Lab13b

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E2<-cov(DT) E2

require(data.table)

## Loading required package: data.table

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

setwd ("C:/Users/Amir/Desktop/UEA madules/econometrics/lab13b")  
list.files()

## [1] "Code for task 1 in 13b.docx" "lab13b.Rmd"   
## [3] "Lab13b1.html" "Lab13b1.Rmd"   
## [5] "Lab13b1.tex" "OL.RData"

df.OLSdat <- read.table("OL.RData")  
  
  
   
  
  
DT <- data.table(df.OLSdat)  
  
   
  
   
  
summary(df.OLSdat)

## y1 const x1 x2   
## Min. :-11.7353 Min. :1 Min. :-1.0813748 Min. :-3.626672   
## 1st Qu.: -0.2118 1st Qu.:1 1st Qu.:-0.2214267 1st Qu.:-0.686488   
## Median : 2.2171 Median :1 Median : 0.0001322 Median : 0.000400   
## Mean : 2.1698 Mean :1 Mean :-0.0038033 Mean :-0.006917   
## 3rd Qu.: 4.5833 3rd Qu.:1 3rd Qu.: 0.2136286 3rd Qu.: 0.670995   
## Max. : 17.5787 Max. :1 Max. : 1.1481061 Max. : 4.024930   
## x3 eps1 eps2   
## Min. :-3.75367 Min. :-5.86698 Min. :-53.6324   
## 1st Qu.:-0.69583 1st Qu.:-0.95432 1st Qu.: -9.4102   
## Median :-0.03440 Median : 0.03125 Median : 0.1831   
## Mean :-0.02018 Mean : 0.01829 Mean : 0.1411   
## 3rd Qu.: 0.66101 3rd Qu.: 0.97468 3rd Qu.: 9.8168   
## Max. : 3.77398 Max. : 5.35372 Max. : 59.9260

summary(DT)

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##Take a look at the data, which variables do you have? we have DT which includes y1, Constant, x1, x2, x3 esp1, esp2  
  
## Now use cbind to build 2 matrices:  
  
## Using DT$const, DT$x1, DT$x2 and DT$x3 to build matrix X,  
  
nrow(DT) #calculate the number of rows in the matreix DT

## [1] 7584

x<-matrix( nrow=7584, ncol = 4)  
  
x<-data.table(DT$const, DT$x1, DT$x2, DT$x3 ) ### x includes constant, x1, x2, x3  
  
stargazer(x, type = "text")

##   
## ==============================================================  
## Statistic N Mean St. Dev. Min Pctl(25) Pctl(75) Max   
## --------------------------------------------------------------  
## V1 7,584 1.000 0.000 1 1 1 1   
## V2 7,584 -0.004 0.322 -1.081 -0.221 0.214 1.148  
## V3 7,584 -0.007 1.016 -3.627 -0.686 0.671 4.025  
## V4 7,584 -0.020 1.002 -3.754 -0.696 0.661 3.774  
## --------------------------------------------------------------

X<-cbind(c(DT$const), c(DT$x1), c(DT$x2), c(DT$x3) )  
  
  
   
  
   
  
## Using DT$y5 to build matrix y  
  
y<- matrix( nrow=7584, ncol = 1)  
  
y<- data.table(DT$y1)  
  
stargazer(y, type = "text")

##   
## ===============================================================  
## Statistic N Mean St. Dev. Min Pctl(25) Pctl(75) Max   
## ---------------------------------------------------------------  
## V1 7,584 2.170 3.513 -11.735 -0.212 4.583 17.579  
## ---------------------------------------------------------------

Y<-cbind(c(DT$y1))  
  
  
  
  
   
  
   
  
##Now compute X' (transpose of X)  
  
   
  
  
  
  
  
library(matlib)  
  
Xt<-t(X)  
  
  
nrow(Xt)

## [1] 4

ncol(Xt)

## [1] 7584

## Next compute X'X . Report your result.  
  
XtX <- Xt%\*%X  
  
  
  
nrow(XtX)

## [1] 4

ncol(XtX)

## [1] 4

####Result:  
  
   
  
 ## Next compute the inverse of X'X. Report it.  
  
   
  
XtXinv<-inv(XtX)  
  
   
  
   
  
## Next compute X'y. Report  
  
XtY <- Xt%\*%Y  
  
XtY

## [,1]  
## [1,] 16455.648  
## [2,] 1174.928  
## [3,] 10158.341  
## [4,] 4778.788

##Results V1  
  
## Lastly multiply the inverse of X'X with X'y. Report your result. What is this?  
  
XtXXtY <- XtXinv%\*%XtY  
  
XtXXtY

## [,1]  
## [1,] 2.1919399  
## [2,] 0.1224290  
## [3,] 1.3063511  
## [4,] 0.6288565

## Finally run a few comparisons.  
  
### Regress y1 on x1, x2, and x3 in a linear model.  
  
   
  
dt.E<-data.table(DT)  
  
lm1 <- lm(y1~ x1 + x2+ x3, data=dt.E)  
  
summary(lm1)

##   
## Call:  
## lm(formula = y1 ~ x1 + x2 + x3, data = dt.E)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -12.1144 -2.1371 0.0641 2.1496 10.7707   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 2.19198 0.03656 59.954 <2e-16 \*\*\*  
## x1 0.12240 0.16701 0.733 0.464   
## x2 1.30648 0.03599 36.301 <2e-16 \*\*\*  
## x3 0.62897 0.05367 11.720 <2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 3.183 on 7580 degrees of freedom  
## Multiple R-squared: 0.1794, Adjusted R-squared: 0.179   
## F-statistic: 552.2 on 3 and 7580 DF, p-value: < 2.2e-16

stargazer(lm1, type="text")

##   
## ===============================================  
## Dependent variable:   
## ---------------------------  
## y1   
## -----------------------------------------------  
## x1 0.122   
## (0.167)   
##   
## x2 1.306\*\*\*   
## (0.036)   
##   
## x3 0.629\*\*\*   
## (0.054)   
##   
## Constant 2.192\*\*\*   
## (0.037)   
##   
## -----------------------------------------------  
## Observations 7,584   
## R2 0.179   
## Adjusted R2 0.179   
## Residual Std. Error 3.183 (df = 7580)   
## F Statistic 552.210\*\*\* (df = 3; 7580)   
## ===============================================  
## Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

##o Divide XtX by n (number of observations) and compare it to cov(DT), comment.  
  
E <- XtXXtY/nrow(DT)  
  
E

## [,1]  
## [1,] 2.890216e-04  
## [2,] 1.614306e-05  
## [3,] 1.722509e-04  
## [4,] 8.291884e-05

E1<- cov(DT)  
  
E1

## y1 const x1 x2 x3 eps1  
## y1 12.34255205 0 0.1631956969 1.354630521 0.67399025 -0.0345977698  
## const 0.00000000 0 0.0000000000 0.000000000 0.00000000 0.0000000000  
## x1 0.16319570 0 0.1036575573 0.001305074 0.23658268 -0.0009250523  
## x2 1.35463052 0 0.0013050743 1.031741563 0.01036725 0.0044524846  
## x3 0.67399025 0 0.2365826780 0.010367251 1.00400651 -0.0149200056  
## eps1 -0.03459777 0 -0.0009250523 0.004452485 -0.01492001 2.0521287710  
## eps2 0.35828556 0 0.0845584145 -0.105670109 0.22875506 -0.1687865058  
## eps2  
## y1 0.35828556  
## const 0.00000000  
## x1 0.08455841  
## x2 -0.10567011  
## x3 0.22875506  
## eps1 -0.16878651  
## eps2 199.70843926