

regression

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10 December 2015

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When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
#Uploading the data set
d<-read.csv(file = "/Users/Nitij singh/Documents/gdpcoun.csv")
#Creating separate table for developed countries
d1<-subset(d,d$D.E.De == 1)
#View the new table
View(d1)
# Dropping the variable country name
d1$X<-NULL
# Dropping the variable years
d1$X.1<-NULL
#Summary Statisitc of Developed Countries
summary(d1)
```

```
##      D.E.De      GDP.Growth      Lab.Qual      Lab.Quant
## Min.   :1      Min.   :-8.631      Min.   :-1.2487      Min.   :-9.9211
## 1st Qu.:1      1st Qu.: 1.528      1st Qu.: 0.1684      1st Qu.: -0.1009
## Median :1      Median : 2.582      Median : 0.3080      Median : 0.9513
## Mean   :1      Mean   : 2.307      Mean   : 0.3683      Mean   : 0.8325
## 3rd Qu.:1      3rd Qu.: 3.700      3rd Qu.: 0.5316      3rd Qu.: 1.9577
## Max.   :1      Max.   :10.234      Max.   : 1.6147      Max.   : 5.6898
## ICT.Capital      NICT.Capital      Cl.Quality      Cl.Quant
## Min.   : 0.5678      Min.   :-2.459      Min.   :-0.8349      Min.   :-6.26626
## 1st Qu.: 7.9922      1st Qu.: 1.482      1st Qu.: 0.1181      1st Qu.: -0.06874
## Median :11.3690      Median : 2.182      Median : 0.1900      Median : 0.60905
## Mean   :11.1155      Mean   : 2.324      Mean   : 0.2296      Mean   : 0.49789
## 3rd Qu.:14.0709      3rd Qu.: 2.880      3rd Qu.: 0.3420      3rd Qu.: 1.24928
## Max.   :24.4539      Max.   : 7.957      Max.   : 1.0359      Max.   : 3.20281
## ContriICT      ContriNICT
## Min.   :0.02453      Min.   :-0.7256
## 1st Qu.:0.33692      1st Qu.: 0.4360
## Median :0.52180      Median : 0.6500
## Mean   :0.54836      Mean   : 0.7778
## 3rd Qu.:0.73754      3rd Qu.: 0.9742
## Max.   :1.32499      Max.   : 3.0919
## Export.of.goods.and.services....of.GDP.      Popgrwth
## Min.   : 9.038      Min.   :-0.2534
## 1st Qu.:25.354      1st Qu.: 0.2963
## Median :36.226      Median : 0.5412
## Mean   :36.643      Mean   : 0.6513
## 3rd Qu.:44.418      3rd Qu.: 0.9261
## Max.   :96.588      Max.   : 2.8910
```

```

#Creating separate table for emerging countries
d2<-subset(d,d$D.E.De == 2)
#Viewing the new table
View(d2)
#Dropping the variable country name
d2$X<-NULL
#Dropping the variable years
d2$X.1<-NULL
##Summary statistc of Emerging Countries
summary(d2)

```

