Delta Hedging Using Covered Call: A Profitable and less Risky Investment Strategy

ISSN 2321 – 371X
Commerce Spectrum 6(1) 1-7

santhasaraswathy4@gmail.com
www.commercespectrum.com

Vinoo Mathew
Assistant Professor

Marygiri College of Arts and Science
Koothattukulam P.O, Email:zidane.vinu@gmail.com

Abstract

All of us are familiar with the term option contracts, the derivative instrument which are quite common among active traders. In Indian market scenario index options are much popular compared to stock options with a few exceptions. The derivatives market is considered to be a dangerous one and most of the traders who have started trading in derivatives have burnt their fingers just because of not understanding the concept of 'time value'. The trades are executed through options contracts and that too an index option with the help of greek's of options like delta, theta gamma and vega. As has been pointed out by a number of researchers, the normally calculated delta does not minimize the variance of changes in the value of a trader's position. This is because there is a non-zero correlation between movements in the price of the underlying asset and movements in the asset's volatility. The minimum variance delta takes account of both price changes and the expected change in volatility conditional on a price change. Delta is by far the most important hedge parameter and fortunately it is the one that can be most easily adjusted as it only requires a trade in the underlying asset. Implied volatility plays a major role in determining the fair value of an option contract and without understanding the impact of implied volatility options trading can be a night mare for most of the traders. One mistake that traders usually make is to ignore the implied volatility (IV) and only consider delta and theta. Option traders adjust delta frequently, making it close to zero, by trading the underlying asset. Arranging delta every now and then by initiating new trades would be a cumbersome process but the effort would be justified when it comes at a risk of 4-5%. The objective of this research paper is to find out ways by which a person who has knowledge about stock market can get decent returns. In this research paper the researcher has tried to introduce a financial model based on index options and futures contract which is less risky compared to naked futures positions in the market. The research paper analyses Black Scholes Model of option pricing and the pitfalls and differences associated with the original model using secondary data consisting of option prices and the value of nifty futures for the same period. Technical analysis software Metastock is used for deriving the values of option greeks. The study revealed that if a trader uses the time value of options wisely along with futures contract it can give the best possible result within a month's time. A well-informed investor who is good in reading technical charts can easily make a return by using model of delta hedging strategy.

Keywords:
Implied volatility, covered call, delta hedging, nifty, greeks, call option, put option, theta, gamma

Introduction

All of us are familiar with the term options contracts the derivative instruments which are quite common among active traders. In Indian market scenario index options are much popular compared to stock options with a few exceptions. The derivatives market is considered to be a dangerous one and most of the traders who have started trading in derivatives have burnt their fingers just because of not understanding the concept of 'time value'. Thus, don't expect exceptional profits from options or futures contract but expect a reasonable gain of close to 25% per annum if you properly hedge your positions and then trade. The trades are executed through options contracts and that too an index option with the help of greek's of options like delta, theta gamma and Vega. As has been pointed out by a number of researchers, the normally calculated delta does not minimize the variance of changes in the value of a trader's position. This is because there is a non-zero correlation between movements in the price of the underlying asset and movements in the

asset's volatility. The minimum variance delta takes account of both price changes and the expected change in volatility conditional on a price change.

Statement of the Problem

Delta is by far the most important hedge parameter and fortunately it is the one that can be most easily adjusted as it only requires a trade in the underlying asset. Ever since the birth of exchange-traded options markets in 1973, delta hedging has played a major role in the management of portfolios of options. Hedging using options can be different depending on the nature of the maturity of markets. For example, both index options and stock options have enough depth in U S markets but Indian market is still in a nascent state when we come to stock options. Implied volatility plays a major role in determining the fair value of an options contract and without understanding the impact of implied volatility options trading can be a night mare for most of the traders. One mistake that traders usually make is to ignore the implied volatility (IV) and only consider delta and theta. Option traders adjust delta frequently, making it close to zero, by trading the underlying asset. Arranging delta every now and then by initiating new trades would be a cumbersome process but the effort would be justified when it comes at a risk of 4-5%.

