

Name:

Enrolment No:



**UNIVERSITY OF PETROLEUM & ENERGY STUDIES
DEHRADUN**

End Semester Examination-December 2018

Program/course: MA Economics (Energy Economics)

Semester : III

Subject: Business Modeling in Energy Sector

Max. Marks : 100

Code : OGET 8007

Duration : 3 Hrs

No. of page/s: 7

Section A (attempt all)

Q1. Fill in the blanks

i.	In panel data analysis, we assume that the X 's are _____. a. Quantitative b. Nonstochastic c. Fixed d. qualitative	[1]	CO1
ii.	Which one of the following is Least-Squares Dummy Variable Regression Model a. Slope Coefficients Constant but the Intercept Varies across time b. All coefficients (the intercept as well as slope coefficients) vary over individuals c. Slope Coefficients Constant but the Intercept Varies across Individuals d. The intercept as well as slope coefficients vary over individuals and time	[1]	CO1
iii.	Random effect model is known as _____. a. ECM b. GLS c. WLS d. OLS	[1]	CO1
iv.	The term "fixed effects" is due to the fact that, although the intercept may differ across individuals, each individual's intercept does not vary _____. a. from slop coefficients b. across industries	[1]	CO1

	<p>a. Slope coefficient c. Intercept</p>	<p>b. Dependent variable d. error term</p>		
xiii.	<p>Stochastic (Random) Process is the collection of random variables ordered in_____.</p> <p>a. Space c. Variables</p>	<p>b. Time d. Panels</p>	[1]	CO1
xiv.	<p>If $X_t \sim I(d1)$ and $Y_t \sim I(d2)$, then $Z_t = (aX_t + bY_t) \sim$ _____, where $d1 < d2$.</p> <p>a. $I(d1 + d2)$ c. $I(d1 - d2)$</p>	<p>b. $I(d2)$ d. $I(d1 * d2)$</p>	[1]	CO1
xv.	<p>$R^2 > d$ is a good rule of thumb to suspect that the estimated regression is _____, as in the example above.</p> <p>a. Perfect fit c. Spurious</p>	<p>b. Non-spurious d. Stationary</p>	[1]	CO1
xvi.	<p>Which one is a random walk without drift model?</p> <p>a. $Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + u_t$ c. $Y_t = \delta Y_{t-1} + u_t$</p>	<p>b. $Y_t = \beta_1 + \delta Y_{t-1} + u_t$ d. $Y_t = \beta_2 t + \delta Y_{t-1}$</p>	[1]	CO1
xvii.	<p>In conducting the DF test it is assumed that the error terms u_t are_____.</p> <p>a. Fixed c. Zero</p>	<p>b. Uncorrelated d. correlated</p>	[1]	CO1
xviii.	<p>In which of the following models, the intercept varies across subjects but remains time-invariant?</p> <p>a. Pooled OLS model c. Random effect model</p>	<p>b. Fixed effect least-square dummy variable model d. None of the above</p>	[1]	CO1
xix.	<p>In which of the following models, the intercept varies across subjects and over time?</p> <p>a. Pooled OLS model c. Random effect model</p>	<p>b. Fixed effect least-square dummy variable model d. None of the above</p>	[1]	CO1

xx.	<p>The H_0, we test using Hausman statistics is that</p> <p>a. FEM and REM estimators differ substantially b. FEM and REM estimators are equal to zero</p> <p>c. FEM and REM estimators do not differ substantially d. FEM and REM estimators are not equal to zero</p>	[1]	CO1												
SECTION B															
Answer any four questions															
Q2.	What is a random walk process? Explain with suitable example.	[5]	CO3, CO4												
Q3.	What is stationary time series? Explain with suitable example.	[5]	CO3, CO4												
Q4.	What is ADF test?	[5]	CO3, CO4												
Q5.	What do you mean by integrated stochastic process? Explain with suitable example.	[5]	CO3, CO4												
Q6.	What do you mean by white noise process?	[5]	CO3, CO4												
SECTION C															
Answer any two questions															
Q7.	Explain the procedure of random effect model with example.\	[15]	CO1, CO4												
Q8.	Explain the procedure of fixed effect model with example.	[15]	CO3, CO4												
Q9.	<p>Using fixed effect model of panel data analysis, electricity production from renewable sources, excluding hydroelectric (% of total) (epre) is estimated considering GDP at market prices (constant 2010 US\$) (gdp) and Gross capital formation (constant 2010 US\$) (gcf) as independent variables for three countries as given below. Note that natural log of all the variables were taken before estimating the model.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Panel ID</th> <th>Country</th> <th>Period</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>India</td> <td>1986-2013</td> </tr> <tr> <td>2</td> <td>Singapore</td> <td>1986-2013</td> </tr> <tr> <td>3</td> <td>Sweden</td> <td>1986-2013</td> </tr> </tbody> </table>	Panel ID	Country	Period	1	India	1986-2013	2	Singapore	1986-2013	3	Sweden	1986-2013	[15]	CO3, CO4
Panel ID	Country	Period													
1	India	1986-2013													
2	Singapore	1986-2013													
3	Sweden	1986-2013													

