

Exercise Sheet 6

This exercise sheet is to be done prior to your actual Support and Feedback class. The Stata/R file, which you write as a group, should then be submitted by one of your group members via e-mail to your class tutor by Monday 10am of Week 8 (Term 1). You **MUST** take the output generated from your Stata/R programme to your tutorial classes. The data file is **march_cps_1976.dta/RData**.

- 1) First estimate the equation

$$wkswork_i = \beta_0 + \beta_1 age_i + \beta_2 chlt5_i + \varepsilon_i.$$

Then, estimate

$$wkswork_i = \gamma_0 + \gamma_1 chlt5_i + \epsilon_i, \quad age_i = \delta_0 + \delta_1 chlt5_i + u_i$$

and save the residuals $\hat{\epsilon}_i = wkswork_i - \hat{\gamma}_0 - \hat{\gamma}_1 chlt5_i$, $\hat{u}_i = age_i - \hat{\delta}_0 - \hat{\delta}_1 chlt5_i$.

Now estimate the equation

$$\hat{\epsilon}_i = \alpha_0 + \alpha_1 \hat{u}_i + \nu_i$$

and compare the OLS estimates of β_1 and α_1 .

- 2) Estimate the model

$$wkswork_i = \beta_0 + \beta_1 age_i + \beta_2 chlt5_i + \varepsilon_i \quad (1)$$

separately for each of the four regions (*Northeast*, *Midwest*, *South*, and *West*).

- 3) Use Stata/R to calculate the F-statistic for a test between the unrestricted model estimated in (1) and the following restricted model:

$$\begin{aligned} wkswork_i = & \alpha_0 + \alpha_1 age_i + \alpha_2 chlt5_i + \alpha_3 age_i * Midwest_i \\ & + \alpha_4 age_i * South_i + \alpha_5 age_i * West_i + \varepsilon_i \end{aligned} \quad (2)$$

For your understanding: what is the restriction imposed on (2) relative to (1)?

- 4) Reproduce the F-statistic obtained in Question 3 using appropriate (additive and multiplicative) dummy variables within a suitable regression and “test” commands in Stata/R.

NOTE:

Before you e-mail your Stata/R file to your class tutor:

- (i) Check the file runs all the way through from start to end without intervention from the marker.
- (ii) Annotate your Stata/R file with the appropriate question number to which your answer relates to help the marker understand what part of the script file is answering which question.
- (iii) Ensure that your Stata/R file only contains the commands necessary to answer the questions from the exercise sheet using the dataset **march_cps_1976.dta/RData** (in the script file do not include commands related to earlier exercise sheets, which are not needed for this exercise sheet).

All exercise sheets will be marked out of 3 points. Failure to follow the instructions noted above will involve you losing marks.