Objective of the study

The objective of this research paper is to find out ways by which a person who has knowledge about stock market can get decent returns. In this research paper the researcher has introduced a financial model based on index options and futures contract which is less risky compared to naked futures positions in the market.

Research Methodology

Usually the problem faced by a layman is that he has enough money to spend on trading activities but he is not able to specify his investment vehicles. A person who is trading in index options should have the basic knowledge of stock markets and need to have the patience to wait till the expiry of option contracts. While writing options one needs to wait until the time value gets eroded as that would be the profit element in writing options. A covered call would be a simple strategy of buying futures contract along with selling an options contract. For example, if we are long on nifty futures contract at 10200 we would hedge that long position by writing a call option. When we sell an option contract some major questions that would come to the mind are which one to sell, when to sell, when to square off the position, how much investment is involved etc.The research paper analyses effectiveness of delta hedging strategy in the Indian market scenario using secondary data consisting of option prices of six months and the value of nifty futures for the same period. Technical analysis software Metastock is used for deriving the values of option greeks.

Greeks of options

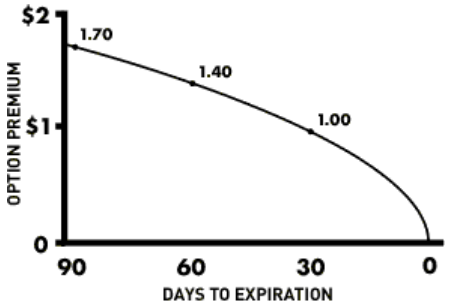
Before discussing Greeks of options Implied volatility (IV) is an important term that should be known to all option traders. The Implied Volatility of an option is the theoretical volatility based on the option's quoted price. It is an estimate of how its price may change going forward. In other words, implied volatility is the estimated volatility of a stock that is implied by the prices of the options on that stock. Volatility is somewhat related to the standard deviation in statistics. Implied volatility would tell you whether an option contract is overpriced or under-priced. A contract with higher IV would be over priced and usually traders would prefer to write those and people would buy those contracts where IV's are low. Usually when the market is bearish the IV's would rise and that means more amount of time value is available in those contracts.

Delta is the amount an option price is expected to move based on a one rupee change in the underlying stock. Calls have positive delta, between 0 and 1. That means if the stock price goes up and no other pricing variables change, the price for the call will go up. Here's an example. If a call has a delta of .50 and the stock goes up Re.1, in theory, the price of the call will go up about .50. If the stock goes down Re.1, in theory, the price of the call will go down about .50. Puts have a negative delta, between 0 and -1. That means if the stock goes up and no other pricing variables change, the price of the option will go down. For example, if a put has a delta of -.50 and the stock goes up Re.1, in theory, the price of the put will go down .50. If the stock goes down Re.1, in theory, the price of the put will go up .50. As a general rule, in-the-money options will move more than out-of-the-money options, and short-term options will react more than longer-term options to the same price change in the stock.

As expiration nears, the delta for in-the-money calls will approach 1, reflecting a one-to-one reaction to price changes in the stock. Delta for out of the-money calls will approach 0 and won't react at all to price changes in the stock. This happens because at the expiry day out of the money options will have only time value left in that and all options that have only time value will turn out to be zero. As expiration approaches, the delta for in-the-money puts will approach -1 and delta for out-of-the-money puts will approach 0.

Gamma is the rate that delta will change based on a Re.1 change in the stock price and thus it is considered as the second derivative. So **if delta is the "speed" at which option prices change, you can think of gamma as the "acceleration."** Options with the highest gamma are the most

responsive to changes in the price of the underlying security. **Time decay, or theta, is enemy number one for the option buyer. On the other hand, for an option seller that would be his best friend**. An option seller always looks for those options which are highly priced. This can happen due to two reasons; lack of demand and high implied volatility (IV). Theta is the amount the price of calls and puts will decrease (at least in theory) for a one-day change in the time to expiration. A person who is in the business of delta hedging should definitely be aware about elements like theta and volatility as these are the two things that an option seller is concentrating on while building an options portfolio. This graph shows how an at-the-money option's value will decay over the last three months until expiration. Notice how time value melts away at an accelerated rate as expiration approaches.



