

# Env Econ 2 - Homework 7

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**1.**

**(a)**

The regression coefficient of a binary treatment variable indicating the pandemic period (March 1, 2020, and after) is estimated as -0.07 with a heteroskedasticity-robust standard error of 0.001, under 0.05 significance level. In other words, electricity consumption (in log-transformed) decreased in the treatment period by about -0.07. Considering  $\alpha_i, m, d, h, y$ , I interacted zone, month of year, day of week, hour of day, and year indicator as I seen in Deryugina et al. (2019).

**(b)**

I created *month2* variable to drop months 1 and 2. The average treatment effect on the treated (ATET) is estimated as -0.068 with a heteroskedasticity-robust standard error of 0.001, under 0.05 significance level. The estimated effect is similar to the one we got in Q1.

**(c)**

Since these estimators do not consider year indicator, they might be unable to account for yearly variation and unforeseen factors affecting it. For instance, electricity consumption might have an upward trend in general as time goes by. Since the year indicator is not included, both OLS nor matching cannot deal with unobserved heterogeneity.

**2.**

**(a)**

Whenever I tried to run the regression, Stata kept showing 'op. sys. refuses to provide memory'. I tried 'set maxvar' or 'set memory' command, but it didn't work... Even when I limited the data to 2017-2020, 2018-2020, and 2019-2020, Stata kept showing an error message or stopped working. Stata might require much more computational capacity due to interaction terms.

**(b)**

Since year indicator is included, it can control for unobserved yearly heterogeneity.

**3.**

**(a)**

The estimated treatment effect using difference between observed consumption and matched electricity consumption is 0.003 and statistically insignificant. The estimated value is much smaller compared to what we get in previous questions. Table 1 shows heteroskedasticity-robust standard error of 0.002.

VARIABLES	(1) y
tr	0.00278 (0.00177)
Constant	-0.0420*** (0.00152)
Observations	17,568
R-squared	0.000
Robust standard errors in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	

Table 1: Results of regression estimate with matched log electricity consumption. Robust standard error is used.

**(b)**

In the nearest neighbor matching, the variation is susceptible to idiosyncrasy. Therefore, the standard errors of estimates might be influenced and not reliable.

Reference: Deryugina, Tatyana, Garth Heutel, Nolan H. Miller, David Molitor, and Julian Reif. "The mortality and medical costs of air pollution: Evidence from changes in wind direction." American Economic Review 109, no. 12 (2019): 4178-4219.