6. PLACE-BASED POLICY AND FIRM FINANCIAL PERFORMANCE: EVIDENCE FROM CHINA'S SEZS EXPANSION PROGRAM[1]

Jun CHEN[2,3*]
Junjie PAN[2]
Yunfei ZENG[2]

Abstract

Using China's firm-level dataset and matched difference-in-differences approach, this paper evaluates the impacts of special economic zones (SEZs) expansion program on firm financial performance. The results show that: first, the program leads to a loss of firm financial performance in the expansion areas, in which the return on sales (ROS), return on assets (ROA) and return on equity (ROE) all decreased significantly; second, the loss of firm financial performance is caused by the rising production costs and operation expenses; third, the program has the characteristics of eliminating excessive production capacity and raising minimum wage standard, which makes the firms of overcapacity industries and labor-intensive industry suffer more profit losses.

Keyword: place-based policy, financial performance, special economic zones, China

JEL Classification: R11, D24, O12

1. Introduction

China's special economic zones (SEZs) program was implemented at the beginning of reform and opening up policy, aiming to attract foreign investments by tax credits and subsidies. In 1980, part of Shenzhen city, part of Zhuhai city and part of Xiamen city were selected as SEZs, and part of Shantou city was selected as SEZ in 1981. After 30 years, the economic gap between inside and outside the SEZs is huge and growing. On July 1st, 2010, the State Council announced that the scope of Shenzhen and Xiamen SEZs were expanded to whole city. The State Council also announced that the scope of Zhuhai and Shantou SEZs were expanded to whole city on October 1st, 2010 and May 1st, 2011, respectively. The purposes of SEZs in the expansion period are different from in the initial period. The SEZs expansion program is aimed at reducing the inequality between the inside and the outside SEZs in terms of economic development, infrastructure, laws and regulations.

The SEZs expansion program is a kind of place-based policy implemented within city, which is different from other well-known place-based policy (Neumark and Simpson, 2014; Olfert *et al*.,

[1] *The work was supported by China National Office for Philosophy and Social Sciences (21CJY007).*

[2] *School of Economics, Guangdong University of Finance & Economics, Guangzhou 510320, China.*

[3] *The Key Lab of Coevolution between Ecological Environment Resources and Economic Society System, Guangdong University of Finance & Economics, Guangzhou 510320, China.*

[*] *Coresponding author. E-mail: tcj@gdufe.edu.cn*

2014). Many studies showed that place-based policy may have shocks on labor market (e.g., job creation, employment rate, and wage) (Busso, Gregory and Kline, 2013; Kline and Moretti, 2014; Briant, Lafourcade and Schmutz, 2015; Reynolds and Rohlin, 2015; Austin, Glaeser and Summers, 2018; Charnoz, 2018; Criscuolo *et al.*, 2019; Faggio, 2019; Rupasingha *et al*., 2023; Ciani, Grompone and Olivieri, 2024), housing market (e.g., housing price, and land rents), production activities (e.g., total output, investment, and productivity) (Zheng et al., 2017; Shenoy, 2018; Chen et al., 2019; Koster et al., 2019; Lu, Wang and Zhu, 2019; Kim, 2023), local economic development (e.g., GDP, investment, and total factor productivity) (Wang, 2013; Alder, Shao and Zilibotti, 2016; Liu and Ma, 2019; Vasilakos et al., 2023), and regional poverty (Danquah, Moral-Benito and Ouattara, 2014; Neumark and Young, 2019). Besides, some studies also showed that place-based policies had causal effect on firm's export behavior (Davies and Mazhikeyev, 2019), life and business environment quality (Reynolds and Rohlin, 2014), financing for innovation and entrepreneurship (Tian and Xu, 2022), and fertility and health (Grossman, 2019). However, to our best knowledge, no existing literature has evaluated the policy impacts of the China's SEZs expansion program. Moreover, the outcomes with regarded to firm financial performance of place-based policy are also rarely discussed in the extant literature.

This paper investigates the impacts of China's SEZs expansion program on firm financial performance. To be specific, we construct a matched firm-level panel data to estimate the causal effect of the SEZs expansion program on firm financial performance. We take the expansion program as a quasi-experiment, where the firms in SEZs expansion areas are selected as the treated group and the firms in other cities are selected as the control group. In order to eliminate the systematic differences between the control group and the treated group, the propensity score matching (PSM) method are adopted. In the matched panel data, the firms that existed in both 2008 and 2009 and still existed at least once during 2011 to 2013 are obtained, but the firms that transferred to other cities and newly entered after 2010 are not included in our data.