Source:www.projectoption.com

Figure 1

Vega is the amount call and put prices will change, in theory, for a corresponding one-point change in implied volatility. Vega does not have any effect on the intrinsic value of options; it only affects the "time value" of the price of an option. Typically, as implied volatility increases, the value of options will increase. That's because an increase in implied volatility suggests an increased range of potential movement for the stock.

Option greeks and relevance of positions (Long and short)

- Long calls have positive delta and short calls will have negative delta.
- Long puts have negative delta and short puts have positive delta.
- Long stock has positive delta and short stock has negative delta

Positive delta means the option's value will increase when the underlying stock price increases and will decrease when the stock price decreases (positive relationship). Negative delta means the value of an option will increase when the underlying stock price drop, and will decrease when the stock price rises (negative relationship).

For calls, the value of delta ranges from 0 to 1 whereas for Puts from -1 to 0. Calls have a positive delta because call premiums increase when the underlying stock price increases and vice versa assuming all other factors remaining the same. In contrast, puts have a negative delta because the put option price drops when the stock price goes up and vice versa.

- Long calls and long puts always have negative theta.
- Short calls and short puts always have positive theta.
- Stock has zero theta as the time value erosion is not happening there.

Positive theta means the option value will increase as the time passes, while negative theta means the option value will fall as the time passes. Therefore, it makes sense that long options have negative theta and short options have positive theta. If options are continuously losing their time value as days pass, a long option position will lose money because of theta, whereas a short option position will make money because of theta.

Different ways to initiate an options trade

An options trader can initiate trades in different ways: i) a naked call or put on the long side ii) a naked call or put on the short side iii.) a futures contract on the long side and a call on the short side or any of the famous options trading strategies like butterfly or straddles. While initiating trades an options trader is concerned about only one thing, 'how can he earn decent returns at lower risk'? A layman would think an options contract would be one of the cheapest instruments available in the market which can give enormous returns. While a seasoned trader knows that options are instruments for hedging your risk in a single side trade either on the long or short side.

Hedging can give you calculated profits but not a huge return, for example a stock might give you a return of 300-400% in a 2-3 years' time frame if the market is on a continuous bull run but an options portfolio might give you a consistent return of 25-30% per annum. Options trade would do its best when the market is in a range bound mode or while trending downwards. In a bear market most of the stocks would give a negative return while a long put can give you tremendous return compared to the capital employed.

The basic question that comes to the mind of a trader while thinking about options contract would be whether to buy or sell an options contract. Buying an options contract would be cheap as it involves less capital but if the market does not initiate a strong move the contract would end at a loss. For example, if a nifty call option contract with a strike price of 10000 would be trading at ₹ 50 and a trader expects the market to reach to 10200.If the market reaches 10200 before the expiry the fair value of the call option contract would be 200 and

the trader would get a profit of ₹ 150/contract but if the market reaches 10200 marks just after the expiry month that option contract on the long side would end worthless. Thus, an option trader should have a fair idea about the speed at which the stock or index advances. The process would be somewhat difficult and most of the traders would lose their money at the end. Even an option writer should be aware about the speed at which an index or stock advances but he should be aware only about the range in which at index moves. If an options writer knows that the market would move in a range of 10000-10600 he can easily initiate traders on the short side and make some money during that expiry. There would be returns but as options selling involves good amount of money the return compared to the capital employed would be less and it can easily earn a return of 25-30% if you are ready to invest anything above 3 lakhs. Usually option sellers use more money as the trades would happen in different legs. An option trader who uses only the general strategies like straddle, strangle, butterfly make not be aware about the delta hedging strategy. Delta hedging does not generally talk about matching a selling trade and buying trade, it just matches the long and short side trades by adjusting delta.

