

Exam on Topics from Chapters 2 through 13 (1.5 hours)

Consider the following three-equation model (the t subscript is ignore for simplicity).

$$Y_1 = a_1 + a_2 X_1 + a_3 X_2 + a_4 X_3 + u$$

$$Y_2 = b_1 + b_2 Y_3 + b_3 X_2 + v$$

$$Y_3 = Y_2 - Y_1$$

Y s are endogenous, X s are exogenous, u and v are error terms.

1. (15 points)

Derive the reduced form equations.

2. (5 points)

Explain why you can apply the OLS procedure for the first equation. What statistical properties do the OLS estimators of that equation possess?

3. (5 points)

Suppose we had used OLS estimation for the second equation. What statistical properties would the OLS estimators of that equation possess?

4. (10 points)

Step by step explain how you would obtain TSLS estimators for the second equation.

5. (10 points)

In (1) above show how you can get estimates of the original parameters (a s and b s) from those of the reduced form parameters (p s and m s). Are the estimates unique?