Assignment 3

Examine the return series from file byd.dat.

1. Plot the data and comment of the pattern of the returns and their volatility

2. Discuss the summary statistics.

3. Are the returns normally distributed? Note that SAS reports the EXCESS kurtosis, i.e. the sample kurtosis less 3. Comment on the outcomes of the normality tests, the histogram and the q-q plot.

4. Estimate the mean of returns by OLS and name the residuals ehat and save them.

5. Perform the LM test for the ARCH effect by regressing the squared residuals (ehat) from the OLS regression on their past values. Calculate the test statistic by multiplying the R^2 by the sample size and compare it to the critical value from the chi-square table.

6. Estimate an ARCH(1) model. Write the formula of the model. Comment on the significance of the coefficients and the fit of the model. Plot the fitted volatility.

7. Estimate a GARCH(1,1) model. Write the formula of the model. Comment on the significance f the coefficients. Plot the fitted volatility.

8. Build a "bad news indicator variable that takes value 1 if the ehat variable from the OLS regression is negative, i.e. when the returns fall below their mean. Next, formulate a TARCH(1,1) model and estimate that model. Comment on the significance of the coefficients. Plot the fitted volatility.

9. Estimate a GARCH-M(1,1) model. Write the formula of the model and interpret the presence of volatility in the conditional mean of returns. Comment on the significance of the coefficients. Plot the fitted volatility.