Unemployment_Project

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2/10/2020

```
rm(list=ls())
library(rio)
library(moments)
library(corrplot)

## corrplot 0.84 loaded

library(car)

## Loading required package: carData

library(plm)
library(stargazer)

##
## Please cite as:

##  Hlavac, Marek (2018). stargazer: Well-Formatted Regression and Summary
Statistics Tables.

##  R package version 5.2.2. https://CRAN.R-project.org/package=stargazer

library(corrplot)
library(plotly)

## Loading required package: ggplot2

##
## Attaching package: 'plotly'

## The following object is masked from 'package:ggplot2':
##
##     last_plot

## The following object is masked from 'package:rio':
##
##     export

## The following object is masked from 'package:stats':
##
##     filter

## The following object is masked from 'package:graphics':
##
##     layout
```

```r
library(ggplot2)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:plm':
##
##     between, lag, lead
```

```
## The following object is masked from 'package:car':
##
##     recode
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```r
library(lattice)
setwd("C:/Users/yagna/Documents/R/R workings")
d <- import("Unemployment.xlsx")
names(d)
```

```
## [1] "country" "year"    "unemp"   "inf"     "snp"     "gdp"
```

```r
head(d)
```

```
##   country year unemp inf    snp  gdp
## 1      UK 1985  11.4 6.1 1314.8 4.20
## 2      UK 1986  11.3 3.4 1607.0 3.14
## 3      UK 1987  10.4 4.1 2028.6 5.30
## 4      UK 1988   8.6 4.2 1801.5 5.76
## 5      UK 1989   7.2 5.8 2194.9 2.57
## 6      UK 1990   7.1 8.1 2207.2 0.74
```

```r
str(d)
```

```
## 'data.frame':    68 obs. of  6 variables:
##  $ country: chr  "UK" "UK" "UK" "UK" ...
##  $ year   : num  1985 1986 1987 1988 1989 ...
##  $ unemp  : num  11.4 11.3 10.4 8.6 7.2 7.1 8.9 9.9 10.4 9.5 ...
##  $ inf    : num  6.1 3.4 4.1 4.2 5.8 8.1 7.5 4.6 2.6 2.2 ...
##  $ snp    : num  1315 1607 2029 1802 2195 ...
##  $ gdp    : num  4.2 3.14 5.3 5.76 2.57 0.74 -1.09 0.37 2.53 3.89 ...
```

```r
if(!require(FSA)){install.packages("FSA")}
```

```
## Loading required package: FSA
```

```
## ## FSA v0.8.27. See citation('FSA') if used in publication.
## ## Run fishR() for related website and fishR('IFAR') for related book.

##
## Attaching package: 'FSA'

## The following object is masked from 'package:car':
##
##     bootCase

if(!require(psych)){install.packages("psych")}

## Loading required package: psych

##
## Attaching package: 'psych'

## The following object is masked from 'package:FSA':
##
##     headtail

## The following objects are masked from 'package:ggplot2':
##
##     %+%, alpha

## The following object is masked from 'package:car':
##
##     logit

if(!require(lme4)){install.packages("lme4")}

## Loading required package: lme4

## Loading required package: Matrix

## Registered S3 methods overwritten by 'lme4':
##   method                          from
##   cooks.distance.influence.merMod car
##   influence.merMod                car
##   dfbeta.influence.merMod         car
##   dfbetas.influence.merMod        car

##
## Attaching package: 'lme4'

## The following object is masked from 'package:rio':
##
##     factorize

if(!require(lmerTest)){install.packages("lmerTest")}

## Loading required package: lmerTest
```

```
##
## Attaching package: 'lmerTest'

## The following object is masked from 'package:lme4':
##
##     lmer

## The following object is masked from 'package:stats':
##
##     step

if(!require(nlme)){install.packages("nlme")}

## Loading required package: nlme

##
## Attaching package: 'nlme'

## The following object is masked from 'package:lme4':
##
##     lmList

## The following object is masked from 'package:dplyr':
##
##     collapse

#
a <-pdata.frame(d, index=c("country","year"))
pdim(a)

## Balanced Panel: n = 2, T = 34, N = 68

summary(a)

##  country      year        unemp            inf             snp
##  UK:34   1985   : 2   Min.   : 3.900   Min.   :0.400   Min.   : 186.8
##  US:34   1986   : 2   1st Qu.: 5.100   1st Qu.:1.800   1st Qu.:1119.0
##          1987   : 2   Median : 6.000   Median :2.400   Median :2044.9
##          1988   : 2   Mean   : 6.532   Mean   :2.793   Mean   :2838.0
##          1989   : 2   3rd Qu.: 7.675   3rd Qu.:3.425   3rd Qu.:4813.0
##          1990   : 2   Max.   :11.400   Max.   :8.100   Max.   :7367.1
##          (Other):56
##       gdp
##  Min.   :-4.250
##  1st Qu.: 2.368
##  Median : 3.600
##  Mean   : 3.620
##  3rd Qu.: 5.075
##  Max.   : 7.800
##
```

```r
# Pooled Effects Model

pooled <-plm(unemp ~ inf + gdp + snp, data=a, model="pooling")
summary(pooled)
```

