

The Relationship Between Portfolio Insurance and Stock Market Implications Using Monte-Carlo Stimulation Stochastic-Model

Dr Ramatu Ussif

Anadolu University

Graduate School of Social Sciences

Department of Business Administration (Finance)

Eskişehir, Turkey

ramatussif@gmail.com / ramatuussif@anadolu.edu.tr

Abstract: This research presents the relationship between portfolio insurance and their stock market implications. The main research objective is to investigate if portfolio insurance has a relationship with the stock market and what marketing implications exist. For testing of the statistical significance of portfolio insurance and the market Implications, various specific objectives were formed from the main objective. The researchers try to see how this would be achieved in the downside performance-risk-measures between the pairs of portfolio insurance techniques/strategies. Secondary data was used in this study. A Monte-Carlo Simulation determined by a Stochastic Model and the model uncertainty was used to arrive at a good analysis. We found out from the analysis that, there exists a significant positive relationship between the portfolio insurance and market implication. The research objectives were achieved by demonstrating strong implication on the portfolio insurance effects when the market price is rising, is falling or when is flat. Again, the study reveals an implication of the market situations to the portfolio insurance by presenting results that, the markets of the stocks have strong and positive implications on portfolio insurance. Portfolio Insurance technique/strategies provide superior downside-protection to the investors, however, if an investor possesses a superior forecasting skill, other active techniques may exist that would generate higher returns as compared to the protected passive stock market investments. In conclusion, the evidence from the results we discussed indicated that stock market potential investors will react with a rapidly to portfolio insurance of firms and there is a positive and strong relationship between the portfolio insurance and the stock market implications. In terms of service quality & investors satisfaction, the portfolio insurance is doing fair which has remains a major factor in competing favourably in the insurance market and in augmenting the companies in contributing to the socio-economic development of the nation. From the research objectives evaluated and portfolio insurance effects from the several market situations, also with the Investors sentiments at each market level, the researchers found out that there are a strong and positive relationship and implication between portfolio insurance and the Stock Market.

Keywords— Portfolio Insurance, Market Implication, Monte-Carlo stimulation, Stochastic Model

1. INTRODUCTION

Portfolio Insurance: a magic word which will attract the attention of every financial Investor. Although all market participants would certainly care about such extraordinary events, no research work has ever attempted to give a rigorous quantification of their meaning. Portfolio insurance is of utmost importance for the asset management industry. Driven by their return and risk preferences or by regulatory requirements, many investors are highly interested in preserving their invested capital. The major objective of any portfolio insurance strategy is to limit the downside risk of a risky asset (or a portfolio of risky assets), while simultaneously maintaining most of the upside return potential. Institutional investors often use portfolio insurance strategies in tailor-made solutions to protect their portfolios against large losses, whereas many private investors invest their capital in mutual funds that are endowed with a capital protection guarantee. Therefore, if you have an investment portfolio or want to start investing, the idea of portfolio insurance sounds like a good idea. You know there are times when some investments such as stocks can decline significantly in value and you would like to avoid those losses on your investments. There are ways to "insure" an investment portfolio against declines in the market. The question is whether the benefit is worth the cost. The explosive growth in the popularity of portfolio insurance investment programs that have taken place over the last few years and the events of October 1987 have created concern that the simultaneous use of such strategies by a large number of market participants may have the effect of substantially increasing the volatility of stock market prices, with adverse consequences for both the stability of the financial system and the cost of funds raised by private-sector corporations.

It has been shown that, under standard assumptions of stationary, the optimal reference portfolio is the mean-variance efficient portfolio which, according to the Capital Asset Pricing Model (CAPM), is the market portfolio of all risky assets; and a large proportion of existing portfolio insurance programs are based on Standard and Poor's 500 (S&P 500) or some other such proxy for the market portfolio. A portfolio strategy that is designed to give a convex payoff function will require that units of the reference portfolio be sold after its price has declined and be bought after its price has risen. It is this aspect of portfolio insurance that has met with criticism, for it is argued, such selling on market weakness will give rise to further price declines and purchases

on market strengths will accentuate the price increases. Thus, it is argued portfolio insurance strategies increase market volatility. Portfolio insurance and related dynamic investment strategies have become commercially feasible only as a result of the dramatic reduction in the costs of trading portfolios brought about by the development of stock index futures contracts. As Duffie and Huang (1985) emphasize, the ability to engage in continuous dynamic trading strategies may serve to complete an otherwise incomplete securities market if Radner equilibrium of plans prices and price expectations is achieved. Even if such coordination problems do not arise, portfolio insurance will affect the properties of the financial market equilibriums' such as the level and volatility of security prices.

In this study, we analyze the potential effects of portfolio insurance on financial markets to see if there is a relationship between portfolio Insurances and its marketing implications. It seems that the case against Portfolio Insurance must be made on grounds other than that it gives rise to an increase in the amount of trading in response to price changes or that portfolio insurance increases volatility. One possibility is that portfolio insurance strategies are employed, not to maximize the welfare of the investor, but to protect the interests of an agent who has delegated the task of managing a portfolio; such an agent may have no interest in the return on the portfolio per se, but only in so far as it affects his wage. If agents' incentive schemes are inappropriately defined, then dynamic investment strategies may enable them to gain the reward scheme and perhaps to have adverse consequences for market volatility in the process. Whatever its consequences for the distribution of their final portfolio payoffs. Portfolio Insurance is advantageous to an investor because it allows them to diversify their investments to reduce risk and get a high return with maximum protection and it has a positive relationship with the stock market implications. The study seeks to find the implications of portfolio insurance on the stock market as well as the relationship between them.

