THE UNIVERSITY OF CHICAGO
Graduate School of Business
Business 41202, Spring Quarter 2006, Mr. Ruey S. Tsay

Homework Assignment #6

Due Date: Campus – June 2, 2006; Evening – June 1, 2006. (You may hand in on May 25 and 26, 2006).

1. Problem 6.4 of the textbook.
2. Problem 6.9 of the textbook.
3. For problems 3 to 5, suppose that you hold a long position of General Motors stock valued at 1 million dollars. Also, the probability of interest is 1% and the daily stock returns are in the file "d-gm7205.txt" (date, simple return). You may use log returns.
   - Calculate the VaR of your position for the next trading day using the RiskMetrics method, assuming that $\alpha = 0.92$ and $\sigma_{8583} = 0.0288$ and $r_{8583} = 0.0213$, where 8583 is the sample size.
   - Build an AR(2)-GARCH(1,1) model for the log return series. What is the VaR based on the fitted model?
   - Build an AR(2)-GARCH(1,1) model with t-innovations for the log return series. What is the VaR based on the fitted model?
4. Again, consider the log returns of daily GM stock as in Problem 3. Use blocks of size 21. Fit a generalized extreme value distribution to the left tail of the return series. Write down the estimates and their standard errors. Compute the 1% VaR based on the fitted parameters.
5. Again, consider the log returns of daily GM stock as in Problem 3. Fit a generalized Pareto distribution to the negative return series with threshold 2.5%. Based on the fitted model, what is the 1% VaR of your position? What is the associated expected shortfall?