
The calculation for the intrinsic value of a Put option is slightly different from that of a call option. To help you appreciate the difference let me post here the intrinsic value formula for a Call option

IV (Call option) = Spot Price – Strike Price

The intrinsic value of a Put option is –

IV (Put Option) = Strike Price – Spot Price

I want you to remember an important aspect here with respect to the intrinsic value of an option – consider the following timeline –



The formula to calculate the intrinsic value of an option that we have just looked at, is applicable **only on the day of the expiry**. However the calculation of intrinsic value of an option is different **during the series**. Of course we will understand how to calculate (and the need to calculate) the intrinsic value of an option during the expiry. But for now, we only need to know the calculation of the intrinsic value upon expiry.

5.4 – P&L behavior of the Put Option buyer

Keeping the concept of intrinsic value of a put option at the back of our mind, let us work towards building a table which would help us identify how much money, I as the buyer of Bank Nifty's 18400 put option would make under the various possible spot value changes of Bank Nifty (in spot market) on expiry. Do remember the premium paid for this option is Rs 315/–. Irrespective of how the spot value changes, the fact that I have paid Rs.315/- will remain unchanged. This is the cost that I have incurred in order to buy the Bank Nifty 18400 Put Option. Let us keep this in perspective and work out the P&L table –

Please note – the negative sign before the premium paid represents a cash outflow from my trading account.

Serial No.	Possible values of spot	Premium Paid	Intrinsic Value (IV)	P&L (IV + Premium)
1	16195	-315	18400 – 16195 = 2205	2205 + (-315) = + 1890
2	16510	-315	18400 – 16510 = 1890	1890 + (-315)= + 1575
3	16825	-315	18400 – 16825 = 1575	1575 + (-315) = + 1260
4	17140	-315	18400 – 17140 = 1260	1260 + (-315) = + 945
5	17455	-315	18400 – 17455 = 945	945 + (-315) = + 630
6	17770	-315	18400 – 17770 = 630	630 + (-315) = + 315
7	18085	-315	18400 – 18085 = 315	315 + (-315) = 0
8	18400	-315	18400 – 18400 = 0	0 + (-315)= – 315
9	18715	-315	18400 – 18715 = 0	0 + (-315) = -315
10	19030	-315	18400 – 19030 = 0	0 + (-315) = -315
11	19345	-315	18400 – 19345 = 0	0 + (-315) = -315
12	19660	-315	18400 – 19660 = 0	0 + (-315) = -315

Let us make some observations on the behavior of the P&L (and also make a few P&L generalizations). For the above discussion, set your eyes at row number 8 as your reference point –

1. The objective behind buying a put option is to benefit from a falling price. As we can see, the profit increases as and when the price decreases in the spot market (with reference to the strike price of 18400).

    a. **Generalization 1** – Buyers of Put Options are profitable as and when the spot price goes below the strike price. In other words buy a put option only when you are bearish about the underlying

2. As the spot price goes above the strike price (18400) the position starts to make a loss. However the loss is restricted to the extent of the premium paid, which in this case is Rs.315/-

    a. Generalization 2 – A put option buyer experiences a loss when the spot price goes higher than the strike price. However the maximum loss is **restricted** to the extent of the premium the put option buyer has paid.

Here is a general formula using which you can calculate the P&L from a Put Option position. Do bear in mind this formula is applicable on positions held till expiry.

P&L = [Max (0, Strike Price – Spot Price)] – Premium Paid

Let us pick 2 random values and evaluate if the formula works –

1. 16510

2. 19660

@16510 (spot below strike, position has to be profitable)

= Max (0, 18400 -16510)] – 315

= 1890 – 315

= + 1575

@19660 (spot above strike, position has to be loss making, restricted to premium paid)

= Max (0, 18400 – 19660) – 315

= Max (0, -1260) – 315

= – 315

Clearly both the results match the expected outcome.

Further, we need to understand the breakeven point calculation for a Put Option buyer. Note, I will take the liberty of skipping the explanation of a breakeven point as we have already dealt with it in the previous chapter; hence I will give you the formula to calculate the same –

Breakeven point = Strike Price – Premium Paid

For the Bank Nifty breakeven point would be

= 18400 – 315

= 18085

So as per this definition of the breakeven point, at 18085 the put option should neither make any money nor lose any money. To validate this let us apply the P&L formula –

= Max (0, 18400 – 18085) – 315

= Max (0, 315) – 315

= 315 – 315

=0

The result obtained in clearly in line with the expectation of the breakeven point.

Important note – The calculation of the intrinsic value, P&L, and Breakeven point are all with respect to the expiry. So far in this module, we have assumed that you as an option buyer or seller would set up the option trade with an intention to hold the same till expiry.

But soon you will realize that that more often than not, you will initiate an options trade only to close it much earlier than expiry. Under such a situation the calculations of breakeven point may not matter much, however the calculation of the P&L and intrinsic value does matter and there is a different formula to do the same.

To put this more clearly let me assume two situations on the Bank Nifty Trade, we know the trade has been initiated on 7th April 2015 and the expiry is on 30th April 2015–

1. What would be the P&L assuming spot is at 17000 on 30th April 2015?
2. What would be the P&L assuming spot is at 17000 on 15th April 2015 (or for that matter any other date apart from the expiry date)

Answer to the first question is fairly simple, we can straight way apply the P&L formula –

= Max (0, 18400 – 17000) – 315

= Max (0, 1400) – 315

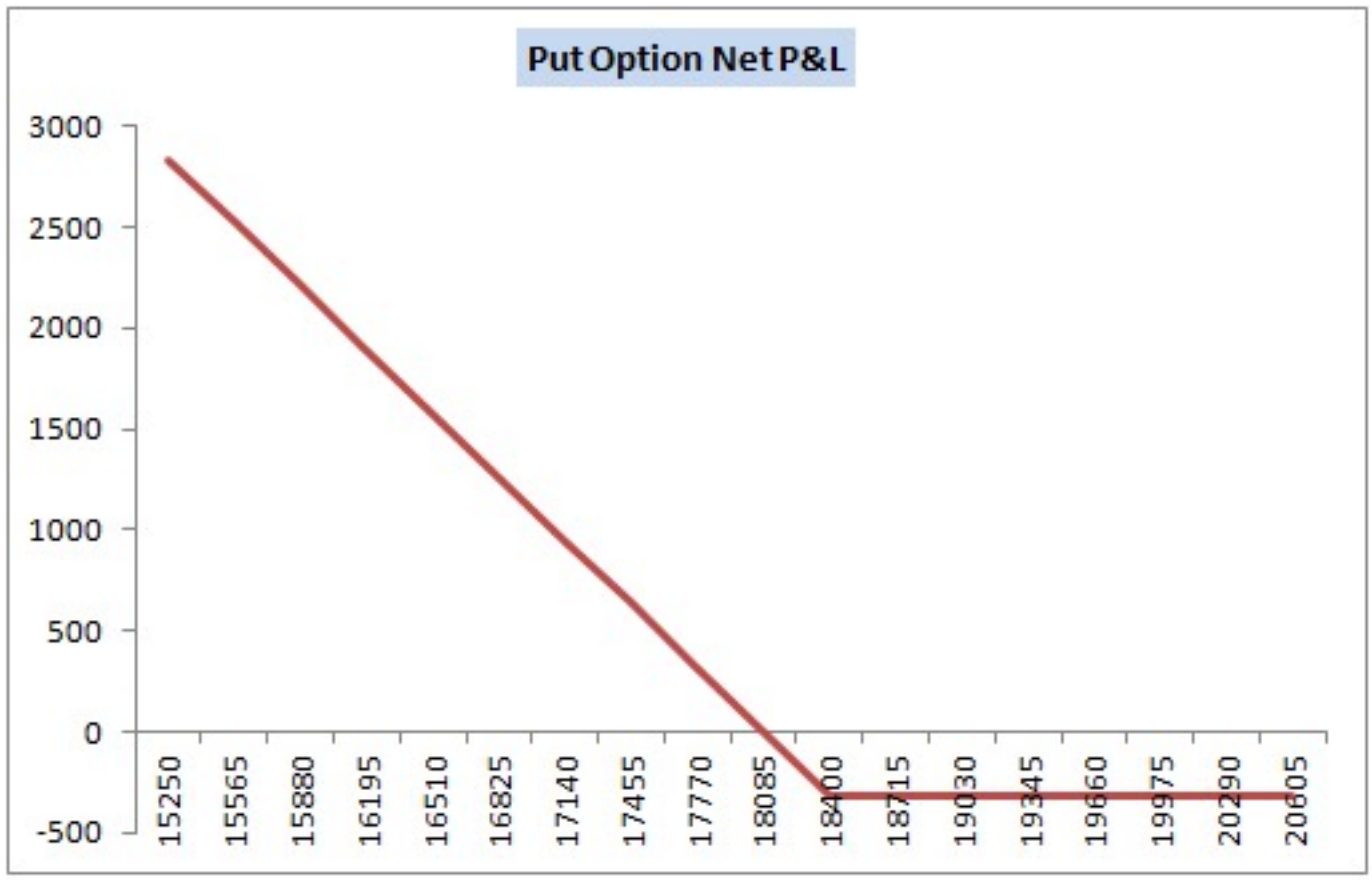
= 1400 – 315

= 1085

Going on to the 2nd question, if the spot is at 17000 on any other date apart from the expiry date, the P&L is **not** going to be 1085, it will be **higher**. We will discuss why this will be higher at an appropriate stage, but for now just keep this point in the back of your mind.

5.5 – Put option buyer's P&L payoff

If we connect the P&L points of the Put Option and develop a line chart, we should be able to observe the generalizations we have made on the Put option buyers P&L. Please find below the same –



Here are a few things that you should appreciate from the chart above, remember 18400 is the strike price –

1. The Put option buyer experienced a loss only when the spot price goes above the strike price (18400 and above)

2. However this loss is limited to the extent of the premium paid

3. The Put Option buyer will experience an exponential gain as and when the spot price trades below the strike price

4. The gains can be potentially unlimited

5. At the breakeven point (18085) the put option buyer neither makes money nor losses money. You can observe that at the breakeven point, the P&L graph just recovers from a loss making situation to a neutral situation. It is only above this point the put option buyer would start to make money**.**

Key takeaways from this chapter

1. Buy a Put Option when you are bearish about the prospects of the underlying. In other words a Put option buyer is profitable only when the underlying declines in value

2. The intrinsic value calculation of a Put option is slightly different when compared to the intrinsic value calculation of a call option

3. IV (Put Option) = Strike Price – Spot Price

4. The P&L of a Put Option buyer can be calculated as **P&L = [Max (0, Strike Price – Spot Price)] – Premium Paid**

5. The breakeven point for the put option buyer is calculated as **Strike – Premium Paid**

CHAPTER 6

The Put Option selling

6.1 – Building the case

Previously we understood that, an option seller and the buyer are like two sides of the same coin. They have a diametrically opposite view on markets. Going by this, if the Put option buyer is bearish about the market, then clearly the put option seller must have a bullish view on the markets. Recollect we looked at the Bank Nifty's chart in the previous chapter; we will review the same chart again, but from the perspective of a put option seller.

The typical thought process for the Put Option Seller would be something like this –

1. Bank Nifty is trading at 18417

2. 2 days ago Bank Nifty tested its resistance level at 18550 (resistance level is highlighted by a green horizontal line)

3. 18550 is considered as resistance as there is a price action zone at this level which is well spaced in time (for people who are not familiar with the concept of resistance I would suggest you read about it **here**)

4. I have highlighted the price action zone in a blue rectangular boxes

5. Bank Nifty has attempted to crack the resistance level for the last 3 consecutive times

6. All it needs is 1 good push (maybe a large sized bank announcing decent results – HDFC, ICICI, and SBI are expected to declare results soon)

7. A positive cue plus a move above the resistance will set Bank Nifty on the upward trajectory

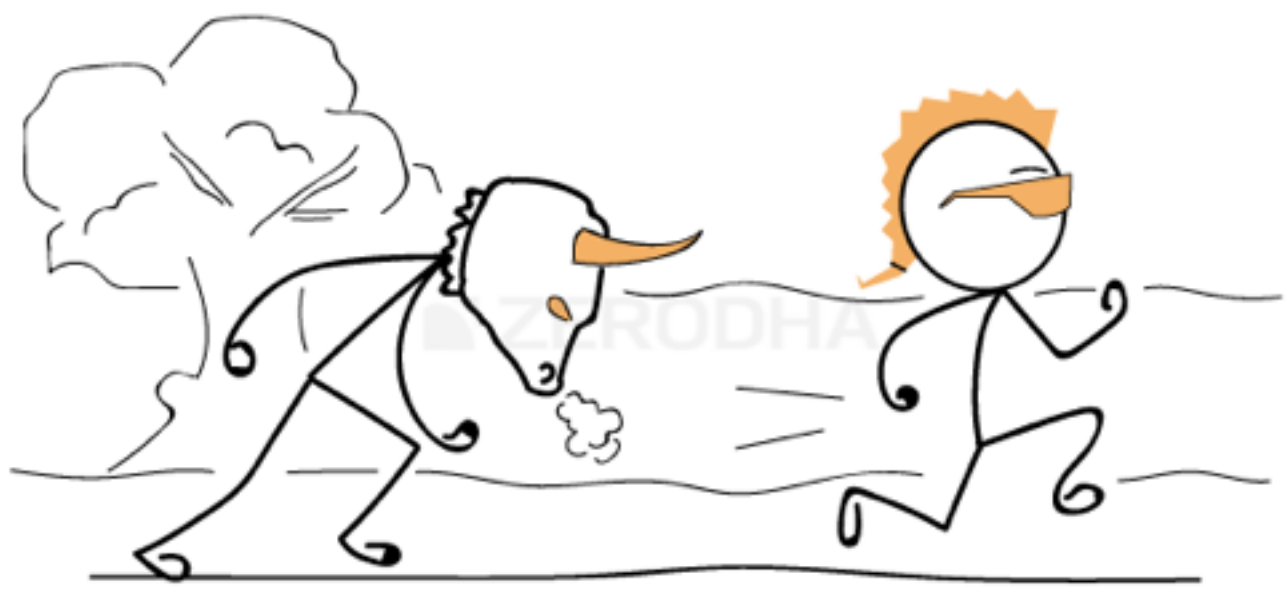
8. Hence writing the Put Option and collecting the premiums may sound like a good idea

You may have a question at this stage – If the outlook is bullish, why write (sell) a put option and why not just buy a call option?

Well, the decision to either buy a call option or sell a put option really depends on how attractive the premiums are. At the time of taking the decision, if the call option has a low premium then buying a call option makes sense, likewise if the put option is trading at a very high premium then selling the put option (and therefore collecting the premium) makes sense. Of course to figure out what exactly to do (buying a call option or selling a put option) depends on the attractiveness of the premium, and to judge how attractive the premium is you need some background knowledge on 'option pricing'. Of course, going forward in this module we will understand option pricing.

