

Exam No. 2 on Topics from Chapters 2 through 7 (1 hour)

Consider the following model that relates the log of change in the income of a country to a number of growth and other factors.

$$\text{(Model R)} \quad \text{grth} = \mathbf{a} + \mathbf{b} \text{y60} + \mathbf{g} \text{inv} + \mathbf{d} \text{school} + \mathbf{e} \text{pop} + \mathbf{u}$$

where

grth = log of change in income 1960-85 (growth rate measure)

y60 = log of income in 1960

inv = average investment to GNP ratio over 60-85 (as percent)

pop = measure of population growth in logarithms

school = measure of percentage population in school

dn = 1 for a non-oil producing country, 0 otherwise

di = 1 for industrialized countries

doecd = 1 dummy for OECD countries

(Organization for Economic Cooperation and Development)

You have data for 104 countries.

1. (10 points)

You suspect that each of the parameters of the above model depends on all the dummy variables. Derive a general model (U) that incorporates that belief and state the corresponding null hypothesis.

2. (12 points)

Carefully describe how you will use the Wald F -test to test the null hypothesis that none of the variables added in Model U is significant. Your answer should be specific to the model derived in (1) and give numerical values where available (use a 5 percent level).

3. (13 points)

Describe, step by step, how you will use the LM test to test the null hypothesis that none of the variables added in Model U is significant. Your answer should be specific to the model derived in (1) and give numerical values where available (use a 5 percent level).

4. (15 points)

A general to simple analysis was carried out and the estimated final model is the following.

$$\text{grth} = 1.7494 - 0.4080 \text{y60} + 0.7933 \text{inv} - 0.3059 \text{dn} \times \text{inv} - 0.0961 \text{doecd} \times \text{pop} + 0.3102 \text{di} \times \text{school}$$

Derive the marginal effects on grth attributable separately to y60, inv, pop, and school, that is, derive the partial derivative of grth with respect to each variable specified. Interpret the numbers in words.