**Homework 3**

**Due Nov 7, 2011 - Before Noon**

1. Use your simulation model for Homework 2 and rank the risky scenarios using the following methods:
   1. FDSD do this without the aid of Simetar’s function for stochastic dominance.
   2. SDSD do this without the aid of Simetar’s function for stochastic dominance.
   3. SDRF you can use the Simetar stochastic dominance function but you have to choose your ARAC’s and justify them.
   4. SERF using ARAC for negative exponential utility function.
   5. SERF using RAC for a power function.

Note: On setting your RAC and ARAC assume W equals $500,000

1. Estimate the confidence intervals for the elasticities in the model you estimate to forecast Y given the data in HWK3DATA.XLSX. Show all of your work and explain your steps and results.
2. You are an investor who wants to insure your portfolio's value against any losses for one year. Use one year of historical data from the website to estimate any parameters that you need to complete the two parts of the exercise.

Your portfolio consists of two positions:

* Long 1000 shares of SPY
* Long 1000 shares of GLD

Assumptions:

* The risk-free interest rate is 1.0%. That is, *r* = 0.01
* Treat SPY as a stock paying a continuous dividend yield of 0.25%.
* Treat GLD as a commodity with a convenience yield of 1.0%.

Hints:

* Only the terminal value of the portfolio one year from now is important in valuing the European options.
* Using the historical data, regress Δln*S* on a constant to estimate parameters. Summary statistics for the recovered residuals, along with the properties of a Wiener process, will be needed for estimating σ. *Recall that you always need to use an annualized sigma for valuing derivative contracts.* Note that there are 252 observations in the one year of historical data. That is, Δ*t* = 1/251.

**Part I:**

Suppose that you will protect your portfolio by buying at-the-money (as of the market's close on 2008-10-13) European put options separately for each of the two assets in your portfolio. Calculate the values of these two options. Note: you can calculate the options' values on a per share basis, then multiply by the number of shares at the end.

**Part II:**

Suppose that you can find someone to write you a single, custom over-the-counter option to cover the whole portfolio. Specifically they will sell you an at-the-money, European put option covering your whole portfolio. What is a fair price for this option? Is this more or less than the cost to protect the whole portfolio that you calculated in Part I? Why?