So, with these thoughts assume the trader decides to write (sell) the 18400 Put option and collect Rs.315 as the premium. As usual let us observe the P&L behavior for a Put Option seller and make a few generalizations.

Do Note – when you write options (regardless of Calls or Puts) margins are blocked in your account. We have discussed this perspective here, request you to go through the same.



6.2 – P&L behavior for the put option seller

Please do remember the calculation of the intrinsic value of the option remains the same for both writing a put option as well as buying a put option. However the P&L calculation changes, which we will discuss shortly. We will assume various possible scenarios on the expiry date and figure out how the P&L behaves.

Serial No.	Possible values of spot	Premium Recieved	Intrinsic Value (IV)	P&L (IV + Premium)
1	16195	+ 315	18400 – 16195 = 2205	315 – 2205 = – 1890
2	16510	+ 315	18400 – 16510 = 1890	315 – 1890 = – 1575
3	16825	+ 315	18400 – 16825 = 1575	315 – 1575 = – 1260
4	17140	+ 315	18400 – 17140 = 1260	315 – 1260 = – 945
5	17455	+ 315	18400 – 17455 = 945	315 – 945 = – 630
6	17770	+ 315	18400 – 17770 = 630	315 – 630 = – 315
7	18085	+ 315	18400 – 18085 = 315	315 – 315 = 0
8	18400	+ 315	18400 – 18400 = 0	315 – 0 = + 315
9	18715	+ 315	18400 – 18715 = 0	315 – 0 = + 315
10	19030	+ 315	18400 – 19030 = 0	315 – 0 = + 315
11	19345	+ 315	18400 – 19345 = 0	315 – 0 = + 315
12	19660	+ 315	18400 – 19660 = 0	315 – 0 = + 315

I would assume by now you will be in a position to easily generalize the P&L behavior upon expiry, especially considering the fact that we have done the same for the last 3 chapters. The generalizations are as below (make sure you set your eyes on row 8 as it's the strike price for this trade)

1. The objective behind selling a put option is to collect the premiums and benefit from the bullish outlook on market. Therefore as we can see, the profit stays flat at Rs.315 (premium collected) as long as the spot price stays above the strike price.

a. **Generalization 1** – Sellers of the Put Options are profitable as long as long as the spot price remains at or higher than the strike price. In other words sell a put option only when you are bullish about the underlying or when you believe that the underlying will no longer continue to fall.

2. As the spot price goes below the strike price (18400) the position starts to make a loss. Clearly there is no cap on how much loss the seller can experience here and it can be theoretically be unlimited

    a. **Generalization 2** – A put option seller can potentially experience an unlimited loss as and when the spot price goes lower than the strike price.

Here is a general formula using which you can calculate the P&L from writing a Put Option position. Do bear in mind this formula is applicable on positions held till expiry.

P&L = Premium Received – [Max (0, Strike Price – Spot Price)]

Let us pick 2 random values and evaluate if the formula works –

1. 16510
2. 19660

@16510 (spot below strike, position has to be loss making)

= 315 – Max (0, 18400 -16510)

= 315 – 1890

= – 1575

@19660 (spot above strike, position has to be profitable, restricted to premium paid)

= 315 – Max (0, 18400 – 19660)

= 315 – Max (0, -1260)

Clearly both the results match the expected outcome.

Further, the breakdown point for a Put Option seller can be defined as a point where the Put Option seller starts making a loss after giving away all the premium he has collected –

Breakdown point = Strike Price – Premium Received

For the Bank Nifty, the breakdown point would be

= 18400 – 315

= 18085

So as per this definition of the breakdown point, at 18085 the put option seller should neither make any money nor lose any money. Do note this also means at this stage, he would lose the en-

tire Premium he has collected. To validate this, let us apply the P&L formula and calculate the P&L at the breakdown point –

= 315 – Max (0, 18400 – 18085)

= 315 – Max (0, 315)

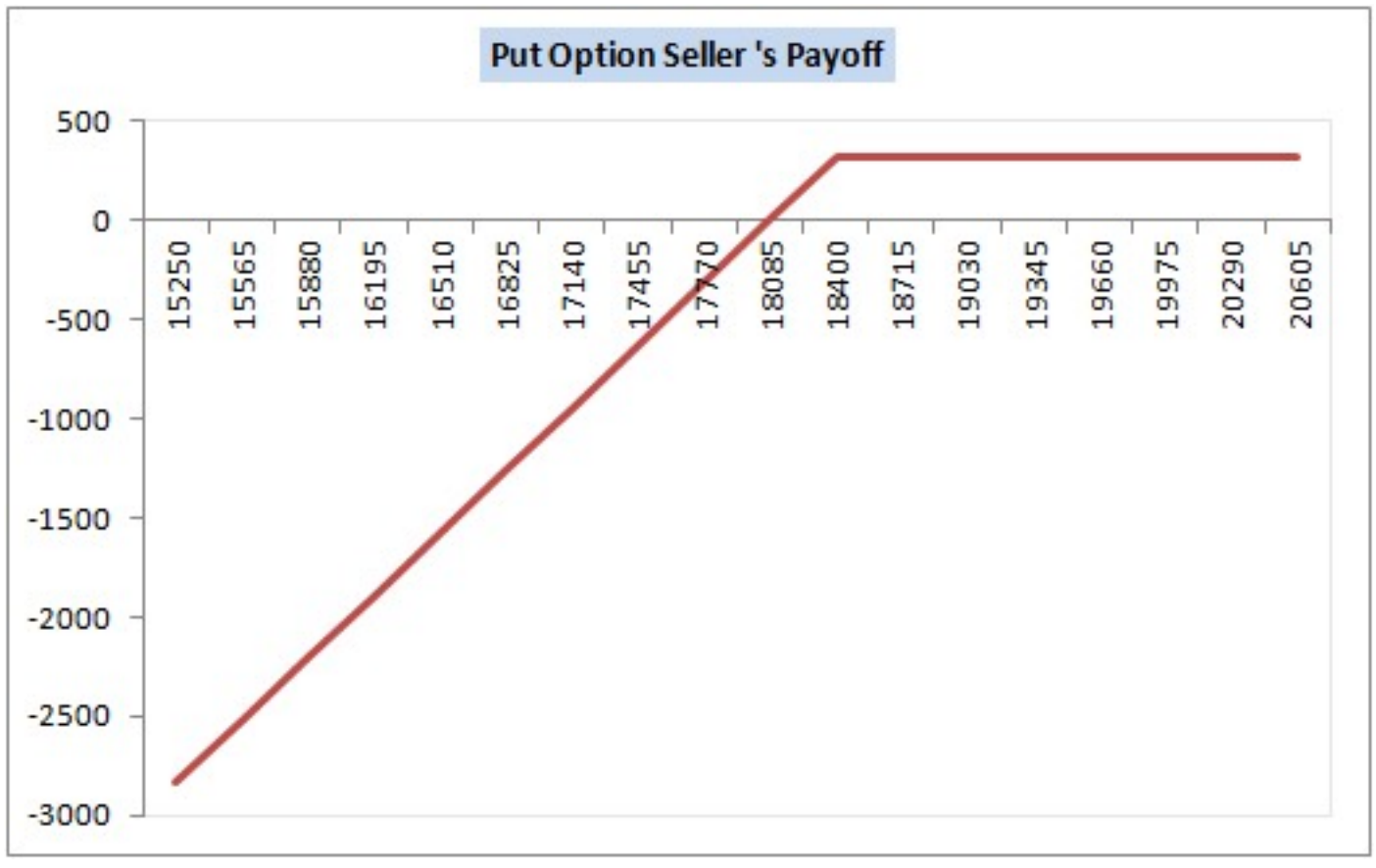
= 315 – 315

=0

The result obtained in clearly in line with the expectation of the breakdown point.

6.3 – Put option seller's Payoff

If we connect the P&L points (as seen in the table earlier) and develop a line chart, we should be able to observe the generalizations we have made on the Put option seller's P&L. Please find below the same –



Here are a few things that you should appreciate from the chart above, remember 18400 is the strike price –

1. The Put option seller experiences a loss only when the spot price goes below the strike price (18400 and lower**)**

2. The loss is theoretically unlimited (therefore the risk)

3. The Put Option seller will experience a profit (to the extent of premium received) as and when the spot price trades above the strike price

4. The gains are restricted to the extent of premium received

5. At the breakdown point (18085) the put option seller neither makes money nor losses money. However at this stage he gives up the entire premium he has received.

6. You can observe that at the breakdown point, the P&L graph just starts to buckle down – from a positive territory to the neutral (no profit no loss) situation. It is only below this point the put option seller starts to lose money.

And with these points, hopefully you should have got the essence of Put Option selling. Over the last few chapters we have looked at both the call option and the put option from both the buyer and sellers perspective. In the next chapter we will quickly summarize the same and shift gear towards other essential concepts of Options.

Key takeaways from this chapter

1. You sell a Put option when you are bullish on a stock or when you believe the stock price will no longer go down

2. When you are bullish on the underlying you can either buy the call option or sell a put option. The decision depends on how attractive the premium is

3. Option Premium pricing along with Option Greeks gives a sense of how attractive the premiums are

4. The put option buyer and the seller have a symmetrically opposite P&L behavior

5. When you sell a put option you receive premium

6. Selling a put option requires you to deposit margin

7. When you sell a put option your profit is limited to the extent of the premium you receive and your loss can potentially be unlimited

8. P&L = Premium received – Max [0, (Strike Price – Spot Price)]

9. Breakdown point = Strike Price – Premium Paid

CHAPTER 7

Summarizing Call & Put Options

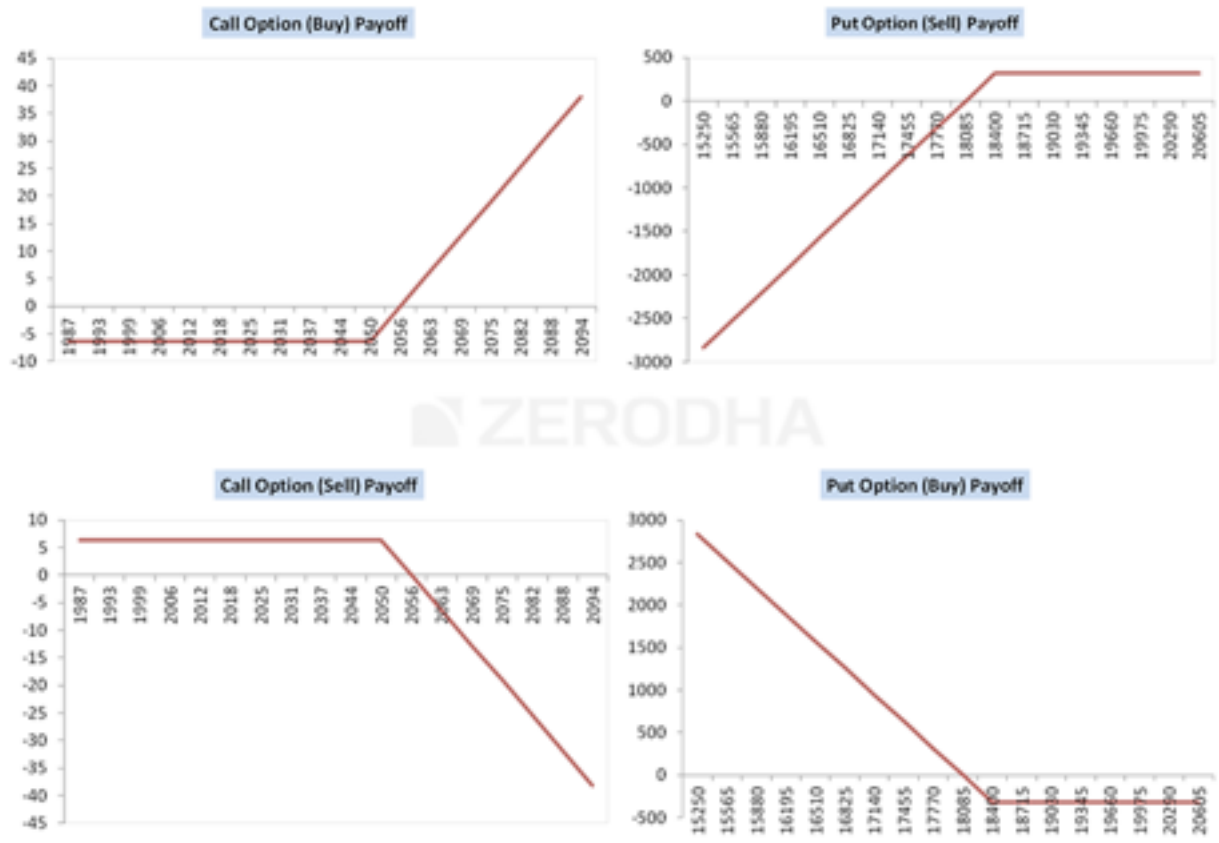
7.1 – Remember these graphs

Over the last few chapters we have looked at two basic option type's i.e. the 'Call Option' and the 'Put Option'. Further we looked at four different variants originating from these 2 options –

1. Buying a Call Option
2. Selling a Call Option
3. Buying a Put Option
4. Selling a Put Option

With these 4 variants, a trader can create numerous different combinations and venture into some really efficient strategies generally referred to as 'Option Strategies'. Think of it this way – if you give a good artist a color palette and canvas he can create some really interesting paintings, similarly a good trader can use these four option variants to create some really good trades. Imagination and intellect is the only requirement for creating these option trades. Hence before we get deeper into options, it is important to have a strong foundation on these four variants of options. For this reason, we will quickly summarize what we have learnt so far in this module.

Please find below the pay off diagrams for the four different option variants –



Arranging the Payoff diagrams in the above fashion helps us understand a few things better. Let me list them for you –

1. Let us start from the left side – if you notice we have stacked the pay off diagram of Call Option (buy) and Call option (sell) one below the other. If you look at the payoff diagram carefully, they both look like a mirror image. The mirror image of the payoff emphasis the fact that the risk-reward characteristics of an option buyer and seller are opposite. The maximum loss of the call option buyer is the maximum profit of the call option seller. Likewise the call option buyer has unlimited profit potential, mirroring this the call option seller has maximum loss potential

2. We have placed the payoff of Call Option (buy) and Put Option (sell) next to each other. This is to emphasize that both these option variants make money only when the market is expected to go higher. In other words, do not buy a call option or do not sell a put option when you sense there is a chance for the markets to go down. You will not make money doing so, or in other words you will certainly lose money in such circumstances. Of course there is an angle of volatility here which we have not discussed yet; we will discuss the same going forward. The reason why I'm talking about volatility is because volatility has an impact on option premiums

3. Finally on the right, the pay off diagram of Put Option (sell) and the Put Option (buy) are stacked one below the other. Clearly the pay off diagrams looks like the mirror image of one another. The mirror image of the payoff emphasizes the fact that the maximum loss of the put option buyer is the maximum profit of the put option seller. Likewise the put option buyer has unlimited profit potential, mirroring this the put option seller has maximum loss potential

Further, here is a table where the option positions are summarized.