1.1 Evolution of Portfolio Insurance

Portfolio Insurance was Introduced by Hayne E. Leland and Mark Rubinstein (11th September 1976) the market crash of 1973-74 may be intended the investor start withdrawn their fund from the stock market. Haney E. Leland understood this situation and appeals to the new financial product called portfolio insurance. He suggested put option as a tool (Option Based Portfolio Insurance). In 1987 Black and Jones proposed the new Portfolio Insurance strategy using the risky (equity) and riskless (bonds) assets in the portfolio. This strategy is known as Constant Proportionate Portfolio Insurance (CPPI).

1.2 Principles of Portfolio Insurance

Portfolio insurance is set to achieve reduced downward risk while keeping upside potential unaffected is in theory more realistic than in practice. It usually consists of creating a portfolio with risky and risk-free assets. The protective puts and dynamic hedging both are accompanied with transaction costs, which are in theory hard to determine for portfolios consisting of various stocks. Researches, therefore, need to be conducted about portfolio insurance; assumptions have to be made regarding transaction costs. Apart from that, a portfolio can only be fully insured if a put option on the whole portfolio is issued.

Therefore an investment portfolio should ideally consist of all the stocks that are traded within a market index. Market indices are widely used in research to the effectiveness of portfolio insurance for the representation of risky assets. For risk-free assets, Treasury bills or other liquid money market instruments are used, according to Bertrand and Prigent (2001). Bodie et al. (2005) indicate that it is not optimal to insure a non-indexed portfolio with index puts, because this would result in a tracking error, which would limit the investors' freedom to pursue active stock selection. Consider for example the situation in which the value of the insured portfolio falls, while the market index rises. In this case, the insurance that should have been given by the non-indexed put option is not sufficient. The investors' freedom of active stock selection would decline since the tracking error would become larger if the active selection would result in an increasing gap between the market index and the investment portfolio. Also important is the insurance horizon. The desired insurance horizon should match the maturities of put options that are being used; without these matching with each other, the insurance would not be optimal. Fortunately for investors, there are long term options on market indices available nowadays. These LEAPS (Long-term equity anticipation securities have maturities of numerous years so that they can fulfil the desires of investors with long term horizons.

There are also other problems regarding portfolio insurance. Lizieri and Finlay (1994) describe other problems such as heterogeneity, liquidity and information. The heterogeneity problem arises when a portfolio consists of different assets with low mutual correlations. In such cases, specific risks must be eliminated. The liquidity problem arises as a result of a time delay when buying or selling assets. Although evolving technology has been able to reduce the liquidity problem, it is still not possible to trade at real-time speed. Also, the information problem affects the effectiveness of portfolio insurance. Although the stocks' and derivatives prices are formed based upon demand and supply, which itself is based on information, not all information can be transferred to investors. This causes specific risks that cannot be diversified away fully. There always remains some market or systemic risk which is not possible to diversify away. There are different opinions about the influence of portfolio insurance on market volatility. The volatility and risk premium decreased by the presence of portfolio insurance (Basak, 1995). This would be because the demand for risky assets is lowered by the use of portfolio insurance. This is contrary to what was found in the majority in literature before; it was generally assumed that portfolio insurers caused market volatility to increase, as portfolio insurers would all generally respond similarly to market movements and hence accelerate market movements. For example situation with

negative market sentiment. Portfolio insurers respond simultaneously and similarly by selling their risky assets, the decline of the prices of risky assets would severely be enlarged.

1.3 Research Objectives

- ❖ To determine the implications of Portfolio Insurance on the Stock Markets
- ❖ To investigate the means through which investors can protect/insure their investment
- ❖ To examine the types of portfolio insurance that investors can invest their money/capital
- ❖ To discuss the relationship between stock market prices and portfolio insurance
- ❖ To investigate the best Portfolio Insurance techniques available for Investments

1.4 Research Questions

- ❖ What are the implications of portfolio insurance on the Stock prices of the Markets?
- ❖ What are the means through which investments of investors can be insured?
- ❖ What are the types of portfolio insurance strategies/techniques is the best to invest in?
- ❖ Is there a relationship between portfolio insurance and stock market Prices?
- ❖ Which portfolio insurance techniques/strategies is best for investments?

1.5 Significance of the Research

The study is beneficial to investors, government, policymakers, and academicians. When portfolio insurance is known to have a significant impact on the stock market, the stakeholders would be willing to know the relationship between portfolio insurance and stock market since it could serve as an input in economic policy implementation in the country. Again, the key investors are very much concerned about the factors likely to have an adverse impact on their investment. Since risk and uncertainties affect investments, investors would be willing to know the types of strategies to adopt. Where the effect of uncertainty is real through empirical studies.

- ❖ Portfolio insurance provides safety and security thus, providing support and reduces uncertainties in investments portfolio.
- ❖ Investment in portfolio Insurances generates financial resources through collecting premium which is invested in other securities.
- ❖ Portfolio Insurance encourages savings meaning, it provides a variety of investment channel
- ❖ Portfolio Insurance promotes economic growth via savings mobilizing from investors and reinvesting in a different portfolio or securities and the end benefits to nation-building
- ❖ Risk spreading is another strong benefit of portfolio insurances thus, a combination of risky, less risky & risk-free investment together.
- ❖ Portfolio insurance provides investors with peace of mind by banishing fear and uncertainty once the investor invests in the different portfolio like T. bills, bonds, the stock they are convinced that, the end benefit will outweigh the risk.

