SINGAPORE MANAGEMENT UNIVERSITY

School of Economics

Econ623 Econometrics II
Assignment 2
Due: Wed 17 February, 2010

1. X and Y are two random variables. If $E(X \mid Y) = 0$, show that $E(h(Y)X) = 0$ for any h.

2. Let $Y = \{Y_1, Y_2, \ldots, Y_n\}$ be the n random variables that represent the durations of transaction n stocks. Suppose that these variables are iid with the following pdf:

$$f(y,\theta) = \begin{cases} \theta_2 \exp\{-\theta_2 (y - \theta_1)\} & if.y \geq \theta_1 \\ 0 & if.y < \theta_1 \end{cases}$$

   This is an Exponential distribution with the shift parameter θ_1. The support of the duration is $[\theta_1, +\infty)$. Let $\{y_1, y_2, \ldots, y_n\}$ be a sample from the distribution of these random variables. Answer the following questions:

   (a) Obtain the analytical expression of the MLE of the parameters θ_1 and θ_2.

   (b) Show that the MLE estimator of θ_1 (call it $\hat{\theta}_1$) is consistent (ie $\hat{\theta}_1 \xrightarrow{p} \theta_1$) but not asymptotically normal.

   (c) Show that $n(\hat{\theta}_1 - \theta_1)$ is asymptotically distributed as an Exponential random variable with parameter θ_2.