Your Market View	Option Type	Position also called	Other Alternatives	Premium
Bullish	Call Option (Buy)	Long Call	Buy Futures or Buy Spot	Pay
Flat or Bullish	Put Option (Sell)	Short Put	Buy Futures or Buy Spot	Receive
Flat or Bearish	Call Option (Sell)	Short Call	Sell Futures	Receive
Bearish	Put Option (Buy)	Long Put	Sell Futures	Pay

It is important for you to remember that when you buy an option, it is also called a 'Long' position. Going by that, buying a call option and buying a put option is called Long Call and Long Put position respectively.

Likewise whenever you sell an option it is called a 'Short' position. Going by that, selling a call option and selling a put option is also called Short Call and Short Put position respectively.

Now here is another important thing to note, you can buy an option under 2 circumstances –

1. You buy with an intention of creating a fresh option position
2. You buy with an intention to close an existing short position

The position is called 'Long Option' only if you are creating a fresh buy position. If you are buying with and intention of closing an existing short position then it is merely called a 'square off' position.

Similarly you can sell an option under 2 circumstances –

1. You sell with an intention of creating a fresh short position
2. You sell with an intention to close an existing long position

The position is called 'Short Option' only if you are creating a fresh sell (writing an option) position. If you are selling with and intention of closing an existing long position then it is merely called a 'square off' position.

7.2 – Option Buyer in a nutshell

By now I'm certain you would have a basic understanding of the call and put option both from the buyer's and seller's perspective. However I think it is best to reiterate a few key points before we make further progress in this module.

Buying an option (call or put) makes sense only when we expect the market to move strongly in a certain direction. If fact, for the option buyer to be profitable the market should move away from the selected strike price. Selecting the right strike price to trade is a major task; we will learn this at a later stage. For now, here are a few key points that you should remember –

1. P&L (Long call) upon expiry is calculated as P&L = Max [0, (Spot Price – Strike Price)] – Premium Paid

2. P&L (Long Put) upon expiry is calculated as P&L = [Max (0, Strike Price – Spot Price)] – Premium Paid

3. The above formula is applicable only when the trader intends to hold the long option till expiry

4. The intrinsic value calculation we have looked at in the previous chapters is only applicable on the expiry day. We CANNOT use the same formula during the series

5. The P&L calculation changes when the trader intends to square off the position well before the expiry

6. The buyer of an option has limited risk, to the extent of premium paid. However he enjoys an unlimited profit potential

7.2 – Option seller in a nutshell

The option sellers (call or put) are also called the option writers. The buyers and sellers have exact opposite P&L experience. Selling an option makes sense when you expect the market to remain flat or below the strike price (in case of calls) or above strike price (in case of put option).

I want you to appreciate the fact that all else equal, markets are slightly favorable to option sellers. This is because, for the option sellers to be profitable the market has to be either flat or move

in a certain direction (based on the type of option). However for the option buyer to be profitable, the market has to move in a certain direction. Clearly there are two favorable market conditions for the option seller versus one favorable condition for the option buyer. But of course this in it-self should not be a reason to sell options.

Here are few key points you need to remember when it comes to selling options –

1. P&L for a short call option upon expiry is calculated as *P&L = Premium Received – Max [0, (Spot Price – Strike Price)]*

2. P&L for a short put option upon expiry is calculated as *P&L = Premium Received – Max (0, Strike Price – Spot Price)*

3. Of course the P&L formula is applicable only if the trader intends to hold the position till expiry

4. When you write options, margins are blocked in your trading account

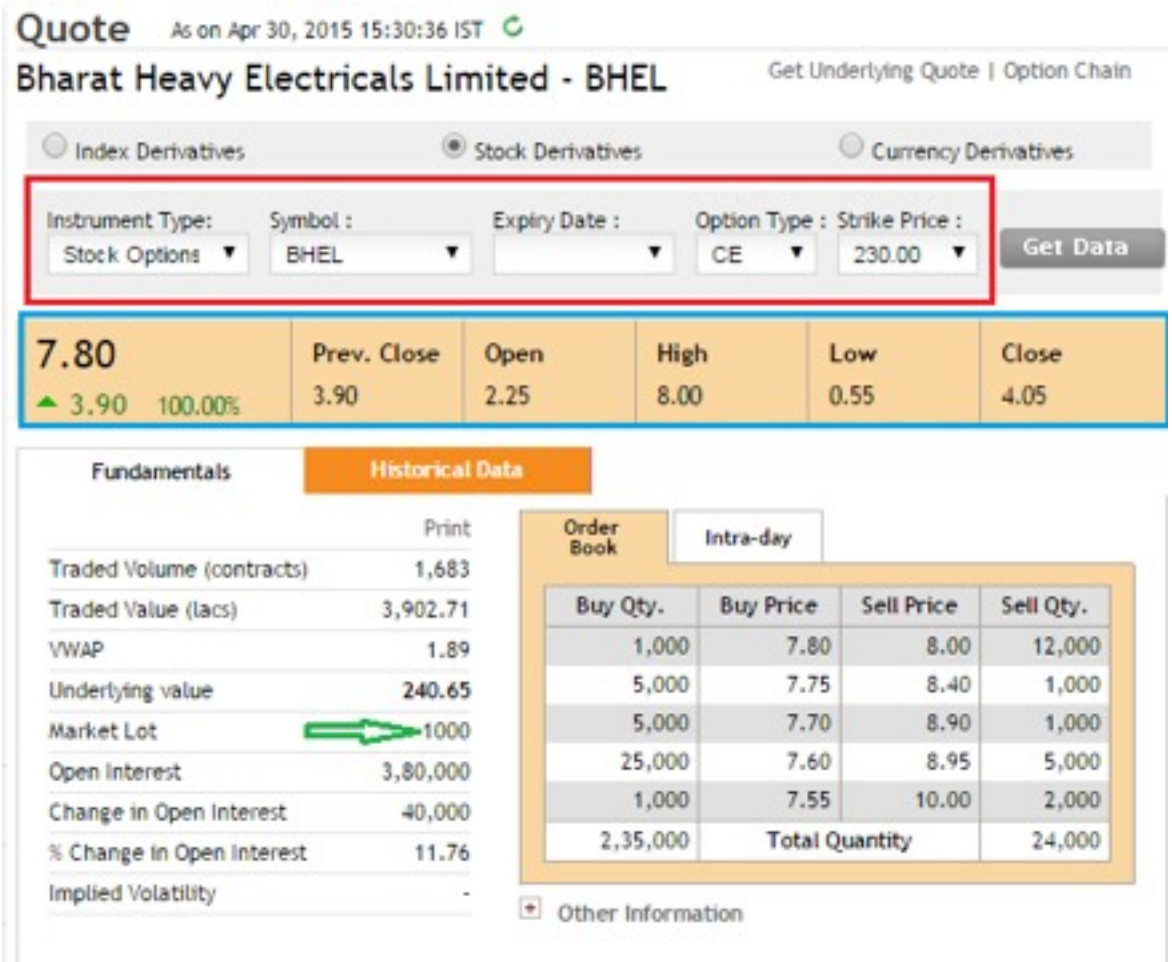
5. The seller of the option has unlimited risk but very limited profit potential (to the extent of the premium received)

Perhaps this is the reason why Nassim Nicholas Taleb in his book "Fooled by Randomness" says "Option writers eat like a chicken but shit like an elephant". This means to say that the option writers earn small and steady returns by selling options, but when a disaster happens, they tend to lose a fortune.

Well, with this I hope you have developed a strong foundation on how a Call and Put option be-haves. Just to give you a heads up, the focus going forward in this module will be on moneyness of an option, premiums, option pricing, option Greeks, and strike selection. Once we understand these topics we will revisit the call and put option all over again. When we do so, I'm certain you will see the calls and puts in a new light and perhaps develop a vision to trade options profession-ally.

7.3 – A quick note on Premiums

Have a look at the snapshot below –



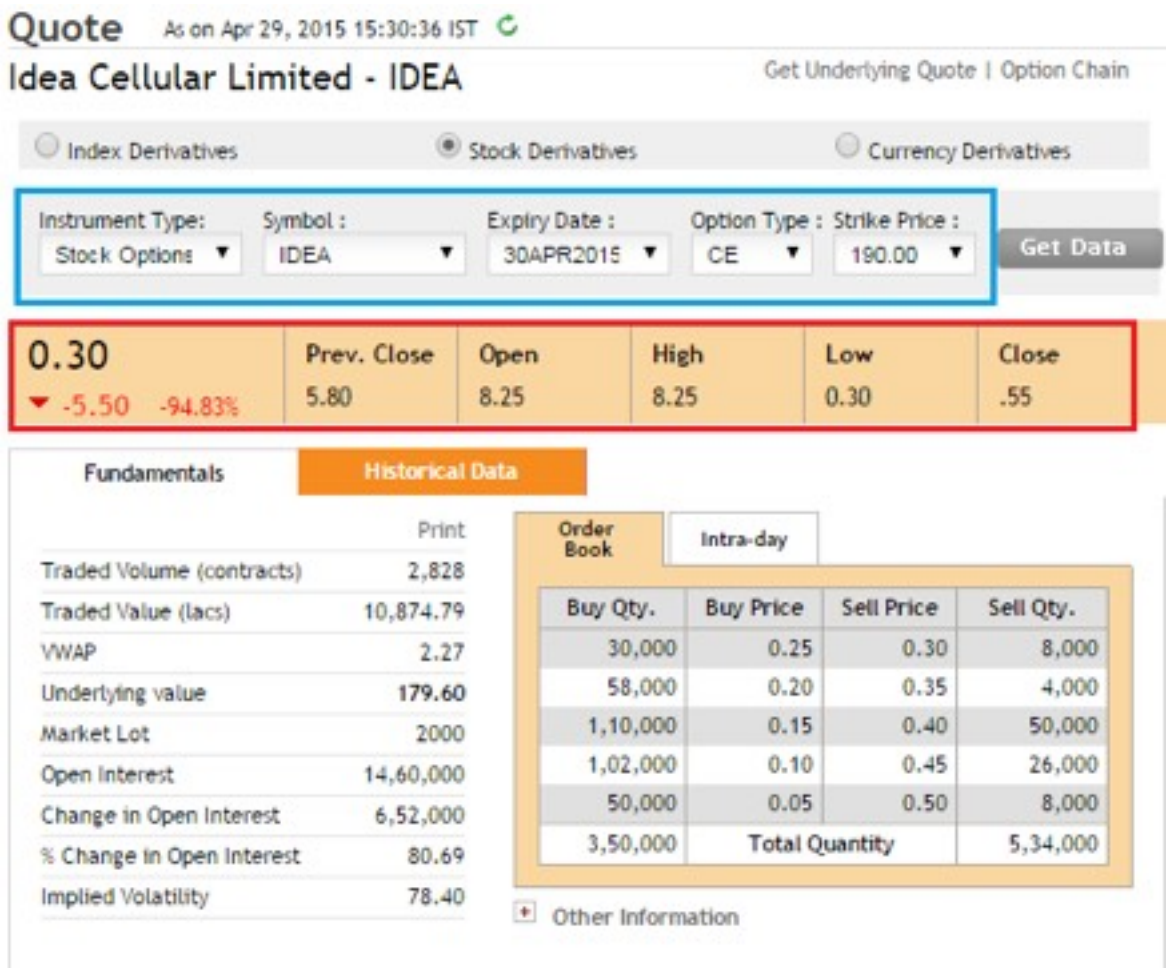
This is the snapshot of how the premium has behaved on an intraday basis (30th April 2015) for BHEL. The strike under consideration is 230 and the option type is a European Call Option (CE). This information is highlighted in the red box. Below the red box, I have highlighted the price information of the premium. If you notice, the premium of the 230 CE opened at Rs.2.25, shot up to make a high of Rs.8/- and closed the day at Rs.4.05/-.

Think about it, the premium has gyrated over 350% intraday! i.e. from Rs.2.25/- to Rs.8/-, and it roughly closed up 180% for the day i.e. from Rs.2.25/- to Rs.4.05/-. Moves like this should not surprise you. These are fairly common to expect in the options world.

Assume in this massive swing you managed to capture just 2 points while trading this particular option intraday. This translates to a sweet Rs.2000/- in profits considering the lot size is 1000 (highlighted in green arrow). In fact this is exactly what happens in the real world. Traders just trade premiums. Hardly any traders hold option contracts until expiry. Most of the traders are interested in initiating a trade now and squaring it off in a short while (intraday or maybe for a few days) and capturing the movements in the premium. They do not really wait for the options to expire.

In fact you might be interested to know that a return of 100% or so while trading options is not really a thing of surprise. But please don't just get carried away with what I just said; to enjoy such returns consistently you need develop a deep insight into options.

Have a look at this snapshot –



This is the option contract of IDEA Cellular Limited, strike price is 190, expiry is on 30th April 2015 and the option type is a European Call Option . These details are marked in the blue box. Below this we can notice the OHLC data, which quite obviously is very interesting.

The 190CE premium opened the day at Rs.8.25/- and made a low of Rs.0.30/-. I will skip the % calculation simply because it is a ridiculous figure for intraday. However assume you were a seller of the 190 call option intraday and you managed to capture just 2 points again, considering the lot size is 2000, the 2 point capture on the premium translates to Rs.4000/- in profits intraday, good enough for that nice dinner at Marriot with your better half J.

The point that I'm trying to make is that, traders (most of them) trade options only to capture the variations in premium. They don't really bother to hold till expiry. However by no means I am suggesting that you need not hold until expiry, in fact I do hold options till expiry in certain cases. Generally speaking option sellers tend to hold contracts till expiry rather than option buyers. This

is because if you have written an option for Rs.8/- you will enjoy the full premium received i.e. Rs.8/- only on expiry.

So having said that the traders prefer to trade just the premiums, you may have a few fundamental questions cropping up in your mind. Why do premiums vary? What is the basis for the change in premium? How can I predict the change in premiums? Who decides what should be the premium price of a particular option?

Well, these questions and therefore the answers to these form the crux of option trading. If you can master these aspects of an option, let me assure you that you would set yourself on a professional path to trade options.

To give you a heads up – the answers to all these questions lies in understanding the 4 forces that simultaneously exerts its influence on options premiums, as a result of which the premiums vary. Think of this as a ship sailing in the sea. The speed at which the ship sails (assume its equivalent to the option premium) depends on various forces such as wind speed, sea water density, sea pressure, and the power of the ship. Some forces tend to increase the speed of the ship, while some tend to decrease the speed of the ship. The ship battles these forces and finally arrives at an optimal sailing speed.

Likewise the premium of the option depends on certain forces called as the 'Option Greeks'. Crudely put, some Option Greeks tends to increase the premium, while some try to reduce the premium. A formula called the 'Black & Scholes Option Pricing Formula' employs these forces and translates the forces into a number, which is the premium of the option.

