ECO 7378 Prof. T. Fomby
Topics in Econometrics Spring 2012

EXERCISE 1

Spurious Regression Phenomenon

Purpose: To come to understand what is meant by the phenomenon of **Spurious Regression** and the danger of interpreting regression results that come from regressions involving nonstationary variables.

Consider the SAS program spurious.sas that you have been provided. The program generates two independent random walk series

$$X_t = X_{t-1} + w_t \qquad (1)$$

and

$$Y_t = Y_{t-1} + v_t \qquad (2)$$

where $E(w_s v_t) = 0$ for all s and t. The spurious.sas program generates generates 20 separate data sets of 500 observations each on Y and X. For each data set the program will run two separate regressions:

$$Y_t = \beta_1 + \beta_2 X_t + u_t \qquad (3)$$

and

$$\Delta Y_t = \beta_1 + \beta_2 \Delta X_t + e_t \quad . \qquad (4)$$

Equation (3) is called the "levels" regression equation while equation (4) is called the "differenced" regression equation. Now go to the spurious.sas program and choose your own random number seeds for X and Y. (In the program as given to you the random number seed for Y is seedy = 123456 while the random number seed for X is seedx = 654321. Change these numbers to whatever you want.) Now for each data set note the significance of the least squares estimate $\hat{\beta}_2$ first in the levels regression and then separately in the differenced regression and report the significances or lack thereof in the table below. Let S denote that the $\hat{\beta}_2$ for that regression is statistically significant at the 5% level and NS denote otherwise.

Data Set	Levels Regression	Differenced Regression
1	_____	_____
2	_____	_____
3	_____	_____

4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____
10	_____	_____
11	_____	_____
12	_____	_____
13	_____	_____
14	_____	_____
15	_____	_____
16	_____	_____
17	_____	_____
18	_____	_____
19	_____	_____
20	_____	_____

Given the 20 levels regression results, does it appear that Y is related to X? Given the differenced regression results, does it appear that Y is related to X? Which results do you believe? Explain your answer. Also define what the **spurious regression problem** is. Give me a short summary of the findings in the Granger and Newbold (1974) and Phillips (1986) papers.