

Problem Set 2

Due Tuesday, September 22, in class.

1. Consider the following system of simultaneous equations:

$$y_{1i} = \alpha y_{2i} + \gamma_1 z_{1i} + \gamma_2 z_{2i} + u_{1i} \quad (1)$$

$$y_{2i} = \beta y_{1i} + \gamma_3 z_{3i} + u_{2i} \quad (2)$$

- Solve the reduced form for y_{1i} and y_{2i} .
- Which regressors are endogenous? Be explicit.
- Which structural equations are identified? Be explicit.
- What is the optimal instrument for y_{1i} in equation (2)? What conditions must the reduced form for y_{1i} satisfy so that a valid instrument exists?

2. Consider the following system of simultaneous equations:

$$y_{1i} = \alpha_0 + \alpha_1 y_{2i} + \gamma_{11} z_{1i} + \gamma_{12} z_{2i} + u_{1i} \quad (1)$$

$$y_{2i} = \beta_0 + \beta_1 y_{1i} + \beta_3 y_{3i} + \gamma_{21} z_{1i} + \gamma_{22} z_{2i} + u_{2i} \quad (2)$$

$$y_{3i} = \delta_0 + \delta_1 y_{1i} + \delta_2 y_{2i} + \gamma_{33} z_{3i} + \gamma_{34} z_{4i} + \gamma_{35} z_{5i} + u_{3i} \quad (3)$$

Verify that each equation in the system is identified. Using the data in ps2_3SLS.wf1, do the following in Eviews.

- System 2SLS. Verify that this is equivalent to equation by equation 2SLS.
- 3SLS.

3. Redo problem 2 in Gauss.

Do the following in Gauss.

4. Replicate the t table of critical values (Table D.2 in Gujarati). Use at least 10^6 random variables for each df . Use 1000 to proxy for infinite df .
5. Replicate the chi-squared critical values, for $df = 1, 2, 3$.