

## **Portfolio Protection in the Short Run – Protective Puts vs. Short Futures: Exploratory Evidence from the Indian Stock Markets**

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### **Abstract**

*Portfolio management involves several decisions on a daily basis. Many managers find it necessary to temporarily protect their portfolios from sudden falls. Volatility becomes a dirty word in these circumstances. Managers using derivatives go for either the protective put strategy, involving buying at the money puts. Alternatively, they go in for short futures positions, which will act as protectors should the markets, fall. Futures do not involve any premium but only margins. Any extent of fall will then be protected by the Futures in much the same way as a long put would. However, a put involves paying a premium, which is the price the manager pays for having the best of both the worlds. In the event of the prices going up beyond the level of protection, the put could be discarded and the higher values enjoyed. However the tradeoff is the premium to be paid. We analyze a sample of three 3-month periods and find that*

*short futures outperform the protective put, provided the former is carried out as an active strategy. The futures have to be monitored closely and levels at which square off is to be done and a new shorting is to be carried out will be determined in advance. By this process, we find that the futures always resulted in higher portfolio values than one with protective puts. However this needs to be tested on larger samples to come to an axiom.*

**Key Words:** *Protective put, Short futures, Convergence, Margins, Premium, At-the-money options*

## **Introduction**

With the Indian stock markets showing great short-term fluctuation in recent years, many portfolio managers seek to come to protection strategies which will basically keep the funds intact for a short period. With announcements of quarterly results and consequent pressure on performance, many portfolio managers feel the need to keep a portion of the portfolio at a minimum level below which it will not be allowed to fall.

For this purpose, the two standard tools used are the Protective Put strategy and the Short Futures strategy. In the Protective Put strategy, the portfolio manager will buy puts to support the portfolio. The strike price of the put will be around the at the money level. Although a premium is paid, the strategy enables the portfolio manager to enjoy the best of both the worlds. Thus if as feared, prices do fall in the market, the put will protect the portfolio manager against the loss. On the other hand, if prices were to go up,

the put can always be discarded and the increase in prices can be enjoyed. The premium is a deterrent but if it is reasonable in the context of the portfolio, this could be easily employed with gain.

The other strategy is to use Futures instead. Futures generally go at a premium to the stock prices and shorting futures will act as a protection against the fall in values in the portfolio. Since no premium is paid for entering into a futures contract, it will turn out to be cheaper if eventually prices do fall and the protection becomes necessary. The argument against the use of futures is that should prices go up against expectations, the portfolio losses on the opportunity gains, unlike having the protective put. In other words, by using the Futures strategy one loses the chance to have the best of both the worlds.

There are other factors that come into play as well. Futures contracts suffer from another relatively small risk – the basis risk. Unless the contract is carried to its expiry, convergence will not take place between the stock prices and the futures prices, and the basis will either weaken or strengthen. If it does strengthen, it will be to the detriment of the short position, albeit in a small way. Of course, if the basis strengthens, the position takes an unexpected gain as well.

Secondly the choice of the strike price for the Protective put also is important. Sometimes, based on volatility estimates it might turn out that an out of the money strike price or in the money strike price might turn out to be more optimal. Further, the choice of the strike price will

determine the level of opportunity loss in case the prices do come down and protection is needed.

In this paper, we have looked at a straight comparison between having a protective put struck on the at-the-money level; and a short futures position. Moreover, we assume an active strategy with futures in that should the futures increase (thanks to the spot going up), we immediately square up and incur a small loss. Futures are shorted again once the threshold limit is reached, being the level from which protection was sought at the start. The detailed methodology is given later in the paper.

The paper is organized as follows. First we look at the present literature survey on the topic, then we define the problem statement and the purpose of the study. We then give the methodology followed and then the paper goes on to the conclusions. Subject to the limitations listed in the end, this model could be replicated for longer periods

### **Literature Review**

Burke (2010) goes into the issue of protection strategies increasing return and reducing risk. He seeks to analyze and determine the cost at which put options become viable. The authors say that past studies have examined the continuous process of buying put, but fear that the cost will be too high. Unless a cost limit is fixed the strategy might backfire. The authors conclude that the best strategy for S&P 500 involves selecting a put option with the lowest annualized cost with a limit of 4%..