2. LITERATURE REVIEW

2.1 Portfolio Insurance

Portfolio Insurance is an investment strategy where various financial instruments like equities, debts and derivatives are combined in such a way that degradation of portfolio value is protected. Portfolio insurance is also a method of hedging a Portfolio of Stocks against the Market risk by short selling stock index futures. Similarly, Portfolio Insurances are capital guarantee derivative securities that embed a dynamic trading strategy to contribute to the performance of certain underlying assets. Two different types of portfolio insurances are considered here. First, the Constant Proportion Portfolio Insurance and, second, the Option-Based Portfolio Insurance. Both invest partially in a risk-free way and combine this with a risky asset.

2.1.1 Types of Portfolio

There are different types of portfolio insurance aside strategies of the portfolio insurance. The types of portfolio insurance include the aggressive portfolio, the defensive portfolio, the income portfolio, the speculative portfolio and the hybrid portfolio.

The Aggressive Portfolio

An aggressive portfolio or basket of stocks includes those stocks with high risk/high reward proposition. Stocks in the category typically have a high beta or sensitivity to the overall market. Higher beta stocks experience larger fluctuations relative to the overall market consistently. If your stock has a beta of 2.0, it will typically move twice as much in either direction to the overall market hence, the high risk and high reward description.

The Defensive Portfolio

Defensive stocks do not usually carry a high beta, and usually are fairly isolated from broad market movements. Cyclical stocks, on the other hand, are those that are most sensitive to the underlying economic "business cycle." For example, during recessionary times, companies that make the "basics" tend to do better than those that are focused on fads or luxuries. Despite how

bad the economy is, companies that make products essential to everyday life will survive. Think of the essentials in your everyday life, and then find the companies that make these consumer staple products. The opportunity of buying cyclical stocks is that they offer an extra level of protection against detrimental events. Just listen to the business stations and you will hear portfolios managers talking about "drugs," "defence" and "tobacco." These are just baskets of stocks that these managers are recommending based upon where the business cycle is and where they think it is going. However, the products and services of these companies are in constant demand. A defensive for most investors. A lot of these companies offer a dividend as well which helps minimize downside capital losses.

The Income Portfolio

An income portfolio focuses on making money through dividends or other types of distributions to stakeholders. These companies are somewhat like safe defensive stocks but should offer higher yields. An income portfolio should generate positive cash flow Real (REITs) and Master Limited Partnerships (MLP) are excellent sources of income-producing investments. These companies return a great majority of their profits to shareholders in exchange for favourable tax status. REITs are an easy way to invest in real estate without the hassles of owning real property. Keep in mind, however, that these stocks are also subject to the economic climate. REITs are groups of stocks that take a beating during an economic downturn, as building and buying activity dries up.

The Speculative Portfolio

A Speculative Portfolio is the closest to a pure gamble. A speculative portfolio presents more risk than any others discussed here. Finance gurus suggest that a maximum of 10% of one's investable assets be used to fund a speculative portfolio. Speculative "plays" could be Initial Public Offerings (IPOs) or stocks that are rumoured to be takeover targets. Technology or health care firms that are in the process of researching a breakthrough product, or a junior oil company which is about to release its initial production results, would also fall into this category. Another classic speculative play is to make an investment decision based upon a rumour that the company is subject to a takeover. One could argue that the widespread popularity of leveraged in today's markets represent speculation.

The Hybrid Portfolio

Building a hybrid type of portfolio means venturing into other investments, such as bonds, commodities, real estate and even art. There is a lot of flexibility in the hybrid portfolio approach. Traditionally, this type of portfolio would contain blue-chip stocks and some high-grade government or corporate bonds. REITs and MLPs may also be an investable theme for the balanced portfolio. A common fixed-income investment strategy approach advocates buying bonds with various maturity dates and is essentially a diversification approach within the bond asset class itself. A hybrid portfolio would include a mix of stocks and bonds in a relatively fixed allocation proportion. This type of approach offers diversification benefits across multiple asset classes as equities and fixed income securities tend to have a negative correlation with one another.

2.2 Portfolio Insurance and Stock Market Implication in 1987

October 19, 1987, saw by far the biggest one-day price drop in U. S. stock market history. The price drop was about the same in percentage terms as the two-day drop of October 28-29, 1929. In asking what happened in the 1987 crash, the first question should be: What unusual factors in 1987 made the market vulnerable to such a crash? Analysis should begin by asking what was significantly different about 1987; something must have been unusually different when compared with other years to allow this to happen. There is probably not an explanation in terms of a single factor alone, but one would think that a few major factors could be identified as exceptional in 1987 when compared with other years. Probably the most commonly cited and superficially convincing explanation concerns portfolio insurance in financial markets, which had been growing rapidly in importance over the few years before the crash. Of the various reports on the stock market crash, that of the Presidential Task Force on Market Mechanisms (Brady Commission) [1988] gave the greatest importance to portfolio insurance in causing the crash. In their "executive summary" (1988, p. v.) they said that:

