

01_TFP_analysis

April 22, 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

Service account storage and Bigquery are now connected.

Service account storage is stored as <google.cloud.storage.client.Client object at 0xa1c2dce10> and accessible with "Storage_account"

Service account Bigquery is stored as <google.cloud.bigquery.client.Client object at 0xa1c2dc510> and accessible with "bigquery_account"

2.1 Load the data

It takes a while to upload the firm data, so we load it locally.

```
/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 useful information.

Profiling will be available soon for this dataset

(641287, 32)

2.1.2 Compute Herfindal: 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_herfindahl_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

Split

1. TRUE 2. 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"
```

Error in get(var): object 'threshold_soe_full' not found

Traceback:

```
1. felm(formula = tfp_OP ~ target_c * Period * polluted_thre * OWNERSHIP_
↪ |
.     FE_c_i_o + FE_t_c + FE_t_i + FE_t_o | 0 | industry, data =
↪ df_to_filter %>%
.     filter(get(var) == filters), exactDOF = TRUE)

2. makematrix(mf, contrasts, pf = parent.frame(), clustervar, wildcard =
↪ wildcard)

3. eval(mfcall)

4. eval(mfcall)

5. evalq(model.frame(formula = tfp_OP ~ target_c + Period +
↪ polluted_thre +
.     OWNERSHIP + FE_c_i_o + FE_t_c + FE_t_i + FE_t_o + industry +
.     target_c:Period + target_c:polluted_thre + Period:polluted_thre +
.     target_c:OWNERSHIP + Period:OWNERSHIP + polluted_thre:OWNERSHIP +
.     target_c:Period:polluted_thre + target_c:Period:OWNERSHIP +
.     target_c:polluted_thre:OWNERSHIP + Period:polluted_thre:OWNERSHIP +
.     target_c:Period:polluted_thre:OWNERSHIP - 1, data = ..pdata.coerce..
↪ (df_to_filter %>%
.     filter(get(var) == filters)), drop.unused.levels = TRUE),
.     <environment>)
```

```

6. evalq(model.frame(formula = tfp_OP ~ target_c + Period +
↳polluted_thre +
. OWNERSHIP + FE_c_i_o + FE_t_c + FE_t_i + FE_t_o + industry +
. target_c:Period + target_c:polluted_thre + Period:polluted_thre +
. target_c:OWNERSHIP + Period:OWNERSHIP + polluted_thre:OWNERSHIP +
. target_c:Period:polluted_thre + target_c:Period:OWNERSHIP +
. target_c:polluted_thre:OWNERSHIP + Period:polluted_thre:OWNERSHIP +
. target_c:Period:polluted_thre:OWNERSHIP - 1, data = ..pdata.coerce..
↳(df_to_filter %>%
. filter(get(var) == filters)), drop.unused.levels = TRUE),
. <environment>)

7. model.frame(formula = tfp_OP ~ target_c + Period + polluted_thre +
. OWNERSHIP + FE_c_i_o + FE_t_c + FE_t_i + FE_t_o + industry +
. target_c:Period + target_c:polluted_thre + Period:polluted_thre +
. target_c:OWNERSHIP + Period:OWNERSHIP + polluted_thre:OWNERSHIP +
. target_c:Period:polluted_thre + target_c:Period:OWNERSHIP +
. target_c:polluted_thre:OWNERSHIP + Period:polluted_thre:OWNERSHIP +
. target_c:Period:polluted_thre:OWNERSHIP - 1, data = ..pdata.coerce..
↳(df_to_filter %>%
. filter(get(var) == filters)), drop.unused.levels = TRUE)

8. model.frame.Formula(formula = tfp_OP ~ target_c + Period +
↳polluted_thre +
. OWNERSHIP + FE_c_i_o + FE_t_c + FE_t_i + FE_t_o + industry +
. target_c:Period + target_c:polluted_thre + Period:polluted_thre +
. target_c:OWNERSHIP + Period:OWNERSHIP + polluted_thre:OWNERSHIP +
. target_c:Period:polluted_thre + target_c:Period:OWNERSHIP +
. target_c:polluted_thre:OWNERSHIP + Period:polluted_thre:OWNERSHIP +
. target_c:Period:polluted_thre:OWNERSHIP - 1, data = ..pdata.coerce..
↳(df_to_filter %>%
. filter(get(var) == filters)), drop.unused.levels = TRUE)

9. model.frame(terms(formula, lhs = lhs, rhs = rhs, data = data,
. dot = dot), data = data, ...)

10. terms(formula, lhs = lhs, rhs = rhs, data = data, dot = dot)

11. terms.Formula(formula, lhs = lhs, rhs = rhs, data = data, dot = dot)

12. terms(form, ...)

13. terms.formula(form, ...)

14. ..pdata.coerce..(df_to_filter %>% filter(get(var) == filters))

15. df_to_filter %>% filter(get(var) == filters)

