Pre-Avg_SE

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#Replicating the SDs in the Pre-Avg period

The first step is to open the reference dataset and run the regression and dynamic aggregation of the results.

```
# Data Opening
data(mpdta)

#Regression outline
out <- att_gt(yname="lemp",
              tname="year",
              idname="countyreal",
              gname="first.treat",
              xformla=NULL,
              data=mpdta)


#Aggregation for Event Study
es_dyn <- aggte(out, type = "dynamic")
```

After this step, we calculate the average value of the cofficient for the Pre-Avgs periods.

```
#Extracting the pre-treatment periods
pre_egt <- es_dyn$egt < 0

#Calulating the average value for the coefficients
pre_av <- mean(es_dyn$att.egt[pre_egt], na.rm = TRUE)
```

##Standard Error

We will now apply the formula suggested by Callaway and Sant'Anna to extract the Variance–Covariance matrix available in the HonestDiD package code. Once the matrix V is obtained, I will aggregate the values to compute the Standard Error for the Pre-Avg period.

```
#Code for suggested by the authors in the HonestDiD

es_inf_func <- es_dyn$inf.function$dynamic.inf.func.e
n <- nrow(es_inf_func)
V <- t(es_inf_func) %*% es_inf_func / n / n

# ------------------------------------------------------------------------- #
#Standard Error calculations
## 1) Extracting the pre-treatment values
```

```r
V3 <- V[1:3, 1:3]

## 2) Equal period weights
w <- rep(1/3, 3)

## 3) Multiplication by the weight matrices: w`Vw
var_equal <- as.numeric(crossprod(w, V3 %*% w))

## 4) Square Root.
se_equal  <- sqrt(var_equal)
```

The Pre-Avg SE provided by the Stata package was 0.0075204. Appluing this method, the final SE is:

```r
se_equal
```

```
## [1] 0.007656976
```

While not exact, the final result is close to the reference value, indicating this method can reliably approximate the pre-average standard error.