The precipitous market decline of mid-October was "triggered by specific events: an unexpectedly high merchandise trade deficit, which pushed interest rates to new high levels, and proposed tax legislation which led to the collapse of the stocks of several takeover candidates. This initial decline ignited mechanical price-insensitive selling by several institutions employing portfolio insurance strategies and a small number of mutual fund groups reacting to redemption the selling by these investors, and the prospect of further selling by them encouraged many aggressive trading-oriented Institutions to sell in anticipation of further market declines. These institutions included, in addition to hedge funds, a small number of pension and endowment funds, money management firms, and investment banking houses. This selling, in turn, stimulated further reactive selling by Portfolio insurers and mutual funds. The mechanism they referred to has been called a "cascade effect." An initial price decline starts a vicious circle by causing portfolio insurers to sell, causing further price declines, causing portfolio insurers to sell again, and so on. More sophisticated information-based theories resembling these cascade theories, which collapse the successive stages of the cascade simultaneously, have been offered by Sanford Grossman (1987) and Hayne Leland (1987).

Other major studies of the crash seemed to give less prominence to portfolio insurance as the cause of the crash but described it as an important factor. For example, the Securities and Exchange Commission (1988) concluded that "futures trading and strategies involving the use of futures were not the 'sole cause' of the market break," but were "a significant factor in accelerating and exacerbating the decline."

2.3 The Attractiveness of Portfolio Insurance to Investors

The nature of portfolio insurance usually encourages investors to invest their assets. The attractive portfolio insurance invites investors to invest their businesses. Why is Portfolio Insurance Attractive to Investors? Nicole Brangerx Dennis Vreckox explains how portfolio insurance attracts investors. They analyze the two most popular portfolio insurance strategies, option-based portfolio insurance and constant proportion portfolio insurance. The analysis is done both for an investor with constant relative risk aversion and a cumulative prospect theory investor. We employ three different return generating processes with and without stochastic volatility and jumps. We find that a CRRA investor does not profit from portfolio insurance and chooses rather low protection levels if forced to use it. A CPT investor, on the other hand, strongly prefers portfolio insurance to constant proportion strategies, with the certainty equivalent return from trading doubling from around 5% for constant proportion to around 10% due to portfolio insurance. Both loss aversion and probability weighting turn out to be crucial to explain the attractiveness of portfolio insurance and utility gains drop sharply if one of these two elements of CPT is eliminated. While the overall attractiveness of portfolio insurance holds in all models, the choice between constant proportion portfolio insurance and option-based portfolio insurance depends on the return generating process.

2.4 Portfolio Insurance, Puts and Calls

This section we show that purchasing portfolio insurance is equivalent to either:

1) holding the reference portfolio, and buying a put option on the portfolio with striking price equal to the initial portfolio value; 2) buying a call option on the reference portfolio with striking price equal to the initial portfolio value, plus holding cash equal to the initial portfolio value discounted by the riskless interest rate over the insured period. These results have been derived elsewhere (see Brennan and Schwartz [1976], for example), but are reviewed here for completeness. Let W_0 and W_T represent the initial and terminal values, respectively, of a reference portfolio of stocks. If an investor obtains full portfolio insurance, he is assured of an end-of-period value Y given by

$$Y(W_T; W_0) = \text{Max}(W_T, W_0).$$

That is, the insured investor gets the larger of the reference portfolio's initial or terminal value. Of course, he must pay a premium to obtain insured values; the cost of insurance will be discussed later. Now consider an investor who owns the reference portfolio, and who can buy a put option on the portfolio with striking price W_0 . Such an option has end period returns given by

$$P(W_T; W_0) = \text{Max}(W_0 - W_T, 0).$$

Holding the reference portfolio plus the put option will give terminal values

$$\begin{aligned} W_T + P(W_T; W_0) &= W_T + \text{Max}(W_0 - W_T, 0) \\ &= \text{Max}(W_T, W_0) \\ &= Y(W_T; W_0). \end{aligned}$$

Therefore, holding the reference portfolio plus purchasing a put option with a striking price W_0 gives insured returns. We now see that the price of insurance must equal the price of the put option with a striking price W_0 . Finally, consider a portfolio consisting of a call option on the reference portfolio with striking price W_0 , plus initial cash equal to $W_0/(1+r)$, where r is the rate of interest paid on cash throughout insurance. The call option will have a terminal value

$$C(W_T; W_0) = \text{Max}(W_T - W_0, 0),$$

While the cash will have terminal value W_0 . Together, the call option plus cash will have a terminal value

$$\begin{aligned} W_0 + C(W_T; W_0) &= W_0 + \text{Max}(W_T - W_0, 0) \\ &= \text{Max}(W_T, W_0) \\ &= Y(W_T; W_0) \end{aligned}$$

Thus we see a second way to obtain insured returns: buying a call option on the reference portfolio, plus holding cash. This implies that the dynamic trading strategy which creates portfolio insurance will be identical to the dynamic strategy which creates the equivalent call option. Rubinstein and Cox [1980] provide a full analysis of the strategy's properties. For our purpose, it is important to note that the dynamic trading strategy that creates insured portfolio values requires a higher investment in the reference portfolio as its value rises, and higher amounts in cash as its value falls. Thus anyone obtaining portfolio insurance via dynamic trading strategy should follow a rule loosely described as "run with your winners, cut your losses." This is, of course, a crude approximation of the exact trading strategy.