```

##      D.E.De      GDP.Growth      Lab.Qual      Lab.Quant
##  Min.   :2      Min.   :-11.426      Min.   :-2.7864      Min.   :-11.910
##  1st Qu.:2      1st Qu.:  1.793      1st Qu.:  0.2281      1st Qu.:  -0.443
##  Median :2      Median :  3.931      Median :  0.4248      Median :   1.358
##  Mean   :2      Mean   :  3.354      Mean   :  0.4584      Mean   :   1.228
##  3rd Qu.:2      3rd Qu.:  5.565      3rd Qu.:  0.6386      3rd Qu.:   2.850
##  Max.   :2      Max.   : 10.148      Max.   :  4.4470      Max.   : 16.589
##  ICT.Capital      NICT.Capital      Cl.Quality      Cl.Quant
##  Min.   : 0.09741      Min.   :-1.790      Min.   :-2.05119      Min.   :-4.8904
##  1st Qu.:11.57976      1st Qu.:  2.280      1st Qu.:  0.08582      1st Qu.: -0.2250
##  Median :16.62387      Median :  3.639      Median :  0.21221      Median :  0.6730
##  Mean   :17.02244      Mean   :  4.000      Mean   :  0.24183      Mean   :  0.5562
##  3rd Qu.:22.23989      3rd Qu.:  5.259      3rd Qu.:  0.33372      3rd Qu.:  1.3740
##  Max.   :40.35037      Max.   :13.969      Max.   :  3.21971      Max.   :  5.5855
##  ContriICT      ContriNICT
##  Min.   :-0.003895      Min.   :-1.0760
##  1st Qu.: 0.404869      1st Qu.:  0.9215
##  Median : 0.613752      Median :  1.5248
##  Mean   : 0.722123      Mean   :  1.6892
##  3rd Qu.: 0.924292      3rd Qu.:  2.2489
##  Max.   : 2.561978      Max.   :  5.0004
##  Export.of.goods.and.services....of.GDP.      Popgrwth
##  Min.   :  6.706      Min.   :-1.91102
##  1st Qu.: 23.967      1st Qu.:  0.06508
##  Median : 33.846      Median :  1.13137
##  Mean   : 40.620      Mean   :  0.88943
##  3rd Qu.: 53.078      3rd Qu.:  1.53684
##  Max.   :121.312      Max.   :  2.56440

```

```

#Creating separate table for developing countries
d3<-subset(d,d$D.E.De == 3)
#Dropping the variables country name
d3$X<-NULL
#Dropping the variable year
d3$X.1<-NULL
#Summary statistics of Developing countries
summary(d3)

```

```

##      D.E.De      GDP.Growth      Lab.Qual      Lab.Quant
##  Min.   :3      Min.   :-14.072      Min.   :-0.1247      Min.   :-17.487
##  1st Qu.:3      1st Qu.:  3.300      1st Qu.:  0.1505      1st Qu.:   1.522
##  Median :3      Median :  4.802      Median :  0.2866      Median :   2.715

```

```
## Mean :3 Mean : 4.872 Mean : 0.2603 Mean : 2.788
## 3rd Qu.:3 3rd Qu.: 6.137 3rd Qu.: 0.3435 3rd Qu.: 3.907
## Max. :3 Max. : 19.349 Max. : 0.7314 Max. : 20.593
## ICT.Capital NICT.Capital Cl.Quality Cl.Quant
## Min. :-0.4625 Min. :-0.4561 Min. :-0.06235 Min. :-9.3315
## 1st Qu.:11.2184 1st Qu.: 2.4931 1st Qu.: 0.06817 1st Qu.: 0.7133
## Median :15.5674 Median : 3.4708 Median : 0.14361 Median : 1.2593
## Mean :17.1562 Mean : 4.3258 Mean : 0.12141 Mean : 1.3639
## 3rd Qu.:22.1123 3rd Qu.: 5.8583 3rd Qu.: 0.16369 3rd Qu.: 1.9813
## Max. :43.7080 Max. :11.2052 Max. : 0.30076 Max. :10.9890
## ContriICT ContriNICT
## Min. :-0.01064 Min. :-0.2892
## 1st Qu.: 0.34028 1st Qu.: 1.1429
## Median : 0.58623 Median : 1.6457
## Mean : 0.77307 Mean : 2.0708
## 3rd Qu.: 0.89637 3rd Qu.: 2.8490
## Max. : 8.38740 Max. : 6.3529
## Export.of.goods.and.services....of.GDP. Popgrwth
## Min. : 9.707 Min. :0.483
## 1st Qu.:19.875 1st Qu.:1.360
## Median :26.441 Median :1.927
## Mean :28.232 Mean :1.978
## 3rd Qu.:35.669 3rd Qu.:2.546
## Max. :56.506 Max. :3.879
```

```
#Installing plm package
# Loading the pannel data package in the memory
library(plm)
```

```
## Loading required package: Formula
```

```
# Loading the formula package in the memory
library(Formula)
# Attaching data set for developed countries
d4<-subset(d,d$D.E.De == 1)
attach(d4)
d4$X<-NULL
# Defining dependent and indenpendt variable
Y <- cbind(d4$GDP.Growth)
X <- cbind(d4$ContriICT, d4$ContriNICT)
# Descriptive statistics
summary(Y)
```