Source	SS	df	MS			
Model	251.328351	4	62.8320878	Number of obs =	84	
Residual	71.279649	79	.902274038	F(4, 79) =	69.64	
Total	322.608	83	3.88684338	Prob > F =	0.0000	
				R-squared =	0.7791	
				Adj R-squared =	0.7679	
				Root MSE =	.94988	

lnpre	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lnngdp	-1.347776	.7378308	-1.83	0.072	-2.816391	.1208396
lnngcf	3.675447	.6259793	5.87	0.000	2.429466	4.921427
_Icountry_2	5.648096	.5714033	9.88	0.000	4.510746	6.785446
_Icountry_3	4.959391	.3167205	15.66	0.000	4.328974	5.589807
_cons	-60.39543	7.208063	-8.38	0.000	-74.74273	-46.04814

Answer the following questions considering above results:

- Test the hypothesis that both the independent variables affect dependent variable individually. Interpret the slope coefficient.
- Test the hypothesis that both the independent variables affect dependent variable jointly. Interpret the slope coefficient.
- Do you think intercept of each country will differ from each other? If yes compute intercept of each country and justify your answer.

Section D

Answer any one question

Q10. Summery statistics and stationarity test results of oil consumption (OC) are given below. Interpret the given results with justification.

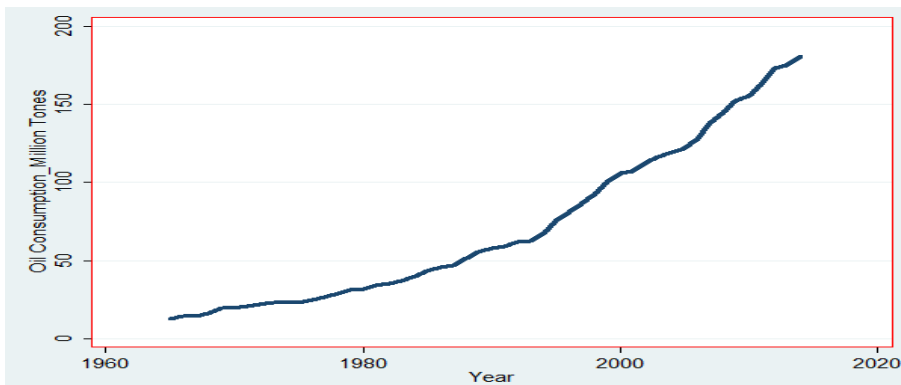
a) Summary Statistics

Variable	obs	Mean	Std. Dev.	Min	Max
year	50	1989.5	14.57738	1965	2014
oc	50	71.622	51.25576	12.6	180.7

[30]

CO1,
CO3,
CO4

b) Results of Stationarity tests: Graphical Method



c) Dickey-Fuller test for Unit Root

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. dfuller OC, trend regress
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Dickey-Fuller test for unit root Number of obs = **49**

	Test Statistic	1% Critical Value	Interpolated Dickey-Fuller		10% Critical Value
			5% Critical Value		
Z(t)	-0.184	-4.159	-3.504		-3.182

Mackinnon approximate p-value for z(t) = **0.9918**

D.OC	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
OC						
_L1.	-.0039937	.0217641	-0.18	0.855	-.0478025	.0398151
_trend	.1409496	.0750684	1.88	0.067	-.0101552	.2920543
_cons	.1840203	.6567739	0.28	0.781	-1.137997	1.506038

d) Phillips-Perron test for unit root

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. pperron OC, trend regress
Phillips-Perron test for unit root           Number of obs =    49
                                             Newey-west lags =    3

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	Test Statistic	Interpolated Dickey-Fuller		
		1% Critical Value	5% Critical Value	10% Critical Value
z(rho)	-0.181	-25.572	-19.724	-16.752
z(t)	-0.172	-4.159	-3.504	-3.182

Mackinnon approximate p-value for z(t) = **0.9920**

OC	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
OC					
L1.	.9960063	.0217641	45.76	0.000	.9521975 1.039815
_trend	.1409496	.0750684	1.88	0.067	-.0101552 .2920543
_cons	.1840203	.6567739	0.28	0.781	-1.137997 1.506038

e) Augmented Dickey-Fuller (ADF) test for Unit Root

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. dfuller OC, trend regress lags(5)
Augmented Dickey-Fuller test for unit root   Number of obs =    44

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	Test Statistic	Interpolated Dickey-Fuller		
		1% Critical Value	5% Critical Value	10% Critical Value
z(t)	-0.502	-4.205	-3.524	-3.194

Mackinnon approximate p-value for z(t) = **0.9834**

D.OC	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
OC					
L1.	-.0155647	.0310128	-0.50	0.619	-.0784616 .0473321
LD.	.0792706	.1664868	0.48	0.637	-.2583804 .4169216
L2D.	-.2181164	.1815841	-1.20	0.238	-.5863859 .1501532
L3D.	.1232392	.1893026	0.65	0.519	-.2606842 .5071627
L4D.	-.0834787	.1890653	-0.44	0.661	-.4669208 .2999635
L5D.	-.0633032	.1980766	-0.32	0.751	-.4650213 .3384148
_trend	.2226245	.1078604	2.06	0.046	.0038735 .4413755
_cons	-.7298735	1.04461	-0.70	0.489	-2.848442 1.388695