Econ 4743, Problem Set 3

{{ student_name }}

Instruction:

This problem set is due on Thursday after the Spring break. You are going to submit your work online (no handwriting anymore) for which details will be given next week. But it is vital that you answer the questions first in any text processor by listing the question number followed by your answer in one line or many lines when it is open-question. This is because you are going to transfer your answers to the online submission portal by copy-pasting them and saving your work will save your time and energy. For image submission questions, it is also good to snip the image using an app in your computer or the 'prt sc' key in PC (If taking photo, please don't include other background images in the photo).

I. Consider the following demand function for beer

$$log(q) = \beta_0 + \beta_1 log(pb) + \beta_2 log(pl) + \beta_3 log(pr) + \beta_4 log(y) + e$$

where, q is liters of beer consumed, pb is price of beer in $ per unit, pl is price of other liquor in $ per unit, pr is price of other goods and services (an index) and y is income in $. The data for this is provided as .csv file on Bb under the assessment folder.

Demand theory tells us that the coefficient of pb must be negative.

1. When you test whether its coefficient in the population is negative, the null hypothesis is: (enter text input)

{{ q1 }}

2. and the alternative hypothesis is : (enter text input)

{{ q2 }}

3. In testing this hypothesis at 1% significance level, the t-test critical value is: (enter numeric input)

{{ q3 }}

4. and the sample t-value is: (enter numeric input)

{{ q4 }}

5. So, you will reject or not reject the null? (enter text input)

{{ q5 }}

6. and your will state your conclusion in layman terms by saying (enter longer text input)

{{ q6 }}

Now you want to test whether income and price of liquor are jointly significant at 5%. Answer the following:

7. What is the numerical value of the SSR from the **unrestricted model**? (enter numeric value)

{{ q7 }}

8. Upload a snippet of stata or other package output of your regression (.PNG, .JPG, .JEPG, .PDF, no HEIC please)

9. What is the numerical value of the SSR from the **restricted model**? (enter numeric value)

{{ q9 }}

10. Upload a snippet of stata or other package output of your regression (.PNG, .JPG, .JEPG, .PDF, no HEIC please)

11. When you test this hypothesis, the null is: (enter text input)

{{ q11 }}

12. and the alternative hypothesis is : (enter text input)

{{ q12 }}

13. In testing this hypothesis at 5% significance level, the “test’s” critical value is: (enter numeric input)

{{ q13 }}

14. and the sample value of the test statistics is: (enter numeric input)

{{ q14 }}

15. Therefore, you will reject or not reject the null? (enter text input)

{{ q15 }}

16. and your will state your conclusion in layman terms by saying (enter longer text input)

{{ q16 }}

Economic theory asserts that ideal demand functions must exhibit homogeneity of degree zero property, which means that when the income of consumers and all prices double, then quantity demanded must be unchanged- **No Money Illusion**. If this is true, it must be the case that $\beta_1 + \beta_2 + \beta_3 + \beta_4 = 0$. So test this hypothesis against the alternative hypothesis and answer the following.

17. What is the sample t-value associated with this hypothesis test? (enter numeric input)

{{ q17 }}

Hint: by adding $(\beta_2 + \beta_3 + \beta_4)log(pb)$ and then subtracting the same term and re-arranging, the restricted model will be as follows:

$$log(q) = \beta_0 + (\beta_1 + \beta_2 + \beta_3 + \beta_4)log(pb) + \beta_2(log(pl) - log(pb)) + \\ \beta_3(log(pr) - log(pb)) + \beta_4(log(y) - log(pb)) + e$$

18. Do you reject or not reject the null at 5%? (text input)

{{ q18 }}

19. Why ? (longer text input)

{{ q19 }}