EE325 Section 2 Quiz #7

Answers

1. For pedagogic purposes Hanushek and Jackson estimate the following model:

$$C_t = \beta_1 + \beta_2 GNP_t + \beta_3 D_t + u_t \qquad (1)$$

Where C_t = aggregate private consumption expenditure in year t
GNP_t = GNP in year t
D_t = national defense expenditures in year t

The objective of the analysis being to study the effect of defense expenditure on other expenditures in the economy.

Postulating that $\sigma_t^2 = \sigma^2 (GNP_t)^2$, they transform (1) and estimate

$$C_t/GNP_t = \beta_1 (1/GNP_t) + \beta_2 + \beta_3 (D_t/GNP_t) + (u_t/GNP_t) \qquad (2)$$

The empirical results based on the data for 1946-1975 were as follows (standard errors in the parentheses):

$$\widehat{C_t} = 26.19 + 0.6248\, GNP_t - 0.4398 D_t$$
$$(2.73) \qquad (0.0060) \quad (0.0736)$$
$$R^2 = 0.999$$

$$\widehat{C_t/GNP_t} = 25.92\, (1/GNP_t) + 0.6246 - 0.4315\, (D_t/GNP_t)$$
$$(2.22) \qquad (0.0068) \quad (0.0597)$$
$$R^2 = 0.875$$

a. What assumption is made by the authors about the nature of heteroscedasticity? Can you justify it?

The assumption made is that the error variance is proportional to the square of GNP, as is described in the postulation. The authors make this assumption by looking at the data over time and observing this relationship.

b. Can you compare the two R^2 values? Why or why not?

No. The R^2 terms may not be directly compared, as the dependent variables in the two models are not the same.