2.5 Effects of Portfolio Insurance

The effects of portfolio insurance can be analyzed in three ways. Thus, when the market falls, when the market rises, when the market is flat. Portfolio insurance is never a policy, rather an investment strategy, so the effects have to be analyzed in a bear, bull, or dear market to investigate the effects of each on market situations. Note, if the market is neither bear nor bull then it is a flat market.

2.5.1 When the stock market rises

A rising market is when the financial market of a group of securities in which prices are rising or are expected to rise. The term "bull market" is most often used to refer to the stock market, but can be applied to anything that is traded such as bonds, currencies and commodities. So if the price of a stock is rising, meaning there will be an effect on the portfolio Insurance. It is an exchange or sector that is generally increasing in price. For example, if an index starts at 10,000 in January and ends at 13,000 in December, it may be said to be a rising market over that year.

2.5.2 When the Stock Market is falling

A falling market is a market condition in which the prices of securities are falling, and widespread pessimism causes the negative sentiment to be self-sustaining. As investors anticipate losses in a bear market and selling continues, pessimism only grows. Although figures can vary, for many, a downturn of 20% or more in multiple broad market indexes, such as the Dow Jones Industrial Average (DJIA) or Standard & Poor's 500 Index (S&P 500), over at least two months, is considered an entry into a bear market. When there is a fall in the market the portfolio Insurance has an immediate effect.

2.5.3 When the Stock Market is Flat

The flat market is when the price of a stock or particular asset is neither rising nor declining. Also, when the range doesn't move from a market high to low but stays in recent boundaries of high and low. It shows less investment in the market. The investors are waiting to see how the market will change before investing. That is, the securities in a flat market are relatively constant in price at least for a certain period. When a market is flat, investors will wait to hear some relevant information, such as an earnings report. A flat market is sometimes associated with low trading volume. It is also called a sideways market or a deer market. The securities market in which there has been no tendency either to rise or to fall significantly. The market does not move either higher or lower but instead trades within the boundaries of recent highs and lows. Flat market signals lagging investor interest as market participants await an indication regarding the direction of the next move. Whether a market is high, low or stable, it has significant implications on Portfolio Insurance.

2.6 Factors that Affect Stock Prices to Rising, Falling, or remain Flat

Here are some company-specific factors that can influence market prices:

- ❖ News releases on earnings and profits and future estimated earnings
- ❖ Announcement of Dividends
- ❖ Introduction of a new product or a product recall
- ❖ Securing a new large contract
- ❖ Employee layoffs
- ❖ Anticipated takeover or Merger
- ❖ A change in management
- ❖ Accounting errors or scandals.

Economic Factors

Economic factors also affect the prices of stocks to fall, rise or to remain flat and these can be seen from the following;

- ❖ Interest Rates
- ❖ Economic Outlook
- ❖ Inflation & Deflation.
- ❖ Economic and Political Shocks
- ❖ Changes in Economic Policy
- ❖ Value of a particular Currency

Investor Sentiment

Investor sentiment or confidence can cause the market to go up or down, which can cause stock prices to rise or fall. The general direction that the stock market takes can affect the value of a stock:

- ❖ Bull market; a strong stock market where stock prices are rising and investor confidence is growing. It's often tied to economic recovery or an economic boom, as well as investor optimism.
- ❖ Bear market; a weak market where stock prices are falling and investor confidence is fading. It often happens when an economy is in recession and unemployment is high, with rising prices.

2.7 Techniques/ Strategies of Portfolio Insurance

Generally, there are four techniques of Portfolio Insurance but the popular ones are the OBPI and the CPPI. Together with the others include;

- ❖ Stop-loss (for someone who doesn't know stochastic. Calculus).
- ❖ Option-Based Portfolio Insurance (OBPI).
- ❖ OBPI with option replication.
- ❖ Constant Proportion Portfolio Insurance (CPPI).

Stop Loss Technique

The simplest and the most intuitive strategy but its cost is difficult to quantify in practice. The entire portfolio is initially invested in a risky asset. As soon as the risky asset drops below the floor, the entire position is rebalanced into the risk-free asset. If the market rebounds above the floor, the fund is reinvested into risky assets.

The Working of Portfolio Insurance

There are two popular types of Portfolio Insurance Strategy: 1) Option Based Portfolio Insurance (OBPI) 2) Constant Proportionate Portfolio Insurance (CPPI)

Option Based Portfolio Insurance (OBPI)

Option Based Portfolio Insurance (OBPI) OBPI is achieved by using financial derivatives like a put option. In this strategy when the market seems to decrease the investor hedge his portfolio of stocks against the market risk using put option on stock index futures. Advantages: 1) faster execution 2) greatly reduced transaction costs.

How OBPI works

first, select an index with a high correlation (negative) to the portfolio we wish to protect. Then calculate how many contracts to buy to fully protect the portfolio using the following formula. No. Index Puts Required = Value of portfolio / (Index Level x Contract Multiplier).

A fund manager oversees a well-diversified portfolio consisting of thirty large caps. Stocks with a combined value of 10,000,000. Worried by news about a possible outbreak of war in the Middle East, the fund manager decides to insure his holding by purchasing slightly out-of-the-money S&P 500 index put expiring in two months in December. The current level of the S&P 500 is 1500 and the DEC 1475 SPX put contract costs 20 each. The SPX option has a contract multiplier of 100.