```

```
16. withVisible(eval(quote(`_fseq`(`_lhs`)), env, env))
17. eval(quote(`_fseq`(`_lhs`)), env, env)
18. eval(quote(`_fseq`(`_lhs`)), env, env)
19. `_fseq`(`_lhs`)
20. freduce(value, `_function_list`)
21. withVisible(function_list[[k]](value))
22. function_list[[k]](value)
23. filter(., get(var) == filters)
24. filter.data.frame(., get(var) == filters)
25. as.data.frame(filter(tbl_df(.data), ..., .preserve = .preserve))
26. filter(tbl_df(.data), ..., .preserve = .preserve)
27. filter.tbl_df(tbl_df(.data), ..., .preserve = .preserve)
28. filter_impl(.data, quo)
29. get(var)
```


Table 1: TFP subsample - Coastal_c

	Dependent variable TFP f_{ikt}					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Coastal _c	NO Coastal _c	Coastal _c	NO Coastal _c	Coastal _c	NO Coastal _c
target _c × Period × Polluted _i	−0.009 (0.024)	−0.033 (0.039)	−0.044 (0.111)	0.121 (0.149)	−0.008 (0.024)	−0.055 (0.039)
target _c × Period × SOE	0.140** (0.066)	0.055 (0.085)				
Period × Polluted _i × SOE	−0.070 (0.058)	−0.058 (0.058)				
target _c × Period × Polluted _i × SOE	−0.041 (0.098)	0.037 (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 f_{ikt}					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	TCZ	NO TCZ	TCZ	NO TCZ	TCZ	NO TCZ
target _c × Period × Polluted _i	−0.012 (0.020)	−0.449** (0.216)	−0.037 (0.082)	0.225 (0.814)	−0.014 (0.020)	−0.416* (0.223)
target _c × Period × SOE	0.116** (0.058)	−1.778*** (0.523)				
Period × Polluted _i × SOE	−0.063 (0.049)	−0.042 (0.105)				
target _c × Period × Polluted _i × SOE	−0.024 (0.086)	0.498 (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 - Herfindhal

