

Exam #2 Answer Key

Economics 435: Quantitative Methods

Spring 2005

1 Some short-answer questions

- a) You need 2 IV's, and it is fine if you have more.
- b) The one that jumps to my mind is that parents who only have the resources to send one son to university will choose to send the smarter of the two brothers. This will lead to overestimation of the returns to schooling.

2 An alternative to the IV estimator

- a) You can use:

$$\hat{\beta}_1 = \frac{\hat{\gamma}_{yz}}{\hat{\gamma}_{xz}}$$

- b) It is identical to the IV estimator.

3 Simultaneous equations

- a) In general, we cannot learn anything from this regression. The coefficients represent some complex interaction of supply and demand which we can't figure out from this regression.

- b) I have: (REDO)

$$p = \frac{\gamma_0 - \lambda_0}{\lambda_1 - \gamma_1} + \frac{\gamma_2}{\lambda_1 - \gamma_1}z + \frac{-\lambda_2}{\lambda_1 - \gamma_1} + \frac{1}{\lambda_1 - \gamma_1}(v - u)$$

- c) I have:

$$q = \frac{\gamma_0\lambda_1 - \lambda_0\gamma_1}{\lambda_1 - \gamma_1} + \frac{\lambda_1\gamma_2}{\lambda_1 - \gamma_1}z + \frac{-\gamma_1\lambda_2}{\lambda_1 - \gamma_1}x + \frac{\lambda_1}{\lambda_1 - \gamma_1}v + \frac{-\gamma_1}{\lambda_1 - \gamma_1}u$$

- d) I have:

$$\beta_{pz} = \frac{\gamma_2}{\lambda_1 - \gamma_1}$$
$$\beta_{px} = \frac{-\lambda_2}{\lambda_1 - \gamma_1}$$

e) I have:

$$\beta_{qz} = \frac{\lambda_1 \gamma_2}{\lambda_1 - \gamma_1}$$
$$\beta_{qx} = \frac{-\gamma_1 \lambda_2}{\lambda_1 - \gamma_1}$$

f) I have:

$$\hat{\lambda}_1 = \frac{\hat{\beta}_{qz}}{\hat{\beta}_{pz}}$$
$$\hat{\gamma}_1 = \frac{\hat{\beta}_{qx}}{\hat{\beta}_{px}}$$

(1)