Try and imagine this – the Option Greeks influence the option premium however the Option Greeks itself are controlled by the markets. As the markets change on a minute by minute basis, therefore the Option Greeks change and therefore the option premiums!

Going forward in this module, we will understand each of these forces and its characteristics. We will understand how the force gets influenced by the markets and how the Option Greeks further influences the premium.

So the end objective here would be to be –

1. To get a sense of how the Option Greeks influence premiums

2. To figure out how the premiums are priced considering Option Greeks and their influence

3. Finally keeping the Greeks and pricing in perspective, we need to smartly select strike prices to trade

One of the key things we need to know before we attempt to learn the option Greeks is to learn about the 'Moneyness of an Option'. We will do the same in the next chapter.

A quick note here – the topics going forward will get a little complex, although we will try our best to simplify it. While we do that, we would request you to please be thorough with all the concepts we have learnt so far.

Key takeaways from this chapter

1. Buy a call option or sell a put option only when you expect the market to go up
2. Buy a put option or sell a call option only when you expect the market to go down
3. The buyer of an option has an unlimited profit potential and limited risk (to the extent of premium paid)
4. The seller of an option has an unlimited risk potential and limited reward (to the extent of premium received)
5. Majority of option traders prefer to trade options only to capture the variation in premiums
6. Option premiums tend to gyrate drastically – as an options trader you can expect this to happen quite frequently
7. Premiums vary as a function of 4 forces called the Option Greeks
8. Black & Sholes option pricing formula employs four forces as inputs to give out a price for the premium
9. Markets control the Option Greeks and the Greek's variation itself

CHAPTER 8

Moneyness of an Option Contract

8.1 – Intrinsic Value

The moneyness of an option contract is a classification method wherein each option (strike) gets classified as either – In the money (ITM), At the money (ATM), or Out of the money (OTM) option. This classification helps the trader to decide which strike to trade, given a particular circumstance in the market. However before we get into the details, I guess it makes sense to look through the concept of intrinsic value again.

The intrinsic value of an option is the money the option buyer makes from an options contract provided he has the right to exercise that option on the given day. Intrinsic Value is always a positive value and can never go below 0. Consider this example –

Underlying	**CNX Nifty**
Spot Value	8070
Option strike	8050
Option Type	Call Option (CE)
Days to expiry	15
Position	Long

Given this, assume you bought the 8050CE and instead of waiting for 15 days to expiry you had the right to exercise the option today. Now my question to you is – How much money would you stand to make provided you exercised the contract today?

Do remember when you exercise a long option, the money you make is equivalent to the intrinsic value of an option minus the premium paid. Hence to answer the above question we need to calculate the intrinsic value of an option, for which we need to pull up the call option intrinsic value formula from Chapter 3.

Here is the formula –

Intrinsic Value of a Call option = Spot Price – Strike Price

Let us plug in the values

= 8070 – 8050

= 20

So, if you were to exercise this option today, you are entitled to make 20 points (ignoring the premium paid).

Here is a table which calculates the intrinsic value for various options strike (these are just random values that I have used to drive across the concept) –

Option Type	Strike	Spot	Formula	Intrinsic Value	Remarks
Long Call	280	310	Spot Price – Strike Price	310 – 280 = 30	
Long Put	1040	980	Strike Price – Spot Price	1040 -980 = 60	
Long Call	920	918	Spot Price – Strike Price	918 – 920 = 0	Since IV cannot be -ve
Long Put	80	88	Strike Price – Spot Price	80 – 88 = 0	Since IV cannot be -ve

With this, I hope you are clear about the intrinsic value calculation for a given option strike. Let me summarize a few important points –

1. Intrinsic value of an option is the amount of money you would make if you were to exercise the option contract

2. Intrinsic value of an options contract can never be negative. It can be either zero or a positive number

3. Call option Intrinsic value = Spot Price – Strike Price

4. Put option Intrinsic value = Strike Price – Spot price

Before we wrap up this discussion, here is a question for you – Why do you think the intrinsic value cannot be a negative value?

To answer this, let us pick an example from the above table – Strike is 920, spot is 918, and option type is long call. Let us assume the premium for the 920 Call option is Rs.15.

Now,

1. If you were to exercise this option, what do you get?

a. Clearly we get the intrinsic value.

2. How much is the intrinsic value?

a. Intrinsic Value = 918 – 920 = **-2**

3. The formula suggests we get '**– Rs.2**'. What does this mean?

a. This means Rs.2 is going from our pocket

4. Let us believe this is true for a moment, what will be the total loss?

a. 15 + 2 = Rs.17/-

5. But we know the maximum loss for a call option buyer is limited to the extent of premium one pays, in this case it will be Rs.15/-

a. However if we include a negative intrinsic value this property of option payoff is not obeyed (Rs.17/- loss as opposed to Rs.15/-). Hence in order to maintain the non linear property of option payoff, the Intrinsic value can never be negative.

6. You can apply the same logic to the put option intrinsic value calculation

Hopefully this should give you some insights into why the intrinsic value of an option can never go negative.

8.2 – Moneyness of a Call option

With our discussions on the intrinsic value of an option, the concept of moneyness should be quite easy to comprehend. Moneyness of an option is a classification method which classifies each option strike based on how much money a trader is likely to make if he were to exercise his option contract today. There are 3 broad classifications –

1. In the Money (ITM)

2. At the Money (ATM)

3. Out of the Money (OTM)

And for all practical purposes I guess it is best to further classify these as –

1. Deep In the money

2. In the Money (ITM)

3. At the Money (ATM)

4. Out of the Money (OTM)

5. Deep Out of the Money

Understanding these option strike classification is very easy. All you need to do is figure out the intrinsic value. If the intrinsic value is a non zero number, then the option strike is considered 'In the money'. If the intrinsic value is a zero the option strike is called 'Out of the money'. The strike which is closest to the Spot price is called 'At the money'.

Let us take up an example to understand this well. As of today (7th May 2015) the value of Nifty is at 8060, keeping this in perspective I've take the snapshot of all the available strike prices (the same is highlighted within a blue box). The objective is to classify each of these strikes as ITM, ATM, or OTM. We will discuss the 'Deep ITM' and 'Deep OTM' later.

752,675	-200	569	-	967.00	-46.85	50	963.65	969.00	25	7100.00
-	-	-	-	-	-	2,000	741.30	1,072.50	2,000	7150.00
179,750	-1,650	187	-	864.35	-53.75	50	863.45	872.20	125	7200.00
-	-	-	-	-	-	2,000	641.30	972.50	2,000	7250.00
20,275	1,075	157	-	780.35	-37.85	125	766.60	791.70	50	7300.00
-	-	-	-	-	-	2,000	546.15	876.55	2,000	7350.00
18,550	1,275	63	-	684.30	-30.45	125	673.15	681.65	25	7400.00
-	-	-	-	-	-	2,000	451.00	780.60	2,000	7450.00
525,425	13,450	2,363	-	583.00	-39.65	25	581.30	586.40	50	7500.00
-	-	-	-	-	-	2,000	367.35	680.60	2,000	7550.00
90,775	7,975	499	-	486.90	-48.30	50	489.55	495.40	50	7600.00
100	100	4	-	333.30	-870.80	100	286.85	584.60	100	7650.00
138,750	13,950	1,650	13.56	406.90	-43.60	25	405.00	410.00	25	7700.00
-	-	-	-	-	-	2,000	203.40	-	-	7750.00
350,250	119,650	11,537	16.10	325.65	-40.50	75	322.10	328.15	100	7800.00
-	-	-	-	-	-	1,000	242.00	420.85	2,000	7850.00
217,950	50,375	14,855	17.12	252.60	-36.65	125	252.45	253.85	25	7900.00
3,600	3,600	158	16.47	211.00	-716.10	125	205.45	305.05	125	7950.00
921,000	214,775	111,929	17.34	187.40	-34.95	100	186.05	189.00	100	8000.00
34,075	32,175	4,758	17.38	159.85	-27.25	50	156.05	162.45	100	8050.00
1,192,900	439,975	376,448	17.30	133.00	-30.25	5,500	133.00	133.40	825	8100.00
110,275	14,500	12,682	17.13	111.90	-25.25	25	108.00	111.85	50	8150.00
2,573,325	463,400	774,529	17.07	89.00	-25.10	25	88.25	89.00	600	8200.00
122,875	-25,475	17,657	17.17	72.00	-20.65	400	70.20	73.20	25	8250.00
3,396,200	163,025	736,709	17.07	56.45	-18.50	2,075	56.30	56.45	75	8300.00
182,025	-6,025	11,633	17.04	42.05	-17.35	100	43.20	46.00	175	8350.00
3,201,050	-2,025	643,267	17.07	33.50	-12.60	25	33.65	33.85	200	8400.00
155,125	-18,275	10,499	16.99	25.30	-9.20	25	25.00	25.85	50	8450.00
4,402,950	49,700	555,081	17.30	19.65	-7.25	475	19.65	19.90	25	8500.00
108,425	4,250	4,126	17.85	15.00	-6.00	175	14.25	16.20	75	8550.00
4,056,750	197,225	348,205	17.54	11.50	-4.20	200	11.50	11.70	1,050	8600.00
54,600	4,325	1,890	17.70	13.50	1.45	25	8.75	11.00	10,000	8650.00
2,736,750	85,075	159,108	18.09	7.05	-2.20	50	7.05	7.30	150	8700.00

As you can notice from the image above, the available strike prices trade starts from 7100 all the way upto 8700.

We will first identify '**At the Money Option (ATM)'** as this is the easiest to deal with.

From the definition of ATM option that we posted earlier we know, ATM option is that option strike which is closest to the spot price. Considering the spot is at 8060, the closest strike is probably 8050. If there was 8060 strike, then clearly 8060 would be the ATM option. But in the absence of 8060 strike the next closest strike becomes ATM. Hence we classify 8050 as, the ATM option.

Having established the ATM option (8050), we will proceed to identify ITM and OTM options. In order to do this we will pick few strikes and calculate the intrinsic value.

1. 7100
2. 7500
3. 8050
4. 8100
5. 8300

Do remember the spot price is 8060, keeping this in perspective the intrinsic value for the strikes above would be –

@ 7100

Intrinsic Value = 8060 – 7100

= 960

Non zero value, hence the strike should be In the Money (ITM) option

@7500

Intrinsic Value = 8060 – 7500

= 560

Non zero value, hence the strike should be In the Money (ITM) option

@8050

We know this is the ATM option as 8050 strike is closest to the spot price of 8060. So we will not bother to calculate its intrinsic value.

@ 8100

Intrinsic Value = 8060 – 8100

= – 40

Negative intrinsic value, therefore the intrinsic value is 0. Since the intrinsic value is 0, the strike is Out of the Money (OTM).

@ 8300

Intrinsic Value = 8060 – 8300

= – 240

Negative intrinsic value, therefore the intrinsic value is 0. Since the intrinsic value is 0, the strike is Out of the Money (OTM).

You may have already sensed the generalizations (for call options) that exists here, however allow me to restate the same again

1. All option strikes that are higher than the ATM strike are considered OTM
2. All option strikes that are below the ATM strike are considered ITM

In fact I would suggest you relook at the snapshot we just posted –

752,675	-200	569	-	967.00	-46.85	50	963.65	969.00	25	7100.00
-	-	-	-	-	-	2,000	741.30	1,072.50	2,000	7150.00
179,750	-1,650	187	-	864.35	-53.75	50	863.45	872.20	125	7200.00
-	-	-	-	-	-	2,000	641.30	972.50	2,000	7250.00
20,275	1,075	157	-	780.35	-37.85	125	766.60	791.70	50	7300.00
-	-	-	-	-	-	2,000	546.15	876.55	2,000	7350.00
18,550	1,275	63	-	684.30	-30.45	125	673.15	681.65	25	7400.00
-	-	-	-	-	-	2,000	451.00	780.60	2,000	7450.00
525,425	13,450	2,363	-	583.00	-39.65	25	581.30	586.40	50	7500.00
-	-	-	-	-	-	2,000	367.35	680.60	2,000	7550.00
90,775	7,975	499	-	486.90	-48.30	50	489.55	495.40	50	7600.00
100	100	4	-	333.30	870.80	100	286.85	584.60	100	7650.00
138,750	13,950	1,650	13.56	406.90	-43.60	25	405.00	410.00	25	7700.00
-	-	-	-	-	-	2,000	203.40	-	-	7750.00
350,250	119,650	11,537	16.10	325.65	-40.50	75	322.10	328.15	100	7800.00
-	-	-	-	-	-	1,000	242.00	420.85	2,000	7850.00
217,950	50,375	14,855	17.12	252.60	-36.65	125	252.45	253.85	25	7900.00
3,600	3,600	158	16.47	211.00	-716.10	125	205.45	305.05	125	7950.00
921,000	214,775	111,929	17.34	187.40	-34.95	100	186.05	189.00	100	8000.00
34,075	32,175	4,758	17.38	159.85	-27.25	50	156.05	162.45	100	8050.00
1,192,900	439,975	376,448	17.30	133.00	-30.25	5,500	133.00	133.40	825	8100.00
110,275	14,500	12,682	17.13	111.90	-25.25	25	108.00	111.85	50	8150.00
2,573,325	463,400	774,529	17.07	89.00	-25.10	25	88.25	89.00	600	8200.00
122,875	-25,475	17,657	17.17	72.00	-20.65	400	70.20	73.20	25	8250.00
3,396,200	163,025	736,709	17.07	56.45	-18.50	2,075	56.30	56.45	75	8300.00
182,025	-6,025	11,633	17.04	42.05	-17.35	100	43.20	46.00	175	8350.00
3,201,050	-2,025	643,267	17.07	33.50	-12.60	25	33.65	33.85	200	8400.00
155,125	-18,275	10,499	16.99	25.30	-9.20	25	25.00	25.85	50	8450.00
4,402,950	49,700	555,081	17.30	19.65	-7.25	475	19.65	19.90	25	8500.00
108,425	4,250	4,126	17.85	15.00	-6.00	175	14.25	16.20	75	8550.00
4,056,750	197,225	348,205	17.54	11.50	-4.20	200	11.50	11.70	1,050	8600.00
54,600	4,325	1,890	17.70	13.50	1.45	25	8.75	11.00	10,000	8650.00
2,736,750	85,075	159,108	18.09	7.05	-2.20	50	7.05	7.30	150	8700.00

NSE presents ITM options with a pale yellow background and all OTM options have a regular white background. Now let us look at 2 ITM options – 7500 and 8000. The intrinsic value works out to be 560 and 60 respectively (considering the spot is at 8060). Higher the intrinsic value, deeper the moneyness of the option. Therefore 7500 strike is considered as 'Deep In the Money' option and 8000 as just 'In the money' option.

