

Econometrics 1.2

M2 PPD-APE

Exercise 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.

1. If adults trade off sleep for work, what is the sign of β_1 ?
2. What signs do you think β_2 and β_3 will have?
3. The estimated equation is

$$\widehat{sleep} = 3638.25 - .148totwrk - 11.13educ + 2.20age$$

with $n = 706$ and $R^2 = .113$. If someone works 5 more hours per week, by how many minutes is *sleep* predicted to fall? Is this a large tradeoff?

4. Discuss the sign and magnitude of the estimated coefficient on *educ*.
5. 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*?

Exercise 2 Download data "Eggs.dta" from the course's website.

A firm that produces 10,000 eggs per day needs to be able to calibrate its production and hence to predict the eggs' weight. However, weighing an egg is time consuming since they have to wait until the egg is stabilized on the scales before the measure. It would be much quicker to only measure its height or its width (taking both measures cannot be done at the same time). The question is thus: which of the height or the width predicts best the egg's weight?

1. Study the relationship between weight and egg's height? (scatterplot with the "plot" function for instance, regression with the "reg" function, try different functional relationships with the log for instance)
2. Study the relationship between weight and egg's width?
3. What process for calibration would you advise?

Exercise 3 Download Coleman, B. (1999), “The Impact of Group Lending in Northeast Thailand.” *Journal of Development Economics* 60 (no.1) Oct 1999: 105-141 from the course’s website.

1. What are the main econometric problems facing someone who is trying to do a program evaluation of a microfinance program?
2. Describe precisely what the ”member” and the ”months of village bank membership” variables capture (eq. 3 and 4).
3. Explain carefully how Coleman goes around the different selection biases.
4. What does he find?
5. What are the directions of the biases? Was it expected?

Exercise 4 Which of the following can cause OLS estimators to be biased?

- Heteroskedasticity
- Omitting an important variable
- A sample correlation coefficient of .95 between two independent variables both included in the model.