01_TFP_analysis

April 21, 2020

1 SBC_pollution_China data analysis

This notebook has been generated on 2020-04-19 11:39

The objective of this notebook is to YYY

1.1 Analysis steps

The analysis steps performed in this notebook are the following

- Lorem ipsum dolor sit amet
- Lorem ipsum dolor sit amet
- Lorem ipsum dolor sit amet

1.2 Data source

The data source of this dataset is:

- TFP_SBC_firm

1.2.1 Variable name

The variables names and labels are the following:

Variables

Labels

Types

0

id

id

object

1

OWNERSHIP

OWNERSHIP

object

2

year

year

int64

3

geocode4_corr

geocode4_corr

int64

4

industry

industry

int64

5

occurence

occurence

int64

6

tfp_OP

tfp_OP

float64

7

tfp_OWNERSHIP

tfp_OWNERSHIP

float64

8

polluted_thre

polluted_thre

object

9

cityen

cityen

object

10

Coastal

Coastal

bool

11

TCZ_c

TCZ_c

object

12

target_c

target_c

float64

13

Period

Period

object

14

FE_c_i

FE_c_i

int64

15

FE_t_i

FE_t_i

int64

16

FE_t_c

FE_t_c

int64

17

FE_c_i_o

FE_c_i_o

int64

18

FE_t_o

FE_t_o

int64

2 Analysis

```
The autoreload extension is already loaded. To reload it, use:
  %reload_ext autoreload
```

```
Service account storage and Bigquery are now connected.
Service account storage is stored as <google.cloud.storage.client.Client object
at 0xa21ab5c10> and accessible with "Storage_account"
Service account Bigquery is stored as <google.cloud.bigquery.client.Client
object at 0xa205be290> and accessible with "bigquery_account"
```

2.1 Load the data

It takes a will to upload the firm data, so we load it localy.

```
/Users/thomas/anaconda3/lib/python3.7/site-packages/pyarrow/feather.py:83:
FutureWarning:

The SparseDataFrame class is removed from pandas. Accessing it from the top-
level namespace will also be removed in the next version
```

2.1.1 Load chinese_city_characteristics from Google Spreadsheet

Feel free to add description about the dataset or any usefull information.

Profiling will be available soon for this dataset

```
(641287, 31)
```

2.1.2 Compute Herfhindal: proxy Size

$$H = \sum_{i=1}^{N} s_i^2$$

where s_i is the market share of industry[city] i in a city [industry], and N is the number of firms.

We proceed as follow: - Step 1: Compute the share [output, capital, employment] by city-industry: `market_share_cit` - Step 2: compute the sum of squared market share by industry[city]: `Herfindahl_agg_t` - Step 3: Compute the average across time: `Herfindahl_agg` - Step 4: Compute the deciles of step 3: `decile_herfhindal_agg` - Low decile implies a low concentration within sectors - High decile implies a high concentration within sectors

```
(648797, 19)
```

2.1.3 Create R tables

```
(648797, 25)
```

```
          id OWNERSHIP  …  third_herfhindal  threshold_herfhindal
0  196670558       SOE  …                 0                     1
1  617924545   PRIVATE  …                 0                     1
2  617938939       SOE  …                 0                     1
3  617924545   PRIVATE  …                 0                     1
4  745544854   PRIVATE  …                 0                     1

[5 rows x 25 columns]
```

3 Table TFP

$$TFP_{fikt} = \alpha\,(\text{ Period } \times \text{ Target }_i \times \text{ Polluting sectors }_k) + \nu_i + \lambda_t + \phi_k + \epsilon_{ikt}$$

1. Full sample
2. SOE dominated
3. TCZ vs No TCZ
4. Coastal vs No Coastal
5. Kuznet threshold
   - TCZ: 28795
   - Concentrated: 45396
   - SOE output: 30264
   - SOE Capital: 24867
   - SPE employment: 35190

3.1 Test

For each category, proceed as follow:

1. Without Firm's FE

- Test 1
  - `target * polluted * period *ownership`
  - `target * polluted * period` FOR SOE
  - `target * polluted * period` FOR PRIVATE
  - FE: `cio + ct+ti+to` & `ci+ct+ti`
- Test 2
  - Similar to test 1, but filter `TCZ/No TCZ`
- Test 3
  - `target * period *ownership`
  - `target * period` FOR SOE
  - `target * period` FOR PRIVATE
  - FE: `cio + to+tc` & `c+i+t`

