School of Public Health PHPM1100062

Mengcen Qian Spring 2017

Problem Set 2

Due on 03/29 (Week 5)

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|  | (1) |
|  |  |
| GDPN | 1.435\*\*\* |
|  | (0.213) |
| CVN | -0.595\*\* |
|  | (0.223) |
| PP | 7.224 |
|  | (6.091) |
| DPC | -15.62\*\* |
|  | (6.896) |
| IPC | -11.37 |
|  | (7.121) |
| Constant | 38.17\*\*\* |
|  | (6.353) |
|  |  |
| Observations | 32 |

1. Frederick Schut and Peter Van Bergeijk (Schut & Van Bergeijk 1986) published an article in which they attempted to see if the pharmaceutical industry practiced international price discrimination by estimating a model of the prices of pharmaceuticals in a cross section of 32 countries. The authors felt that if price discrimination existed, then the coefficient of per capita income in a properly specified price equation would be strongly positive. The reason went as follows: the higher the ability to pay, the lower (in absolute value) the price elasticity of demand for pharmaceuticals and the higher the price a price discriminator could charge. In addition, the authors expected that prices would be higher if pharmaceutical patents were allowed and that prices would be lower if price controls existed, if competition was encouraged or if the pharmaceutical market in a country was relative large.

The left table shows the regression results, where standard errors are reported in parentheses and significance levels are indicated using stars (\*\*\* for significance at 1% level; \*\* for 5% level).

The outcome variable is P*i* = the pharmaceutical price level in the *i*th country divided by that of the United States.

The included regressors are:

GDPN*i* = per capita domestic product in the *i*th country divided by that of the United States

CVN*i* = per capita volume of consumption of pharmaceuticals in the *i*th country divided by that of the United States.

PP*i* = a dummy variable equal to 1 if patents for pharmaceutical products are recognized in the *i*th country, 0 otherwise.

DPC*i =* a dummy variable equal to 1 if the *i*th country applied strict price controls, 0 otherwise.

IPC*i =* a dummy variable equal to 1 if the *i*th country encouraged price competition, 0 otherwise.

1. If we are interested in how different these estimates are from zero, which type of hypothesis test should we use (one-sided or two-two sided)? What are your null hypothesis and alternative hypothesis? According to the results in the table, at 5% significance level, the impact of which variable on the pharmaceutical price level is statistically different from zero?
2. With the estimates and standard errors, we are able to construct 95% interval estimates (check your slides for the details). Please use your own words to explain why we prefer a narrower interval range?
3. Do you think Schut and Van Bergeijk concluded that international price discrimination exists? Why or why not?
4. (Optional with bonus points; no punishment if you leave this one blank; So try your best!!!) If we wanted to test if the inverse relationship between price and quantity sold on the market holds in our data (a topic in microeconomics), then we need to develop a one-sided t-test at 5% significance level, where H0: βCVN ≥ 0 and Ha: βCVN < 0. Can you finish the rest steps of the test? What is your conclusion? Here is the information you may need: the t critical value = -1.71.

Reference:

Schut, F, and P Van Bergeijk, “International price discrimination: the pharmaceutical industry,” World Development, 1986, vol.14(9): 1141-1150.