Insuring the Investment Portfolio

By Somnath Basu, PhD

If anything were to be mystical in finance, it certainly would be in the realm of derivatives. For even hardened financial professionals, the very word conjures images horrific enough to be refuted at the first sign of suggestion. Advisors balk and shun the very thought of discussing the possibility of introducing the concept to a client as a part of the portfolio. Most advisors have studied these instruments in some detail, but their application in everyday portfolio construction and risk management remains mysterious, thought of but practically never used. Yet these instruments were created primarily for risk management. Unfortunately for the investing population at large, these instruments were discovered by aggressive speculators and gamblers. Unfortunate, because the spectacular abuses of these instruments were fodder for sensationalized media attention and the eventual misperception among investors that these instruments should not be used in any way, avoided at any cost. Financial advisors run a huge risk of losing clientele if they even suggest including these instruments as part of a portfolio.

Strange as it may sound, advisors think nothing of suggesting an indexed annuity and similar structured notes to suitable clients as instruments that allow some downside protection and the ability to participate in upside market movements. A closer look would quickly reveal that, often, underlying such instruments are basic put or call options. Such a closer look also would reveal that homespun construction of these products is not only fairly straightforward but that they also can be had at a fraction of the cost charged by the institutions that sell these products. This article briefly examines three separate applications that can be employed by advisors to enter the realm of derivatives in the field of portfolio construction and risk management.

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Portfolio Insurance and Program Trading

The 1987 market crash often has been blamed on portfolio insurance. At that time, portfolio insurance was a computer-driven technique of buying and selling securities as a dynamic method of portfolio rebalancing. Program trading, as it was called, used computer-driven trading strategies that automatically generated trade decisions based on levels of security prices and security holdings. Unfortunately, during the crash, these programs could not detect the free-falling market and continued to enact sell orders every time the market hit some threshold level. The result was the spiraling effect of falling market levels generating further sales that fueled further price declines. Since the crash, portfolio insurance and program trading are not as popular as they were in the mid-80s.

In this article the term portfolio insurance should be reckoned in the same way we think of insurance—as protection against, or the mitigation of, pure loss. Analogically consider an insurance policy on a house or a car. The policy protects the holder from a decline in the asset's value (insurable interest) over a certain period of time. Over this period, if there is a loss in value (e.g., from a fire or a collision), the insurer compensates the holder for the amount of the loss. Another way to think of this transaction is that the buyer of the insurance transfers the downside risk of loss in asset value to the insurer, for which the insurer charges a premium. Further, the insured has the option of negotiating the amount of the premium by not transferring the entire risk of loss. If the insured decides to do so (e.g., having a deductible component in the auto insurance policy or insuring the house for less than face value), the premium also is reduced. The discussion below examines how put and call options can serve to provide nearly the exact features of an insurance policy for a client's investment portfolio.

Strategy #1: Using Index Put Options

The more straightforward of these three techniques is to use index puts in conjunction with a portfolio. Here is a simple example that explains the technicalities. Assume that your client holds a portfolio worth $1 million invested in large-cap stocks that tracks the S&P 500 Index very closely. Also assume that the S&P 500 Index is at 1,000. To *fully* insure this portfolio from any loss, divide the portfolio value by the strike price (the value of the index today, i.e., 1,000) times 250 (the S&P 500 Index option multiplier) or 1,000/250 = 4. The answer of 4 tells you how many "at-the-money" index puts to buy. If the premium on the put is $60 (on a one-year option), the total cost of insurance is $60,000 (60 × 250 × 4), or 6 percent

of the portfolio's total value. The $60 premium on the put is a rough approximation of current values only. The lower this premium, the lower the cost of such insurance and vice versa.

If the market trends downward during the year, the portfolio is nearly fully protected (it is fully protected if the correlation between the portfolio of large-cap stocks and the S&P 500 Index is 1). For steep declines (declines of 10 percent or more) the cost actually can go down to some extent. However, if the market moves up, the investor is able to participate in the upward movement and the portfolio will increase by about the same amount as the market minus the 6-percent premium. For example, if the market increased by 15 percent, the portfolio would increase by 9 percent; if the market declined by 15 percent, the portfolio would suffer only the 6-percent cost of the premium. To get an idea on the utility of such an approach consider that between 1989 and 2006, the Dow Jones Industrial Average dropped by more than 12 percent over a 90-day period 30 times. Figure 1 shows the representation of the hedged portfolio in comparison to the unhedged portfolio for various index levels at maturity of the strategy.

