**FA-542 – Assignment 3**

**Problem 1**

Consider the weekly yields of Moody's Aaa and Baa seasoned bonds from January 5, 1962, to April 10, 2009 (*w-aaa.txt* and *w-Baa.txt* files). The data are obtained from the Federal Reserve Bank of St Louis. Weekly yields are averages of daily yields.

a) Obtain the summary statistics (sample mean, standard deviation, skewness, excess kurtosis, minimum, and maximum) of the two yield series. Are the bond yields skewed? Do they have heavy tails? Answer the questions using 5% signifficance level.
b) Build a time series model for the Aaa series.
c) What is the relationship between the Aaa and Baa series? To answer this question, build a time series model using yields of Aaa bonds as the dependent variable and yields of Baa bonds as independent variable.

**Problem 2**

This problem is concerned with the dynamic relationship between the spot and futures prices of the S&P 500 index. The data file *sp5may.txt* has three columns: log (futures price), log (spot price), and cost-of-carry (×100). The data were obtained from the Chicago Mercantile Exchange for the S&P 500 stock index in May 1993 and its June futures contract. The time interval is 1 minute (intraday). Several authors used the data to study index futures arbitrage. Here we focus on the first two columns. Let $f_t$ and $s_t$ be the log prices of futures and spot, respectively. Consider $y_t = f_t - f_{t-1}$ and $x_t = s_t - s_{t-1}$. Build a regression model with time series errors between $\{y_t\}$ and $\{x_t\}$ with $y_t$ being the dependent variable.

**Problem 3**

Consider the daily CDS spreads of JP Morgan from July 20, 2004 to September 19, 2014 (*d-cdsJPM.txt* file). The period includes the financial crisis of 2008 so that the CDS spreads vary substantially. The data are in the file *d-cdsJPM.txt* (column 2). Since the spreads are small, we consider the time series $x_t = 100 \times (\text{spread})$. In addition, sample ACF of $x_t$ shows strong serial dependence. Therefore, we analyze the differenced series $y_t = (1 - B)x_t$. Build a time series model for $y_t$. Write down the fitted model.