Dodd-Frank (2011) looks at regulatory aspects of trading. While the matter is not immediately relevant to the discussion in hand, we have to realize that the strategy outlined in this paper will work only based on regulatory support. For instance, the trading community and the regulators have to be agreed on the principle of having strategies like the ones discussed in this paper, and difficult rules should not come in the way.

Although in a different tone, Keegan (2010) looks at strategies involving buying puts and selling calls, there by saving costs, in situations where his position in the portfolio is above the historical mean but still has room for the upside. In other words, the situation before Keegan is one of protecting the portfolio buy yet trying to participate in the upward movement. The put is the only answer in these cases, it appears. But the model in the paper will still be applicable if the movements are not violent intra-day. Further, the trader in the model suggested by Keegan buys puts and against this sells calls maybe at a higher strike price to partly finance the puts. Having a long put and a short call is called a collar, and sometimes can be a costless collar.

Dixit, Yadav and Jain (2011) test the efficiency of options prices in the Indian stock markets by testing the Lower Boundary Conditions using futures prices instead of spot prices. The argument is that since short selling in stocks is banned in India, short selling in futures is being resorted to by traders to serve the same purpose. The authors test a six-year recent period and conclude that put options appear to be more efficient than call options, not only in

absolute terms but also in terms of showing improvement over the years. They also say that market inefficiencies have not been fully exploited because of the regulatory structure preventing short selling of stocks. Although the study looks at a different phenomenon, we can say that the findings are useful for the concept in the present study as well, in that if puts are correctly priced and even then futures outperform them, the latter becomes the best possible avenue for portfolio protection.

Olgun and Yetkiner (2011) look at the futures strategy in its applicability to the Turkey markets. The authors look at hedging performance of constant and time-varying hedge ratios under mean-variance utility criteria. Using bivariate GARCH frameworks and regression, the hedge ratios are determined. The authors find that dynamic strategies outperform static strategies.

Aldridge (2010) examines special crashes in the market and the need to balance speed with safety. Direct access intended to make the markets speedier sometimes result in risky trades because price discovery is faster and things can go off the original limit resulting in the need for a different strategy.

Cordier and Gross (2011) look at several ways by which traders can enhance their option premium receipts. This has to be seen in the context of the cost of put premiums discussed in this paper. Using these strategies, in our opinion, what works to the benefit of the short position, has to be to the detriment of the short position, and hence

unless done in conjunction with other positions, a naked protective put is likely to be more costly.

### **Problem Statement and Purpose of the Study**

Portfolio protection is a regular requirement for all funds, particularly mutual funds which keep monitoring their positions against the target. In periods of high volatility, funds require short term protection against sudden falls. Also, when the fund has done well for a period of time, it will like to maintain the gains and lose these out to fluctuations. For this fund managers generally resort to protective puts. The puts are bought with at-the-money strike prices, and would enable the fund manager to get protection against down side movement and also enable gains should the markets go up. However, the at-the-money strike prices have high premiums and would cost the fund heavily over a period of time. If the markets do fall, the protection comes to the extent of the fall less the premium. If the markets gain, the premium becomes an unnecessary expenditure.

To overcome this, some traders deal with short futures to the exclusion of protective puts. Short futures will work so long as the markets do fall. The protection will be higher than that given by the protective put strategy. On the other hand, if the markets were to rise, futures would have locked up the position and hence the opportunity gains would have been lost. To avoid this, traders can take an active management of the short futures position as demonstrated in this paper. If the markets do go up, the

position is squared up and once the markets reach back the original position the futures are shorted again. In spite of the increased transaction costs as a result of repeated buying and selling, the final results are, more often than not, much better than the ones given by the protective put strategy.