- Test 4
  - Similar to test 3, but filter `TCZ/No TCZ`

2. With Firm's FE

- Identical to `Without Firm's FE` but include `firm` fixed effect

3.1.1 Without firm's fixed effect

Table 1: TFP

	Dependent variable TFP $_{fikt}$		
	(1)	(2)	(3)
	Dummy	SOE	PRIVATE
$\text{target}_c \times \text{Period} \times \text{Polluted}_i$	−0.012	−0.028	−0.014
	(0.022)	(0.080)	(0.021)
$\text{target}_c \times \text{Period} \times SOE$	0.127**		
	(0.055)		
$\text{Period} \times \text{Polluted}_i \times SOE$	−0.049		
	(0.048)		
$\text{target}_c \times \text{Period} \times \text{Polluted}_i \times SOE$	−0.042		
	(0.089)		
City-industry-ownership	Yes	No	No
City-industry	No	Yes	Yes
City-time	Yes	Yes	Yes
Industry-time	Yes	Yes	Yes
time-ownership	Yes	No	No
Observations	648,797	41,488	607,309
R^2	0.327	0.668	0.234

False

Table 1: TFP

	Dependent variable TFP $_{fikt}$		
	(1)	(2)	(3)
	Dummy	SOE	PRIVATE
target$_c$ × Period		-0.096^{**}	-0.013
		(0.043)	(0.009)
target$_c$ × Period × SOE	0.116^{***}		
	(0.045)		
City-industry-ownership	Yes	No	No
City-time	Yes	No	No
time-ownership	Yes	No	No
City	No	Yes	Yes
Industry	No	Yes	Yes
time	No	Yes	Yes
Observations	648,797	41,488	607,309
R^2	0.324	0.280	0.098

False

Split

1. TRUE 2. TRUE 3. TRUE 4. TRUE 5. TRUE 6. TRUE

```
[1] "TFP subsample - Coastal"
[1] "TFP subsample - TCZ"
[1] "TFP subsample - Herfhindhal"
[1] "TFP subsample - tcz"
[1] "TFP subsample - concentrated"
[1] "TFP subsample - output"
[1] "TFP subsample - capital"
[1] "TFP subsample - employment"
```

Table 1: TFP subsample - Coastal_c

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Coastal_c	NO Coastal_c	Coastal_c	NO Coastal_c	Coastal_c	NO Coastal_c
$\text{target}_c \times \text{Period} \times \text{Polluted}_i$	−0.009	−0.033	−0.044	0.121	−0.008	−0.055
	(0.024)	(0.039)	(0.111)	(0.149)	(0.024)	(0.039)
$\text{target}_c \times \text{Period} \times SOE$	0.140**	0.055				
	(0.066)	(0.085)				
$\text{Period} \times \text{Polluted}_i \times SOE$	−0.070	−0.058				
	(0.058)	(0.058)				
$\text{target}_c \times \text{Period} \times \text{Polluted}_i \times SOE$	−0.041	0.037				
	(0.098)	(0.140)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
Industry-time	Yes	Yes	Yes	Yes	Yes	Yes
time-ownership	Yes	Yes	No	No	No	No
Observations	496,624	152,173	19,540	21,948	477,084	130,225
R^2	0.260	0.496	0.670	0.682	0.197	0.370

False

Table 1: TFP subsample - TCZ

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	TCZ	NO TCZ	TCZ	NO TCZ	TCZ	NO TCZ
$\text{target}_c \times \text{Period} \times \text{Polluted}_i$	−0.012	−0.449**	−0.037	0.225	−0.014	−0.416*
	(0.020)	(0.216)	(0.082)	(0.814)	(0.020)	(0.223)
$\text{target}_c \times \text{Period} \times SOE$	0.116**	−1.778***				
	(0.058)	(0.523)				
$\text{Period} \times \text{Polluted}_i \times SOE$	−0.063	−0.042				
	(0.049)	(0.105)				
$\text{target}_c \times \text{Period} \times \text{Polluted}_i \times SOE$	−0.024	0.498				
	(0.086)	(0.791)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
Industry-time	Yes	Yes	Yes	Yes	Yes	Yes
time-ownership	Yes	Yes	No	No	No	No
Observations	549,730	99,067	32,078	9,410	517,652	89,657
R^2	0.300	0.466	0.645	0.769	0.214	0.352