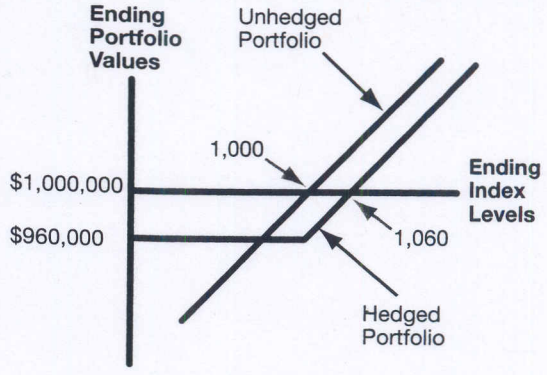
An investor who felt that the premium was too high would have the ability to lower the premium by not transferring the entire risk of loss. In this case the investor could use a lower strike price ("out of the money") of 950 (which still would require four contracts, rounded down), which would reduce the premium by a certain percentage, say for example to a cost of 4 percent. In this case, if the market moved down to 950 over the year (worst case), the loss would be 9 percent. Further declines would reduce the loss amount. However, if the market moved up, the investor would fully participate on the upside minus the 4-percent cost of insurance. This example is similar to underinsuring a house. For example, if you insured a $500,000 house with a deductible of $100,000 (i.e., underinsured) and a fire partially damaged the house where the damage was assessed at $100,000, then you lose both the $100,000 and the premium.

There are some disadvantages in the above technique. Most investors do not hold portfolios that track the S&P 500 Index perfectly (i.e., have a correlation of 1). The difference in co-movements leads to an error in the hedging plan where the outcomes are different from what is expected from a perfect hedge. This difference, which arises because of the basis risk (as the tracking error affect is termed), may lead to outcomes that are not fully desirable. Strategy #1 also can be quite expensive.

Strategy #2: Using Call Index Options

The second approach overcomes some of the problems of the index put option hedge approach. In this case an investor would buy a call option on the S&P 500 Index (or a combination of call options in various indexes if the investor wanted to diversify the portfolio). The number of call options to buy would be determined in exactly the same manner as described

FIGURE 1: PORTFOLIO HEDGE USING AN INDEX PUT OPTION



earlier. In this case, assume that the premium on a call option is also $60. In reality, the value of the put and call would be determined by put-call parity. The four call option contracts would cost a total of $60,000. The remaining $940,000 now would be invested in a money market account. Assume that the one-year money rate is 3 percent—again, the higher this rate, the cheaper the insurance. At the end of the year the money market fund would have earned $28,200. If the index value at the end of the year was either unchanged or at any level below 1,000, the portfolio value would be $968,200 (a loss of $31,800 or 3.18 percent, the cost of the insurance).

For example, if the market went down by 20 percent during the year, the portfolio would be down by 3.18 percent. If the index closed at a level higher than 1,000, the portfolio's value would be the percentage increase in the index minus 3.18 percent. The investor would earn a return of 16.82 percent for a market level increase of 20 percent. As can be seen from this example, this technique is not dependent on errors due to basis risk and is cheaper to implement. Figure 2 shows the representation of the hedged portfolio in comparison to the unhedged portfolio for various index levels at maturity of the strategy.

It is interesting to note that returns from the above strategy can be replicated with a portfolio of large-cap stocks and bonds. A simple comparison of this replicated strategy will quickly show that the Sharpe ratio of the call strategy portfolio will overwhelmingly outperform the stock/bond portfolio in terms of risk-adjusted returns. In fact, the above strategy is not only clearly superior in any risk/return measure to any asset allocation strategy using mainstream asset classes but also infinitely easier to execute because it totally eliminates the efforts and costs of security selection, allocation, and monitoring activities.