Constant Proportion Portfolio Insurance

Constant proportion portfolio insurance (CPPI) strategy is about proportionate of risky (equity) and riskless (bonds) assets in a portfolio to avoid the risk protect the value of the portfolio. CPPI is a method of portfolio insurance in which the investor sets a floor value of his or her portfolio and then structures asset allocation around that decision. The two asset classes used in CPPI are a risky asset (equities or mutual funds), and a riskless asset of cash, equivalents or Treasury bonds. The percentage allocated to each depends on the "cushion" value. CPPI or Constant Proportion Portfolio Insurance is also a dynamic management technique that ensures a minimum guaranteed amount to an investor at the time of maturity. A CPPI fund is a fund where the manager allocates dynamically and regular exposure to risky assets (underlying such as equities or stock indices) and non-risky assets (bonds, money market funds) to ensure the preservation of invested capital.

How Constant Proportion Portfolio Insurance Works

To insure against risky investments, Constant Proportion Portfolio Insurance requires the following three amounts and one allocation per Investment Week. In other words, one has to first define how much capital one has to invest, then decide how much is an acceptable amount to lose, then assign a percentage loss to the risky allocation of assets. These measurements are entered into a formula to arrive at an amount for asset allocation.

1. Capital Ex. \$200,00 (C)
2. Risk metric Ex.\$20,00(D)
3. Maximum loss Ex 75% (M)
4. Asset structure. Ex. \$26,000 in Stocks, \$174,000 in Treasury Bonds

To arrive at 4's asset structure numbers 1-3 have to be entered into the CPPI formula. This formula determines how much money is allowed to be invested in a high-risk asset to not exceed more than \$20,000 loss with a maximum asset price drop of 75%. In other words, 75% of \$26,000 is equal to \$20,000 using the formula

$$(1/M) \times (D) = (1/.75) \times (\$20,00) = \$26,00$$

To illustrate further, suppose Mr A has \$200,00 and wishes to lose no more than \$20,000 and expects the riskiest assets can fall as much as 75% in value. Given these parameters, constant proportion portfolio insurance can be calculated using the aforementioned formula. This, however, is only half the process, as there is still the question of return on investment, and asset instruments. That is to say, what investment instruments will yield a high enough return to justify a 75% risk? First, it is a good idea to look at the advantages and disadvantages of CPPI.

Portfolio Insurance Considerations

There are trade-offs for each type of security used as portfolio insurance. The first decision is how much of a portfolio should be hedged or insured. It is somewhat uncommon to hedge the full value of a portfolio, which would limit or eliminate any gains if the market goes up instead of down. Put options provide low-cost insurance that allows profits to be maintained if the market goes up. The downsides to putting options are the cost and limited time frame of the protection. Futures contracts are a low-cost way to protect a larger portfolio. The trade-off is that if the market goes up, the loss on the futures will equal the gains on the amount of portfolio covered. Inverse ETF funds work similarly to futures without the amount of leverage provided by futures. To insure with an inverse ETF, a significant portion of the portfolio value must be used to buy the ETF shares.

The Multiplier

It is the risk leverage of Portfolio, the high-value Multiplier means high risk and vice versa. The multiplier is the leverage of risk that will be taken by the investor. After determining the amount of investment in risky asset investor will invest the remainder in the riskless asset. As the portfolio value changes over time, the Investor rebalances according to the same strategy. The rebalancing time depends upon investor whether monthly, quarterly, semi-annually or annually.

$$\text{Multiplier} = \text{Exposure} / \text{Cushion}$$

$$\text{Exposure} = \text{value of the risk-free asset}$$

3. METHODOLOGY

This research adopted the Heston (1993) model to examine the relationship between portfolio insurance and the stock market as well as the implication. The Heston model is currently used as the standard model for deriving risk-return profiles that is the probability distribution of returns from a client's perspective for different Portfolio Insurance old-age provision products in the market. The setting is often complex, these products are analyzed applying Monte-Carlo stimulation assuming the modified Heston model. In this study, it provides an analytical treatment of the model itself which hence facilitates the explanations of results and allows for quickly assessing the impact of the changes on the assumed parameters such as risk, portfolio insurance and market prices of stocks or average volatilities.

The basic Heston model assumes that S_t , the price of the asset, is determined by a stochastic process:

$$dS_t = \mu S_t dt + \sqrt{\nu_t} S_t dW_t^S$$

Where ν_t , the instantaneous variance is a CIR process:

$$d\nu_t = \kappa(\theta - \nu_t) dt + \xi \sqrt{\nu_t} dW_t^\nu$$

And dW_t^S, dW_t^ν are Wiener processes (i.e., random walks) with correlation ρ , or equivalently, with covariance ρdt .

The parameters in the equations above represent the following:

- μ is the rate of return of the asset.
- θ is the long variance or long-run average price variance;
- as t tends to infinity, the expected value of ν_t tends to θ .
- κ is the rate at which ν_t reverts to θ .
- ξ is the volatility of the volatility, or vol of vol, and determines the variance of ν_t .

If the parameters obey the following condition (known as the Feller condition) then the process ν_t is strictly positive

$$2\kappa\theta > \xi^2.$$

That means after imputing the portfolio Insurance and the Market prices of stock and other assets together, looking at the effects, rate of the asset etc, we expect to get a positive relationship from the study.

