Homework 4 Submission

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Economics 7103

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Python

1. It does appear as though there is a parallel trend before the treatment.

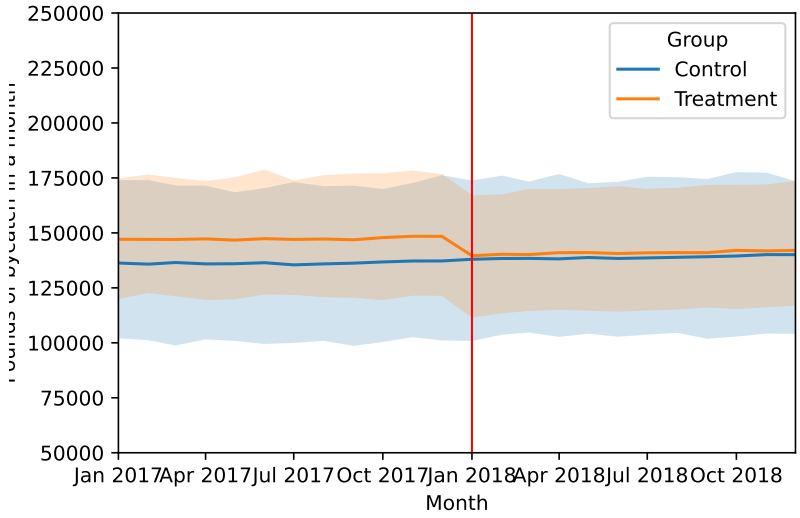

Figure 1: This graph shows the trends between treatment and control group around the policy implementation date of Jan 2018.

2. Estimation of the treatment effect of the program on bycatch.

Table 1: DID estimates

	Sample analog value
$[Y_{igt}\|g(i) = treatment, t = Pre] =$	148430.64
$[Y_{igt}\|g(i) = treatment, t = Post] =$	139612.51
$[Y_{igt}\|g(i) = control, t = Pre] =$	137228.60
$[Y_{igt}\|g(i) = control, t = Post] =$	139612.51
DID=	-9591.35

The intuition of the DID estimate is that it measures the difference between the treatment effect of the program and the change over the same time period in the control group.

3. Estimating difference-in-difference using the following specifications:

$$bycatch_{i,t} = \alpha + \lambda_{t=2017} + \gamma g(i) + \delta treat_{i,t} + \epsilon_{i,t} \tag{1}$$

$$bycatch_{i,t} = \alpha + \lambda + \gamma g(i) + \delta treat_{i,t} + \epsilon_{i,t} \tag{2}$$

$$bycatch_{i,t} = \alpha + \lambda + \gamma g(i) + \delta treat_{i,t} + \beta X_{i,t} + \epsilon_{i,t} \tag{3}$$

The estimates for these specifications can be found below in Table 3, where equation 1 is estimated in column a, equation 2 is estimated in column b, and equation 3 is estimated in column c.

Table 2: DID estimates

	(a)	(b)	(c)
DID estimates	-9591.35	-8956.78	-8436.28
	(3198.64)	(3135.04)	(2795.47)
Group FE			
Month Indicator			
Controls	×	×	
Sample	Dec 2017 - Jan 2018	Jan 2017 - Dec 2018	Jan 2017 - Dec 2018

Stata

1. Estimating DID using different specification in Stata:

Table 3: DID estimates using two different methods in Stata

	(a)	(b)
DID estimates	-8085.14	-8149.06
	(2619.21)	(2489.02)
Method	Firm indicators	Within-transformation
Observations	1200	1200

Standard errors are clustered at the firm level.

The within transformation is more accurate since it provides an estimation with lower standard deviations. It does so with the added caveat of stripping out the time-invariant variables by demeaning.