Modelos dinámicos para datos de panel (enfoque GMM)

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2020

library(plm)  
data( "EmplUK", package="plm" )  
help( "EmplUK", package="plm" )  
EmplUK.pdata <- pdata.frame(EmplUK,index=c( "firm", "year"))  
pdim(EmplUK.pdata)

## Unbalanced Panel: n = 140, T = 7-9, N = 1031

#  
dem\_empl.GMM.1 <-pgmm(log(emp) ~ lag(log(emp), 1:2) + lag(log(wage), 0:1) + log(capital) + lag(log(output), 0:1) | lag(log(emp), 2:99),data=EmplUK.pdata, effect="twoways", model="twosteps")  
summary(dem\_empl.GMM.1, robust = FALSE)

## Twoways effects Two steps model  
##   
## Call:  
## pgmm(formula = log(emp) ~ lag(log(emp), 1:2) + lag(log(wage),   
## 0:1) + log(capital) + lag(log(output), 0:1) | lag(log(emp),   
## 2:99), data = EmplUK.pdata, effect = "twoways", model = "twosteps")  
##   
## Unbalanced Panel: n = 140, T = 7-9, N = 1031  
##   
## Number of Observations Used: 611  
##   
## Residuals:  
## Min. 1st Qu. Median Mean 3rd Qu. Max.   
## -0.6190677 -0.0255683 0.0000000 -0.0001339 0.0332013 0.6410272   
##   
## Coefficients:  
## Estimate Std. Error z-value Pr(>|z|)   
## lag(log(emp), 1:2)1 0.474151 0.085303 5.5584 2.722e-08 \*\*\*  
## lag(log(emp), 1:2)2 -0.052967 0.027284 -1.9413 0.0522200 .   
## lag(log(wage), 0:1)0 -0.513205 0.049345 -10.4003 < 2.2e-16 \*\*\*  
## lag(log(wage), 0:1)1 0.224640 0.080063 2.8058 0.0050192 \*\*   
## log(capital) 0.292723 0.039463 7.4177 1.191e-13 \*\*\*  
## lag(log(output), 0:1)0 0.609775 0.108524 5.6188 1.923e-08 \*\*\*  
## lag(log(output), 0:1)1 -0.446373 0.124815 -3.5763 0.0003485 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Sargan test: chisq(25) = 30.11247 (p-value = 0.22011)  
## Autocorrelation test (1): normal = -2.427829 (p-value = 0.01519)  
## Autocorrelation test (2): normal = -0.3325401 (p-value = 0.73948)  
## Wald test for coefficients: chisq(7) = 371.9877 (p-value = < 2.22e-16)  
## Wald test for time dummies: chisq(6) = 26.9045 (p-value = 0.0001509)  
#  
dem\_empl.GMM.2 <-pgmm(log(emp) ~ lag(log(emp), 1:2) + lag(log(wage), 0:1) + log(capital) + lag(log(output), 0:1) | lag(log(emp), 2:99) + lag(log(wage), 2:99) + lag(log(capital), 1:99) + lag(log(output), 2:99),data=EmplUK.pdata, effect="twoways", model="onestep", transformation="ld")

summary(dem\_empl.GMM.2, robust = FALSE)

## Twoways effects One step model  
##   
## Call:  
## pgmm(formula = log(emp) ~ lag(log(emp), 1:2) + lag(log(wage),   
## 0:1) + log(capital) + lag(log(output), 0:1) | lag(log(emp),   
## 2:99) + lag(log(wage), 2:99) + lag(log(capital), 1:99) +   
## lag(log(output), 2:99), data = EmplUK.pdata, effect = "twoways",   
## model = "onestep", transformation = "ld")  
##   
## Unbalanced Panel: n = 140, T = 7-9, N = 1031  
##   
## Number of Observations Used: 1362  
##   
## Residuals:  
## Min. 1st Qu. Median Mean 3rd Qu. Max.   
## -0.9932906 -0.0325607 0.0000000 0.0001808 0.0333719 0.7321725   
##   
## Coefficients:  
## Estimate Std. Error z-value Pr(>|z|)   
## lag(log(emp), 1:2)1 1.0438525 0.0306054 34.1068 < 2.2e-16 \*\*\*  
## lag(log(emp), 1:2)2 -0.1432701 0.0262623 -5.4553 4.888e-08 \*\*\*  
## lag(log(wage), 0:1)0 -0.4901774 0.0620489 -7.8999 2.792e-15 \*\*\*  
## lag(log(wage), 0:1)1 0.4510478 0.0618904 7.2878 3.149e-13 \*\*\*  
## log(capital) 0.1001554 0.0096001 10.4328 < 2.2e-16 \*\*\*  
## lag(log(output), 0:1)0 0.4082326 0.1301513 3.1366 0.001709 \*\*   
## lag(log(output), 0:1)1 -0.3251147 0.1141944 -2.8470 0.004413 \*\*   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Sargan test: chisq(135) = 125.1628 (p-value = 0.71669)  
## Autocorrelation test (1): normal = -4.395015 (p-value = 1.1077e-05)  
## Autocorrelation test (2): normal = -0.4405889 (p-value = 0.65951)  
## Wald test for coefficients: chisq(7) = 27594.05 (p-value = < 2.22e-16)  
## Wald test for time dummies: chisq(6) = 13.87348 (p-value = 0.031082)