Econometrics
MIF – 2022/2023
Homework 2
(Deadline: 4th December)

1. The following model is a simplified version of the multiple regression model used by Biddle and Hamermesh (1990) to study the tradeoff between time spent sleeping and working and to look at other factors affecting sleep:

$$sleep = \beta_0 + \beta_1 totwrk + \beta_2 educ + \beta_3 age + u,$$

where *sleep* and *totwrk* (total work) are measured in minutes per week and *educ* and *age* are measured in years.

(a) If adults trade off sleep for work, what is the sign of β_1?

(b) What signs do you think β_2 and β_3 will have?

(c) Using the data in *SLEEP75.csv*, the estimated equation is

$$\hat{sleep} = 3638.25 - 0.148 totwrk - 11.13 educ + 2.20 age,$$

$$n = 706 \qquad R^2 = 0.113.$$

If someone works five more hours per week, by how many minutes is sleep predicted to fall? Is this a large tradeoff?

(d) Discuss the sign and magnitude of the estimated coefficient on *educ*.

(e) Would you say *totwrk*, *educ*, and *age* explain much of the variation in sleep? What other factors might affect the time spent sleeping? Are these likely to be correlated with *totwrk*?

2. Using the same data of previous problem (*SLEEP75.csv*), we obtain the estimated equation

$$\hat{sleep} = 3840.83 - 0.163 totwrk - 11.71 educ - 8.70 age + 0.128 age^2 + 87.75 male,$$

$$(235.11) \qquad (.018) \qquad (5.86) \qquad (11.21) \qquad (.134) \qquad (34.33)$$

$$n = 706, \qquad R^2 = 0.123, \qquad \overline{R}^2 = 0.117$$

The variable *sleep* is total minutes per week spent sleeping at night, *totwrk* is total weekly minutes spent working, *educ* and *age* are measured in years, and *male* is a gender dummy.

(a) All other factors being equal, is there evidence that men sleep more than women? How strong is the evidence?

(b) Is there a statistically significant tradeoff between working and sleeping? What is the estimated tradeoff?

(c) What other regression do you need to run to test the null hypothesis that, holding other factors fixed, age has no effect on sleeping?

3. **Computer Exercise**

Use the data in $SLEEP75.csv$[1] for this exercise. The equation of interest is

$$sleep = \beta_0 + \beta_1 totwrk + \beta_2 educ + \beta_3 age + \beta_4 age^2 + \beta_5 yngkid + u.$$

(a) Estimate this equation separately for men and women and report the results in the usual form. Are there notable differences in the two estimated equations?

(b) Compute the Chow test for equality of the parameters in the sleep equation for men and women. Use the form of the test that adds male and the interaction terms $male \cdot totwrk,\ldots,$ $male \cdot yngkid$ and uses the full set of observations. What are the relevant df for the test? Should you reject the null at the 5% level?

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[1]

install.packages('wooldrige') library(wooldridge) data("sleep75")