If you take a 10 years' time frame a market would run up or go down consistently for 10 years. For at least 75-80% of the time it would spend time going nowhere and in technical terms it would be called as a 'range bound market'. A range bound market would be an option writer's paradise as they would be happy selling options contract against their equity positions on the long side. Time value would be the enemy of those option traders who are on the long side either call or put option. An option trader would buy a contract (either a call or put) if he believes that market would make a strong move either on the upside or downside. As the time value factor is not in favor of an option buyer the long side trade can give good amount of profit if the market makes a sharp move within a short period of time.

Initiating a covered call position

a) A simple covered call position can be initiated as follows:

Buy nifty futures at ₹10700

Sell at the money call of 10700 strike at ₹100

In this simple covered call strategy, the break-even point lies at 10600 on the downside. As we have sold the call option contract at ₹ 100 till it reaches 10600 the trader is safe as the long position is covered by the sold call. If the market moves up the trader can lock the profit of 100 points if it passes 10800 mark and even if the market moves beyond 10800 mark the trader would get only 100 points and he would face an opportunity loss. The payoff matrix would explain the profitability positions at each level at the expiry day.

Table 1: Payoff matrix of nifty options

Nifty	Profit/loss of Call 10700 (Short at ₹100)	Profit/loss of futures (long)	Profit/loss
10300	100	-400	-300
10400	100	-300	-200
10500	100	-200	-100
10600	100	-100	0
10700	100	0	100
10800	0	100	100
10900	-100	200	100
11000	-200	300	100

Source: Simulation with imaginary figures

b) Covered call with a protective put

The simple covered call would cover the downside risk up to certain level but beyond a particular point the hedge become worthless if the trader is not selling more calls. A put option contract is the one which we use to cover the downside risk. The buyer of a put option contract is buying a protective cover to hedge the downside risk. Along with the normal covered call a protective put would be a reasonable option. A trading idea with protective put would be like this.

- Buy nifty futures at 10700
- Sell at the money call option contract of 10700 at ₹100
- Buy 10600 put option contract at ₹ 50

Table 2: Payoff matrix for covered call with protective put

Nifty	Profit/loss of Call 10700 (Short at ₹100)	Profit/loss of 10600 Put option (Long at ₹50)	Profit/loss of futures (long)	Profit/loss
10300	100	250	-400	-50
10400	100	150	-300	-50
10500	100	50	-200	-50
10600	100	-50	-100	-50
10700	100	-50	0	50
10800	0	-50	100	50
10900	-100	-50	200	50
11000	-200	-50	300	50

Source: Simulation with imaginary figures

Now let's analyse the positions in these two cases. In the first case the downside risk is unlimited though a call is sold and premium of that call option would be in favor of the trader. A simple covered call is initiated when you are already in a profitable position in your longs. After reaching a particular point if you want to lock your profits we can initiate call writing strategy. This strategy would be beneficial for the trader if the market remains range bound or when it goes up and then remains range bound. In case if the market goes down it would wipe off all the gains we had made till now. The

problem with option writing is the trader should have the patience to wait close to the expiry day as the position would start giving you money when the time decay is at its peak and that happens when we come close to the expiry day. When we write options, a trader should always know about the implied volatility of options. **A trader should always sell those options with higher implied volatilities (IV's) and buy options with lower implied volatilities (IV's)**. Implied volatilities are directly proportional to the demand conditions in the market. Once we are close to the expiry we could see that options closer to at the money options will have lower IV's and options which are far will have higher IV's.

Delta hedging strategies while executing a covered call strategy

An options trader with no knowledge of option greeks would initiate trades in the above-mentioned way but a seasoned trader would always consider greeks before initiating option trades. An 'at the money' call or put option will have a delta of .50 and a futures contract of nifty will have a delta of 1. In the money call or put options will have a delta of more than .50 and deep in the money options will have a delta of 1. If the option contract goes that deep it will not have any time value left in that option and will contain only intrinsic value. Thus, for a proper delta hedge to be executed we need to go long on one futures contract with 1 delta and write two calls of .50 delta each. It is always wise to go pick the right direction using technical charts and execute trades to be in profit. A perfect delta hedge won't earn you any money is a riskless situation and the return on any investment will be directly proportional to the risk taken.