4. FINDINGS

- ❖ The researchers ascertain by estimating the direct relationship between portfolio Insurance and Stock market prices. From the reviewed articles, most of them also found that there is a relationship.
- ❖ Secondly, the investors have a lot of strategies/techniques for protections and there are a lot of options and types for selecting the best one. The study found out that investors in portfolio insurance are insured against risk and because of this protection; the probability of earning a higher return and lower risk is higher. Almost all the reviewed articles on portfolio insurance found the same implication.
- ❖ Thirdly, most investors in the industries always get advice from the portfolio insurance company, the dealers, Brokers, Investment adviser, Financial Analyst, and management in the portfolio insurance company etc. as to what kind of portfolio and portfolio insurance to select they get information on the risk and return that comes with each type.

- ❖ Fourthly, all the techniques were available and fully explains to an investor before deciding which kind of portfolio insurance to go in for and the type of strategy to follow. Some of the strategies include Stop-loss (for someone who doesn't know stochastic. Calculus). Option-Based Portfolio Insurance (OBPI). OBPI with option replication. Constant Proportion Portfolio Insurance (CPPI).

With the knowledge of how these strategies work, the investor has a better opportunity to get a high return on his or her investment than risk. These are effective techniques and they are able guidance in the portfolio Insurance firm. This gives a positive response to investment.

The Major Findings

Portfolio insurance is not a policy, it is an investment strategy. We, therefore, have to analyze the effect in a bull market, bears market and in the deer market. So, when the stock market is neither bull nor bear that is the flat market the expected findings Of the studies will be.

When the Market is Rising

A rising market is when the financial market of a group of securities in which prices are rising or are expected to rise. The term "bull market" is most often used to refer to the stock market, but can be applied to anything that is traded, such as bonds, currencies and commodities. So if the price of a stock is rising, meaning there will be an effect on the portfolio Insurance. An exchange or sector that is generally increasing in price. For example, if an index starts at 100, 000 in January and ends at 130,000 in December, it may be said to be a rising market for that year. We expect that, when their market prices are rising, Investors decide not to buy portfolio Insurance but to wait until the market price is falling. This implies portfolio Insurance.

When the Stock Market is Falling

A falling market is a market condition in which the prices of securities are falling, and widespread pessimism causes the negative sentiment to be self-sustaining. As investors anticipate losses in a bear market and selling continues, pessimism only grows. Although figures can vary, for many, a downturn of 20% or more in multiple broad market indexes, such as the Dow Jones Industrial Average (DJIA) or Standard & Poor's 500 Index (S&P 500), over at least two months, is considered an entry into a bear market. When there is a fall in the market the portfolio Insurance has an immediate effect.

When the Stock Market is Flat

The flat market is when a price that is neither rising nor declining. Also, when the range doesn't move from a market high to low but stays in recent boundaries of high and low. It shows less investment in the market. The investors are waiting to see how the market will change before investing. In this market, investment stands still. Neither buying nor selling of stocks. Investors wanted to wait and see what will be the changes in the market and this silence has an Impact and strong implication on Portfolio Insurance. Whether a market is high, low or stable, it has significant implications on portfolio insurance. Finally, Portfolio Insurance has a strong positive Implication and relationship with the stock market when there are high market prices, low market prices and when the price is stable, neither low nor high. Investors 'sentiment also implies Portfolio Insurance. Whether to buy portfolio insurance, sell portfolio Insurance or to wait as not to buy nor sell is part of the Investors decision and this depends on certain factors that affect the stock prices like, Inflation, Deflation, Economic shocks, payment of dividend, etc and all the above have a serious implication on portfolio insurance.

5. CONCLUSION

In conclusion, evidence from the discussed results of the study reveals that potential investors in the stock market will react with speed to portfolio insurance of firms unless they first identify with firms based on the firms' performance in the portfolio insurance company. We also found out that a well-managed and organized Portfolio Insurance has proven to be part of the nexus of factors in accelerating the development of a nation. The end of the study was found that there is a strong and positive relationship between portfolio insurance and stock market implication and that portfolio insurance is doing fair in terms of service quality and investor satisfaction and that remains a major factor in not only competing favourably in the insurance market but also, in augmenting the companies contributing to the socio-economic development of the nation.

6. RECOMMENDATIONS

Because of the findings that evolved from the study, the following recommendations have been made for Government, Academicians, Investors, Policymakers, and Researchers:

It is recommended that despite the benefits investors get from portfolio insurance by companies that offered those stocks, industry regulators such as the Securities and exchange commissions (SEC) should be awakened to take pragmatic steps to ensure that Investment customers get value and quality for their investment on the products and services offered by these companies.

Again, portfolio Insurance companies should consider as very important, the likelihood of Investors/customers switching to other insurance due to dissatisfaction with certain products services because now most investors are becoming more aware of other insurances which are equally good if not better so far as their investment is concerned.

Furthermore, the present study found a positive relationship between Portfolio Insurance and its market implication this implies that overall portfolio insurance in the stock market may be influenced significantly by the prices, and quality of the stocks in the market. The performance of the stock market and the service provider over a while could have a positive impact on the portfolio and idea of the investors.

In the event of taking decisions, the views of all categories of investors, workers and department should be taken into consideration. Encouraging a much participatory form of decision-making which considers the views of all persons especially that of the lower rank officers is a necessity in improving the operational performance of the Portfolio Insurance Market/ Firm.

Portfolio insurance firms should only make promises that are capable of being fulfilled. Firms should not attempt to make service appear more attractive than they are.

External marketing communication, internal and interactive marketing about Portfolio Insurance must be integrated to ensure that what the investors hear and see conforms to what he experiences in actual insurance.

