UNIVERSITY OF PETROLEUM & ENERGY STUDIES

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End Semester Examination-April 2017

Program/course: MA Economics (Energy Economics)	**Semester** : III
Subject: Business Modeling in Energy Sector	**Max. Marks** : 100
Code : MEDE 822	**Duration** : 3 Hrs
No. of page/s: 6	

Section-A

Q1. Attempt all the questions   1 X20= 20

i.   By studying the repeated cross section of observations, panel data are better suited to study the_____.

   a. Static change   b. Market change

   c. Economic change   d. dynamics of change

ii.   If the number of observations differs among panel members, we call such a panel an _____.

   a.   unbalanced panel   b.   balanced panel
   c.   Unobserved panel   d.   Ungrouped panel

iii. In panel data econometrics we assume that the X 's are_____.

    a. Zero   b. 0 to 1

    c. Nonstochastic   d. 0 to -1

iv. The composite error term ω_{it} consists of two components, ε_i , which is the cross-section, or individual-specific, error component, and u_{it}, which is the combined time series and cross-section error component.

    a. True   b. Partly true

    c. False   d. none of the above

v. In ECM, the intercept β_1 represents the mean value of all the _____intercepts.

    a. Panel   b. cross-sectional

    c. time   d. non of the above

vi. The sum of the random effect values is always_____.

    a. 0   b. 10

    c. 1   d. 11

vii. To decide between fixed or random effects model one can run a _____where the null hypothesis is that the preferred model is random effects vs. the alternative the fixed effects.

    a. HP test   b. BP Test

    c. LM test   d. Hausman test

viii. The LM test helps you decide between a random effects regression and a simple OLS regression.
- a. Strongly agree
- b. Not correct
- c. very weakly agree
- d. can't be said

ix. Random effect model is known as _____.
- a. ECM
- b. GLS
- c. WLS
- d. OLS

x. In random effect model the individual differences in the intercept values of each company are reflected in the _____.
- a. Slope coefficient
- b. Dependent variable
- c. Intercept
- d. error term

xi. Stochastic (Random) Process is the collection of random variables ordered in_____.
- a. Space
- b. Time
- c. Variables
- d. Panels

xii. If $Xt \sim I(d1)$ and $Yt \sim I(d2)$, then $Zt = (aXt + bYt) \sim$_____, where $d1 <$ $d2$.
- a. $I(d1+ d2)$
- b. $I(d2)$
- c. $I(d1\text{-}d2)$
- d. $I(d1 * d2)$

xiii. $R^2 > d$ is a good rule of thumb to suspect that the estimated regression is_____, as in the example above.
- a. Perfect fit
- b. Non-spurious
- c. Spurious
- d. Stationary

xiv. Which one is a random walk with drift model?

a. $Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + u_t$ b. $Y_t = \beta_1 + \delta Y_{t-1} + u_t$

c. $Y_t = \delta Y_{t-1} + u_t$ d. $Y_t = \beta_2 t + \delta Y_{t-1}$

xv. In conducting the DF test it is assumed that the error terms u_t are_____.

a. Fixed   b. Uncorrelated

c. Zero   d. correlated

xvi. In which of the following models, the intercept varies across subjects but remains time-invariant?

a. Pooled OLS model   b. Fixed effect least-square dummy variable model

c. Random effect model   d. None of the above

xvii. In which of the following models, the intercept varies across subjects and over time?

a. Pooled OLS model   b. Fixed effect least-square dummy variable model

c. Random effect model   d. None of the above

xviii. The H_0, we test using Hausman statistics is that

a. FEM and REM estimators differ substantially   b. FEM and REM estimators are equal to zero

c. FEM and REM estimators do not differ substantially   d. FEM and REM estimators are not equal to zero

xix.   Under which of the following conditions, we find REM estimators to be more efficient than FEM estimators, assuming that all underlying assumptions are satisfied?

a. When N is large and T is small
b. When N is small and T is large
c. When N is same as T
d. In all case

xx.   Pooled OLS regression model is also known as

a. Constant coefficient model
b. Constant variance model
c. Constant intercept model
d. None of the above

Section-B

Answer any four questions   5 X4= 20

Q2.   What is a white noise process? Explain.

Q3.   What is nonstationary time series? Write down all three models of nonstationary time series.

Q4.   What is unit root stochastic process? Explain.

Q5.   What do you mean by integrated stochastic process? Explain.

Q6.   What is spurious regression? Explain.

Section C

Answer any two questions   2 X 15 = 30

Q7.   Explain the procedure of fixed effect model with all coefficients vary across individuals.

Q8.   Nominal GDP of given eight country is estimated using the following oil prices and oil consumption.

GDP (Current US$)	WTI ($/bbl)	BRENT ($/bbL)	OIL CONSUMPTION (thoushand barrels\day)
Y1it	X2it	X3it	X4it

variable	Obs	Mean	Std. Dev.	Min	Max
year	152	2006	5.495332	1997	2015
y1it	152	1.88e+12	2.08e+12	8.57e+10	1.10e+13
x2it	152	56.48316	29.70811	14.35	99.56
x3it	152	58.37737	34.03541	12.72	111.97
x4it	152	3257.204	2136.869	649	11968