The following factors would need to be determined beforehand so that the strategy execution is smooth:

1. Futures will be going at a higher price than the spot most of the time, thanks to the cost of carry principle. Protection will therefore be secured by the futures contract at the futures price. If protection is desired only at a lower level of prices, the number of futures contracts shorted can be correspondingly reduced.
2. The horizon for which the futures are required will be important in choosing the futures to be shorted. If one chooses the longest dated futures available, to take advantage of the higher cost of carry and consequent higher prices, the square up subsequently might result in a basis risk.
3. The basis risk mentioned above is likely to be favorable, since in a normal environment, basis is likely to keep strengthening over the horizon and that will work favorably for the short hedger.
4. The trigger points for squaring up the futures once the prices go up have to be determined. In the illustration given in this paper, we have assumed that the trigger is any level higher than the level at which the shorting



took place. However, it can be decided that the trigger can be say a couple of 100 rupees higher, so that we reconcile to a maximum loss of this, as against incurring too much of transaction costs

5. In the same way, the trigger point for shorting the futures again after the square up will need to be determined. In the illustration in this paper, we have assumed that the fund manager will continue to desire protection at the original level. This is subject to review in real life. There is always a tradeoff between protection and transaction costs

### **Methodology of the Study**

We have taken three 3-month periods ending July, August and September 2012. For the purpose of the illustration in this paper, we have reckoned the puts on S&P Nifty index and the S&P Nifty futures. We have compared the puts with the futures assuming that the protection is needed on the first day of the trading period. The futures and options expiring in July, August and September have last dates of trading on the last Thursdays of the month. Correspondingly, we have analyzed the prices from May, June and July respectively for the futures and puts of July, August and September respectively.

It will be possible to add more periods to the model, so long as there is synchronization between the expiry periods of Futures and Puts in the market. As of now, the last Thursday of the month is taken as the closure date for both these products. Also, it will be possible to add to the scope of the

study by including more out of the money or in the money puts to the sample. The reason why we have not done either of these is that we feel the basic objective of the study – to compare the two strategies in principle- will be defeated by too much data.

We have taken the at-the-money put and have assumed that the trader goes in for protection by buying a put at that level. The settlement price of puts and futures is reckoned on a daily basis and used for calculations.

The protective put is a passive strategy and needs to be reviewed only at the end of the tenure.

To compare this with futures, we short the futures on the first day of each cycle and then monitor this. This is then an active strategy. When the prices go higher than the levels at which they were shorted, the futures are squared up at a loss. Again, if the prices do come down a shorting is done again at around the original level. If the markets keep dancing up and down at this level, we would end up having some frequent transaction costs.

### **Model Development and Sample and Data Source**

The daily prices of NIFTY put options for the periods 2nd May to 26<sup>th</sup> July; 1<sup>st</sup> June to 30<sup>th</sup> August; and 2nd June to 27<sup>th</sup> September, have been taken. The settlement prices have been taken for the purpose of calculation. It has been assumed that the Protective Put strategy has been entered into on the first day of each of the three periods – 2<sup>nd</sup> May, 1<sup>st</sup> June and 2<sup>nd</sup> July respectively. The horizon for each of

the three periods has been assumed to be the last day of trading in each cycle-26<sup>th</sup> July, 30<sup>th</sup> August and 27<sup>th</sup> September respectively. The put once entered into has been assumed to be held on till maturity, in keeping with the European style puts. The choices of other period puts have been ignored and for the purpose of this illustration, we have assumed the 3-month horizon of puts.

Also, the futures prices on the first day of trading - 2<sup>nd</sup> May, 1<sup>st</sup> June and 2<sup>nd</sup> July have been reckoned and it has been assumed that the 3-month futures at the settlement price on these days has been shorted. Should the futures prices rise above the originally shorted position at any time during the horizon, the position is squared up. If and when the prices come back to the original position, again a short position is entered into in futures.

At the end of each horizon, the net gain/loss from futures taking into account all the intermediary squaring ups will be reckoned, and the stock portfolio value on this date is added to this to get the total value of the portfolio. This then is compared with the total portfolio value of the protective puts strategy (gain from puts if any minus premium paid plus stock portfolio value). We see that the short futures outperform the protective put in each of the three periods. The model could be modified by deciding on trigger points for square up and re-shortening of futures at different levels.

