Arbitrage Project #3: Portfolio Insurance

The project is to be completed by your study group of between 3-5 people. A report of no more than 10 typed pages is due in class on Thursday, May 29. You may include high quality, neat, and concise supporting material in an appendix that may get evaluated when we grade the reports (depending on the communication value of the material). We will pick two groups for each of the four projects to make short (about 7 minute) presentations during class on Tuesday, June 4. Your grade on the project will be 80% on the report and 20% on the presentation, if you are picked. It will be 100% on the report if you are not picked to present. You should submit an intermediate report of approximately one page in class on Tuesday May 6 so that we can give you feedback on the progress of your work. This project, along with the “grading cash” from the FTS labs, represents the main basis for your grade in this portion of FIN 434, so you should treat it as a serious assignment.

Situation

You are the treasurer of a local organization. You have just been informed that a customer has made a payment by electronic fund transfer of $5,000,000 into the corporation’s account. Assume that these funds represent the bulk of the liquid assets of the firm. From your forecast of cash flows, you know that the next big payment is of $4,000,000 in six months for partial payment on debt. Debt covenants stipulate that the corporation will be in default if does not make this payment on the due date.

You want to invest the funds in an index fund that closely tracks the S&P500 and yet you want to be sure to be able to make the payment. Consider the following strategies:
1. Invest $4,000,000 in a risk free asset such as a T-Bill and $1,000,000 in the index fund.

2. Invest $5,000,000 in the index fund and follow a *Stop Loss* strategy of getting out of the fund if the value of portfolio goes below $4,000,000 + \( \delta \) and re-invest in the fund if the value goes above $4,000,000 + 2\( \delta \). For small \( \delta \), this amounts to synthesizing a put option with an exercise price representing $4,000,000 in notional capital. You pick \( \delta \).

3. Define:
   - **Value**: Value of the portfolio at any point in time
   - **Floor**: The desired minimum value of the portfolio
   - **Cushion**: Value – Floor

   Strategy: Invest \( \alpha \) times the cushion in the index fund and the rest in a risk free asset. Rebalance the portfolio if the cushion changes by \( \varepsilon \). You pick \( \alpha \) and \( \varepsilon \).

4. Use put options to hedge the portfolio. Is Delta hedging needed?

For each of the strategies described above, and for different values of parameters, compute the risk and return and plot them on a graph. To compute these, you will need to:

- Collect data on trading costs, including but not exclusively, bid-ask spreads, commissions, contract costs, etc.
- To evaluate the strategies, simulate their performance against the daily S&P500 series for the second half of 1996.

Analyze the results of your computation. Explain the risk-return performance of the different strategies. If a strategy is not on the frontier, why is it not?

Finally, pick a strategy to follow and justify you answer.