```
## V1
## Min. :-8.631
## 1st Qu.: 1.528
## Median : 2.582
## Mean : 2.307
## 3rd Qu.: 3.700
## Max. :10.234
```

```
summary(X)
```

```
##           V1           V2
## Min.      :0.02453   Min.   :-0.7256
## 1st Qu.:0.33692   1st Qu.: 0.4360
## Median :0.52180   Median : 0.6500
## Mean      :0.54836   Mean    : 0.7778
## 3rd Qu.:0.73754   3rd Qu.: 0.9742
## Max.      :1.32499   Max.    : 3.0919
```

```
# Set data as pannel data
```

```
pdata <- plm.data(d4,index=c("D.E.De", "X.1"))
```

```
## serie D.E.De is constant and has been removed
```

```
# Pooled OLS Estimator
```

```
pooling <- plm(Y ~ X, data=pdata, model= "pooling")
```

```
## series D.E.De is constant and has been removed
```

```
summary(pooling)
```

```
## Oneway (individual) effect Pooling Model
##
## Call:
## plm(formula = Y ~ X, data = pdata, model = "pooling")
##
## Unbalanced Panel: n=16, T=19-19, N=304
##
## Residuals :
##      Min. 1st Qu.  Median 3rd Qu.    Max.
## -10.200  -0.696   0.300   1.120   4.680
##
## Coefficients :
##              Estimate Std. Error t-value Pr(>|t|)
## (Intercept)  0.015952   0.275789  0.0578   0.9539
## X1           1.740230   0.435956  3.9918 8.246e-05 ***
## X2           1.718388   0.220382  7.7973 1.042e-13 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    1731
## Residual Sum of Squares: 1284.2
## R-Squared      : 0.25809
##      Adj. R-Squared : 0.25554
## F-statistic: 52.3552 on 2 and 301 DF, p-value: < 2.22e-16
```

```
# Putting control variable for Export % of GDP
```

```
Y1 <- cbind(d4$GDP.Growth)
```

```
X1 <- cbind(d4$ContriICT, d4$ContriNICT, d4$Export.of.goods.and.services....of.GDP.)
```

```
# Pooled OLS Esitmater with control variable for developed countries
```

```
pool <- plm(Y1 ~ X1, data=pdata, model= "pool")
```

```
## series D.E.De is constant and has been removed
```

```
summary(pool)
```

```
## Oneway (individual) effect Pooling Model
##
## Call:
## plm(formula = Y1 ~ X1, data = pdata, model = "pool")
##
## Unbalanced Panel: n=16, T=19-19, N=304
##
## Residuals :
##      Min. 1st Qu.  Median 3rd Qu.    Max.
## -10.200  -0.656   0.322   1.140   4.330
##
## Coefficients :
##              Estimate Std. Error t-value Pr(>|t|)
## (Intercept) -0.3149601  0.3408630 -0.9240 0.3562249
## X11          1.6511962  0.4380934  3.7691 0.0001973 ***
## X12          1.6728464  0.2215031  7.5522 5.192e-13 ***
## X13          0.0113297  0.0068949  1.6432 0.1013905
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    1731
## Residual Sum of Squares: 1272.8
## R-Squared      : 0.26471
##      Adj. R-Squared : 0.26123
## F-statistic: 36.0007 on 3 and 300 DF, p-value: < 2.22e-16
```