	Dependent variable TFP f_{ikt}					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Concentrated	NO Concentrated	Concentrated	NO Concentrated	Concentrated	NO Concentrated
$target_c \times Period \times Polluted_i$	-0.031 (0.037)	-0.011 (0.025)	0.054 (0.135)	-0.050 (0.105)	-0.045 (0.036)	-0.012 (0.025)
$target_c \times Period \times SOE$	0.045 (0.085)	0.173** (0.069)				
$Period \times Polluted_i \times SOE$	-0.063 (0.047)	-0.048 (0.068)				
$target_c \times Period \times Polluted_i \times SOE$	0.053 (0.129)	-0.065 (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 f_{ikt}					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
$target_c \times Period \times Polluted_i$	-0.014 (0.025)	-0.151* (0.077)	0.029 (0.119)	0.054 (0.231)	-0.017 (0.024)	-0.185** (0.079)
$target_c \times Period \times SOE$	0.081 (0.076)	-0.239 (0.195)				
$Period \times Polluted_i \times SOE$	-0.016 (0.063)	-0.057 (0.060)				
$target_c \times Period \times Polluted_i \times SOE$	-0.095 (0.100)	0.280 (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 f_{ikt}					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
$\text{target}_c \times \text{Period} \times \text{Polluted}_i$	-0.030 (0.021)	-0.094* (0.050)	-0.098 (0.155)	-0.045 (0.173)	-0.029 (0.021)	-0.106** (0.049)
$\text{target}_c \times \text{Period} \times \text{SOE}$	0.185** (0.077)	-0.309** (0.123)				
$\text{Period} \times \text{Polluted}_i \times \text{SOE}$	0.057 (0.109)	-0.079 (0.054)				
$\text{target}_c \times \text{Period} \times \text{Polluted}_i \times \text{SOE}$	-0.112 (0.130)	0.102 (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 f_{ikt}					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Right	Left	Right	Left	Right	Left
$\text{target}_c \times \text{Period} \times \text{Polluted}_i$	-0.012 (0.024)	-0.131* (0.072)	0.031 (0.130)	0.040 (0.220)	-0.016 (0.024)	-0.157** (0.073)
$\text{target}_c \times \text{Period} \times \text{SOE}$	0.060 (0.077)	-0.304* (0.174)				
$\text{Period} \times \text{Polluted}_i \times \text{SOE}$	-0.007 (0.069)	-0.067 (0.059)				
$\text{target}_c \times \text{Period} \times \text{Polluted}_i \times \text{SOE}$	-0.093 (0.104)	0.260 (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
$\text{target}_c \times \text{Period} \times \text{Polluted}_i$	-0.011 (0.023)	-0.142 (0.093)	-0.048 (0.109)	-0.015 (0.231)	-0.012 (0.022)	-0.186* (0.097)
$\text{target}_c \times \text{Period} \times \text{SOE}$	0.097 (0.076)	-0.167 (0.204)				
$\text{Period} \times \text{Polluted}_i \times \text{SOE}$	-0.017 (0.058)	-0.026 (0.060)				
$\text{target}_c \times \text{Period} \times \text{Polluted}_i \times \text{SOE}$	-0.089 (0.101)	0.226 (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
$\text{target}_c \times \text{Period} \times \text{Polluted}_i$	-0.024 (0.024)	-0.124* (0.068)	-0.049 (0.126)	-0.076 (0.196)	-0.025 (0.024)	-0.137** (0.066)
$\text{target}_c \times \text{Period} \times \text{SOE}$	0.103 (0.082)	-0.372** (0.160)				
$\text{Period} \times \text{Polluted}_i \times \text{SOE}$	0.043 (0.084)	-0.067 (0.052)				
$\text{target}_c \times \text{Period} \times \text{Polluted}_i \times \text{SOE}$	-0.129 (0.116)	0.140 (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

- [1] "TFP subsample - employment decile 5"
[1] "TFP subsample - employment decile 6"
[1] "TFP subsample - employment decile 7"
[1] "TFP subsample - employment decile 8"

Table 1: TFP subsample - employment decile 5

	Dependent variable TFP _{firm}					
	Dummy		SOE		PRIVATE	
	(1) Concentrated	(2) NO Concentrated	(3) Concentrated	(4) NO Concentrated	(5) Concentrated	(6) NO Concentrated
target _c × Period × Polluted _i	-0.013 (0.026)	-0.027 (0.039)	-0.013 (0.103)	0.028 (0.130)	-0.013 (0.025)	-0.040 (0.037)
target _c × Period × SOE	0.179** (0.076)	0.062 (0.086)				
Period × Polluted _i × SOE	-0.119* (0.071)	-0.043 (0.052)				
target _c × Period × Polluted _i × SOE	-0.005 (0.104)	0.044 (0.134)				
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	390,052	258,745	14,648	26,840	375,404	231,905
R ²	0.247	0.423	0.651	0.685	0.195	0.298

False

Table 1: TFP subsample - employment decile 6

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

False

Table 1: TFP subsample - employment decile 7

	Dependent variable TFP f_{ikt}					
	Dummy		SOE		PRIVATE	
	(1) Concentrated	(2) NO Concentrated	(3) Concentrated	(4) NO Concentrated	(5) Concentrated	(6) NO Concentrated
$\text{target}_c \times \text{Period} \times \text{Polluted}_i$	-0.012 (0.023)	-0.072 (0.071)	-0.006 (0.101)	-0.163 (0.213)	-0.012 (0.023)	-0.098 (0.068)
$\text{target}_c \times \text{Period} \times \text{SOE}$	0.137** (0.067)	-0.180 (0.189)				
$\text{Period} \times \text{Polluted}_i \times \text{SOE}$	-0.060 (0.063)	-0.044 (0.057)				
$\text{target}_c \times \text{Period} \times \text{Polluted}_i \times \text{SOE}$	-0.023 (0.101)	0.077 (0.237)				
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	530,162	118,635	25,976	15,512	504,186	103,123
R ²	0.277	0.507	0.625	0.759	0.205	0.374

