Safeguarding a portfolio – how far do we go?

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As Praveen Kumar sat staring at the Economic Times one afternoon late April, 2012, he looked a totally worried man. Things were not going well in the stock exchange. Brokerage income was dipping on account of stiff competition and general lethargy in the market. The Government was not coming out with any new policy initiatives and the outlook for business seemed very dull indeed. He wondered what lay in store for the millions of investors in the country, who over the last 6 months have been hoping for a turnaround in the market.

Praveen was the Head of the Portfolio Division of GG Securities[1], an ambitious financial services house set up by the Gogan group of companies. The Chairman of the Group Gogan Chauhan had founded this company with the objective of being a totally professional outfit, with a variety of services like investment portfolio advice, portfolio management, arbitrage portfolio, interest rate derivatives, foreign exchange derivatives, commodity derivatives all thrown in alongside the conventional share broking service as well. The Gogan group had diversified investments in various sectors, but was looking at the company as a future star. Praveen was appointed as the Head of the Shares Division, which basically looked at all portfolio and arbitrage matters relating to stocks and shares, and was authorized to deal with Derivatives in a big way to further the objectives of the vertical.

[1] The names of the company, the executive and his background have all been disguised.

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Praveen was a Post Graduate in Management, having gone through the rigorous course at SDMIMD, Mysore. He considered himself quite well-versed in the world of finance, and worked very hard on the area that was close to his heart- Derivative pricing. GG Securities had a fair derivatives portfolio and there were several clients who dealt with derivatives instruments. Basically, Praveen wanted to expand the specific portfolio of structured derivative strategy initiatives in the organization. He had 4 members in his team, with 2 of them being fresh Management Graduates.

On April 23, 2012, NIFTY closed at 5200.60. Praveen was also managing one specific portfolio for an offshore fund which consisted of 20 different companies' shares for a total value of Rs. 10,000,000. This portfolio was set up with the objective of outperforming the NIFTY by at least 50 basis points. He had asked his team to replicate the index by frequently rebalancing the portfolio. With pressure from other work, particularly research into areas of investment and other derivatives combinations, the team was finding it difficult to complete the rebalancing very frequently. Given the following prices of futures and options, Praveen wondered as to the right strategy for the situation.

	Price in Rs.
NIFTY June futures	5249.25
NIFTY May futures	5238.40
Call European June 5400	109.55
Call European June 5300	152.20
Call European June 5500	75.20
Put European June 5400	248.20
Put European June 5300	203.45

Praveen knew that that the Executive Meeting to be held 3 days later would raise issues as to new strategies his division and particularly this fund could follow. Already, an approach note on Delta hedging

has been circulated by a member of the Board, and the argument went that one could be aggressive in short positions in the options market so long as one delta hedged the risk of the prices based on intrinsic worth. In other words, whenever the team perceived the market volatility to be higher than expected, they could indulge in short options positions to try to earn premium. This would work if the implied volatility in the market fell before expiry. Praveen who knew the theory behind what was described re-looked at the key portions of the note to see if a policy document could be drawn out of it. He read again the key portion:

The principal idea of using delta for gains would be to see if the market is over-volatile and then hope that the whole thing would cool down. Based on a study of historical volatility, and a study of implied volatility, with smiles and surfaces, one can come to a conclusion as the extent to which the market seemed over-volatile. In such cases, a short strangle or straddle, coupled with delta hedging would bring in profits if the volatility fell in the market. The changes in the market prices would be taken care of by the delta hedging process.

Praveen thought that all this looked easier said and done. He found the description in another article on Portfolio Insurance right to his line of thinking Portfolio Insurance has the objective of creating an insurance policy for possible down trend in the market. The extent of puts required can be replicated by using the Delta approach.

Put Delta is related to Call Delta in that Call Delta minus 1 gives us Put Delta. So a short position in Puts can be neutralized with a short position in stocks to the extent of the Put Delta. As stated in the above article: "This gives rise to the replicating portfolio approach. Having a put is equivalent to having short stock to the extent of the delta and investing the proceeds in risk free securities. Since delta changes on a dynamic basis, the replicating portfolio needs to be rebalanced frequently. The shorter the period of rebalancing the better the mimic. For instance if rebalancing is done on a daily basis the performance of the replicating portfolio will mimic the long put in a greater way than say replicating the portfolio once in a week."

Parasuraman N.R. *Portfolio protection and portfolio insurance: an overview*. Portfolio Organizer 10(6) June 2009: 49-53.

Based on the horizon of the investor, the whole duration of the put can be planned.

Praveen found that although the end-objective might be different, the aspects mentioned in the above article on active portfolio protection, would have applicability in the situation on hand. He read on:

"There are two broad practices of portfolio insurance – the Constant Proportion Portfolio Insurance and the Options Based Portfolio Insurance. The first is basically a strategy of having asset allocation in such a way that the exposure to risky assets is put to check. In a basic bond plus call portfolio, a bond is bought which will grow to become the value of the portfolio at maturity. Since the discount bond is likely to be priced less than the par value, the balance amount available is now invested in options which can yield good returns. Whatever happens, the portfolio money is safe on account of the bond growing to the level of the portfolio value by expiry. The allocation between bonds and the options is based on a multiplier which is nothing but the proportion to which risk will be taken. Suppose the multiplier is 4 (usually the multiplier ranges from 3 to 5), and the value of a discount bond is Rs. 85 for a portfolio value of Rs.100, the multiplier indicates that we should have exposure to options to the extent of Rs. 60 (balance value after deducting discount price of bond Rs. 15 multiplied by 4 the multiplier in this case) which means the investment in bonds will now be only Rs.40. After a period the portfolio values are reviewed and rebalancing is done as between the bonds and the options. This strategy seeks to outperform without taking excessive risk. Of course for the lowest risk profile, the exposure to options will be minimal and so the possibility of high returns is also limited."