For example, on the 17th of January 2018 nifty was trading at 10700 and the market prices of the February options contracts were as follows. 10700 call – ₹ 206, 10750 call- ₹175, 10800 call – ₹ 145, 10850 call – ₹ 119, 10900 call- ₹ 100 etc. This is supposed to be the right time to execute a covered call strategy. It would be safe to have at least ₹ 5, 00,000 in your trading account before executing covered calls and writing options need more money in your account. The expiry day of January is 25th Thursday and it is just a week to go and at the money call of 10700 is giving a premium of ₹ 206.Before executing a covered call trade we need to assess the range of nifty in the coming month and for this we need to have an outlook about the technical chart of nifty. Usually technical charts are used in trading for determining the entry and exit points based on support and resistance levels.

Source: www.chartink.com

Figure 2: Nifty price chart during 2016-2017

From the charts it was evident that nifty was reluctant to go down and was slowly inching up. Thus, a trader should first buy nifty futures contract at 10700 and as a safe bet sell out money February call of 10900 at ₹ 100.Now if we analyse the delta positions we could see that we have one long futures (+100 delta) and 10900 strike (-25 delta). Thus, we are short of 75 delta points or it means that we are slightly bullish on the market. By executing this trade, the trader expects the market to move up in the coming weeks before going down. If the market moves up as per his expectations he would be in profit soon. As per the trader's expectation if the market moves up to 10900 levels he would be in a profit of 200 points on his long position and he would lose close to 50-60 points on his written call. It happens because as the call is of far month expiry the time decay would be less and thus delta can

shoot up to 50. Thus, if the delta moves up it would obviously increase the rate of the option contract and as we are on the short side (call option) this would be a loss for the trader. In this current position we could get at least 140 points in total (200-60). The trade can be initiated in one lot or more depends upon the margin available for the trader.

If the market moves against the expectation of the trader ie; he had a bullish stand while he executed the trade but market went his expectations. Remember his trades; long nifty futures at 10700 levels and short nifty 10900 calls at 100.In this scenario market can behave in two ways;

1.) It can remain sideways for some days and then slide down 2.) Go down every day. As per the current market scenario the market is not ready to go down in one go. Whenever it goes down it is getting lot of buying interest and thus it is maintaining its bullish outlook.

Remaining sideways and then going down or sliding down in one go – If the market remains sideways by making 25-50 points up or down would make the call to value less and we are not seeing much value reduction in our long position in futures. The problem lies here; if we are not judging the market properly we would lose the chance of selling another out of the money call option at a higher price as the prices are coming down. When we execute a covered call strategy we always need to sell more premiums. Thus, it is wise to sell one more call of 10900 at ₹80 (as market came down or after a week of range bound session the price of the call would come down)

Thus, the current trade is like this
Long futures at 10700 - Delta +100
Sell 10900 calls at ₹ 90 (2 lots) - Delta – 50

Now if the market comes down to 10600 levels after one more week we can sell 10800 call (2 lots) at ₹ 100 (prices have reduced because of time decay) and book profit in 10900 call. We can at least get 100 points in both these calls together. We are booking profits in those calls as the delta of those calls has become negligible and we are getting decent profits in that. In this situation a wise trader would get out in profit. If the market again goes down to 10500-10450 levels and finds support it is wise to add a long futures position as our average price of buying position would come down. The moment you add one more long position along with the previous lot it is wise to sell an at the money call. If the trader feels a deeper cut in the market he can also sell one more call of 10700 strikes.

