

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

Homework Assignment #7

Due Date: Campus – June 1, 2007; Evening – June 2, 2007.

1. Problem 6.2 of the textbook.
2. Problem 6.10 of the textbook.
3. For problems 3 to 5, suppose that you hold a long position of Apple Computer stock valued at 1 million dollars. Also, the probability of interest is 1% and the daily stock returns are in the file “d-aapl9606.txt” (date, simple return). Transform the data into percentage log returns.
 - Calculate the VaR of your position for the next trading day using the RiskMetrics method, using $\alpha = 0.98$, $r_{2770} = 4.792$ and $\sigma_{2770} = 1.869$, where 2770 is the sample size.
 - Build a GARCH(1,1) model for the log return series with Gaussian innovation. What is the VaR based on the fitted model?
 - Build a 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 Apple Computer 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. Next, fit a generalized Pareto distribution to the negative return series with threshold 4.0%. Based on the fitted model, what is the 1% VaR of your position? What is the associated expected shortfall?
5. Suppose you also hold a long position of \$500,000 dollars on the stock of American International Group (AIG), Inc. The data are in “d-aig9606.txt”. Use the RiskMetrics to calculate VaR for AIG stock using $\alpha = 0.95$, $r_{2770} = -0.306$, and $\sigma_{2770} = 0.636$. What is the VaR for your combined position of AAPL and AIG stocks?