

Economics 141  
Fall 2009  
Gallet  
Homework #4

Note: Make sure to print and provide all relevant Eviews or Excel output with your answers, otherwise you will receive zero credit for this homework.

[1] For this problem you will address issues related to U.S. AIDS mortality. The data can be obtained from my website (<http://www.csus.edu/indiv/g/galletc/>) by clicking on the link labeled Homework4Data; or just download the Eviews file directly (by clicking on the link labeled Homework4EV). This is a panel data set (i.e., data across time and cross-sections) that consists of annual observations over the 1987-2003 for the following five states: Alabama, Alaska, Arizona, Arkansas, and California. Hence, the data contains 85 observations (i.e., 5 states by 17 years each, yields 85 observations). The following variables are in this data file:

AIDS = Total deaths due to AIDS

PRES = Prescription drug expenditures (in millions of dollars)

POV = Poverty rate (i.e., percent of population in poverty)

BAMA = 1 if state is Alabama, 0 if not

ALASKA = 1 if state is Alaska, 0 if not

ARIZ = 1 if state is Arizona, 0 if not

ARK = 1 if state is Arkansas, 0 if not

CALI = 1 if state is California, 0 if not

A. Estimate the following regression:

$$AIDS = \beta_0 + \beta_1 PRES + \beta_2 POV + \beta_3 BAMA + \beta_4 ALASKA + \beta_5 ARIZ + \beta_6 ARK$$

Provide the output. At similar prescription drug expenditure and poverty rates, rank order states (from highest to lowest) in terms of AIDS mortality.

B. Suppose you believe that each of the independent variables should affect AIDS mortality in some way (i.e.,  $\beta_k \neq 0$  for each individual independent variable ( $k = 1, 2, \dots, 6$ )). Based on your results from part A, perform these 6 tests at the 1% level of significance. Note: In the Eviews regression output, the column labeled t-statistic equals the respective coefficient estimate divided by its standard error. Make sure to provide the degrees of freedom and the appropriate critical values.

C. In the process of debating a law intended to expand government prescription drug expenditures, suppose someone testifies before Congress expressing the belief that every \$1 million increase in prescription drug expenditure saves less than one life (i.e., AIDS drops by less than 1). Based on your results from part A, test this claim at the 5% level of significance, making sure to provide the degrees of freedom, test statistic, and critical value(s).

D. Test the significance of the entire model at the 5% level of significance. Note:  $F_{\text{test}}$  is provided at the bottom of your Eviews regression output. Do provide the degrees of freedom and the critical value as well.

E. Suppose you believe there are geographical differences in AIDS mortality. And so, consider the following hypotheses (Essentially, this means you believe California is different from all the other 4 states).

$$H_0: \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$$

$H_A$ : at least one of these coefficients is not zero

Test this at the 5% level of significance, making sure to provide the critical value(s) and the test statistic.

Note: There are two ways you can solve this problem. First, you can do it manually (in the event that you are using Excel) by estimating the constrained (restricted) model, and then using a calculator (showing your calculations) to construct the value of the test statistic. You can then compare this to the appropriate critical value(s) and comment on your results. Second, have Eviews calculate the F test value (with your unconstrained (unrestricted) regression results in view) by clicking on View, then Coefficient Test, then Wald-Coefficient Restrictions, then type  $c(4)=c(5)=c(6)=c(7)=0$  in the box (Note: This assumes you have entered your independent variables in the order consistent with the above regression equation (i.e.,  $c(4)$  is the coefficient of BAMA,  $c(5)$  is the coefficient of ALASKA,  $c(6)$  is the coefficient of ARIZ, and  $c(7)$  is the coefficient of ARK). Note: Eviews labels  $c(1)$  as the intercept.). Then to determine whether or not the F-statistic is significant, look at the column labeled Probability (which corresponds to the P-value). If the corresponding probability value is less than 0.05, the coefficients are jointly significant (i.e., Reject the null hypothesis), if not then they are not jointly significant (i.e., fail to reject the null hypothesis). Comment on your results.

F. Alternatively, imagine you believe there are geographical differences in AIDS mortality in the sense that AIDS mortality differs across Alabama, Alaska, Arizona, and Arkansas. That is, you wish to test the following:

$$H_0: \beta_3 = \beta_4 = \beta_5 = \beta_6$$

$H_A$ : at least one of these coefficients is different from the others

Test this at the 10% level of significance, making sure to provide the critical value(s) and the test statistic.

Again, using Eviews, you can just type  $c(4)=c(5)=c(6)=c(7)$  in the box corresponding to the description above. Using Excel, you will have to impose the restriction in the null hypothesis and estimate the appropriate regression.