COUNTRY	Freq.	Percent	Cum.
BRAZIL	19	12.50	12.50
CANADA	19	12.50	25.00
CHINA	19	12.50	37.50
INDIA	19	12.50	50.00
JAPAN	19	12.50	62.50
RUSSIA	19	12.50	75.00
S. KOREA	19	12.50	87.50
SINGAPORE	19	12.50	100.00
Total	152	100.00	

a) Write which model of panel data analysis produce following result.

```
. xi: regress  lny1it lnx2it lnx3it lnx4it i.country
i.country          _Icountry_1-8        (_Icountry_1 for country==BRAZIL omitted)

      Source |       SS       df       MS              Number of obs =     152
-------------+------------------------------           F( 10,   141) =  390.29
       Model |  180.948455    10  18.0948455           Prob > F      =  0.0000
    Residual |  6.53713381   141  .046362651           R-squared     =  0.9651
-------------+------------------------------           Adj R-squared =  0.9627
       Total |  187.485589   151  1.24162642           Root MSE      =  .21532


      lny1it |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lnx2it |  -1.016974   .3914765    -2.60   0.010    -1.790896   -.2430519
      lnx3it |   1.372232   .3596279     3.82   0.000     .661272    2.083192
      lnx4it |   1.414563   .1191883    11.87   0.000    1.178936    1.65019
 _Icountry_2 |   .0786953   .0703227     1.12   0.265    -.0603278    .2177184
 _Icountry_3 |  -.5530455   .1462079    -3.78   0.000    -.8420886   -.2640024
 _Icountry_4 |  -.4430084   .0724259    -6.12   0.000    -.5861895   -.2998273
 _Icountry_5 |   .3767589   .1120878     3.36   0.001     .1551689    .5983488
 _Icountry_6 |  -.6023298   .0722013    -8.34   0.000    -.7450668   -.4595929
 _Icountry_7 |  -.2978932   .0699049    -4.26   0.000    -.4360904   -.1596959
 _Icountry_8 |  -.6240079   .1367143    -4.56   0.000    -.8942826   -.3537331
       _cons |   15.41411   .8978561    17.17   0.000    13.63911    17.18911
```

b) Interpret the above results.

Q9.   In input-output model distinguish between:

a) Transaction Matrix

b) Technology Matrix

c) Leontief Matrix

Section D

Q10. Answer only one question   1 X 30 = 30

I.   What is input-output analysis? Briefly explain with example the steps involved in input-output analysis.

<center>OR</center>

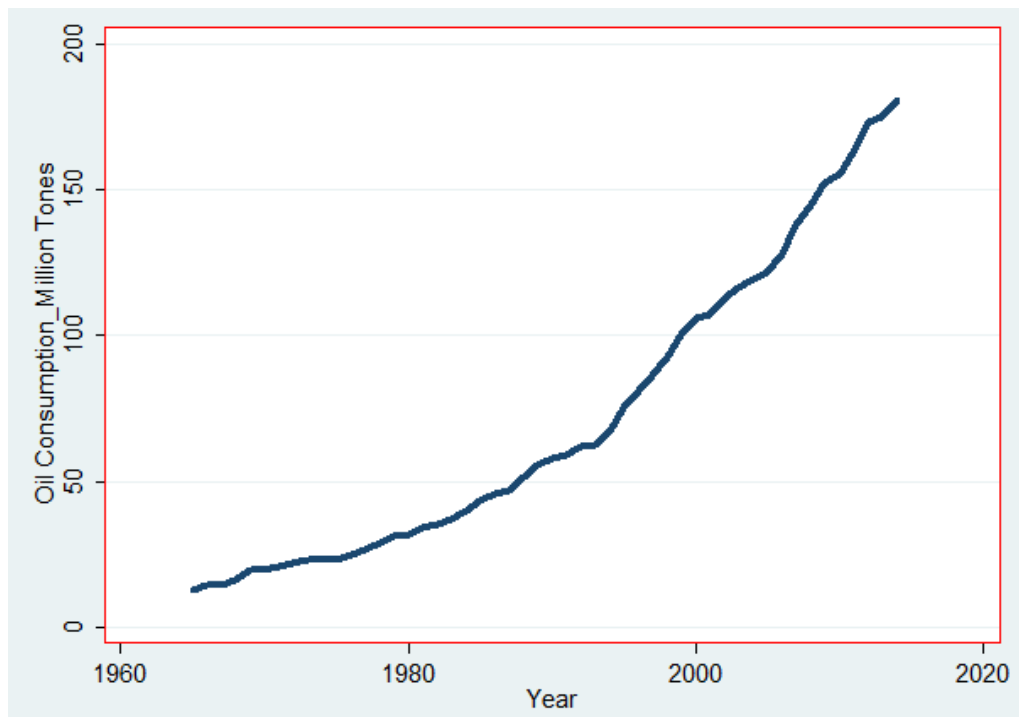II.   Summery statistics and stationarity test results of oil consumption (OC) are given below.

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

b) Results of Stationarity tests: Graphical Method

c) Dickey-Fuller test for Unit Root

```
. dfuller OC, trend regress

Dickey-Fuller test for unit root                    Number of obs    =        49

                                    ————————— Interpolated Dickey-Fuller —————————
                     Test        1% Critical        5% Critical       10% Critical
                   Statistic        Value              Value             Value
─────────────────────────────────────────────────────────────────────────────────
 Z(t)               -0.184          -4.159            -3.504            -3.182
─────────────────────────────────────────────────────────────────────────────────
MacKinnon approximate p-value for Z(t) = 0.9918
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```
─────────────────────────────────────────────────────────────────────────────────
   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
─────────────────────────────────────────────────────────────────────────────────
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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

                                    ————————— Interpolated Dickey-Fuller —————————
                     Test        1% Critical        5% Critical       10% Critical
                   Statistic        Value              Value             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
```

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─────────────────────────────────────────────────────────────────────────────────
     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
─────────────────────────────────────────────────────────────────────────────────
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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

                                 ———————— Interpolated Dickey-Fuller ————————
                    Test           1% Critical        5% Critical       10% Critical
                 Statistic            Value              Value              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
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