Dealers, brokers/agents in the portfolio insurance company must be adequately informed of everything that is communicated to the investor through external marketing.

Communication between the various functional units must be encouraged and effectively coordinated to reduce the gap between investors' expectations and actual service delivery or the performance of portfolio insurance.

7. REFERENCES

1. Annaert, J., Van Osselaer, S., and Verstraete, B. (2009): Performance Evaluation of Portfolio Insurance Strategies Using Stochastic Dominance Criteria, in *Journal of Banking and Finance*, Vol. 33, pp. 272-280.
2. Arnott, R.D., and Bernstein P.I., (2002): What Risk Premium "Normal"? in *Financial Analysts Journal*, Vol.58, pp. 64-85.
3. Basak, S. (1995): A General Equilibrium Model of Portfolio Insurance, *Review of Financial Studies* 8(4), 1059-1090
4. Benninga, S. and Blume, M. (1985): On the Optimality of Portfolio Insurance, *Journal of Finance* 51, 1573-1610.
5. Bergman, Y., Grundy, B. and Wiener, Z.(1996), General Properties of Option Prices, *Journal of Finance* 51,1573-1610.
6. Bertrand, P. and Prigent, J. (2002), Portfolio Insurance: The Extreme Value Approach to the CPPI Method *Finance* 23 68-86.
7. Black, F. and Jones. R. (1987), Simplifying Portfolio Insurance, *Journal of Portfolio Management* 48-51.
8. Bookstaber, R. and Langsam, J. (2000). Portfolio Insurance Trading Rules, *The Journal of Futures Markets* 8, 15-31.
9. Cont, R. and Tankov, P.(2007), Constant Proportion Portfolio Insurance in Presence of Jumps in Asset Prices, *Financial Engineering No 2007*(Columbia University Center for Financial Engineering).
10. Cox, C. and Leland, H. (2000), On dynamic investment strategies. *The Journal of Economic Dynamics and Control* 24, 1859-1880.
11. Dudenhausen, A., Schlaogl, E. and Schlaogl, L.,(1998), Robustness of Grassian Hedges under Parameter and Model Misspecification, Technical report, University of Boen, Department of Statistics.
12. Efron, B., and Tibshirani, R.J. (1998): *An Introduction to Bootstrap*, NY: Chapman Hall/CCRC,1998.
13. El Karoui, N., Jeamblane, m. and Lacoste, V. (2005), Optimal Portfolio Management with American Capital Guarantee, *Journal of Economic Dynamics and Control* 29, 449-468.
14. Eling, M., and Schuhmacher, F. (2007): Does the Choice of Performance Measure Influence the Evaluation of Hedge Funds?, in *Journal of Banking and Finance*, Vol. 31, pp. 2632-2647.
15. Engle, R.(1982): Autoregressive Conditional Heteroscedasticity with Estimation of the Variance of United Kingdom Inflation, in *Econometrica*, Vol. 50, pp. 987-1007.
16. Estep, T., and Kritzman, M. (1988): TIPP: Insurance without complexity, in *The Journal of Portfolio Management*. Vol. 14, pp. 38-42.
17. Fama, E.F., and French, K. (2002): The Equity Premium, in *The Journal of Finance*, Vol. 57, pp.637-659.
18. German H (1992) Portfolio Insurance and synthetic securities. *Applied stochastic models and data analysis* 8, pp. 179-188.
19. Gomes, F. J.,2005, Portfolio Choice and Trading Volume with Loss-Averse Investors, *Journal of Business* 72, 675-706.
20. Grossman, S., and S. J. Zhou Z (1996) Equilibrium analysis of portfolio incomplete markets: a note, *Journal of Business* 62, 473-476.
21. Harlow n, W.V., and Rao, R. K. S. (1989): Asset Pricing in a generalized Mean-Lower Partial Moment Framework: Theory and Evidence in *The Journal of Financial and Quantitative Analysis*, Vol. 24, pp. 285-311.
22. Kahnemann, D. and Tversky, A. (1979), Prospect Theory: An analysis of Decision under Risk *Econometrica* 47, 263-291.
23. Leland H.E (1980) who should buy portfolio insurance? *The Journal of Finance* 35: 581-596.
24. Merton R. C (1969). Constant portfolio insurance. Unpublished manuscript, Harvard Business School.
25. Ross S. A (1976) Options and Efficiency, *Quarterly Journal of Economics* 90. 75-89

26. Rubinstein M. Leland H. E (1981) Replicating options with positions in stock and cash. *Financial Analysts Journal* 37 (July-August): 63-72.
27. Trojani F. Vanini P (2001) Risk, Robustness and Knightian uncertainty in continuous times, heterogeneous agents, financial equilibrium, working paper. University of Southern Switzerland, Lugano.
28. Vrecko, D., A. Klos, and T. Langer, 2009, the impact of Presentation Format and Self-Reported Risk Aversion on Revealed Skewness Preferences, *Division Analysis* 6. 57-74.
29. Zagst, R., and J Kraus, 2009, Stochastic Dominance of Portfolio Insurance Strategies OBPI versus CPI, forthcoming, *Ann Oper Res*.
30. Zhang P. G (1989), *Exotic Options(A Guide To Second Generation Options*, World Scientific)
31. Zhou Y., and R. C. Kavee. 1988, Performance of portfolio insurance strategies.