### **Findings**

In the first cycle, the protective put ends in the money. The period entails two rounds of square up of the futures

position and subsequent shorting. The summarized position for the first cycle is as follows:

**Table 1 : First cycle 2<sup>nd</sup> May to 26<sup>th</sup> July, 2012**  
(All amounts in Rs.)

Spot price of Nifty index on 2 <sup>nd</sup> May, 2012	5239.15
3-month Nifty futures expiring on 26 <sup>th</sup> July	5281.50
Strike price of at-the-money put option	5200
Put premium	150.7
Number of square up of Futures before expiry	2
Date of first square up	July 3 <sup>rd</sup>
Futures on this date	5305.75
Loss from square up (1)	24.25
Date of second shorting	July 9 <sup>th</sup>
Futures on this date	5279.4
Date of second square up	July 10 <sup>th</sup>
Futures price	5305.75
Loss from square up (2)	78.75
Date of third short	July 12 <sup>th</sup>
Futures price	5251.4
Futures price at end	5043.00
Gain from futures	208.40
Total gain from futures strategy	105.40
Total gain from protective put strategy	6.30

In the second cycle, the put ends out of the money and cannot be exercised. Also, there is only one square up needed for futures with no more shorting. The summary is as follows:

**Table 2: Second cycle 1st June to 30th August, 2012**  
(All amounts in Rs.)

Spot price of Nifty index on 1 <sup>st</sup> June, 2012	4841.60
3-month Nifty futures expiring on 30 <sup>th</sup> August	4865.55
Strike price of at-the-money put option	4800
Put premium	189.20
Number of square up of Futures before expiry	1
Date of first square up	June 4th
Futures on this date	4869.30
Loss from square up (1)	3.75
Total gain from futures strategy	-3.75
<b>Total gain from protective put strategy</b>	<b>-189.20</b>

The third cycle entails several rounds of square up of the futures and several rounds of shorting, although in the end there is no outstanding position of futures. The protective put ends out of the money. The summary is as follows:

**Table 3 : Third cycle 2<sup>nd</sup> July to 27<sup>th</sup> September 2012**  
(All amounts in Rs.)

Spot price of Nifty index on 2 <sup>nd</sup> July, 2012	5278.60
3-month Nifty futures expiring on 26 <sup>th</sup> July	5343.95

Strike price of at-the-money put option	5300
Put premium	161.3
Number of square up of Futures before expiry	6
Date of first square up	July 10th
Futures on this date	5410.50
Loss from square up (1)	66.55
Date of second shorting	7 <sup>th</sup> Aug
Futures on this date	5373.60
Date of second square up	August 8th
Futures price	5380.20
Loss from square up (2)	6.60
Date of third short	August 29 <sup>th</sup>
Futures price	5327.80
Date of third square up	August 30th
Futures price	5330.15
Loss from square up(3)	2.35
Date of fourth short	August 31

Futures price	5291.65
Date of fourth square up	September 4
Futures price	5299.40
Loss from square up(4)	7.75
Date of fifth short	September 5
Futures price	5253.35
Date of fifth square up	September 6
Futures price	5261.10
Loss from square up (5)	7.75
Futures price at end	5649.50
Gain from futures	0
Total gain from futures strategy	-91
<b>Total gain from protective put strategy</b>	<b>-161.3</b>

### Conclusion

The findings show that an active futures strategy was more efficient than a passive protective put strategy during the sample period. The testing can be enhanced to greater periods, and also more frequent square ups by including intraday square ups and shorting. Transaction costs have not been explicitly considered, but would appear still not

to affect our preference to futures. Another experiment possible in future studies would be to have a puts at different strike prices as also to have some long calls to save the puts of some cost. The trading in Futures in NIFTY have been very rampant, but the trading in options at other than at-the-money levels have not been great in volume. This will deter any strategy other than a straight protective put. Given that scenario, we find that futures outperform a straight protective put,

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