I would encourage you to observe the premiums for all these strike prices (highlighted in green box). Do you sense a pattern here? The premium decreases as you traverse from 'Deep ITM' option to 'Deep OTM option'. In other words ITM options are always more expensive compared to OTM options.

8.3 – Moneyness of a Put option

Let us run through the same exercise to find out how strikes are classified as ITM and OTM for Put options. Here is the snapshot of various strikes available for a Put option. The strike prices on the left are highlighted in a blue box. Do note at the time of taking the snap shot (8th May 2015) Nifty's spot value is 8202.

7100.00	5,550	2.55	2.60	575	-1.30	2.60	29.06	3,344	-23,750	363,700
7150.00	7,000	0.65	-	-	-	-	-	-	-	-
7200.00	2,725	3.60	3.65	75	-2.30	3.70	28.02	11,339	15,400	422,700
7250.00	300	2.25	5.00	2,000	-0.05	8.00	30.53	2	50	2,175
7300.00	25	4.95	5.00	900	-4.10	4.95	26.78	25,241	-4,500	1,638,800
7350.00	4,800	3.50	-	-	-	-	-	-	-	50
7400.00	1,100	6.50	6.60	2,550	-5.95	6.60	25.41	40,016	110,000	895,775
7450.00	5,000	5.00	-	-	-	-	-	-	-	100
7500.00	2,550	9.55	9.65	1,400	-8.70	9.65	24.48	59,225	125,225	2,214,225
7550.00	100	11.00	18.00	25	-7.45	12.00	24.31	25	450	1,700
7600.00	1,150	14.05	14.20	575	-12.75	14.15	23.68	90,633	-43,425	1,052,900
7650.00	50	16.50	18.00	100	-15.50	16.30	23.02	150	1,975	17,575
7700.00	975	20.70	20.85	475	-18.50	20.75	22.78	157,222	274,000	3,268,875
7750.00	100	25.00	27.65	100	-21.55	24.55	22.44	494	1,375	15,900
7800.00	500	31.15	31.35	125	-26.25	31.40	22.20	229,216	243,350	3,119,375
7850.00	25	37.55	39.45	50	-29.45	39.30	21.96	677	3,800	17,775
7900.00	100	46.20	46.40	125	-35.60	46.45	21.57	222,647	443,325	2,941,075
7950.00	125	55.60	57.00	150	-41.60	55.00	21.39	2,308	10,350	51,800
8000.00	100	66.70	67.00	200	-47.55	66.80	20.88	313,092	629,200	5,014,975
8050.00	50	79.15	80.10	150	-52.85	79.85	20.60	6,735	43,950	110,750
8100.00	100	94.25	94.45	375	-61.45	94.60	20.17	313,481	1,516,625	5,169,650
8150.00	150	111.50	112.95	150	-67.25	112.00	19.94	7,576	-6,375	109,000
8200.00	150	131.40	132.00	50	-78.70	131.35	19.53	177,149	307,650	3,375,625
8250.00	25	155.20	157.75	50	-94.85	154.90	18.96	759	-4,350	40,375
8300.00	25	180.50	182.20	50	-96.00	180.70	19.26	49,997	23,500	2,606,675
8350.00	25	207.80	210.30	100	-106.05	203.30	18.47	163	-650	30,750
8400.00	25	240.85	242.15	25	-107.75	239.85	19.06	13,154	-62,900	1,137,325
8450.00	50	258.35	288.60	50	-142.00	278.00	19.56	18	-100	23,225
8500.00	75	312.35	315.20	25	-120.55	313.85	18.97	6,378	-53,575	1,162,600
8550.00	25	342.10	370.40	175	-73.85	387.00	25.12	16	-75	4,650
8600.00	100	391.80	395.45	25	-124.35	394.85	18.98	2,153	-19,175	687,550
8650.00	50	399.30	684.80	50	-	-	-	-	-	3,000
8700.00	25	484.05	486.00	25	-133.15	485.00	19.25	4,789	-94,550	537,700

As you can see there are many strike prices available right from 7100 to 8700. We will first classify the ATM option and then proceed to identify ITM and OTM option. Since the spot is at 8202, the nearest strike to spot should be the ATM option. As we can see from the snapshot above there is a strike at 8200 which is trading at Rs.131.35/-. This obviously becomes the ATM option.

We will now pick a few strikes above and below the ATM and figure out ITM and OTM options. Let us go with the following strikes and evaluate their respective intrinsic value (also called the moneyness) –

1. 7500
2. 8000
3. 8200
4. 8300
5. 8500

@ 7500

We know the intrinsic value of put option can be calculated as = **Strike – Spot**

Intrinsic Value = 7500 – 8200

= – 700

Negative intrinsic value, therefore the option is OTM

@ 8000

Intrinsic Value = 8000 – 8200

= – 200

Negative intrinsic value, therefore the option is OTM

@8200

8200 is already classified as ATM option, hence we will skip this and move ahead.

@ 8300

Intrinsic Value = 8300 – 8200

= +100

Positive intrinsic value, therefore the option is ITM

@ 8500

Intrinsic Value = 8500 – 8200

= +300

Positive intrinsic value, therefore the option is ITM

Hence, an easy generalization for Put options are –

1. All strikes **higher than** ATM options are considered ITM
2. All strikes **lower than** ATM options are considered OTM

And as you can see from the snapshot, the premiums for ITM options are much higher than the premiums for the OTM options.

I hope you have got a clear understanding of how option strikes are classified based on their moneyness. However you may still be wondering about the need to classify options based on their moneyness. Well the answer to this lies in 'Option Greeks' again. As you briefly know by now, Option Greeks are the market forces which act upon options strikes and therefore affect the premium associated with these strikes. So a certain market force will have a certain effect on ITM option while at the same time it will have a different effect on an OTM option. Hence classifying the option strikes will help us in understanding the Option Greeks and their impact on the premiums better.

8.4 – The Option Chain

The Option chain is a common feature on most of the exchanges and trading platforms. The option chain is a ready reckoner of sorts that helps you identify all the strikes that are available for a particular underlying and also classifies the strikes based on their moneyness. Besides, the option chain also provides information such as the premium price (LTP), bid –ask price, volumes, open interest etc for each of the option strikes. Have a look at the option chain of Ashoka Leyland Limited as published on NSE

Option Chain (Equity Derivatives)

Underlying Stock: ASHOKLEY 68.70 As on May 08, 2015 15:11:37 IST

View Options Contracts for: Select Index OR Search for an underlying stock: GO Filter by: Expiry Date 28MAY2015 Futures contracts

CALLS												PUTS									
Chart	OI	Chng in OI	Volume	IV	LTP	Net Chng	Bid Qty	Bid Price	Ask Price	Ask Qty	Strike Price	Bid Qty	Bid Price	Ask Price	Ask Qty	Net Chng	LTP	IV	Volume	Chng in OI	OI	Chart
	-	-	-	-	-	-	-	-	-	-	40.00	-	-	0.05	48,000	-	-	-	-	-	8,000	
	-	-	-	-	-	-	-	-	-	-	42.50	-	-	0.10	12,000	-	-	-	-	-	-	
	-	-	-	-	-	-	-	-	-	-	45.00	-	-	0.20	4,000	-	-	-	-	-	-	
	-	-	-	-	-	-	24,000	21.10	21.85	24,000	47.50	-	-	0.20	4,000	-	-	-	-	-	-	
	8,000	-	-	-	-	-	4,000	7.80	19.30	24,000	50.00	12,000	0.05	0.10	12,000	0.05	0.20	81.02	1	4,000	40,000	
	-	-	-	-	-	-	4,000	16.15	16.85	36,000	52.50	16,000	0.05	0.10	16,000	-	-	-	-	-	44,000	
	84,000	4,000	1	-	13.30	-1.60	4,000	13.85	14.35	4,000	55.00	232,000	0.10	0.15	28,000	-0.15	0.15	57.27	15	4,000	276,000	
	-	-	-	-	-	-	4,000	11.45	11.95	4,000	57.50	84,000	0.20	0.25	8,000	-0.25	0.30	55.95	6	8,000	204,000	
	72,000	-	1	67.31	10.05	-1.95	4,000	7.20	9.70	32,000	60.00	124,000	0.40	0.50	96,000	-0.60	0.45	51.13	198	356,000	1,124,000	
	12,000	-4,000	2	-	6.45	1.20	4,000	7.05	7.60	8,000	62.50	36,000	0.70	0.75	16,000	-1.00	0.75	48.01	84	-4,000	728,000	
	524,000	-240,000	221	49.09	5.50	1.90	8,000	5.35	5.45	8,000	65.00	32,000	1.30	1.35	68,000	-1.45	1.30	46.38	366	-8,000	1,436,000	
	1,100,000	-36,000	394	45.72	3.85	1.35	12,000	3.75	3.90	12,000	67.50	4,000	2.20	2.25	20,000	-1.90	2.20	46.83	254	224,000	1,132,000	
	4,572,000	-532,000	1,780	47.04	2.55	0.85	16,000	2.55	2.60	40,000	70.00	8,000	3.40	3.50	16,000	-2.50	3.35	42.86	90	-	1,804,000	
	3,264,000	-68,000	462	46.50	1.65	0.55	76,000	1.60	1.70	52,000	72.50	44,000	4.70	5.10	20,000	-3.40	4.95	44.75	7	-	1,256,000	
	6,988,000	428,000	1,134	47.27	1.05	0.35	108,000	1.00	1.05	16,000	75.00	44,000	6.50	7.10	44,000	-3.45	7.20	52.27	5	-8,000	360,000	
	1,872,000	-	78	49.23	0.70	0.25	48,000	0.60	0.70	76,000	77.50	4,000	8.60	9.20	8,000	-	-	-	-	-	20,000	
	4,748,000	224,000	320	48.92	0.40	0.10	144,000	0.40	0.45	216,000	80.00	4,000	10.00	13.85	4,000	-	-	-	-	-	188,000	
	284,000	16,000	10	50.12	0.25	0.05	72,000	0.20	0.30	52,000	82.50	28,000	13.15	13.80	28,000	-	-	-	-	-	-	
	728,000	20,000	22	50.90	0.15	0.05	84,000	0.15	0.20	180,000	85.00	24,000	15.50	16.15	24,000	-	-	-	-	-	-	
	108,000	-	-	-	-	-	12,000	0.05	0.10	4,000	87.50	12,000	18.00	18.70	12,000	-	-	-	-	-	-	
	760,000	100,000	27	57.69	0.10	0.05	92,000	0.05	0.10	376,000	90.00	-	-	-	-	-	-	-	-	-	-	

Few observations to help you understand the option chain better –

1. The underlying spot value is at Rs.68.7/- (highlighted in blue)

2. The Call options are on to the left side of the option chain

3. The Put options are on to the right side of the option chain

4. The strikes are stacked on an increasing order in the center of the option chain

5. Considering the spot at Rs.68.7, the closest strike is 67.5, hence that would be an ATM option (highlighted in yellow)

6. For Call options – all option strikes lower than ATM options are ITM option, hence they have a pale yellow background

7. For Call options – all options higher than ATM options are OTM options, hence they have a white background

8. For Put Options – all options higher than ATM are ITM options, hence they have a pale yellow background

9. For Put Options – all options lower than ATM are OTM options, hence they have a white background

10. The pale yellow and white background from NSE is just a bifurcation method to bifurcate the ITM and OTM options. The color scheme is not a standard convention.

Here is the link to check the option chain for Nifty Options.

8.4 – The way forward

Having understood the basics of the call and put options both from the buyers and sellers perspective and also having understood the concept of ITM, OTM, and ATM I suppose we are all set to dwell deeper into options.

The next couple of chapters will be dedicated to understand Option Greeks and the kind of impact they have on option premiums. Based on the Option Greeks impact on the premiums, we will figure out a way to select the best possible strike to trade for a given circumstance in the market. Further we will also understand how options are priced by briefly running through the 'Black & Scholes Option Pricing Formula'. The 'Black & Scholes Option Pricing Formula' will help us understand things like – Why Nifty 8200 PE is trading at 131 and not 152 or 102!

I hope you are as excited to learn about all these topics as we are to write about the same. So please stay tuned.

Onwards to Option Greeks now!

Key takeaways from this chapter

1. The intrinsic value of an option is equivalent to the value of money the option buyer makes provided if he were to exercise the contract
2. Intrinsic Value of an option cannot be negative, it is a non zero positive value
3. Intrinsic value of call option = Spot Price – Strike Price
4. Intrinsic value of put option = Strike Price – Spot Price
5. Any option that has an intrinsic value is classified as 'In the Money' (ITM) option
6. Any option that does not have an intrinsic value is classified as 'Out of the Money' (OTM) option
7. If the strike price is almost equal to spot price then the option is considered as 'At the money' (ATM) option
8. All strikes lower than ATM are ITM options (for call options)
9. All strikes higher than ATM are OTM options (for call options)
10. All strikes higher than ATM are ITM options (for Put options)
11. All strikes lower than ATM are OTM options (for Put options)
12. When the intrinsic value is very high, it is called 'Deep ITM' option
13. Likewise when the intrinsic value is the least, it is called 'Deep OTM' option
14. The premiums for ITM options are always higher than the premiums for OTM option
15. The Option chain is a quick visualization to understand which option strike is ITM, OTM, ATM (for both calls and puts) along with other information relevant to options.

CHAPTER 9

The Option Greeks (Delta) Part 1

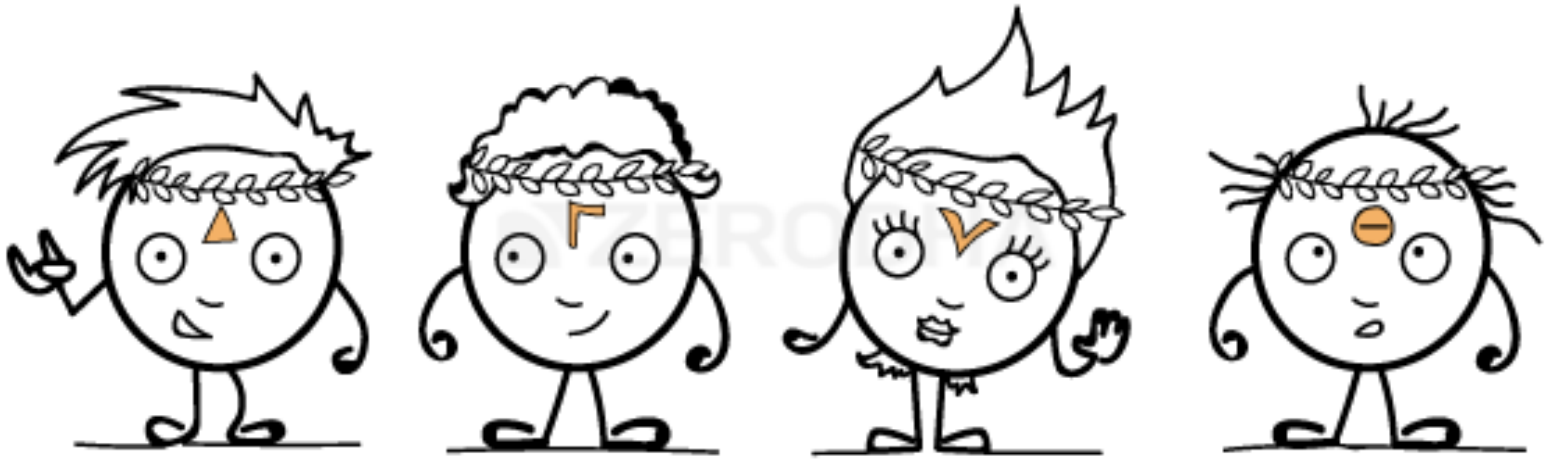
9.1 – Overview

Yesterday I watched the latest bollywood flick 'Piku'. Quite nice I must say. After watching the movie I was casually pondering over what really made me like Piku – was it the overall storyline, or Amitabh Bachchan's brilliant acting, or Deepika Padukone's charming screen presence, or Shoojit Sircar's brilliant direction? Well, I suppose it was a mix of all these factors that made the movie enjoyable.