False

Table 1: TFP subsample - employment decile 8

	Dependent variable TFP f_{ikt}					
	Dummy		SOE		PRIVATE	
	(1) Concentrated	(2) NO Concentrated	(3) Concentrated	(4) NO Concentrated	(5) Concentrated	(6) NO Concentrated
$\text{target}_c \times \text{Period} \times \text{Polluted}_i$	-0.008 (0.023)	-0.165** (0.071)	0.004 (0.093)	-0.163 (0.223)	-0.009 (0.022)	-0.200*** (0.066)
$\text{target}_c \times \text{Period} \times \text{SOE}$	0.151** (0.063)	-0.270 (0.210)				
$\text{Period} \times \text{Polluted}_i \times \text{SOE}$	-0.040 (0.049)	-0.109 (0.086)				
$\text{target}_c \times \text{Period} \times \text{Polluted}_i \times \text{SOE}$	-0.051 (0.094)	0.237 (0.265)				
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	584,066	64,731	31,820	9,668	552,246	55,063
R ²	0.297	0.543	0.641	0.778	0.219	0.393

False

Without polluted

3.1.2 With firm's fixed effect

Split

1. TRUE 2. TRUE 3. TRUE 4. TRUE 5. TRUE 6. TRUE 7. TRUE 8. TRUE 9. TRUE 10. TRUE
11. TRUE 12. TRUE

[1] "TFP subsample - employment decile 5"

[1] "TFP subsample - employment decile 6"

Tue Apr 21 23:57:32 2020 finished centering model matrix

Wed Apr 22 00:49:24 2020 finished centering model matrix

[1] "TFP subsample - employment decile 7"

Wed Apr 22 01:41:09 2020 finished centering model matrix

[1] "TFP subsample - employment decile 8"

Table 1: TFP subsample - employment decile 5

	Dependent variable TFP _{firm}					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Concentrated	NO Concentrated	Concentrated	NO Concentrated	Concentrated	NO Concentrated
target _c × Period × Polluted _i	0.005 (0.029)	−0.050 (0.037)	0.164*** (0.062)	0.085 (0.084)	−0.007 (0.026)	−0.040 (0.031)
target _c × Period × SOE	0.124*** (0.033)	0.045 (0.062)				
Period × Polluted _i × SOE	−0.094** (0.042)	−0.019 (0.036)				
target _c × Period × Polluted _i × SOE	0.144** (0.063)	0.056 (0.101)				
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	390,052	258,745	14,648	26,840	375,404	231,905
R ²	0.868	0.889	0.957	0.954	0.860	0.865

False

Table 1: TFP subsample - employment decile 6

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

False

Table 1: TFP subsample - employment decile 7

	Dependent variable TFP f_{ikt}					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Concentrated	NO Concentrated	Concentrated	NO Concentrated	Concentrated	NO Concentrated
$target_c \times Period \times Polluted_i$	-0.012 (0.026)	0.042 (0.079)	0.114** (0.054)	0.009 (0.115)	-0.021 (0.022)	0.024 (0.074)
$target_c \times Period \times SOE$	0.080*** (0.030)	-0.190* (0.108)				
$Period \times Polluted_i \times SOE$	-0.067** (0.033)	0.007 (0.045)				
$target_c \times Period \times Polluted_i \times SOE$	0.109* (0.062)	0.109 (0.175)				
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	530,162	118,635	25,976	15,512	504,186	103,123
R ²	0.872	0.895	0.953	0.959	0.860	0.870

False

Table 1: TFP subsample - employment decile 8

	Dependent variable TFP f_{ikt}					
	Dummy		SOE		PRIVATE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Concentrated	NO Concentrated	Concentrated	NO Concentrated	Concentrated	NO Concentrated
$target_c \times Period \times Polluted_i$	-0.006 (0.026)	-0.011 (0.089)	0.123** (0.052)	0.085 (0.125)	-0.019 (0.022)	-0.038 (0.084)
$target_c \times Period \times SOE$	0.093*** (0.028)	-0.264** (0.115)				
$Period \times Polluted_i \times SOE$	-0.028 (0.029)	-0.066 (0.058)				
$target_c \times Period \times Polluted_i \times SOE$	0.064 (0.059)	0.247 (0.195)				
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	584,066	64,731	31,820	9,668	552,246	55,063
R ²	0.875	0.897	0.953	0.961	0.861	0.872

False

Without polluted

4 Create reports