False

Table 1: TFP subsample - Herfhindhal

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Concentrated	NO Concentrated	Concentrated	NO Concentrated	Concentrated	NO Concentrated
target$_c$ × Period × Polluted$_i$	−0.031	−0.011	0.054	−0.050	−0.045	−0.012
	(0.037)	(0.025)	(0.135)	(0.105)	(0.036)	(0.025)
target$_c$ × Period × SOE	0.045	0.173**				
	(0.085)	(0.069)				
Period ×Polluted$_i$ × SOE	−0.063	−0.048				
	(0.047)	(0.068)				
target$_c$ × Period × Polluted$_i$ × SOE	0.053	−0.065				
	(0.129)	(0.104)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
Industry-time	Yes	Yes	Yes	Yes	Yes	Yes
time-ownership	Yes	Yes	No	No	No	No
Observations	193,359	455,438	23,054	18,434	170,305	437,004
R^2	0.458	0.257	0.706	0.639	0.328	0.197

False

Table 1: TFP subsample - tcz

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period × Polluted$_i$	−0.014	−0.151*	0.029	0.054	−0.017	−0.185**
	(0.025)	(0.077)	(0.119)	(0.231)	(0.024)	(0.079)
target$_c$ × Period × SOE	0.081	−0.239				
	(0.076)	(0.195)				
Period ×Polluted$_i$ × SOE	−0.016	−0.057				
	(0.063)	(0.060)				
target$_c$ × Period × Polluted$_i$ × SOE	−0.095	0.280				
	(0.100)	(0.238)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
Industry-time	Yes	Yes	Yes	Yes	Yes	Yes
time-ownership	Yes	Yes	No	No	No	No
Observations	380,224	261,063	13,935	26,817	366,289	234,246
R^2	0.240	0.455	0.617	0.727	0.192	0.327

False

Table 1: TFP subsample - concentrated

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period × Polluted$_i$	−0.030	−0.094*	−0.098	−0.045	−0.029	−0.106**
	(0.021)	(0.050)	(0.155)	(0.173)	(0.021)	(0.049)
target$_c$ × Period × SOE	0.185**	−0.309**				
	(0.077)	(0.123)				
Period ×Polluted$_i$ × SOE	0.057	−0.079				
	(0.109)	(0.054)				
target$_c$ × Period × Polluted$_i$ × SOE	−0.112	0.102				
	(0.130)	(0.183)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
Industry-time	Yes	Yes	Yes	Yes	Yes	Yes
time-ownership	Yes	Yes	No	No	No	No
Observations	191,829	449,458	5,130	35,622	186,699	413,836
R^2	0.210	0.380	0.645	0.687	0.176	0.271

False

Table 1: TFP subsample - output

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period × Polluted$_i$	−0.012	−0.131*	0.031	0.040	−0.016	−0.157**
	(0.024)	(0.072)	(0.130)	(0.220)	(0.024)	(0.073)
target$_c$ × Period × SOE	0.060	−0.304*				
	(0.077)	(0.174)				
Period ×Polluted$_i$ × SOE	−0.007	−0.067				
	(0.069)	(0.059)				
target$_c$ × Period × Polluted$_i$ × SOE	−0.093	0.260				
	(0.104)	(0.227)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
Industry-time	Yes	Yes	Yes	Yes	Yes	Yes
time-ownership	Yes	Yes	No	No	No	No
Observations	363,345	277,942	12,605	28,147	350,740	249,795
R^2	0.235	0.448	0.619	0.719	0.189	0.322

False

Table 1: TFP subsample - capital

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period × Polluted$_i$	−0.011	−0.142	−0.048	−0.015	−0.012	−0.186*
	(0.023)	(0.093)	(0.109)	(0.231)	(0.022)	(0.097)
target$_c$ × Period × SOE	0.097	−0.167				
	(0.076)	(0.204)				
Period ×Polluted$_i$ × SOE	−0.017	−0.026				
	(0.058)	(0.060)				
target$_c$ × Period × Polluted$_i$ × SOE	−0.089	0.226				
	(0.101)	(0.245)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
Industry-time	Yes	Yes	Yes	Yes	Yes	Yes
time-ownership	Yes	Yes	No	No	No	No
Observations	437,640	203,647	18,061	22,691	419,579	180,956
R^2	0.250	0.490	0.606	0.752	0.195	0.357

