BACHELOR OF ECONOMICS
THAMMASAT UNIVERSITY

Final Examination: 2/2020

Subject: EE426
Instructor: Tatre Jantarakolica
Date: May 28, 2021
Time: 9:00-15:00

Instructions

1. This is a take home examination.
2. In this exam paper, there are 5 main problems (5 pages, including this cover sheet), with the total marks of 100. Each question is worth 20 points.
3. You are required to estimate the model of each question based on the provided data set. You will have your own data set. Please download your data set (#.zip) based on your assigned number on the list. Copy estimated results from STATA program to your answer of each question (using Font-Courier New).
4. Time: 6 Hours (9:00 – 15:00 hr.) (approximately one hour per question)
5. Submit your answer before 3:00 pm. in ONE pdf-file by setting the file-name as No_Yourname_Student ID, **e.g. 1_6104640021_ THAMCHANOK.pdf**

No.	Student ID	Name- Surname	Files	Zip-file Download
1	6104640021	Mr THAMCHANOK PIANMUEAN	Final_q*_1.dta	01.zip
2	6104640112	Mr HARIT HATAWONG	Final_q*_2.dta	02.zip
3	6104640328	Miss WIRINRATCH KIRIRAK	Final_q*_3.dta	03.zip
4	6104641086	Mr NATTHAPHONG TISAVIPAT	Final_q*_4.dta	04.zip
5	6104641300	Mr NUNTAYOD TULAKARNWONG	Final_q*_5.dta	05.zip
6	6104641318	Miss PHATAKAN KANCHANAPRADIST	Final_q*_6.dta	06.zip
7	6204640087	Mr THANAKRIT METHASATE	Final_q*_7.dta	07.zip
9	6204640178	Miss MAI SURINTRABOON	Final_q*_9.dta	09.zip
10	6204641218	Miss PORNWARAT FOONGPIRIYA	Final_q*_10.dta	10.zip
11	6204641267	Mr PONGPANOT CHALOEMVISETPHON	Final_q*_11.dta	11.zip
12	6204641473	Mr WIRAPHAT LIN	Final_q*_12.dta	12.zip

Take Home Final Exam
EE426
Semester 2/2020

There are five questions - answer all questions.
Each question is worth 20 points.

1. From the data set "`Final_q1-1_no.dta`":

   Model for the degree of acceptance is stated as follows:

   $$Prob(y_i=j|X) = f(x_1, x_2, x_3, x_4) \tag{1}$$

   where: y_i is categorical data = 1 for disagree, = 2 for neutral, and = 3 for agree.
   x_k is independent variable k. k = 1, 2, 3, 4.

   (a) Estimate the model using multinomial logit model using y_i=0 is the base outcome. Make interpretation of your estimated results (sign & meaning (in term of rrr), overall test, goodness of fit, and individual test). Perform IIA test whether it is appropriated to apply multinomial logit in this case? Give explanation why IIA is important for multinomial logit. Determine whether multinomial logit is appropriated for this case? Why? (5 points).

   (b) Estimate the model using order probit model of y_i. Make interpretation of your estimated results (sign & meaning, overall test, goodness of fit, and individual test). Perform the test to determine whether order probit is appropriated in this case? Give explanation why? (5 points).

   From the data set "`Final_q1-2_no.dta`":

   In the study of decision to subscribe mobile phone services, three choices have been studied including AIS, DTAC, and TRUE. The probit model can be stated as:

   $$I_{Ji} = \beta_{J0} + \beta_{J1}x_{1i} + \beta_{J2}x_{2i} + \beta_{J3}x_{3i} + \beta_{J4}x_{4i} + u_{Ji} \tag{2}$$

   and

   $$\Pr(Y_{Ji} = 1) = \Phi(I_{Ji})$$

   where: I_{Ji} is index variables.
   Y_{Ji} is decision to choose financial choice J, value equals to 1 if choosing choice J or 0 if not. J = 1 for AIS, 2 for DTAC, 3 for TRUE.
   x_{ki} is independent variable k.
   $\Phi(.)$ is multivariate normal probability distribution function.
   u_{Ji} is disturbance term.

   (c) Estimate models for Y_{1i}, Y_{2i}, and Y_{3i} assuming that the probability functions follow separate normal distribution function. Should we use these three separate probit models? Why? (4 points)

   (d) Estimate models for Y_{1i}, Y_{2i}, and Y_{3i} assuming that the probability functions follow multivariate normal probability distribution function (MV Probit models). Determine whether MVProbit is appropriated. Why? How does the MV Probit models differ from three separate probit models? (6 points)

2. From the data set "`Final_q2_no.dta`":

According to the following model,

$$y_{ki} = \beta_{k0} + \beta_{k1} x_i + u_{ki} \qquad (3)$$

where: y_{ki} is Dependent variable, k=1, 2, 3.
x_i is Independent variable
u_i is Stochastic disturbance term

(a) Plot histogram of y_{1i}, y_{2i}, y_{3i}, compute descriptive statistics of these three variables. Determine limitations of these three dependent variables. (5 points)

(b) Estimate the model (3) for y_{1i} using OLS and truncated regression model. Determine the most appropriated model in this case. Why? What is the major problem in this case? What will happen if we ignore the problem? (5 points)

