

Questions and Exercises - Tutorial #7

Ettore Gallo

May 29, 2018

Dummy variables and interaction terms

1. [Wooldridge 7.1] Using the data in SLEEP75.RAW, we obtain the estimated equation:

$$\begin{aligned}\widehat{sleep} = & 3,840.83 - .163 \text{ totwrk} - 11.71 \text{ educ} - 8.70 \text{ age} \\ & (235.11) \quad (.018) \quad (5.86) \quad (11.21) \\ & + .128 \text{ age}^2 + 87.75 \text{ male} \\ & \quad (.134) \quad (34.33) \\ n = & 706, R^2 = .123, \bar{R}^2 = .117.\end{aligned}$$

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

- All other factors being equal, is there evidence that men sleep more than women? How strong is the evidence?
- Is there a statistically significant trade-off between working and sleeping? What is the estimated trade-off?
- What other regressions do you need to run to test the null hypothesis that, holding other factors fixed, age has no effect on sleeping?

2. [Wooldridge 7.14, modified] Use the data in SLEEP75.DTA for this exercise. The equation of interest is:

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

- 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? What is the difference between the estimates reported below and the estimated model of exercise 7.1?

The estimated equation for men is

$$\begin{aligned}\widehat{sleep} = & 3,648.2 - .182 \text{ totwrk} - 13.05 \text{ educ} + 7.16 \text{ age} - .0448 \text{ age}^2 + 60.38 \text{ yngkid} \\ & (310.0) \quad (.024) \quad (7.41) \quad (14.32) \quad (.1684) \quad (59.02)\end{aligned}$$

$$n = 400, \quad R^2 = .156$$

and the estimated equation for women is

$$\begin{aligned}\widehat{sleep} = & 4,238.7 - .140 \text{ totwrk} - 10.21 \text{ educ} - 30.36 \text{ age} - .368 \text{ age}^2 - 118.28 \text{ yngkid} \\ & (384.9) \quad (.028) \quad (9.59) \quad (18.53) \quad (.223) \quad (93.19)\end{aligned}$$

$$n = 306, \quad R^2 = .098.$$

3. Starting with the original model of Exercise 2, now introduce the interaction between having a young kid and gender.

- How many interactions do you need to include in the regression?
- Estimate the difference between men with and without a young kid.