This also made me realize, there is a remarkable similarity between a bollywood movie and an options trade. Similar to a bollywood movie, for an options trade to be successful in the market there are several forces which need to work in the option trader's favor. These forces are collectively called 'The Option Greeks'. These forces influence an option contract in real time, affecting the premium to either increase or decrease on a minute by minute basis. To make matters complicated, these forces not only influence the premiums directly but also influence each another.

To put this in perspective think about these two bollywood actors – Aamir Khan and Salman Khan. Movie buffs would recognize them as two independent acting forces (similar to option Greeks) of Bollywood. They can independently influence the outcome of the movie they act in (think of the movie as an options premium). However if you put both these guys in a single flick, chances are that they will try to pull one another down while at the same time push themselves up and at the same time try to make the movie a success. Do you see the juggling around here? This may not be a perfect analogy, but I hope it gives you a sense of what I'm trying to convey.

Options Premiums, options Greeks, and the natural demand supply situation of the markets influence each other. Though all these factors work as independent agents, yet they are all intervened with one another. The final outcome of this mixture can be assessed in the option's premium. For an options trader, assessing the variation in premium is most important. He needs to develop a sense for how these factors play out before setting up an option trade.



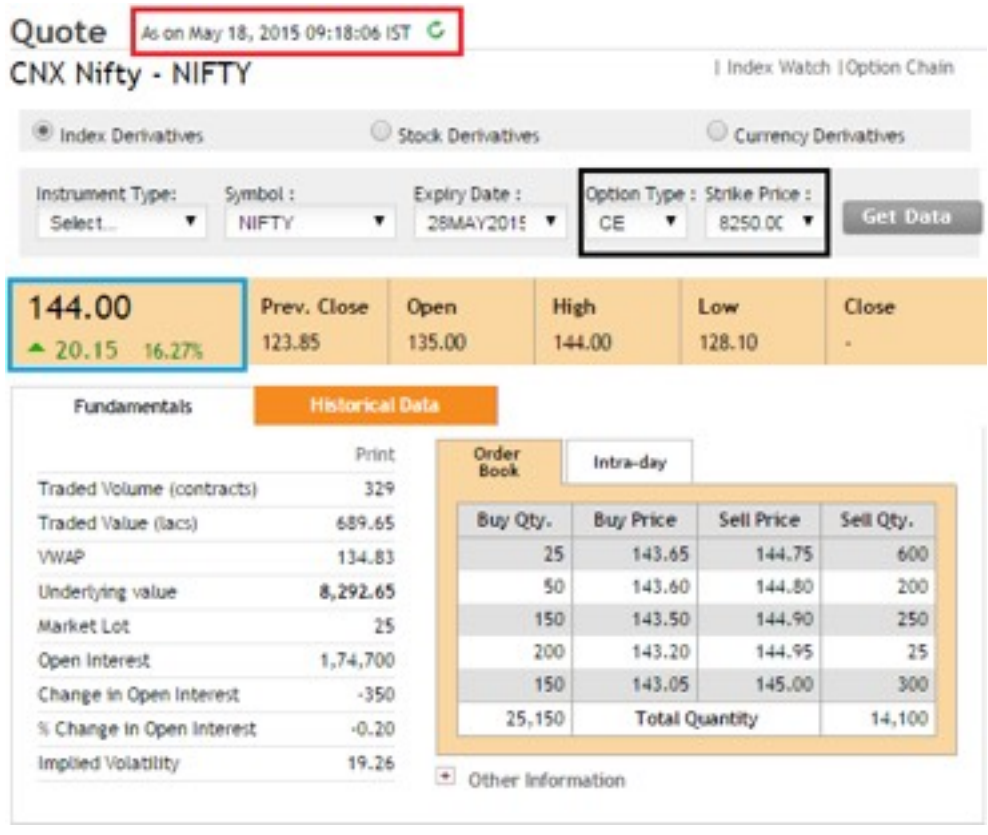
So without much ado, let me introduce the Greeks to you –

1. **Delta** – Measures the rate of change of options premium based on the directional movement of the underlying
2. **Gamma** – Rate of change of delta itself
3. **Vega** – Rate of change of premium based on change in volatility
4. **Theta** – Measures the impact on premium based on time left for expiry

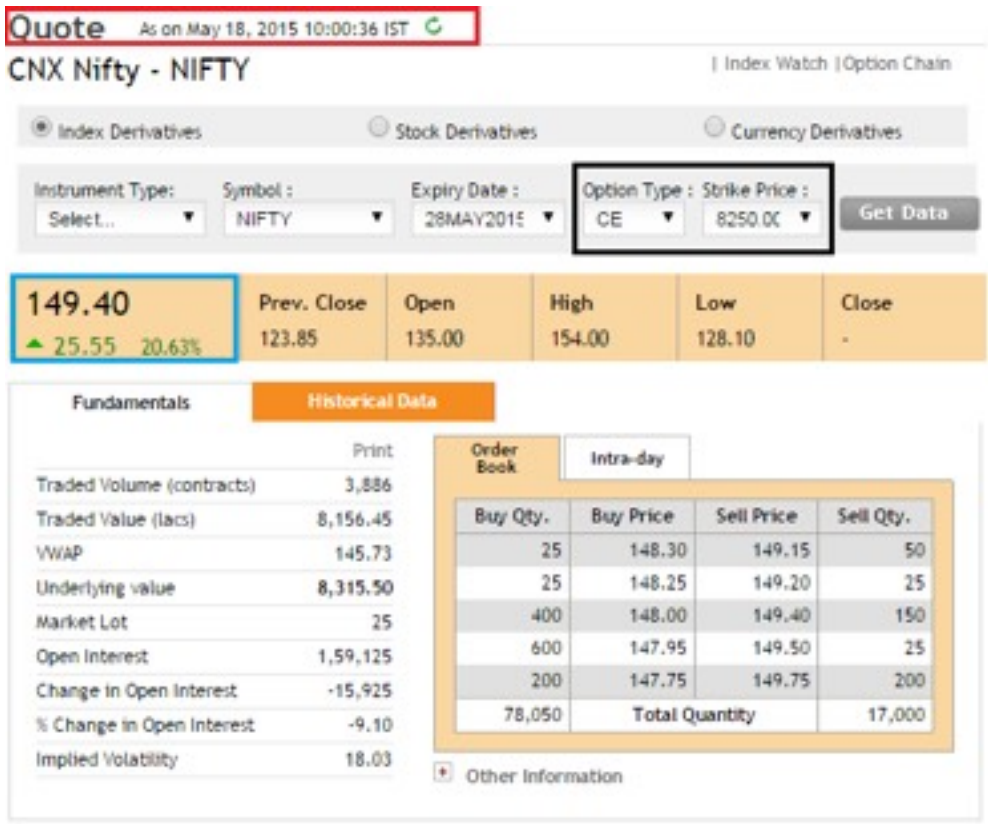
We will discuss these Greeks over the next few chapters. The focus of this chapter is to understand the Delta.

9.2 – Delta of an Option

Notice the following two snapshots here – they belong to Nifty's 8250 CE option. The first snapshot was taken at 09:18 AM when Nifty spot was at 8292.

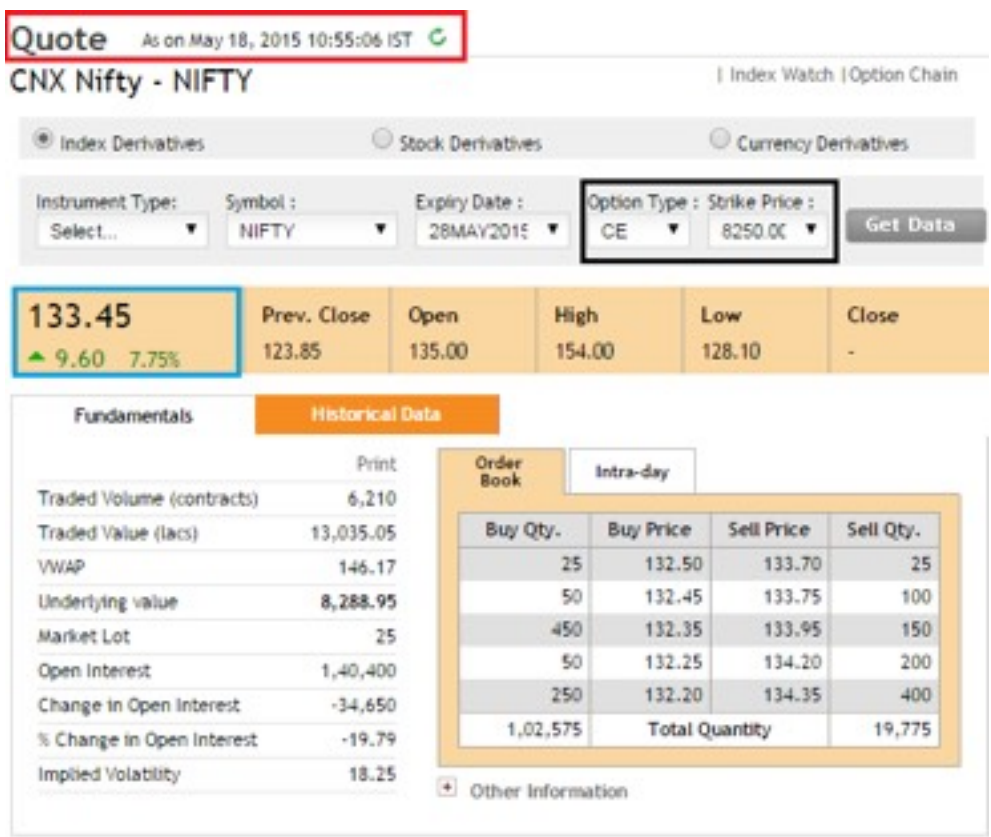


A little while later…



Now notice the change in premium – at 09:18 AM **when Nifty was at 8292** the call option was trading at 144, however at 10:00 AM **Nifty moved to 8315** and the same call option was trading at 150.

In fact here is another snapshot at 10:55 AM – **Nifty declined to 8288** and so did the option premium (declined to 133).



From the above observations one thing stands out very clear – as and when the value of the spot changes, so does the option premium. More precisely as we already know – the call option premium increases with the increase in the spot value and vice versa.

Keeping this in perspective, imagine this – you have predicted that Nifty will reach 8355 by 3:00 PM today. From the snapshots above we know that the premium will certainly change – but by how much? What is the likely value of the 8250 CE premium if Nifty reaches 8355?

Well, this is exactly where the 'Delta of an Option' comes handy. The Delta measures how an options value changes with respect to the change in the underlying. In simpler terms, the Delta of an option helps us answer questions of this sort – "By how many points will the option premium change for every 1 point change in the underlying?"

Therefore the Option Greek's 'Delta' captures the effect of the directional movement of the market on the Option's premium.

The delta is a number which varies –

1. Between 0 and 1 for a call option, some traders prefer to use the 0 to 100 scale. So the delta value of 0.55 on 0 to 1 scale is equivalent to 55 on the 0 to 100 scale.

2. Between -1 and 0 (-100 to 0) for a put option. So the delta value of -0.4 on the -1 to 0 scale is equivalent to -40 on the -100 to 0 scale

3. We will soon understand why the put option's delta has a negative value associated with it

At this stage I want to give you an orientation of how this chapter will shape up, please do keep this at the back of your mind as I believe it will help you join the dots better –

1. We will understand how we can use the Delta value for Call Options
2. A quick note on how the Delta values are arrived at
3. Understand how we can use the Delta value for Put Options
4. Delta Characteristics – Delta vs. Spot, Delta Acceleration (continued in next chapter)
5. Option positions in terms of Delta (continued in next chapter)

So let's hit the road!

9.3 – Delta for a Call Option

We know the delta is a number that ranges between 0 and 1. Assume a call option has a delta of 0.3 or 30 – what does this mean?

Well, as we know the delta measures the rate of change of premium for every unit change in the underlying. So a delta of 0.3 indicates that for every 1 point change in the underlying, the premium is likely change by 0.3 units, or for every 100 point change in the underlying the premium is likely to change by 30 points.

The following example should help you understand this better –

Nifty @ 10:55 AM is at 8288

Option Strike = 8250 Call Option

Premium = 133

Delta of the option = + 0.55

Nifty @ 3:15 PM is expected to reach 8310
What is the likely option premium value at 3:15 PM?

Well, this is fairly easy to calculate. We know the Delta of the option is 0.55, which means for every 1 point change in the underlying the premium is expected to change by 0.55 points.

We are expecting the underlying to change by 22 points (8310 – 8288), hence the premium is supposed to increase by

= 22*0.55

= **12.1**

Therefore the new option premium is expected to trade around **145.1** (133+12.1)

Which is the sum of old premium + expected change in premium

Let us pick another case – what if one anticipates a drop in Nifty? What will happen to the premium? Let us figure that out –

Nifty @ 10:55 AM is at 8288

Option Strike = 8250 Call Option

Premium = 133

Delta of the option = 0.55

Nifty @ 3:15 PM is expected to reach 8200

What is the likely premium value at 3:15 PM?

We are expecting Nifty to decline by **– 88** points (8200 – 8288), hence the change in premium will be –

= **– 88 * 0.55**

= **– 48.4**

Therefore the premium is expected to trade around

= 133 – 48.4

= 84.6 (new premium value)

As you can see from the above two examples, the delta helps us evaluate the premium value based on the directional move in the underlying. This is extremely useful information to have while trading options. For example assume you expect a massive 100 point up move on Nifty, and based on this expectation you decide to buy an option. There are two Call options and you need to decide which one to buy.

Call Option 1 has a delta of 0.05

Call Option 2 has a delta of 0.2

Now the question is, which option will you buy?

