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ECONOMETRICS
REVIEW QUESTIONS
Instrumental variables and simultaneous equations

1. Answer by TRUE, FALSE or UNCERTAIN to each one of the following statements, and justify briefly your answers (maximum: 1 page per statement).

   (a) The least squares is a special case of the instrumental variables method.

   (b) The generalized least squares method is a special case of the instrumental variables method.

   (c) In a linear regression, the instrumental variables estimator can be obtained by replacing all the explanatory variables with fitted values from a regression on a set of instruments.

   (d) In a linear regression, the instrumental variables estimator can be obtained by adding to the explanatory variables the residuals from least-squares regressions of certain explanatory variables on a set of instruments.

   (e) The two-stage least squares method is preferable to the instrumental variables method.

2. Consider the following demand and supply model:

$$q_t = a_1 + b_1 p_t + c_1 Y_t + u_{t1} \,, \text{ (demand function)} \tag{1}$$
$$q_t = a_2 + b_2 p_t + c_2 R_t + u_{t2} \,, \text{ (supply function)} \tag{2}$$

   where

   $q_t =$ quantity (at time t), $p_t =$ price, $Y_t =$ income, $R_t =$ rain volume,

   u_{t1} and u_{t2} are random disturbances.

   (a) Derive the reduced form of this model.

   (b) Explain why applying least squares to the equations (1)-(2) may not be an appropriate method to estimate the parameters of these two equations.

   (c) Are the parameters of equations (1)-(2) identified? Explain your answer.

(d) Propose an estimation method for the parameters of equations (1)-(2) and discuss its properties.