In Options Based Protection Strategies, the protection itself is carried out with options. These could be in the nature of puts or calls or both, and will include strategies described below, wherein dynamic delta hedging is carried out.

Praveen decided that he needed to have absolute clarity on the practical uses of these strategies before he presented this before the Executive Committee meeting. He realized, however, that in a dull market these are steps one would need to take to make something out of nothing

As a first step it is important to assess the extent of insurance needs and this will depend on the risk aversion of the investor as well as the outlook on the short-term risk. Funds could be intended to yield substantially higher return than a typical market portfolio and if so the design of insurance would work keeping this in mind. Higher risks would then be taken and protection will be in the nature of insurance and not hedging. However, if the portfolio philosophy is one of having a steady return of a spread over the market portfolio, the extent of risk taken will also be correspondingly watered down. So this exercise is as much a matter of discretion as one of necessity.

The article contains several theoretical strategies for the purpose. These are quoted below:

Buying Puts

If puts are available for the horizon of the investor and are freely traded, the asset manager buys pus to the extent of the portfolio worth. The puts can be bought only at a cost. Puts will protect the portfolio against the downslide. Should the portfolio increase, the puts can be discarded and the upward movement enjoyed. Puts are advantageous because they are freely traded and the exact number required can be ascertained and planned. However, they are costly over a period of time and generally are not available for longer horizons. Besides if the portfolio is composed of various types of securities then to get a put encompassing all of them will involve cross hedging

Sell Stock, Buy Risk Free Securities and Buy Calls

In case puts are not available, but calls are available, the principle of put-call parity can be used to have a replication of puts by going in for long calls and risk free securities and simultaneously selling

stock. This process will be found tedious and is advisable only if puts cannot be used.

ManufacTuring Puts by Using Stocks and Risk Free Securities

In case a longer horizon is sought buying a put straight will not serve the purpose because the put is likely to have a relatively short life. A refinement is to have a replicating portfolio consisting of short stock to the extent of the delta of the portfolio and investing the proceeds in risk free securities. This follows the principle of delta hedging. Delta is the first derivative of options prices to the underlying price. The put delta for instance shows the extent to which the put will change in value for a given change in stock prices. A put delta will move towards 1 when the put becomes more and more in the money (when the stock price is lower than the strike price). The put delta will move towards 0 when the put is out of the money (stock prices move over the strike price.). An at the money put will have a delta of around 0.5. In delta hedging we say that a put which has a delta of 1 (in the money) can be replicated by having the stock itself. The payoff of the put is the difference between the strike price and the stock price. Having the stock short to the extent of delta (1 in this case) will give the same payoff.

This gives rise to the replicating portfolio approach. Having a put is equivalent to having short stock to the extent of the delta and investing the proceeds in risk free securities. Since delta changes on a dynamic basis, the replicating portfolio needs to be rebalanced frequently. The shorter the period of rebalancing the better the mimic. For instance if rebalancing is done on a daily basis the performance of the replicating portfolio will mimic the long put in a greater way than say replicating the portfolio once in a week.

So depending on the horizon of the investor the process can be continued for a long time. If continued for say one year, it tantamount to having a long put for one year.

Manufacturing Puts Using the Stock Index Futures

This is the further refinement to portfolio insurance brought about in the U.S. A replication using stocks will delta hedging involves dealing in the identical stock. This may be difficult, time consuming and expensive in terms of transaction costs. In the circumstances, finding a relationship of the portfolio with the stock index and using index futures for the replication will serve the purpose

First the correlation and Beta of the portfolio in relation to the stock index has to be arrived at. To this extent shorting of futures is done by reckoning the put delta of the portfolio. Futures are then bought and sold to adjust to the changing delta of the portfolio. The result can be shown to be identical to the replicating portfolio using stocks. This strategy also needs to have a rebalancing done very frequently. The shorter the period of rebalancing the better the performance of the portfolio insurance."

All told, Praveen realized that he would have to translate the theory into practice by making specific recommendations. He knew he had his task cut out.

The issues before this could be listed as follows:

1. For protecting a portfolio would puts be always superior to short Futures?
2. Given the figures in the case, what all mini strategies could Praveen adopt to make "something out of nothing" in the exchange, without taking undue risk?
3. What is Portfolio Insurance? When is it needed?
4. What measures of Portfolio Insurance do you find to be most practically applicable?
5. If you were in Praveen's position, what strategies would you adopt in the short run?

Reference

Parasuraman N. R. Portfolio Protection and Portfolio insurance: an overview. Portfolio Organizer 10 (6), June 2009:49-53.