False

Table 1: TFP subsample - employment

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period × Polluted$_i$	−0.024	−0.124*	−0.049	−0.076	−0.025	−0.137**
	(0.024)	(0.068)	(0.126)	(0.196)	(0.024)	(0.066)
target$_c$ × Period × SOE	0.103	−0.372**				
	(0.082)	(0.160)				
Period ×Polluted$_i$ × SOE	0.043	−0.067				
	(0.084)	(0.052)				
target$_c$ × Period × Polluted$_i$ × SOE	−0.129	0.140				
	(0.116)	(0.212)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
Industry-time	Yes	Yes	Yes	Yes	Yes	Yes
time-ownership	Yes	Yes	No	No	No	No
Observations	294,091	347,196	9,397	31,355	284,694	315,841
R^2	0.221	0.419	0.620	0.704	0.181	0.301

False

Without polluted

1. TRUE 2. TRUE 3. TRUE 4. TRUE 5. TRUE 6. TRUE 7. TRUE 8. TRUE 9. TRUE 10. TRUE 11. TRUE 12. TRUE 13. TRUE 14. TRUE 15. TRUE 16. TRUE 17. TRUE 18. TRUE 19. TRUE 20. TRUE 21. TRUE 22. TRUE 23. TRUE 24. TRUE

```
[1] "TFP subsample - Coastal"
[1] "TFP subsample - TCZ"
[1] "TFP subsample - Herfhindhal"
[1] "TFP subsample - tcz"
[1] "TFP subsample - concentrated"
[1] "TFP subsample - output"
[1] "TFP subsample - capital"
[1] "TFP subsample - employment"
```

Table 1: TFP subsample - Coastal_c

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Coastal_c	NO Coastal_c	Coastal_c	NO Coastal_c	Coastal_c	NO Coastal_c
$\text{target}_c \times \text{Period}$			0.014	-0.202^{***}	0.017^{*}	-0.098^{***}
			(0.054)	(0.065)	(0.009)	(0.020)
$\text{target}_c \times \text{Period} \times SOE$	0.133^{***}	0.064				
	(0.051)	(0.069)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
Industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	496,624	152,173	19,540	21,948	477,084	130,225
R^2	0.257	0.490	0.299	0.290	0.089	0.144

False

Table 1: TFP subsample - TCZ

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	TCZ	NO TCZ	TCZ	NO TCZ	TCZ	NO TCZ
target$_c$ × Period			−0.079*	−0.292	−0.001	0.611***
			(0.045)	(0.441)	(0.008)	(0.121)
target$_c$ × Period × SOE	0.112**	−1.472***				
	(0.045)	(0.414)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
Industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	549,730	99,067	32,078	9,410	517,652	89,657
R^2	0.297	0.458	0.275	0.353	0.095	0.130

False

Table 1: TFP subsample - Herfhindhal

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Concentrated	NO Concentrated	Concentrated	NO Concentrated	Concentrated	NO Concentrated
target$_c$ × Period			−0.214***	−0.013	−0.071***	−0.003
			(0.067)	(0.054)	(0.021)	(0.009)
target$_c$ × Period × SOE	0.057	0.158***				
	(0.063)	(0.053)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
Industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	193,359	455,438	23,054	18,434	170,305	437,004
R^2	0.452	0.254	0.304	0.277	0.118	0.095

False

Table 1: TFP subsample - tcz

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period			0.013	−0.181*	0.034***	0.191***
			(0.051)	(0.104)	(0.009)	(0.054)
target$_c$ × Period × *SOE*	0.062	−0.069				
	(0.056)	(0.113)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
Industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	380,224	261,063	13,935	26,817	366,289	234,246
R^2	0.237	0.451	0.285	0.292	0.092	0.118

False

Table 1: TFP subsample - concentrated

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period			0.104	−0.244***	−0.013	0.294***
			(0.065)	(0.088)	(0.009)	(0.037)
target$_c$ × Period × *SOE*	0.154**	−0.248***				
	(0.062)	(0.090)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
Industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	191,829	449,458	5,130	35,622	186,699	413,836
R^2	0.205	0.377	0.327	0.281	0.091	0.107