Let us do some math to answer this –

Change in underlying = 100 points

Call option 1 Delta = 0.05

Change in premium for call option 1 = 100 * 0.05

= 5

Call option 2 Delta = 0.2

Change in premium for call option 2 = 100 * 0.2

= 20

As you can see the same 100 point move in the underlying has different effects on different options. In this case clearly the trader would be better off buying Call Option 2. This should give you a hint – the delta helps you select the right option strike to trade. But of course there are more dimensions to this, which we will explore soon.

At this stage let me post a very important question – Why is the delta value for a call option bound by 0 and 1? Why can't the call option's delta go beyond 0 and 1?

To help understand this, let us look at 2 scenarios wherein I will purposely keep the delta value above 1 and below 0.

Scenario 1: Delta greater than 1 for a call option

Nifty @ 10:55 AM at 8268

Option Strike = 8250 Call Option

Premium = 133

Delta of the option = 1.5 (purposely keeping it above 1)

Nifty @ 3:15 PM is expected to reach 8310

What is the likely premium value at 3:15 PM?

Change in Nifty = 42 points

Therefore the change in premium (considering the delta is 1.5)

= 1.5*42

= **63**

Do you notice that? The answer suggests that for a 42 point change in the underlying, the value of premium is increasing by 63 points! In other words, the option is gaining more value than the underlying itself. Remember the option is a derivative contract, it derives its value from its respective underlying, hence it can never move faster than the underlying.

If the delta is 1 (which is the maximum delta value) it signifies that the option is moving in line with the underlying which is acceptable, but a value higher than 1 does not make sense. For this reason the delta of an option is fixed to a maximum value of 1 or 100.

Let us extend the same logic to figure out why the delta of a call option is lower bound to 0.

Scenario 2: Delta lesser than 0 for a call option

Nifty @ 10:55 AM at 8288

Option Strike = 8300 Call Option

Premium = 9

Delta of the option = – 0.2 (have purposely changed the value to below 0, hence negative delta)

Nifty @ 3:15 PM is expected to reach 8200

What is the likely premium value at 3:15 PM?

Change in Nifty = 88 points (8288 -8200)

Therefore the change in premium (considering the delta is -0.2)

= -0.2*88

= **-17.6**

For a moment we will assume this is true, therefore new premium will be

= -17.6 + 9

= **– 8.6**

As you can see in this case, when the delta of a call option goes below 0, there is a possibility for the premium to go below 0, which is impossible. At this point do recollect the premium irrespective of a call or put can never be negative. Hence for this reason, the delta of a call option is lower bound to zero.

9.4 – Who decides the value of the Delta?

The value of the delta is one of the many outputs from the Black & Scholes option pricing formula. As I have mentioned earlier in this module, the B&S formula takes in a bunch of inputs and gives out a few key outputs. The output includes the option's delta value and other Greeks. After discussing all the Greeks, we will also go through the B&S formula to strengthen our understanding on options. However for now, you need to be aware that the delta and other Greeks are market driven values and are computed by the B&S formula.

However here is a table which will help you identify the approximate delta value for a given option –

Option Type	Approx Delta value (CE)	Approx Delta value (PE)
Deep ITM	Between + 0.8 to + 1	Between – 0.8 to – 1
Slightly ITM	Between + 0.6 to + 1	Between – 0.6 to – 1
ATM	Between + 0.45 to + 0.55	Between – 0.45 to – 0.55
Slightly OTM	Between + 0.45 to + 0.3	Between – 0.45 to -0.3
Deep OTM	Between + 0.3 to + 0	Between – 0.3 to – 0

Of course you can always find out the exact delta of an option by using a B&S option pricing calculator.

9.5 – Delta for a Put Option

Do recollect the Delta of a Put Option ranges from -1 to 0. The negative sign is just to illustrate the fact that when the underlying gains in value, the value of premium goes down. Keeping this in mind, consider the following details –

Parameters	Values
Underlying	Nifty
Strike	8300

Parameters	Values
Spot value	8268
Premium	128
Delta	-0.55
Expected Nifty Value (Case 1)	8310
Expected Nifty Value (Case 2)	8230

Note – 8268 is a slightly ITM option, hence the delta is around -0.55 (as indicated from the table above).

The objective is to evaluate the new premium value considering the delta value to be -0.55. Do pay attention to the calculations made below.

Case 1: Nifty is expected to move to 8310

Expected change = 8310 – 8268

= 42

Delta = – 0.55

= -0.55*42

= -23.1

Current Premium = 128

New Premium = 128 -23.1

= 104.9

Here I'm subtracting the value of delta since I know that the value of a Put option declines when the underlying value increases.

Case 2: Nifty is expected to move to 8230

Expected change = 8268 – 8230

= 38

Delta = – 0.55

= -0.55*38

= -20.9

Current Premium = 128

New Premium = 128 + 20.9

= 148.9

Here I'm adding the value of delta since I know that the value of a Put option gains when the underlying value decreases.

I hope with the above two Illustrations you are now clear on how to use the Put Option's delta value to evaluate the new premium value. Also, I will take the liberty to skip explaining why the Put Option's delta is bound between -1 and 0.

In fact I would encourage the readers to apply the same logic we used while understanding why the call option's delta is bound between 0 and 1, to understand why Put option's delta is bound between -1 and 0.

In the next chapter we will dig deeper into Delta and understand some of its characteristics.

Key takeaways from this chapter

1. Option Greeks are forces that influence the premium of an option
2. Delta is an Option Greek that captures the effect of the direction of the market
3. Call option delta varies between 0 and 1, some traders prefer to use 0 to 100.
4. Put option delta varies between -1 and 0 (-100 to 0)
5. The negative delta value for a Put Option indicates that the option premium and underlying value moves in the opposite direction
6. ATM options have a delta of 0.5
7. ITM option have a delta of close to 1
8. OTM options have a delta of close to 0.

CHAPTER 10

Delta (Part 2)

10.1 – Model Thinking

The previous chapter gave you a sneak peek into the first option Greek – the Delta. Besides discussing the delta, there was another hidden agenda in the previous chapter – to set you on a 'model thinking' path. Let me explain what I mean by this – the previous chapter opened up a new window to evaluate options. The window threw open different option trading perspectives – hopefully you now no longer think about options in a one-dimensional perspective.

For instance going forward if you have view on markets (bullish for example) you **may not** strategize your trade this way – 'My view is bullish, therefore it makes sense to either buy a call option or collect premium by selling a put option'.

Rather you may strategize this way – "My view is bullish as I expect the market to move by 40 points, therefore it makes sense to buy an option which has a delta of 0.5 or more as the option is expected to gain at least 20 points for the given 40 point move in the market".

See the difference between the two thought processes? While the former is a bit naïve and casual, the latter is well defined and quantitative in nature. The expectation of a 20 point move in the option premium was an outcome of a formula that we explored in the previous chapter –

Expected change in option premium = Option Delta * Points change in underlying

The above formula is just one piece in the whole game plan. As and when we discover the other Greeks, the evaluation metric becomes more quantitative and in the process the trade selection becomes more scientifically streamlined. Point is – the thinking going forward will be guided by equations and numbers and 'casual trading thoughts' will have very little scope. I know there are many traders who trade just with a few random thoughts and some may even be successful. However this is not everybody's cup of tea. The odds are better when you put numbers in perspective – and this happens when you develop 'model thinking'.

So please do keep model thinking framework in perspective while analyzing options, as this will help you setup systematic trades.

10.2 – Delta versus spot price

In the previous chapter we looked at the significance of Delta and also understood how one can use delta to evaluate the expected change in premium. Before we proceed any further, here is a quick recap from the previous chapter –

1. Call options has a +ve delta. A Call option with a delta of 0.4 indicates that for every 1 point gain/loss in the underlying the call option premium gains/losses 0.4 points

2. Put options has a –ve delta. A Put option with a delta of -0.4 Indicates that for every 1 point loss/gain in the underlying the put option premium gains/losses 0.4 points

3. OTM options have a delta value between 0 and 0.5, ATM option has a delta of 0.5, and ITM option has a delta between 0.5 and 1.

Let me take cues from the 3rd point here and make some deductions. Assume Nifty Spot is at 8312, strike under consideration is 8400, and option type is CE (Call option, European).

1. What is the approximate Delta value for the 8400 CE when the spot is 8312?

a. Delta should be between 0 and 0.5 as 8400 CE is OTM. Let us assume Delta is 0.4

2. Assume Nifty spot moves from 8312 to 8400, what do you think is the Delta value?

a. Delta should be around 0.5 as the 8400 CE is now an ATM option

3. Further assume Nifty spot moves from 8400 to 8500, what do you think is the Delta value?

a. Delta should be closer to 1 as the 8400 CE is now an ITM option. Let us say 0.8.

4. Finally assume Nifty Spot cracks heavily and drops back to 8300 from 8500, what happens to delta?

a. With the fall in spot, the option has again become an OTM from ITM, hence the value of delta also falls from 0.8 to let us say 0.35.

5. What can you deduce from the above 4 points?

a. Clearly as and when the spot value changes, the moneyness of an option changes, and therefore the delta also changes.

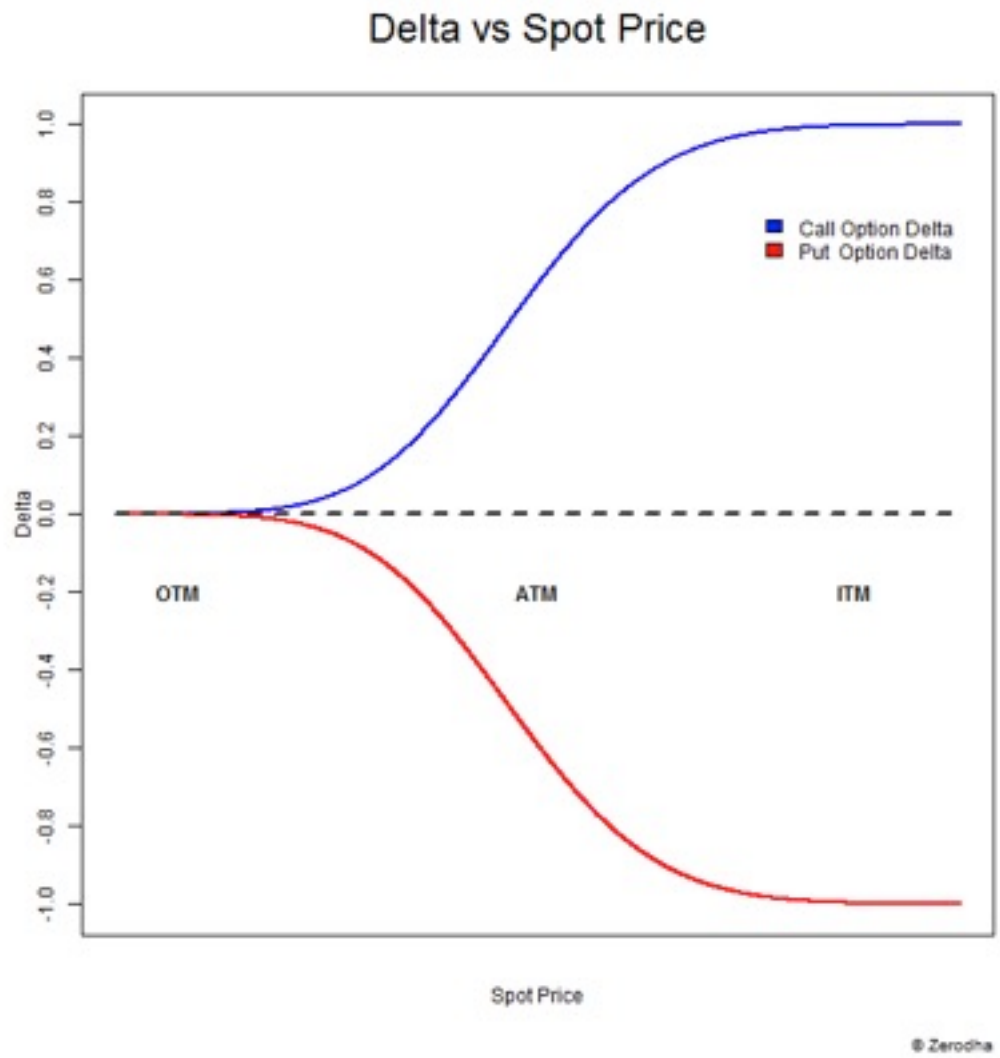
Now this is a very important point here – **the delta changes with changes in the value of spot**. Hence delta is a variable and not really a fixed entity. Therefore if an option has a delta of 0.4, the value is likely to change with the change in the value of the underlying.

Have a look at the chart below – it captures the movement of delta versus the spot price. The chart is a generic one and not specific to any particular option or strike as such. As you can see there are two lines –

1. The blue line captures the behavior of the Call option's delta (varies from 0 to 1)

2. The red line captures the behavior of the Put option's delta (varies from -1 to 0)

Let us understand this better –



This is a very interesting chart, and to begin with I would suggest you look at only the blue line and ignore the red line completely. The blue line represents the delta of a call option. The graph above captures few interesting characteristics of the delta; let me list them for you (meanwhile keep this point in the back of your mind – as and when the spot price changes, the moneyness of the option also changes) –

1. Look at the X axis – starting from left the moneyness increases as the spot price traverses from OTM to ATM to ITM

2. Look at the delta line (blue line) – as and when the spot price increases so does the delta

3. Notice at OTM the delta is flattish near 0 – this also means irrespective of how much the spot price falls (going from OTM to deep OTM) the option's delta will remain at 0

a. Remember the call option's delta is lower bound by 0

4. When the spot moves from OTM to ATM the delta also starts to pick up (remember the option's moneyness also increases)

a. Notice how the delta of option lies within 0 to 0.5 range for options that are less than ATM

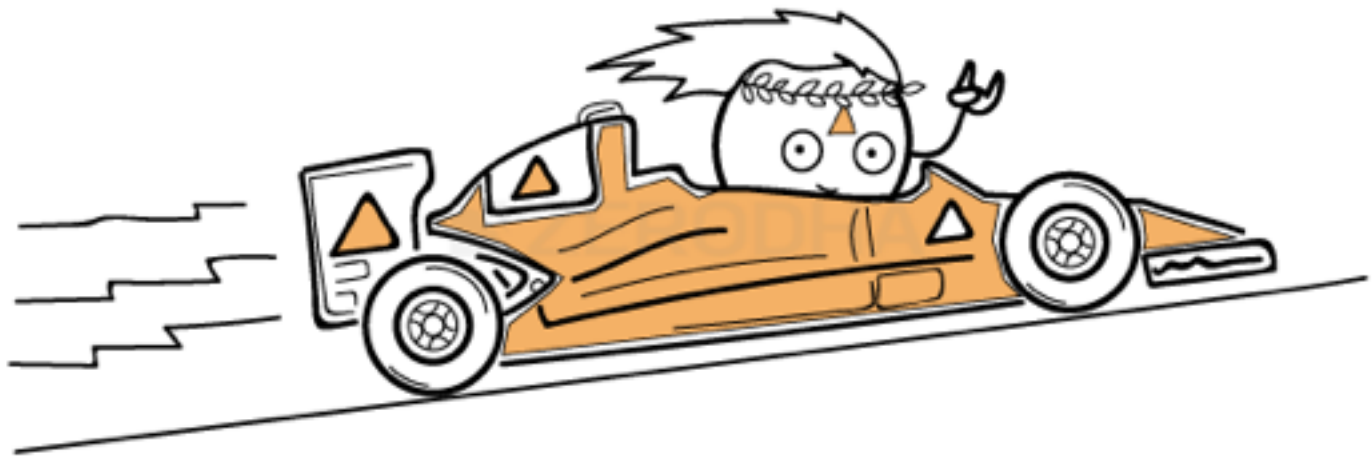
5. At ATM, the delta hits a value of 0.5

6. When the spot moves along from the ATM towards ITM the delta starts to move beyond the 0.5 mark

7. Notice the delta starts to fatten out when it hits a value of 1

a. This also implies that as and when the delta moves beyond ITM to say deep ITM the delta value does not change. It stays at its maximum value of 1.