```
# Attaching data set for emerging countries
```

```
d5<-subset(d,d$D.E.De == 2)
```

```
attach(d5)
```

```
## The following object is masked _by_ .GlobalEnv:
```

```
##
```

```
##      X
```

```
##
```

```
## The following objects are masked from d4:
```

```
##
```

```
##      Cl.Quality, Cl.Quant, ContriICT, ContriNICT, D.E.De,
```

```
##      Export.of.goods.and.services....of.GDP., GDP.Growth,
```

```
##      ICT.Capital, Lab.Qual, Lab.Quant, NICT.Capital, Popgrwth, X,
```

```
##      X.1
```

```
d5$X<-NULL
```

```
# Defining dependent and indenpendt variable
```

```
Y2 <- cbind(d5$GDP.Growth)
```

```
X2 <- cbind(d5$ContriICT, d5$ContriNICT)
```

```
# Descriptive statistics
```

```
summary(Y2)
```

```
##          V1
## Min.      :-11.426
## 1st Qu.:   1.793
## Median :   3.931
## Mean      :   3.354
## 3rd Qu.:   5.565
## Max.      :  10.148
```

```
summary(X2)
```

```
##          V1          V2
## Min.      :-0.003895  Min.      :-1.0760
## 1st Qu.:   0.404869  1st Qu.:   0.9215
## Median :   0.613752  Median :   1.5248
## Mean      :   0.722123  Mean      :   1.6892
## 3rd Qu.:   0.924292  3rd Qu.:   2.2489
## Max.      :   2.561978  Max.      :   5.0004
```

```
# Set data as pannel data
pdata <- plm.data(d5, index=c("D.E.De", "X.1"))
```

```
## serie D.E.De is constant and has been removed
```

```
# Pooled OLS Estimator
pooling <- plm(Y2 ~ X2, data=pdata, model= "pooling")
```

```
## series D.E.De is constant and has been removed
```

```
summary(pooling)
```

```
## Oneway (individual) effect Pooling Model
##
## Call:
## plm(formula = Y2 ~ X2, data = pdata, model = "pooling")
##
## Unbalanced Panel: n=16, T=18-18, N=288
##
## Residuals :
##      Min. 1st Qu.  Median 3rd Qu.    Max.
## -13.100  -1.260   0.451   2.010   8.290
##
## Coefficients :
##              Estimate Std. Error t-value Pr(>|t|)
## (Intercept)  0.72337    0.42587  1.6986  0.090491 .
## X21          1.19629    0.40872  2.9269  0.003699 **
## X22          1.04567    0.16753  6.2418 1.563e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    3595.1
## Residual Sum of Squares: 3027.1
```

```
## R-Squared      : 0.15801
##      Adj. R-Squared : 0.15636
## F-statistic: 26.741 on 2 and 285 DF, p-value: 2.2729e-11
```

```
# Putting control variable for Export % of GDP
Y3 <- cbind(d5$GDP.Growth)
X3 <- cbind(d5$ContriICT, d5$ContriNICT, d5$Export.of.goods.and.services....of.GDP.)
# Pooled OLS Esitmater with control variable for developed countries
pooling <- plm(Y3 ~ X3, data=pdata, model= "pooling")
```

```
## series D.E.De is constant and has been removed
```

```
summary(pooling)
```

```
## Oneway (individual) effect Pooling Model
##
## Call:
## plm(formula = Y3 ~ X3, data = pdata, model = "pooling")
##
## Unbalanced Panel: n=16, T=18-18, N=288
##
## Residuals :
##      Min. 1st Qu.  Median 3rd Qu.    Max.
## -13.100  -1.080    0.499   1.870   8.620
##
## Coefficients :
##              Estimate Std. Error t-value Pr(>|t|)
## (Intercept) 0.0884727  0.5321355  0.1663  0.868071
## X31         1.0689291  0.4117564  2.5960  0.009922 **
## X32         1.0902521  0.1682095  6.4815 4.004e-10 ***
## X33         0.0160406  0.0081328  1.9723  0.049542 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    3595.1
## Residual Sum of Squares: 2986.2
## R-Squared      : 0.16938
##      Adj. R-Squared : 0.16703
## F-statistic: 19.3048 on 3 and 284 DF, p-value: 2.0248e-11
```

```
# Attaching data set for developing countries
d6<-subset(d,d$D.E.De == 3)
attach(d6)
```

```
## The following object is masked _by_ .GlobalEnv:
##
##      X
##
## The following objects are masked from d5:
##
##      Cl.Quality, Cl.Quant, ContriICT, ContriNICT, D.E.De,
##      Export.of.goods.and.services....of.GDP., GDP.Growth,
```