```
## Pooling Model
##
## Call:
## plm(formula = unemp ~ inf + gdp + snp, data = a, model = "pooling")
##
## Balanced Panel: n = 2, T = 34, N = 68
##
## Residuals:
##     Min.  1st Qu.   Median  3rd Qu.     Max.
## -2.48086 -1.24925 -0.56813  1.15146  4.19319
##
## Coefficients:
##               Estimate  Std. Error t-value  Pr(>|t|)
## (Intercept)  7.04204323  0.98697992  7.1349 1.078e-09 ***
## inf          0.35866600  0.16078945  2.2307   0.02922 *
## gdp         -0.27412652  0.11804322 -2.3223   0.02341 *
## snp         -0.00018291  0.00012498 -1.4635   0.14823
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    238.45
## Residual Sum of Squares: 191.57
## R-Squared:      0.19658
## Adj. R-Squared: 0.15892
## F-statistic: 5.21982 on 3 and 64 DF, p-value: 0.0027528
```

```r
# Fixed Effects Model
fixed_w <-plm(unemp ~ inf + gdp + snp , data=a, model="within")
summary(fixed_w)
```

```
## Oneway (individual) effect Within Model
##
## Call:
## plm(formula = unemp ~ inf + gdp + snp, data = a, model = "within")
##
## Balanced Panel: n = 2, T = 34, N = 68
##
## Residuals:
##     Min.  1st Qu.   Median  3rd Qu.     Max.
## -2.88511 -0.96033 -0.17268  0.88002  3.19089
##
## Coefficients:
##       Estimate  Std. Error t-value  Pr(>|t|)
## inf -0.23018800  0.15439764 -1.4909   0.14098
## gdp -0.19035321  0.09282889 -2.0506   0.04447 *
```

```
## snp -0.00107337  0.00016771 -6.4001 2.192e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    216.54
## Residual Sum of Squares: 114.39
## R-Squared:      0.47174
## Adj. R-Squared: 0.4382
## F-statistic: 18.7531 on 3 and 63 DF, p-value: 8.3292e-09
```

```
summary(fixef(fixed_w))
```

```
##    Estimate Std. Error t-value  Pr(>|t|)
## UK 13.15910    1.21289  10.849 4.725e-16 ***
## US  8.66168    0.80783  10.722 7.683e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
fixed_w2 <-plm(unemp ~ inf + gdp + snp , data=a, model="within",
effect="twoways")
summary(fixed_w2)
```

```
## Twoways effects Within Model
##
## Call:
## plm(formula = unemp ~ inf + gdp + snp, data = a, effect = "twoways",
##     model = "within")
##
## Balanced Panel: n = 2, T = 34, N = 68
##
## Residuals:
##        Min.     1st Qu.      Median     3rd Qu.        Max.
## -1.3393e+00 -3.7843e-01  2.4633e-16  3.7843e-01  1.3393e+00
##
## Coefficients:
##        Estimate  Std. Error t-value  Pr(>|t|)
## inf -0.37373631  0.22627524 -1.6517    0.1090
## gdp  0.08764085  0.17069304  0.5134    0.6114
## snp -0.00107293  0.00019017 -5.6418 3.808e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    48.569
## Residual Sum of Squares: 23.363
## R-Squared:      0.51897
## Adj. R-Squared: -0.074311
## F-statistic: 10.7885 on 3 and 30 DF, p-value: 5.668e-05
```

```
summary(fixef(fixed_w2))
```

```
##    Estimate Std. Error t-value  Pr(>|t|)
## UK  12.9198     1.2892 10.0213 4.354e-11 ***
## US   7.6878     1.2216  6.2931 6.164e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
#Comparing

stargazer(summary(fixef(fixed_w)), type = "text", summary = FALSE, title =
"Intercept for Within one way ")
```

```
##
## Intercept for Within one way
## ========================================
##    Estimate Std. Error t-value Pr(> | t| )
## ----------------------------------------
## UK  13.159    1.213    10.849       0
## US  8.662     0.808    10.722       0
## ----------------------------------------
```

```
stargazer(summary(fixef(fixed_w2)), type = "text", summary = FALSE, title =
"Intercept for Within Two way ")
```

```
##
## Intercept for Within Two way
## ========================================
##    Estimate Std. Error t-value Pr(> | t| )
## ----------------------------------------
## UK  12.920    1.289    10.021       0
## US  7.688     1.222     6.293    0.00000
## ----------------------------------------
```

```
stargazer(pooled,fixed_w,fixed_w2,type='text',summary=FALSE)
```

```
##
##
================================================================================
===
##                                      Dependent variable:
##              ---------------------------------------------------------------
------
##                                             unemp
##                        (1)                   (2)                    (3)
## --------------------------------------------------------------------------
------