False

Table 1: TFP subsample - output

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period			−0.006	−0.174*	0.029***	0.282***
			(0.052)	(0.099)	(0.009)	(0.050)
target$_c$ × Period × *SOE*	0.038	−0.157				
	(0.057)	(0.110)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
Industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	363,345	277,942	12,605	28,147	350,740	249,795
R^2	0.231	0.443	0.291	0.289	0.091	0.116

False

Table 1: TFP subsample - capital

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period			−0.003	−0.154	0.015*	0.123**
			(0.052)	(0.106)	(0.009)	(0.050)
target$_c$ × Period × *SOE*	0.074	−0.031				
	(0.056)	(0.115)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
Industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	437,640	203,647	18,061	22,691	419,579	180,956
R^2	0.247	0.485	0.279	0.304	0.092	0.127

False

Table 1: TFP subsample - employment

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period			0.015	−0.237**	0.031***	0.442***
			(0.056)	(0.095)	(0.010)	(0.051)
target$_c$ × Period × SOE	0.071	−0.290***				
	(0.060)	(0.107)				
City-industry-ownership	Yes	Yes	No	No	No	No
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
Industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	294,091	347,196	9,397	31,355	284,694	315,841
R^2	0.216	0.415	0.294	0.284	0.088	0.116

False

3.1.2 With firm's fixed effect

1. TRUE 2. TRUE 3. TRUE 4. TRUE 5. TRUE 6. TRUE 7. TRUE 8. TRUE 9. TRUE 10. TRUE 11. TRUE 12. TRUE 13. TRUE 14. TRUE 15. TRUE 16. TRUE 17. TRUE 18. TRUE 19. TRUE 20. TRUE 21. TRUE 22. TRUE 23. TRUE 24. TRUE

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Mon Apr 20 21:45:55 2020 finished centering model matrix
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Mon Apr 20 22:30:42 2020 finished centering model matrix
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Table 1: TFP

	Dependent variable TFP $_{fikt}$		
	(1)	(2)	(3)
	Dummy	SOE	PRIVATE
$\text{target}_c \times \text{Period} \times \text{Polluted}_i$	-0.004	0.122^{**}	-0.019
	(0.025)	(0.048)	(0.021)
$\text{target}_c \times \text{Period} \times SOE$	0.063^{**}		
	(0.028)		
$\text{Period} \times \text{Polluted}_i \times SOE$	-0.032		
	(0.029)		
$\text{target}_c \times \text{Period} \times \text{Polluted}_i \times SOE$	0.073		
	(0.059)		
Firm	Yes	Yes	Yes
City-industry-ownership	Yes	No	No
time-ownership	Yes	No	No
City-industry	No	Yes	Yes
City-time	Yes	Yes	Yes
time-industry	No	Yes	Yes
Observations	593,434	37,313	556,121
R^2	0.865	0.946	0.848

False

Table 1: TFP

	Dependent variable TFP $_{fikt}$		
	(1)	(2)	(3)
	Dummy	SOE	PRIVATE
target$_c$ × Period		−0.093***	−0.142***
		(0.022)	(0.010)
target$_c$ × Period × SOE	0.090***		
	(0.025)		
City-time	Yes	No	No
time-ownership	Yes	No	No
City	No	Yes	Yes
Industry	No	Yes	Yes
time	No	Yes	Yes
Observations	593,434	37,313	556,121
R^2	0.865	0.928	0.826

False

Split

1. TRUE 2. TRUE 3. TRUE 4. TRUE 5. TRUE 6. TRUE

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Tue Apr 21 06:03:21 2020 finished centering model matrix

[1] "TFP subsample - Coastal"
Tue Apr 21 07:04:33 2020 finished centering model matrix

[1] "TFP subsample - TCZ"
Tue Apr 21 08:28:04 2020 finished centering model matrix

[1] "TFP subsample - Herfhindhal"
Tue Apr 21 10:08:43 2020 finished centering model matrix

