

Econometrics Homework 2

Instructor: Deep Mukherjee & Sounak Thakur

Due date: 24th April

Full marks: 10

Please read the following instructions very carefully before answering the following questions.

- Write your name (in capital) and roll number at the top of your answer script.
- Save the scan copy of your answer script in pdf format. The file name should have your roll number and name and then upload it in the portal. For example, if your name is XYZ and roll number is 12345 then you should upload your answer script as "12345_XYZ.pdf" in the portal.

Q1. Following table provides data on monthly the export of sugarcane from 2015 to 2018.

Export of sugarcane (000 tons)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	103.4	105.6	89.5	69.2	55.6	48.7	42.4	47.8	87.3	105.9	143.9	138.9
2016	130.2	121.8	115.1	85.3	63.2	53.6	55.7	74.5	79.4	110	138.6	135.7
2017	131.8	101	85.8	67.3	75.4	63.7	59.9	53.1	75.5	109.9	141.4	138
2018	132.2	96.5	86	74.4	77.8	54.3	57	63.6	73	122.5	152.7	158

Using the information given in above table, compute the adjusted seasonal index for the month of August. [2 points]

Q2. Consider the following randomly generated error term in the below table

Time (t)	1	2	3	4	5	6	7	8	9	10
Error (ϵ)	1.4884	-0.2714	-0.2714	-2.3637	-1.7548	0.0142	-0.3184	0.6471	0.7578	0.7866

Based on the above table, calculate the AR (1) for $t = 6$, when $\gamma = -0.5$. [Hint: You should assume the following functional form of AR (1) process: $Y_t = \gamma_t Y_{t-1} + \epsilon_t$] [2 points]

Q3. Consider the following randomly generated error term in the below table

Time (t)	1	2	3	4	5	6	7	8	9	10
Error (ϵ)	1.4884	-0.2714	-0.2714	-2.3637	-1.7548	0.0142	-0.3184	0.6471	0.7578	0.7866

Assuming the following functional form $Y_t = \epsilon_t - \theta_t \epsilon_{t-1}$, calculate the MA (1) for $t = 7$ when $\theta_t = -0.5$. [2 points]

Q4. Following crosstabulation displays the distribution of two variables – number of students in honors course (i.e., Y) and gender of students (i.e., X)

Honour's course	Gender of Student		Total
	Male	Female	
NO	74	77	151
YES	17	32	49
Total	91	109	200

Compute the ration of odds for female students of being honors course to odds for male students of being honors course. [2 points]

Q5. The **Assignment** dataset contains 4 variables – one dependent variable (Y) which is binary in nature and three independent variables (X1, X2, and X3). Note that among three independent variables X1, X2 are continuous in nature while X3 is categorical variable which contain 4 categories – 1, 2, 3, and 4. Here category 1 indicates top category while category 4 stands for bottom category. Use the **Assignment** dataset to solve the following two problems. [2 points]

- Use Probit model to estimate the influence of independent variables on the dependent variable Y. Based on your probit estimation results, can we conclude that category 3 has any significant impact on the dependent variable Y? [1]
- Based on your probit model, estimate the predicted probability for category 3. [1]

Best of luck