HW 4 (Due June 20, Friday)

[Don't try Q2(6) until Monday. I will give you some instrunctions for the question on M onday]

1. (20 pts.) Consider the following equations:

$$y_1 = \gamma_{31}y_3 + \beta_{11}x_1 + \varepsilon_1$$
$$y_2 = \gamma_{12}y_1 + \gamma_{32}y_3 + \beta_{22}x_2 + \varepsilon_2$$
$$y_3 = \gamma_{13}y_1 + \varepsilon_3$$

(1) Examine the identification of each equation.
(2) Examine the identification of each equation, assuming $\gamma_{31} + 4\beta_{11} = 2$. (Do not assume that Σ is diagonal.)

2. (60 pts.) A simultaneous equations model is given:

(A) $y_1 = \gamma_{21}y_2 + \beta_{11} + \beta_{21}x_2 + \beta_{31}x_3 + \varepsilon_1$;
(B) $y_2 = \gamma_{12}y_1 + \beta_{12} + \beta_{42}x_4 + \varepsilon_2$.

To estimate this model, use the data set named sem.db, which is available from Dr. Ahn's web page. The data set contains 30 observations on 5 variables (y1, y2, x2, x3 and x4). Using this data set, construct a GAUSS program that can do the followings:

(1) (10 pts.) Estimate models (A) and (B) by 2SLS. Report the variable names, estimated coefficients, standard errors, t statistics and R^2.
(2) (10 pts.) Evaluate the quality of the instrumental variables for each equation.
(3) (10 pts.) Can you test the specification of the first equation? If so, report your test result. How about the second equation?
(4) (10 pts.) Estimate models (A) and (B) by 3SLS. Report the variable names, estimated coefficients, standard errors, and t statistics.
(5) (10 pts.) You will observe that the 3SLS estimates for equation (B) are identical to the 2SLS results obtained from (1). Provide a proper explanation for these phenomena.
(6) (10 pts.) Estimate models (A) and (B) by LIML. Report the variable names, estimated coefficients, standard errors, and t statistics. Also, report the model specification test result.