

EXCERSISES IN APPLIED PANEL DATA ANALYSIS #11

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1. INTRODUCTION

This exercise will familiarize you with fixed effects estimation in a panel setting where the fixed effects are constant across the quantiles. We will use the two-step estimator of Canay (2011). Given that there is no package that implements this estimator in R, we will need to load in personal source code.

2. QUANTILE ESTIMATION OF THE UNOBSERVED EFFECTS MODEL

Recall that Canay's (2011) fixed effects quantile estimator proceeds in two steps. In the first step we run standard fixed effects framework for the unobserved effects model and obtain the unobserved effects. We then subtract these unobserved effects from y and engage in standard quantile regression. To estimate a cross-sectional quantile regression we make use of the **quantreg** package (Koenker 2013). The command for running a quantile regression in R is **rq**.

```
> ## We first load necessary libraries
> library(plm)
> library(quantreg)
> ## Next we load personal codes
> source("rqpanel.R")
> ## Load our data. We use the Grunfeld data in R
> data("Grunfeld")
> # Then we compute the two step estimator.
> form <- inv ~ value + capital # Equation to be estimated
> tau   <- 0.25                # Quantile to be estimated
> two.step <- pqr.estimator(Grunfeld,form,tau,
+                           index=c("firm","year"),
+                           Y="inv")
> data <- read.csv(file="PanelAreaData.csv",h=T)
> data$1MQ <- log(data$Mz_Area)
```

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```

> data$lWP <- log(data$Wh_annualP)
> data$lSP <- log(data$Soy_AnnualP)
> data$lRP <- log(data$Ric_AnnualP)
> ## For this example we need a balanced panel
> uni.country <- unique(data$country)
> length(uni.country)
> singleyear.store <- as.numeric()
> for (i in 1:length(uni.country)){
+
+   c.id <- uni.country[i]
+
+     singleyear.store[i] <- length(which(data$country==c.id))
+
+ }
> omit <- uni.country[which(singleyear.store<50)]
> id.omit <- which(data$country%in%omit)
> data1 <- data[-id.omit,]
> # Then we compute the two step estimator.
> form <- lMQ ~ lWP+lSP+lRP # Equation to be estimated
> two.step.25 <- pqr.estimator(data1,form,tau=0.25,
+                               index=c("country","year"),
+                               Y="lMQ")
> two.step.50 <- pqr.estimator(data1,form,tau=0.50,
+                               index=c("country","year"),
+                               Y="lMQ")
> two.step.75 <- pqr.estimator(data1,form,tau=0.75,
+                               index=c("country","year"),
+                               Y="lMQ")
> ## Print out results
> two.step.25$prelim
> two.step.25$theta
> two.step.50$theta
> two.step.75$theta

```

REFERENCES

- Canay, I. (2011), ‘A simple approach to quantile regression for panel data’, *The Econometrics Journal* **14**, 368–386.
- Koenker, R. (2013), *quantreg: Quantile Regression*. R package version 5.02.
URL: <http://CRAN.R-project.org/package=quantreg>