Assignment II: Functional Form

Econometrics I

Assigned: Mar 1, 2022
Submit: Mar 6, 2022

Write down the answer of each problem:

Problem 1

For the population of firms in the chemical industry, let rd denote annual expenditures on research and development, and let $sales$ denote annual sales (both are in millions of dollars).

1. Write down a model (not an estimated equation) that implies a constant elasticity between rd and $sales$. Which parameter is the elasticity?
2. Now, estimate the model using the data in RDCHEM. Write out the estimated equation in the usual form. What is the estimated elasticity of rd with respect to $sales$? Explain in words what this elasticity means.

Problem 2

Use the data in BWGHT2 for this exercise.

1. Estimate the equation
$$log(bwght) = \beta_0 + \beta_1 npvis + \beta_2 npvis^2 + u$$
by OLS, and report the results in the usual way. Is the quadratic term significant?
2. Show that, based on the equation from part (i), the number of prenatal visits that maximizes $log(bwght)$ is estimated to be about 22. How many women had **at least 22** prenatal visits in the sample?
3. Does it make sense that birth weight is actually predicted to decline after 22 prenatal visits? Explain.
4. Add mother's age to the equation, using a **quadratic functional form**. Holding $npvis$ fixed, at what mother's age is the birth weight of the child maximized? What fraction of women in the sample are older than the *"optimal"* age?

Note: *Dataset are available in our GitHub repository class.*