```
##      ICT.Capital, Lab.Qual, Lab.Quant, NICT.Capital, Popgrwth, X,
##      X.1
##
## The following objects are masked from d4:
##
##      Cl.Quality, Cl.Quant, ContriICT, ContriNICT, D.E.De,
##      Export.of.goods.and.services....of.GDP., GDP.Growth,
##      ICT.Capital, Lab.Qual, Lab.Quant, NICT.Capital, Popgrwth, X,
##      X.1
```

```
d5$X<-NULL
# Defining dependent and indenpendt variable
Y4 <- cbind(d5$GDP.Growth)
X4 <- cbind(d5$ContriICT, d5$ContriNICT)
# Descriptive statistics
summary(Y4)
```

```
##          V1
## Min.      :-11.426
## 1st Qu.:   1.793
## Median :   3.931
## Mean      :   3.354
## 3rd Qu.:   5.565
## Max.      :  10.148
```

```
summary(X4)
```

```
##          V1          V2
## Min.      :-0.003895  Min.      :-1.0760
## 1st Qu.:  0.404869    1st Qu.:  0.9215
## Median :  0.613752    Median :  1.5248
## Mean      :  0.722123    Mean      :  1.6892
## 3rd Qu.:  0.924292    3rd Qu.:  2.2489
## Max.      :  2.561978    Max.      :  5.0004
```

```
# Set data as pannel data
pdata <- plm.data(d5,index=c("D.E.De", "X.1"))
```

```
## serie D.E.De is constant and has been removed
```

```
# Pooled OLS Estimator
pooling <- plm(Y4 ~ X4, data=pdata, model= "pooling")
```

```
## series D.E.De is constant and has been removed
```

```
summary(pooling)
```

```
## Oneway (individual) effect Pooling Model
##
## Call:
```



```
## plm(formula = Y4 ~ X4, data = pdata, model = "pooling")
##
## Unbalanced Panel: n=16, T=18-18, N=288
##
## Residuals :
##      Min. 1st Qu.  Median 3rd Qu.    Max.
## -13.100  -1.260    0.451   2.010   8.290
##
## Coefficients :
##              Estimate Std. Error t-value Pr(>|t|)
## (Intercept)  0.72337    0.42587  1.6986  0.090491 .
## X41          1.19629    0.40872  2.9269  0.003699 **
## X42          1.04567    0.16753  6.2418 1.563e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    3595.1
## Residual Sum of Squares: 3027.1
## R-Squared      : 0.15801
##      Adj. R-Squared : 0.15636
## F-statistic: 26.741 on 2 and 285 DF, p-value: 2.2729e-11
```

```
# Putting control variable for Export % of GDP
Y5 <- cbind(d5$GDP.Growth)
X5 <- cbind(d5$ContrilICT, d5$ContriNICT, d5$Export.of.goods.and.services....of.GDP.)
# Pooled OLS Esitmater with control variable for developed countries
pooling <- plm(Y5 ~ X5, data=pdata, model= "pooling")
```

```
## series D.E.De is constant and has been removed
```

```
summary(pooling)
```

```
## Oneway (individual) effect Pooling Model
##
## Call:
## plm(formula = Y5 ~ X5, data = pdata, model = "pooling")
##
## Unbalanced Panel: n=16, T=18-18, N=288
##
## Residuals :
##      Min. 1st Qu.  Median 3rd Qu.    Max.
## -13.100  -1.080    0.499   1.870   8.620
##
## Coefficients :
##              Estimate Std. Error t-value Pr(>|t|)
## (Intercept) 0.0884727  0.5321355  0.1663  0.868071
## X51          1.0689291  0.4117564  2.5960  0.009922 **
## X52          1.0902521  0.1682095  6.4815 4.004e-10 ***
## X53          0.0160406  0.0081328  1.9723  0.049542 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    3595.1
```

```
## Residual Sum of Squares: 2986.2
## R-Squared      : 0.16938
##      Adj. R-Squared : 0.16703
## F-statistic: 19.3048 on 3 and 284 DF, p-value: 2.0248e-11
```