

**ECON582 Econometrics III**

**Homework 4 – Simultaneous-Equations Models**

**Due: 4<sup>th</sup> May 2007**

Analytical Exercises

Greene Chapter 15 Questions 1 and 3

Matlab Exercise

Consider the following demand-supply model:

$$q_{d,t} = -0.5p_t + 0.5x_t + \varepsilon_{d,t} \text{ (Quantity demanded is a function of price and income)}$$

$$q_{s,t} = 1.5p_t - 0.5w_t + \varepsilon_{s,t} \text{ (Quantity supplied is a function of price and rainfall)}$$

$$x_t \sim U(0,1) \text{ and } w_t \sim U(0,1)$$

The two shocks are serially uncorrelated, and have the properties:

$$E(\varepsilon_{d,t} | x_t) = E(\varepsilon_{s,t} | x_t) = 0, E(\varepsilon_{d,t}^2 | x_t, w_t) = 1, E(\varepsilon_{s,t}^2 | x_t, w_t) = 1, E(\varepsilon_{d,t}\varepsilon_{s,t} | x_t) = 0$$

- a) Generate the two exogenous variables and the two structural shocks, solve for the reduced form of the system, and use it as a DGP to generate  $p_t$  and  $q_t$ . The sample size is 1000.
- b) Using the artificial data, find the OLS estimates for the demand and supply slopes.
- c) Using the artificial data, find the IV estimates for the demand and supply slopes.
- d) Repeat a) and b) 10000 times, save the estimates, show that the OLS estimator sucks and the IV estimator works.