Problem Set 5 (Short)

MaCCS 201 - Fall 2025

2025-11-18

Tentative Due Date: December 15

Please submit markdown file named [last_name]_[first_name]_ps4.Rmd or a pdf with all code and answers.

Synthetic Controls

Let's replicate another OG. Abadie and Gardeazabal (2003). They estimate the effect of terrorist conflict in the Basque Country (Spain) on GDP per capita. You essentially construct a synthetic version of Basque Country.

```
library(SCtools)
```

```
## Loading required package: future
```

```
library(Synth)
data(basque)
```

We want to replicate the paper. I will save you the digging through the pages. Also, try and do this yourself. This paper has been replicated a thousand time. Use this to learn!!!

1. You want to use the follwing variables as predictors. "`school.illit`", "`school.prim`", "`school.med`", "`school.high`", "`school.post.high`", "`invest`"
2. You want to use the `mean` as the relevant operator.
3. As special predictors you do: special.predictors = list(list("gdpcap", 1960:1969 , "mean"), list("sec.agriculture", seq(1961, 1969, 2), "mean"), list("sec.energy", seq(1961, 1969, 2), "mean"), list("sec.industry", seq(1961, 1969, 2), "mean"), list("sec.construction", seq(1961, 1969, 2), "mean"), list("sec.services.venta", seq(1961, 1969, 2), "mean"), list("sec.services.nonventa", seq(1961, 1969, 2), "mean"), list("popdens", 1969, "mean"))
4. The dependent vairable is `gdpcap`
5. The unit variable is `regionno`
6. The unit names variable is "`regionname`"
7. The time variable is "`year`"
8. The treatment identifier should be obvious. (Basque Country!!!)
9. As controls indentifiers use `2:16` and `18`. Leave out 1, because that is all of Spain.
10. `time.optimize.ssr = 1960:1969`
11. `time.plot = 1955:1997`
12. As method use method = "BFGS"
13. Generate a nice looking plot of the gap between the synthetic control and Basque Country GDP.
14. Create a falsification plot, using all other areas from 9. above as fake units.
15. Optional. Repeat 14, but fake move treatment up a bit.