[1] "TFP subsample - tcz"
[1] "TFP subsample - concentrated"
```

```
[1] "TFP subsample - output"
```

```
Tue Apr 21 12:12:31 2020 finished centering model matrix
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```
[1] "TFP subsample - capital"
[1] "TFP subsample - employment"
```

Table 1: TFP subsample - Coastal_c

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Coastal_c	NO Coastal_c	Coastal_c	NO Coastal_c	Coastal_c	NO Coastal_c
$\text{target}_c \times \text{Period} \times \text{Polluted}_i$	0.001	-0.072^{*}	0.158^{**}	0.119	-0.012	-0.087^{**}
	(0.027)	(0.039)	(0.063)	(0.098)	(0.023)	(0.036)
$\text{target}_c \times \text{Period} \times SOE$	0.065^{**}	0.028				
	(0.031)	(0.059)				
$\text{Period} \times \text{Polluted}_i \times SOE$	-0.070^{*}	-0.002				
	(0.041)	(0.036)				
$\text{target}_c \times \text{Period} \times \text{Polluted}_i \times SOE$	0.108^{*}	0.098				
	(0.065)	(0.104)				
Firm	Yes	Yes	Yes	Yes	Yes	Yes
City-industry-ownership	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
time-industry	No	No	Yes	Yes	Yes	Yes
Observations	496,624	152,173	19,540	21,948	477,084	130,225
R^2	0.867	0.903	0.955	0.956	0.857	0.878

False

Table 1: TFP subsample - TCZ

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	TCZ	NO TCZ	TCZ	NO TCZ	TCZ	NO TCZ
target$_c$ × Period × Polluted$_i$	−0.010	−0.555***	0.144***	−0.419	−0.022	−0.421**
	(0.025)	(0.195)	(0.050)	(0.429)	(0.021)	(0.188)
target$_c$ × Period × SOE	0.037	−1.317***				
	(0.028)	(0.327)				
Period ×Polluted$_i$ × SOE	−0.068**	0.019				
	(0.032)	(0.052)				
target$_c$ × Period × Polluted$_i$ × SOE	0.119**	0.528				
	(0.058)	(0.442)				
Firm	Yes	Yes	Yes	Yes	Yes	Yes
City-industry-ownership	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
time-industry	No	No	Yes	Yes	Yes	Yes
Observations	549,730	99,067	32,078	9,410	517,652	89,657
R^2	0.876	0.888	0.953	0.961	0.861	0.869

False

Table 1: TFP subsample - Herfhindhal

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Concentrated	NO Concentrated	Concentrated	NO Concentrated	Concentrated	NO Concentrated
target$_c$ × Period × Polluted$_i$	−0.038	−0.006	0.068	0.159**	−0.035	−0.015
	(0.037)	(0.028)	(0.084)	(0.063)	(0.032)	(0.024)
target$_c$ × Period × SOE	0.034	0.080**				
	(0.060)	(0.033)				
Period ×Polluted$_i$ × SOE	0.008	−0.097**				
	(0.035)	(0.041)				
target$_c$ × Period × Polluted$_i$ × SOE	0.045	0.145**				
	(0.100)	(0.067)				
Firm	Yes	Yes	Yes	Yes	Yes	Yes
City-industry-ownership	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
time-industry	No	No	Yes	Yes	Yes	Yes
Observations	193,359	455,438	23,054	18,434	170,305	437,004
R^2	0.894	0.869	0.957	0.953	0.869	0.859

False

Table 1: TFP subsample - tcz

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
$\text{target}_c \times \text{Period} \times \text{Polluted}_i$	−0.009	−0.158*	0.156***	0.178	−0.017	−0.146*
	(0.024)	(0.088)	(0.056)	(0.137)	(0.021)	(0.082)
$\text{target}_c \times \text{Period} \times SOE$	−0.026	−0.331***				
	(0.035)	(0.101)				
$\text{Period} \times \text{Polluted}_i \times SOE$	−0.101***	0.006				
	(0.038)	(0.036)				
$\text{target}_c \times \text{Period} \times \text{Polluted}_i \times SOE$	0.155**	0.464***				
	(0.061)	(0.165)				
Firm	Yes	Yes	Yes	Yes	Yes	Yes
City-industry-ownership	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
time-industry	No	No	Yes	Yes	Yes	Yes
Observations	380,224	261,063	13,935	26,817	366,289	234,246
R^2	0.886	0.911	0.964	0.964	0.879	0.893

False

Table 1: TFP subsample - concentrated

