

Note Equilibria

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Introduction

This progress report gives output for the property crime of youth

Preamble

First, we need to read in packages, my own functions and the two datasets

```
setwd("C:/Users/tgf200/Dropbox/Thomas/papers/Crime")
library(tidyr)
library(foreign)
library(ggplot2)
library(rootSolve)
library(AER)
library(dplyr)
library(reshape2)
source("./prog/R/iterationBayer.R")
source("./prog/R/CharacteristicsEq.R")
source("./prog/R/MakeFig.R")
source("./prog/R/FindEquilibria.R")

data <- read.table("./Data/GeneralData.csv", header=TRUE, sep=",")
data <- data %>% # fill in crime type
  filter(! is.na(alpha_crime)) %>%
  mutate(pfield = pfieldcrime,
         interaction = pfield * addrdens,
         alpha = alpha_crime,
         se = sealpha_crime
        )
dataind <- read.dta("./Data/hat_anyproperty2006_jongeren.dta")
```

We then specify the specifications:

```
forminit <- alpha~addrdens + oneperdens + oneparentdens + perperhh + opleiding + socklasse + k_tweeverd + v_uit_perc + v_in_perc + schooldens + perchouseown + shops + polavail_mean_2005+pfield+interaction
formcrime <- alpha~addrdens + oneperdens + oneparentdens + perperhh + opleiding + socklasse + k_tweeverd + v_uit_perc + v_in_perc + schooldens + perchouseown + shops + polavail_mean_2005+pfield+interaction |
  addrdens + oneperdens +oneparentdens + perperhh + opleiding + socklasse + k_tweeverd + v_uit_perc + v_in_perc + schooldens + perchouseown + shops + polavail_mean_2005+instrument+instrinter
dataind$directions.foreign <- factor(dataind$foreign)
dataind$foreign <- as.numeric(dataind$directions.foreign) - 1
```

And then the estimation procedure:

```
output <- iteration2sls(dataind, data, formcrime, forminit, youth=TRUE)
```

```
## [1] "    Criterium 2 is now : 0.0253691120712322"
## [1] "    Criterium 2 is now : 0.000208038568607519"
## [1] "    Criterium 2 is now : 2.79754429491777e-06"
## [1] "    Criterium 2 is now : 5.1246635843404e-08"
## [1] "Criterium 1 is now : 0.0304253501360187"
## [1] "    Criterium 2 is now : 0.000643401574768949"
## [1] "    Criterium 2 is now : 3.92328946934895e-06"
## [1] "    Criterium 2 is now : 8.08037358454878e-08"
## [1] "Criterium 1 is now : 0.000673536109775938"
## [1] "    Criterium 2 is now : 6.65638439724103e-06"
## [1] "    Criterium 2 is now : 4.09274313907392e-08"
## [1] "Criterium 1 is now : 7.45057687607576e-06"
## [1] "    Criterium 2 is now : 8.66415782371779e-08"
## [1] "Criterium 1 is now : 8.66415782371779e-08"
```

```
summary(output$iv)
```

```
##
## Call:
## ivreg(formula = formiv, data = datahat, weights = 1/se)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.35174 -0.47812 -0.04963  0.38260  2.81502
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.818426   0.269298   3.039  0.00240 **
## addrdens       0.476146   0.187975   2.533  0.01138 *
## oneperdens    -0.809993   0.193156  -4.193 2.86e-05 ***
## oneparentdens  2.568445   0.527437   4.870 1.20e-06 ***
## perperhh      -0.362513   0.081134  -4.468 8.31e-06 ***
## opleiding     -0.374817   0.046235  -8.107 8.75e-16 ***
## socklasse      0.024768   0.025637   0.966  0.33410
## k_tweeverd     0.043937   0.015812   2.779  0.00551 **
## v_uit_perc     0.009179   0.002036   4.509 6.89e-06 ***
## v_in_perc      0.004731   0.001957   2.417  0.01574 *
## schooldens     0.006318   0.003849   1.642  0.10083
## perhouseown   -0.107966   0.093713  -1.152  0.24942
## shops          0.019660   0.007536   2.609  0.00915 **
## polavail_mean_2005 -0.005378  0.008025  -0.670  0.50283
## pfield         0.095120   0.024005   3.962 7.67e-05 ***
## interaction    -0.134012   0.047391  -2.828  0.00473 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6464 on 2089 degrees of freedom
## Multiple R-Squared: 0.4826, Adjusted R-squared: 0.4788
## Wald test: 70.83 on 15 and 2089 DF, p-value: < 2.2e-16
```

With final analysis of the output

We first want to find all equilibria for all iterations

```
matrices <- findequilibria(output)
```

Then we want to find the percentages of 3 equilibria occuring per iteration

```
counteq(matrices$cmat)
```

```
## [1] 0.6451306 0.6513064 0.6551069 0.6551069
```

Then we want to know the number of low equilibria (smaller than 50%). This also indicates the number of equilibria changing from low to high (larger than 50%)

```
counteqlow(output$instrument)
```

```
##  
## 1 1 1 1
```

And finally, we want to know whether our found equilibria are close (in this case the difference should be smaller than 2% in an absolute sence) to the real crime rates

```
percclose(output$alpha_est/100, output$instrument, 0.02)
```

```
##  
## 0.9629454 0.9543943 0.9505938 0.9467933
```