Strategy #3: The Collar a.k.a. The "Fence" Strategy

The final technique represents a departure in strategy and motivation from the above two techniques where loss preven-

FIGURE 2: PORTFOLIO HEDGE USING AN INDEX CALL OPTION

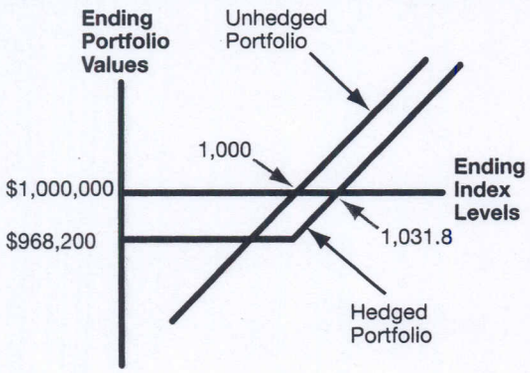
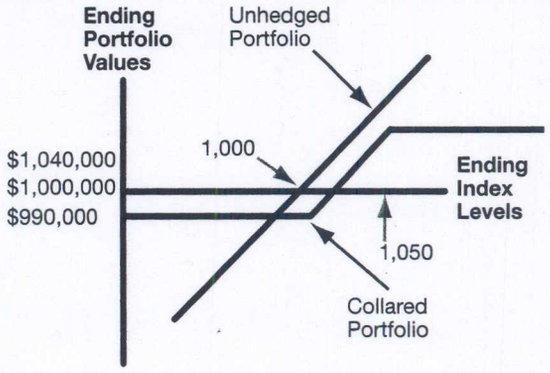


FIGURE 3: COLLARED PORTFOLIO USING A LONG PUT AND A SHORT CALL



tion or mitigation along with upside participation was the sole purpose. These two techniques are better used when the advisor has reason to believe that a market correction is impending but does not wish to lose out on the upside potential in case the expectation proves to be unfounded.

Application of this third technique is more suitable in situations where there is considerable uncertainty (both upside and downside movements) about impending changes in the market. In this case, the investor does not wish to begin investing because of risk of loss, but he also does not wish to be left behind if the market starts moving upward. In such a case, an investor may apply this technique whereby if the market moves down the investor's losses are minimal, but he is willing to forego the total return from large upward movements of the market by capping the returns received at some specific level. As before, this strategy, often termed "collar" or "fence," is much easier explained with a simple example.

Continue assuming that the investor holds a $1-million portfolio diversified among large stocks. The collar strategy requires this investor to buy an equivalent number of "at-the-money" puts (i.e., four contracts in our example) and sell an equal number of "out-of-the-money" calls. Assume that the premium on the call options with a strike price of 1,050 (index level) is $50. In this case, the net cost of the strategy would be $10 ($60 for the long put—$50 for the short call) or a total cost of $10,000 (or 1 percent). If, in the ensuing period, the market is at any level equal to or less than 1,000, the portfolio value would rest at $990,000 or a maximum loss of 1 percent. If the index moved to 1,050 or above, the portfolio also would rest at a value of $1,040,000, or a maximum gain of 4 percent. The strategy would have a "floor" (max loss) of 1 percent and a "cap" (max gain) of 4 percent. This floor and cap represents the two ends of the collar.

For index levels between 1,000 and 1,050, every unit increase in the index level would represent an increase in portfolio value of $1,000, which then would be netted from the $10,000 cost of the strategy to arrive at the final portfolio value. For example, if the index settled at 1,010, the portfolio value would equal $1 million (the $10,000 gain on the portfolio would be exactly offset by the cost of the strategy). As can be observed from this discussion, strategy #3 is well-suited for investors who are "fence-sitters" and who cannot decide when to jump in. Figure 3 shows the representation of the "collared" portfolio in comparison to the unhedged portfolio for various index levels at maturity of the strategy.

Conclusion

The above strategies illustrate the straightforward nature of structuring portfolios to manage downside risk with minimal loss in upside participation. A way for investment advisors to become comfortable in these applications is to explore the strategies by using "funny money" portfolios to simulate actual outcomes under various market outcomes. Most professional derivatives trading Web sites offer trading platforms where advisors can learn the ropes of these strategies by replicating various portfolios using hypothetical dollar amounts. Advisors who are adventurous enough to tread this path will find the rewards overwhelming. The few who provided such strategic services before the recent financial crisis already have reaped their rich harvests.

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See page 49 for a link to the online CE quiz.