Thus, the current trade can be like this
Long futures at 10700 and 10500
(Average level of 10600) - Delta +200
Sold 10800 call at ₹100 - Delta - 40
Sold 10600 call at 150 - Delta – 50

No need to initiate a protective put position now as we are buying a put position we need to wait for the premiums to come down and thus it is better to wait close to the expiry week before initiating a put position. Now let's examine the payoff matrix if the market expires at the following levels at expiry.

Table 3: Payoff matrix for range bound markets

Contracts	Trade initiated(Rs)	10400	10500	10600	10700	10800
2 Futures (long)	10600	-400	-200	0	+200	+400
10900 call(short) 2 lots	90	+100	+100	+100	+100	+100
10800 call (short) 2 lots	100	+200	+200	+200	+200	+200
10600 call (short)	150	+150	+150	+150	+50	-50
Profit/loss		+50	+250	+450	+550	+650

Source: Simulation with imaginary figures

(In some of the technical charts Greeks tool may give the value from 1 to 100. Thus 0-1 and 0-100 are one and the same. For example 40 delta means .4)

The position says that the downside range ends at 10400 and if the market goes below that zone we need to write more calls or buy puts. If the market slides down continuously and then makes an upward move it is better to add puts at that moment as that would be more economical. The same is applicable in the case of stocks too but as stock options is not a very active market due to lack of depth traders may not be able to find buyers and sellers when they need. In the Indian scenario traders would prefer nifty as there is no effect of dividends or bonus issues and stock specific news will have more impact on options than nifty. We could hardly see a more than 2% up or down move in nifty in the opening minutes but a 4-5% move in the opening trades is a common feature in stocks. As the covered call strategy with delta hedge is not in the perfect ratio this can turn out to be dangerous.

Delta hedging is a defensive tactic that is used to reduce the directional exposure of an option or stock position. The directional exposure of a position can be gauged by the position delta, which indicates the expected profit or loss of a position when the stock price changes by one rupee.

- Delta hedging is a practice used to reduce the directional risk of a stock or option position.

- To hedge a positive delta position, a negative delta strategy must be added to the position to bring the overall delta closer to zero.
- To hedge a negative delta position, a positive delta strategy must be added to the position to bring the overall delta closer to zero.
- Delta hedging can be very effective at reducing risk, but the risk reduction comes at the cost of lower profit potential on the original position.

Results and conclusion

When trading Delta Neutral option strategies, there are times when the delta exposure becomes higher than what we initially planned for the trade. Perhaps the market has made a sharp move resulting in a sharp move of Delta. The trader wants to stay in the trade but is concerned that further moves will see losses start to accelerate. One solution is to use futures contract to temporarily hedge the delta exposure. This can be a short-term solution until things settle down. The markets would be in a trending mode only for a few months like 3-4 months and it would be in a range bound mode for rest of the months. Writing options can turn out to be a profitable investment strategy during this period as stocks would be stuck in a range and would hardly give any return.

As the objective clearly states traders often misunderstand options as instruments to trade either on the long or short side but they are actually instruments to hedge your stock or futures positions. As we all know once we hedge a position the major aim would be to protect the position rather than giving enormous profit. Thus, the research paper focuses on developing a less risky but a profit generating strategy by using index futures and options. The same strategy of covered call using delta hedging can be used in stock options too once the stock options attain enough volume. Thus, if a trader uses the time value of options wisely along with futures contract that can give the best possible result within a month's time. A well-informed investor who is good in reading technical charts can easily make a return of using the trading model of delta hedging.

References

Richard Lehman,Lawrence G. McMillan.(2003), New Insights on Covered Call Writing: The Powerful Technique That Enhances Return and Lowers Risk in Stock Investing Volume 15 of Bloomberg HYPERLINK "https://www. google. co.in/search?tbo=p&tbm=bks&q=bibliogroup:%22Bloomberg+Financial%22&source=gbs_metadata_r&cad=4"Financial,Wiley.

Allan Ellman. (2009). Exit strategies for covered call writing, Wheatmark,Inc.

John, C.Hull.(2016). Options, futures and other derivatives, Pearson

www.nseindia.com

www.projectoption.com

www.chartink.com