You can notice similar characteristics for the Put Option's delta (red line).



10.3 – The Delta Acceleration

If you are fairly involved in the options world you may have heard of bizarre stories of how traders double or triple their money by trading OTM option. If you have not heard such stories, let me tell you one – It was 17th May 2009 (Sunday), the election results were declared, the UPA Government got re-elected at the center and Dr.Manmohan Singh came back as the country's Prime Minister to serve his 2nd term. Stock markets likes stability at the center and we all knew that the market would rally the next day i.e. 18th May 2009. The previous day Nifty had closed at 3671.

Zerodha was not born then, we were just a bunch of traders trading our own capital along with a few clients. One of our associates had taken a huge risk few days prior to 17th May – he bought

far off options (OTM) worth Rs.200,000/-. A dare devil act this was considering the fact that nobody can really predict the outcome of a general election. Obviously he would benefit if the market rallied, but for the market to rally there were many factors at play. Along with him, we too were very anxious to figure out what would happen. Finally the results were declared and we all knew he would make money on 18th May – but none of us really knew to what extent he would stand to benefit.

18th May 2009, a day that I cannot forget – markets opened at 9:55 AM (that was the market opening time back then), it was a big bang open for market, Nifty immediately hit an upper circuit and the markets froze. Within a matter of few minutes Nifty rallied close to 20% to close the day at 4321! The exchanges decided to close the market at 10:01 AM as it was overheated…and thus it was the shortest working day of my life.

Here is the chart that highlights that day's market move –

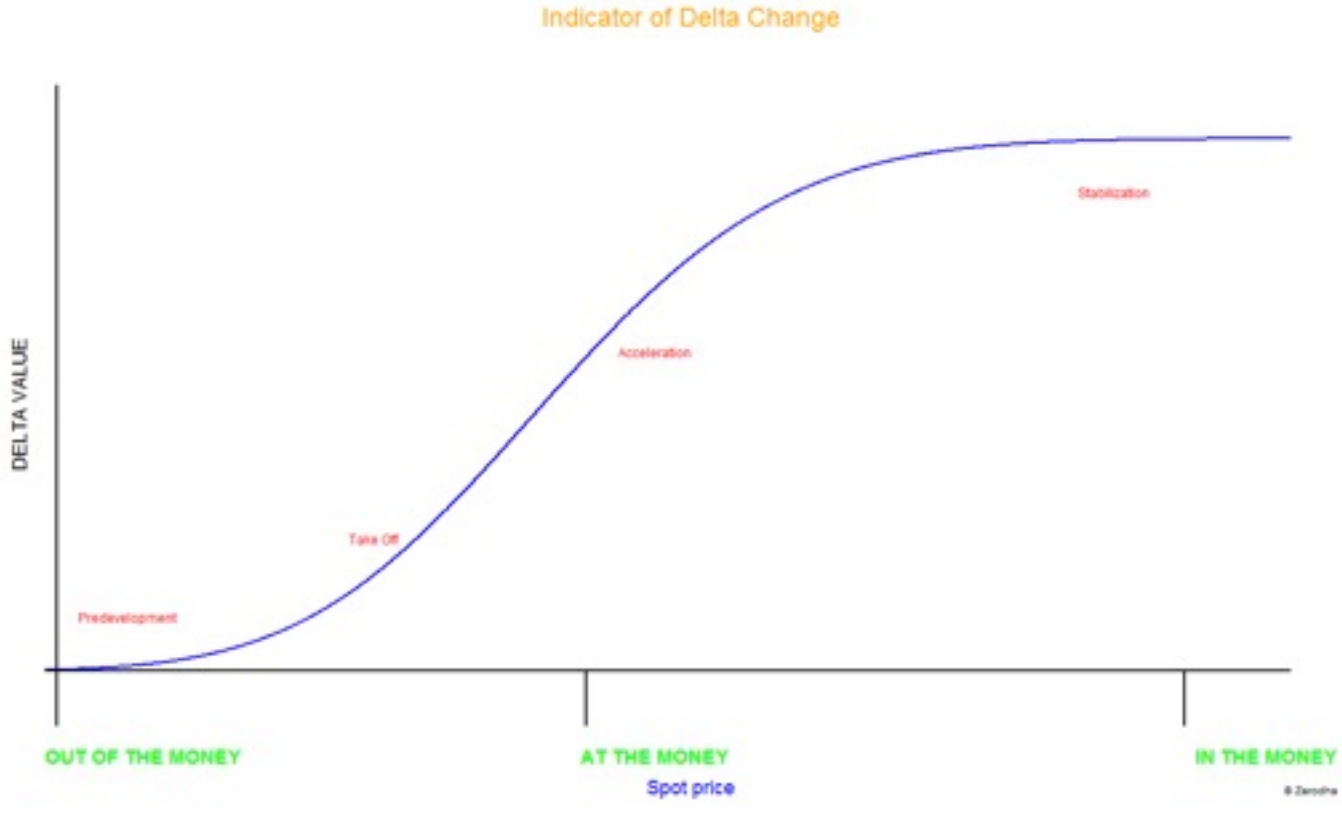
In the whole process our dear associate had made a sweet fortune. At 10:01 AM on that glorious Monday morning, his option were valued at Rs.28,00,000/- a whopping 1300% gain all achieved overnight! This is the kind of trades that almost all traders including me aspire to experience.

Anyway, let me ask you a few questions regarding this story and that will also bring us back to the main topic –

1. Why do you think our associate choose to buy OTM options and not really ATM or ITM options?

2. What would have happened if he had bought an ITM or ATM option instead?

Well the answers to these questions lies in this graph –



This graph talks about the 'Delta Acceleration' – there are 4 delta stages mentioned in the graph, let us look into each one of them.

Before we move ahead with the following discussion some points for you here –

➡ I would advise you to pay a lot of attention to the following discussion, these are some of the really important points to know and remember

➡ Do recollect and revise the delta table (option type, approximate delta value etc) from the previous chapter

➡ Please do bear in mind the delta and premium numbers used here is an intelligent assumption for the sake of this illustration –

Predevelopment – This is the stage when the option is OTM or deep OTM. The delta here is close to 0. The delta will remain close to 0 even when the option moves from deep OTM to OTM. For example when spot is 8400, 8700 Call Option is Deep OTM, which is likely to have a delta of 0.05. Now even if the spot moves from 8400 to let us say 8500, the delta of 8700 Call option will not move much as 8700 CE is still an OTM option. The delta will still be a small non – zero number.

So if the premium for 8700 CE when spot is at 8400 is Rs.12, then when Nifty moves to 8500 (100 point move) the premium is likely to move by 100 * 0.05 = 5 points.

Hence the new premium will be Rs.12 + 5 = Rs.17/-. However the 8700 CE is now considered slightly OTM and not really deep OTM.

Most important to note – the change in premium value in absolute terms maybe small (Rs.5/-) but in percentage terms the Rs.12/- option has changed by 41.6% to Rs.17/-

Conclusion – Deep OTM options tends to put on an impressive percentage however for this to happen the spot has to move by a large value.

Recommendation – avoid buying **deep OTM** options because the deltas are really small and the underlying has to move massively for the option to work in your favor. There is more bang for the buck elsewhere. However for the very same reason selling deep OTM makes sense, but we will evaluate when to sell these options when we take up the Greek 'Theta'.

Take off & Acceleration – This is the stage when the option transitions from OTM to ATM. This is where the maximum bang for the buck lies, and therefore the risk.

Consider this – Nifty spot @ 8400, Strike is 8500 CE, option is slightly OTM, delta is 0.25, Premium is Rs.20/-.

Spot moves from 8400 to 8500 (100 point), to figure out what happens on the premium side, let us do some math –

Change in underlying = 100

Delta for 8500 CE = 0.25

Premium change = 100 * 0.25 = 25

New premium = Rs.20 + 25 = Rs.45/-

Percentage change = 125%

Do you see that? For the same 100 point move slightly OTM options behaves very differently.

Conclusion – The slightly OTM option which usually has a delta value of say 0.2 or 0.3 is more sensitive to changes in the underlying. For any meaningful change in the underlying the percentage change in the slightly OTM options is very impressive. In fact this is exactly how option traders double or triple their money i.e. by buying slightly OTM options when they expect big moves in

the underlying. But I would like to remind you that this is just one face of the cube, there are other faces we still need to explore.

Recommendation – Buying slightly OTM option is more expensive than buying deep OTM options, but if you get your act right you stand to make a killing. Whenever you buy options, consider buying slightly OTM options (of course assuming there is plenty of time to expiry, we will talk about this later).

Let us take this forward and see how the ATM option would react for the same 100 point move.

Spot = 8400

Strike = 8400 (ATM)

Premium = Rs.60/-

Change in underlying = 100

Delta for 8400 CE = 0.5

Premium change = 100 * 0.5 = 50

New premium = Rs.60 + 50 = Rs.110/-

Percentage change = 83%

Conclusion – ATM options are more sensitive to changes in the spot when compared to OTM options. Now because the ATM's delta is high the underlying need not really move by a large value. Even if the underlying moves by a small value the option premium changes. However buying ATM options are more expensive when compared to OTM options.

Recommendation – Buy ATM options when you want to play safe. The ATM option will move even if the underlying does not move by a large value. Also as a corollary, do not attempt to sell an ATM option unless you are very sure about what you are doing.

Stabilization – When the option transitions from ATM to ITM and Deep ITM the delta starts to stabilize at 1. As we can see from the graph, the delta starts to flatten out when hits the value of 1. This means the option can be ITM or deep ITM but the delta gets fixed to 1 and would not change in value.

Let us see how this works –

Nifty Spot = 8400

Option 1 = 8300 CE Strike, ITM option, Delta of 0.8, and Premium is Rs.105

Option 2 = 8200 CE Strike, Deep ITM Option, Delta of 1.0, and Premium is Rs.210

Change in underlying = 100 points, hence Nifty moves to 8500.

Given this let us see how the two options behave –

Change in premium for Option 1 = 100 * 0.8 = **80**

New Premium for Option 1 = Rs.105 + 80 = Rs.185/-

Percentage Change = 80/105 = **76.19%**

Change in premium for Option 2 = 100 * 1 = **100**

New Premium for Option 2 = Rs.210 + 100 = Rs.310/-

Percentage Change = 100/210 = **47.6%**

Conclusion – In terms of the absolute change in the number of points, the deep ITM option scores over the slightly ITM option. However in terms of percentage change it is the other way round. Clearly ITM options are more sensitive to the changes in the underlying but certainly most expensive.

Most importantly notice the change in the deep ITM option (delta 1) for a change of 100 points in the underlying there is a change of 100 points in the option premium. **This means to say when you buy a deep ITM option it is as good as buying the underlying itself**.This is because whatever is the change in the underlying, the deep ITM option will experience the same change.

Recommendation – Buy the ITM options when you want to play very safe. When I say safe, I'm contrasting the deep ITM option with deep OTM option. The ITM options have a high delta, which means they are most sensitive to changes in the underlying.

Deep ITM option moves in line with the underlying, this means you can substitute a deep ITM option to a futures contract!

Think about this –

Nifty Spot @ 8400

Nifty Futures = 8409

Strike = 8000 (deep ITM)

Premium = 450

Delta = 1.0

Change in spot = 30 points

New Spot value = 8430

Change in Futures = 8409 + 30 = 8439 à Reflects the entire 30 point change

Change Option Premium = 1*30 = 30

New Option Premium = 30 + 450 = 480 à Reflects the entire 30 point change

So the point is, both futures and Deep ITM options react very similar to the changes in the underlying. Hence you are better off buying a Deep ITM option and therefore lessen your margin burden. However if you opt to do this, you need to constantly make sure that the Deep ITM option continues to remain Deep ITM (in other words make sure the delta is always 1), plus do keep an eye on the liquidity of the contract.

I would suspect that at this stage the information contained in this chapter could be an overdose, especially if you are exploring the Greeks for the first time. I would suggest you take your time to learn this one bit at a time.

There are few more angles we need to explore with respect to the delta, but will do that in the next chapter. However before we conclude this chapter let us summarize the discussion with the help of a table.

This table will help us understand how different options behave differently given a certain change in the underlying.

I've considered Bajaj Auto as the underlying. The price is 2210 and the expectation is a 30 point change in the underlying (which means we are expecting Bajaj Auto to hit 2240). We will also assume there is plenty of time to expiry; hence time is not really a concern.

Moneyness	Strike	Delta	Old Premium	Change in Premium	New Premium	% Change
Deep OTM	2400	0.05	Rs.3/-	30* 0.05 = 1.5	3+1.5 = 4.5	50%
Slightly OTM	2275	0.3	Rs.7/-	30*0.3 = 9	7 +9 = 16	129%
ATM	2210	0.5	Rs.12/-	30*0.5 = 15	12+15 = 27	125%
Slightly ITM	2200	0.7	Rs.22/-	30*0.7 = 21	22+21 = 43	95.45%
Deep ITM	2150	1	Rs.75/-	30*1 = 30	75 + 30 =105	40%

As you can see each option behaves differently for the same move in the underlying.

Before I wrap this chapter – I narrated a story to you earlier in this chapter following which I posted few questions. Perhaps you can now revisit the questions and you will hopefully know the answers

Key takeaways from this chapter

1. Model Thinking helps in developing a scientifically streamlined approach to trading
2. The Delta changes as and when the spot value changes
3. As the option transitions from OTM to ATM to ITM, so does the delta
4. Delta hits a value of 0.5 for ATM options
5. Delta predevelopment is when the option transitions from Deep OTM to OTM
6. Delta Take off and acceleration is when the option transitions from OTM to ATM
7. Delta stabilization is when the option transitions from ATM to ITM to Deep ITM
8. Buying options in the take off stage tends to give high % return
9. Buying Deep ITM option is as good as buying the underlying.