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
$\text{target}_c \times \text{Period} \times \text{Polluted}_i$	−0.014	0.022	0.047	0.024	−0.009	−0.008
	(0.023)	(0.053)	(0.102)	(0.106)	(0.020)	(0.048)
$\text{target}_c \times \text{Period} \times SOE$	0.014	−0.179**				
	(0.046)	(0.087)				
$\text{Period} \times \text{Polluted}_i \times SOE$	0.018	0.0005				
	(0.095)	(0.037)				
$\text{target}_c \times \text{Period} \times \text{Polluted}_i \times SOE$	0.066	0.031				
	(0.088)	(0.153)				
Firm	Yes	Yes	Yes	Yes	Yes	Yes
City-industry-ownership	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
time-industry	No	No	Yes	Yes	Yes	Yes
Observations	191,829	449,458	5,130	35,622	186,699	413,836
R^2	0.907	0.893	0.979	0.956	0.905	0.876

False

Table 1: TFP subsample - output

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period × Polluted$_i$	−0.007	−0.114	0.168***	0.108	−0.013	−0.124
	(0.024)	(0.086)	(0.058)	(0.126)	(0.020)	(0.076)
target$_c$ × Period × SOE	−0.039	−0.333***				
	(0.036)	(0.098)				
Period ×Polluted$_i$ × SOE	−0.103***	0.0004				
	(0.039)	(0.036)				
target$_c$ × Period × Polluted$_i$ × SOE	0.163***	0.358**				
	(0.062)	(0.168)				
Firm	Yes	Yes	Yes	Yes	Yes	Yes
City-industry-ownership	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
time-industry	No	No	Yes	Yes	Yes	Yes
Observations	363,345	277,942	12,605	28,147	350,740	249,795
R^2	0.888	0.910	0.965	0.963	0.882	0.892

False

Table 1: TFP subsample - capital

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period × Polluted$_i$	−0.009	−0.164*	0.123**	0.130	−0.017	−0.161
	(0.025)	(0.094)	(0.051)	(0.143)	(0.021)	(0.100)
target$_c$ × Period × SOE	−0.0004	−0.272***				
	(0.033)	(0.102)				
Period ×Polluted$_i$ × SOE	−0.070**	0.040				
	(0.034)	(0.036)				
target$_c$ × Period × Polluted$_i$ × SOE	0.107*	0.412**				
	(0.059)	(0.165)				
Firm	Yes	Yes	Yes	Yes	Yes	Yes
City-industry-ownership	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
time-industry	No	No	Yes	Yes	Yes	Yes
Observations	437,640	203,647	18,061	22,691	419,579	180,956
R^2	0.878	0.913	0.958	0.966	0.869	0.894

False

Table 1: TFP subsample - employment

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period × Polluted$_i$	−0.014	−0.097	0.117	0.042	−0.018	−0.109
	(0.025)	(0.078)	(0.071)	(0.116)	(0.020)	(0.069)
target$_c$ × Period × SOE	−0.024	−0.371***				
	(0.043)	(0.097)				
Period ×Polluted$_i$ × SOE	−0.090*	0.012				
	(0.053)	(0.037)				
target$_c$ × Period × Polluted$_i$ × SOE	0.165**	0.245				
	(0.069)	(0.173)				
Firm	Yes	Yes	Yes	Yes	Yes	Yes
City-industry-ownership	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City-industry	No	No	Yes	Yes	Yes	Yes
City-time	Yes	Yes	Yes	Yes	Yes	Yes
time-industry	No	No	Yes	Yes	Yes	Yes
Observations	294,091	347,196	9,397	31,355	284,694	315,841
R^2	0.894	0.902	0.971	0.960	0.890	0.883

False

Without polluted

1. TRUE 2. TRUE 3. TRUE 4. TRUE 5. TRUE 6. TRUE 7. TRUE 8. TRUE 9. TRUE 10. TRUE 11. TRUE 12. TRUE 13. TRUE 14. TRUE 15. TRUE 16. TRUE 17. TRUE 18. TRUE 19. TRUE 20. TRUE 21. TRUE 22. TRUE 23. TRUE 24. TRUE

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Tue Apr 21 13:54:41 2020 finished centering model matrix


[1] "TFP subsample - Coastal"

Tue Apr 21 14:56:49 2020 finished centering model matrix


[1] "TFP subsample - TCZ"
[1] "TFP subsample - Herfhindhal"
[1] "TFP subsample - tcz"
[1] "TFP subsample - concentrated"
[1] "TFP subsample - output"
[1] "TFP subsample - capital"
[1] "TFP subsample - employment"
```