(c) Estimate the model (3) for y_{2i} using OLS and Tobit model. Determine the most appropriated model in this case. Why? What is the major problem in this case? What will happen if we ignore the problem? (5 points)

(d) Estimate the model (3) for y_{3i} using OLS and Tobit model. Determine the most appropriated model in this case. Why? What is the major problem in this case? What will happen if we ignore the problem? (5 points)

3. From the data set "`Final_q3_no.dta`":

The generalized linear regression model can be stated as:

$$I_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} + \beta_4 x_{4i} + u_i \qquad (4)$$

and

$$\Pr(Y_i = y_i) = f(I_i)$$

where: I_i is index variables.
y_i is counted number 0, 1, 2,...
x_{ki} is independent variable k.
$f(.)$ is either Poisson or Negative Binomial probability distribution function.
u_i is disturbance term.

(a) Estimate models for Y_i assuming that the model is traditional linear regression model. Create histogram for Y_i. Determine whether there is limitation of dependent variable in this case. If yes, what type of limitation is it? (3 points)

(b) Estimate models for Y_i assuming that the probability functions follow Poisson probability distribution. Perform GOF test and determine whether Poisson is appropriated in this case. Interpret the estimated result (sign and meaning (in term of incidence-rate ratios), overall test, individual test, pseudo R^2, marginal effects). (5 points)

(c) Estimate models for Y_i assuming that the probability functions follow Negative Binomial probability distribution. Determine whether Negative Binomial regression model is appropriated in this case. Interpret your estimated result (sign and meaning (in term of incidence-rate ratios), overall test, individual test, pseudo R^2, marginal effects). (5 points)

(d) Estimate models for Y_i assuming that the model is Zero Inflated Poisson (x_{1i}, x_{2i}, and x_{3i} are independent variables in Poisson model and x_{4i} is independent variable in Inflated (Logit) model). Interpret your estimated result. Determine which model (Linear regression model, Poisson, Negative Binomial, or ZIP) is the most appropriated model in this case? Why? (provide the tests) (7 points)

4. From the data set "`Final_q4_no.dta`":

(a) Test whether the series y_t and x_t are stationary series and determine their order of integration. Give explanation of the process of the test. Why is testing equation important? Why is stationary property important to time series analysis? (5 points)

(b) Estimate Autoregressive Integrated Moving Average (ARIMA(p,d,q)) model for y_t – determine the most appropriated order for p, d, and q using SBIC given the maximum lag equals 4. Make dynamic forecast for period time = 501 to 505. (5 points)

From the following GARCH model:

Mean Equation: $$y_t = \alpha + \beta x_t + \varepsilon_t \qquad (5)$$

Variance Equation: $$\sigma_t^2 = \alpha_0 + \sum_{j=1}^{p} \delta_j \sigma_{t-j}^2 + \sum_{i=1}^{q} \alpha_i \varepsilon_{t-i}^2 \qquad (6)$$

where: y_t is Dependent variable.
x_t is Independent variable
ε_t is Stochastic disturbance term
σ_t^2 is Conditional variance of stochastic disturbance term.

(c) Estimate model (5) using OLS by employing y_t as dependent variable and x_t as explanatory variable, determine whether ARCH-effect significantly occurs, and state null hypothesis of the test. Why the test is classified as LM test? (3 points)

(d) Estimate GARCH(p,q) for y_t using x_t as explanatory variable for mean equation (model (5) and (6)) – determine the most appropriated order p and q for variance equation using SBIC given the maximum lag equals to 2. Then, predict the variance of y_t using the estimated result of GARCH(p,q) model with the most appropriated lag. (4 points)

(e) Among these three models, ARCH(1), GARCH(1,1), or EGARCH(1,1,1), which model is the most appropriated in this case? Why? What are the differences among ARCH, GARCH, and EGARCH? (3 points)

5. From the data set "Final_q5_no.dta":

The following VARs models:

$$Y_t = A_0 + A_1 Y_{t-1} + \in_t \tag{7}$$

where: $Y_t = \begin{pmatrix} y_t \\ x_t \end{pmatrix}$, $A_0 = \begin{pmatrix} a_{10} \\ a_{20} \end{pmatrix}$, $A_1 = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix}$, $\in_t = \begin{pmatrix} e_{1t} \\ e_{2t} \end{pmatrix}$

(a) Estimate VARs models using y_t and x_t as endogenous variables and determine the most appropriated lags models using SBIC. (5 points).

(b) Perform stability test and Granger exogeneity test. Determine whether assumptions of VARs are satisfied, explain your evaluation criteria. If the stability assumption is unsatisfied, what will happen? (5 points)

(c) Perform Impulse response function analysis (irf), Orthogonal impulse response function analysis (oirf), Cumulative impulse response function analysis (coirf), make interpretation of the analysis, and determine which variable has more impact (using Cholesky order – y_t x_t). (5 points)

(d) Perform Forecast error variance decomposition (fevd) and determine variable that has more impact on each endogenous variable. (3 points)

(e) Determine whether changing Cholesky order from – "y_t x_t" to "x_t y_t" will change the results of irf, oirf, coirf, and fevd. Why? or why not? (2 points)