## inf                  0.359**               -0.230                 -0.374
##                      (0.161)              (0.154)                (0.226)
##
## gdp                 -0.274**              -0.190**                0.088
##                      (0.118)              (0.093)                (0.171)
##
```

```
## snp                  -0.0002              -0.001***              -0.001***
##                     (0.0001)              (0.0002)               (0.0002)
##
## Constant            7.042***
##                      (0.987)
##
## ------------------------------------------------------------------------
------
## Observations          68                    68                     68
## R2                   0.197                 0.472                  0.519
## Adjusted R2          0.159                 0.438                  -0.074
## F Statistic  5.220*** (df = 3; 64) 18.753*** (df = 3; 63) 10.789*** (df =
3; 30)
##
========================================================================
===
## Note:                                              *p<0.1; **p<0.05;
***p<0.01
```

```
?plmtest
```

```
## starting httpd help server ... done
```

```
pFtest(fixed_w, pooled)
```

```
##
##  F test for individual effects
##
## data:  unemp ~ inf + gdp + snp
## F = 42.511, df1 = 1, df2 = 63, p-value = 1.361e-08
## alternative hypothesis: significant effects
```

```
plmtest(fixed_w, effect = "individual")
```

```
##
##  Lagrange Multiplier Test - (Honda) for balanced panels
##
## data:  unemp ~ inf + gdp + snp
## normal = 2.1062, p-value = 0.01759
## alternative hypothesis: significant effects
```

```
plmtest(fixed_w2, effect="twoways", type="bp")
```

```
##
##  Lagrange Multiplier Test - two-ways effects (Breusch-Pagan) for
##  balanced panels
##
## data:  unemp ~ inf + gdp + snp
## chisq = 7.5561, df = 2, p-value = 0.02287
## alternative hypothesis: significant effects
```

```
pFtest(fixed_w, fixed_w2)
```

```
## Warning in pf(stat, df1, df2, lower.tail = FALSE): NaNs produced

##
##  F test for individual effects
##
## data:  unemp ~ inf + gdp + snp
## F = 1.5192, df1 = -33, df2 = 63, p-value = NA
## alternative hypothesis: significant effects
```

```
plmtest(fixed_w2,)
```

```
##
##  Lagrange Multiplier Test - (Honda) for balanced panels
##
## data:  unemp ~ inf + gdp + snp
## normal = 2.1062, p-value = 0.01759
## alternative hypothesis: significant effects
```

```
#Mixed effects

model = lmer(unemp ~ inf + gdp +snp + (1|country),
             data=d,
             REML=TRUE)
```

```
## Warning: Some predictor variables are on very different scales: consider
## rescaling

## Warning: Some predictor variables are on very different scales: consider
## rescaling
```

```
summary(model)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: unemp ~ inf + gdp + snp + (1 | country)
##    Data: d
##
## REML criterion at convergence: 257.6
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.1066 -0.7185 -0.1337  0.6539  2.3745
##
## Random effects:
##  Groups   Name        Variance Std.Dev.
##  country  (Intercept) 9.875    3.143
##  Residual             1.816    1.347
## Number of obs: 68, groups:  country, 2
##
## Fixed effects:
##               Estimate Std. Error         df t value Pr(>|t|)
```

```
## (Intercept) 10.8193948  2.4232853  1.3436928   4.465   0.0916 .
## inf         -0.2163360  0.1537750 63.7661262  -1.407   0.1643
## gdp         -0.1923239  0.0928080 63.0560354  -2.072   0.0423 *
## snp         -0.0010524  0.0001664 63.9997960  -6.325  2.8e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##     (Intr) inf    gdp
## inf -0.328
## gdp -0.209  0.138
## snp -0.347  0.675  0.233
## fit warnings:
## Some predictor variables are on very different scales: consider rescaling
```

```
fixef(model)
```

```
##  (Intercept)          inf          gdp          snp
## 10.819394809 -0.216336006 -0.192323861 -0.001052422
```

```
ranef(model)
```

```
## $country
##    (Intercept)
## UK    2.195811
## US   -2.195811
##
## with conditional variances for "country"
```

```
coef(model)
```

```
## $country
##    (Intercept)       inf        gdp          snp
## UK   13.015205 -0.216336 -0.1923239 -0.001052422
## US    8.623584 -0.216336 -0.1923239 -0.001052422
##
## attr(,"class")
## [1] "coef.mer"
```