Class 6. Selecting the set of regressors

Advanced Econometrics I

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Problem 1

Suppose researcher Innokentiy estimated two different models:

$$y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \varepsilon_i \tag{1}$$

$$y_i = \lambda_0 + \lambda_1 z_1 + \lambda_2 z_2 + \lambda_3 x_3 + \xi_i \tag{2}$$

The values of RSS for each of the model are equal to 101 and 110, correspondingly. Besides that, a researcher constructed and estimated one more special model:

$$y_i = \Delta_0 + \Delta_1 x_1 + \Delta_2 x_2 + \Delta_3 x_3 + \Delta_4 z_1 + \Delta_5 z_2 + u_i. \tag{3}$$

The value of RSS for this model after the estimation procedure was equal to $RSS = 99$.

Further, econometrician Boris looked at the provided results ad decided to estimate two more models:

$$y_i = 1.2 + \underset{(3.7)}{5.1} \times z_1 + \underset{(2.4)}{2.5} \times z_2 + \underset{(1.2)}{3.4} \times x_3 + \underset{(0.6)}{1.3} \times \hat{y}_{i,A} \tag{4}$$

$$y_i = 1.8 + \underset{(1.5)}{4.1} \times x_1 + \underset{(0.8)}{3.2} \times x_2 + \underset{(0.5)}{2.2} \times x_3 + \underset{(0.6)}{0.8} \times \hat{y}_{i,B} \tag{5}$$

(a) Explain why would Innokentiy want to estimate model (3);

(b) Provide an analysis whether models (1) and (2) are nested or not using non-nested F-test;

(c) Why would Boris want to estimate models (4)-(5)?

(d) Provide an analysis whether models (1) and (2) are nested or not using J-test;

(e) Would Innokentiy and Boris argue concerning the results with each other or not?

Problem 2

Using the dataset data.xlsx estimate two different models:

$$price\_msq_i = \alpha_0 + \alpha_1 \times dist_i + \alpha_2 \times livesp_i + \alpha_3 \times brick_i + \varepsilon_i \tag{1}$$

$$price\_msq_i = \beta_0 + \beta_1 \times dist_i + \beta_2 \times kitsp_i + \beta_3 \times floor_i + \beta_4 \times metrdist_i + \beta_5 \times walk_i + \xi_i \tag{2}$$

(a) Provide an analysis whether models (1) and (2) are nested or not using non-nested F-test;

(b) Provide an analysis whether models (1) and (2) are nested or not using J-test;

(c) Conduct the J-test manually and compare the results with the package estimation*.