Table 1: TFP subsample - Coastal_c

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Coastal_c	NO Coastal_c	Coastal_c	NO Coastal_c	Coastal_c	NO Coastal_c
$\text{target}_c \times \text{Period}$			-0.056^{**}	-0.143^{***}	-0.115^{***}	-0.211^{***}
			(0.025)	(0.043)	(0.009)	(0.033)
$\text{target}_c \times \text{Period} \times SOE$	0.104^{***}	0.067				
	(0.027)	(0.049)				
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	496,624	152,173	19,540	21,948	477,084	130,225
R^2	0.867	0.903	0.938	0.937	0.839	0.852

False

Table 1: TFP subsample - TCZ

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	TCZ	NO TCZ	TCZ	NO TCZ	TCZ	NO TCZ
$\text{target}_c \times \text{Period}$			-0.080^{***}	-0.451^{**}	-0.113^{***}	0.835^{***}
			(0.024)	(0.196)	(0.009)	(0.144)
$\text{target}_c \times \text{Period} \times SOE$	0.083^{***}	-1.000^{***}				
	(0.025)	(0.265)				
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	549,730	99,067	32,078	9,410	517,652	89,657
R^2	0.876	0.888	0.937	0.940	0.842	0.845

False

Table 1: TFP subsample - Herfhindhal

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Concentrated	NO Concentrated	Concentrated	NO Concentrated	Concentrated	NO Concentrated
target$_c$ × Period			−0.116***	−0.080***	−0.139***	−0.136***
			(0.042)	(0.028)	(0.032)	(0.010)
target$_c$ × Period × SOE	0.051	0.131***				
	(0.047)	(0.029)				
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	193,359	455,438	23,054	18,434	170,305	437,004
R^2	0.894	0.869	0.938	0.937	0.846	0.840

False

Table 1: TFP subsample - tcz

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period			−0.044	−0.210**	−0.065***	0.211***
			(0.028)	(0.090)	(0.009)	(0.079)
target$_c$ × Period × SOE	0.026	−0.086				
	(0.030)	(0.096)				
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	380,224	261,063	13,935	26,817	366,289	234,246
R^2	0.886	0.911	0.950	0.947	0.868	0.872

False

Table 1: TFP subsample - concentrated

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period			−0.028	−0.177**	−0.063***	0.182***
			(0.039)	(0.070)	(0.010)	(0.043)
target$_c$ × Period × SOE	0.038	−0.164**				
	(0.040)	(0.078)				
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	191,829	449,458	5,130	35,622	186,699	413,836
R^2	0.907	0.893	0.964	0.940	0.898	0.856

False

Table 1: TFP subsample - output

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period			−0.053*	−0.204**	−0.061***	0.288***
			(0.029)	(0.083)	(0.009)	(0.071)
target$_c$ × Period × SOE	0.016	−0.148				
	(0.030)	(0.092)				
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	363,345	277,942	12,605	28,147	350,740	249,795
R^2	0.888	0.910	0.952	0.946	0.872	0.870

False

Table 1: TFP subsample - capital

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period			−0.063**	−0.209**	−0.089***	0.009
			(0.026)	(0.092)	(0.009)	(0.062)
target$_c$ × Period × SOE	0.037	−0.053				
	(0.028)	(0.095)				
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	437,640	203,647	18,061	22,691	419,579	180,956
R^2	0.878	0.913	0.944	0.948	0.856	0.872

False

Table 1: TFP subsample - employment

	Dependent variable TFP $_{fikt}$					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
target$_c$ × Period			−0.025	−0.219***	−0.049***	0.361***
			(0.032)	(0.079)	(0.010)	(0.064)
target$_c$ × Period × SOE	0.031	−0.246***				
	(0.035)	(0.090)				
City-time	Yes	Yes	No	No	No	No
time-ownership	Yes	Yes	No	No	No	No
City	No	No	Yes	Yes	Yes	Yes
industry	No	No	Yes	Yes	Yes	Yes
time	No	No	Yes	Yes	Yes	Yes
Observations	294,091	347,196	9,397	31,355	284,694	315,841
R^2	0.894	0.902	0.957	0.943	0.880	0.863

False

4 Create reports

0