This paper finds that the expansion program does increase the production and operation costs of firms in the expansion areas, where the return on sale (ROS), return on assets (ROA) and return on equity (ROE) are decreased by 0.794 percentage, 4.678 percentage, and 12.63 percentage, respectively. Besides, the policy impacts are greater in the overcapacity industries and labor-intensive industries. Although the purpose of expansion program is to improve the economic equality between the outside and the inside SEZs in each city, the findings suggest that the expansion program cause a loss of firm performance in a short term. Meanwhile, the expansion program makes the overcapacity industries and the labor-intensive industries suffer more as a result of some specific policy designs.

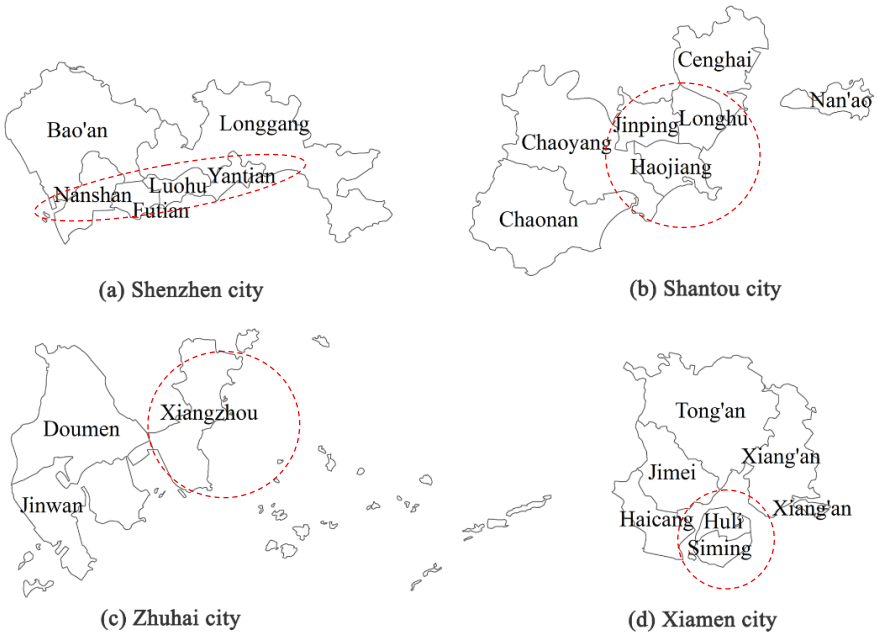
The contribution is twofold. First, most of studies using China as a case study focused on the policy impacts of SEZs program and NPCs program (Zheng et al., 2017; Chen et al., 2019; Lu, Wang and Zhu, 2019; Chen, He and Liu, 2020; Tian and Xu, 2022), but this paper pays attentions to the impacts of the expansion program in the four traditional SEZs on firm financial performance, which is different from the extant literature in terms of program types and outcome types. Second, we confirm that the SEZs expansion program leads to a loss of firm financial performance through a rigorous quasi-experimental design, especially for the firms in overcapacity industries and labor-intensive industry. We determine that these findings may provide some relevant policy implications for developing countries.

The rest of this paper is organized as follows. Section 2 is to introduce the backgrounds of the SEZs expansion program. Section 3 will introduce the identification strategy, data and variables; Section 4 will report the empirical results; Section 5 will be concluding remarks.

2. Policy Backgrounds

In the early 1980s, the central government of China established four SEZs in the southeast coast: Shenzhen, Zhuhai, Xiamen and Shantou. Shenzhen, Zhuhai and Shantou are located in Guangdong Province, and Xiamen is located in Fujian Province. The four traditional SEZs played the role of "experimental field" of reform and opening up policy. In the inside SEZs, special economic policies and independent legislation system are available to attract foreign investments, including the investments from Hong Kong, Macau and Taiwan. Shenzhen's SEZ, bordering Hong Kong, has a total area of about 417.16 square kilometers, including four districts: Nanshan, Futian, Luohu and Yantian. Zhuhai's SEZ, bordering Macau, has a total area of about 546.27 square kilometers, including Xiangzhou, Gongbei, Wanzai and Hengqin. Xiamen's SEZ, bordering Taiwan, has a total area of about 141.09 square kilometers, including two districts: Siming and Huli. Shantou is famous for "hometown of overseas Chinese" and "the 100-year-old commercial port". Shantou's SEZ has a total area of about 434.33 square kilometers, including three districts: Longhu, Jinping and Haojiang. The locations of four traditional SEZs are illustrated by Figure 1.

Figure 1. The location of the four traditional SEZs in China



Source: own contribution in ArcGIS 10.2.1

The reason for the huge economic gap between the inside SEZs and the outside SEZs is that different economic policies have been implemented for a long time. As showed in Table 1, the level of economic development in the inside SEZs is obviously higher than the outside SEZs. For example, the GDP per capita in the inside SEZs is much higher than the outside SEZs, especially in Shenzhen's SEZ and Shantou's SEZ. However, the land supply in the inside SEZs is very limited, which is much lower than the outside SEZs. Meanwhile, as the central government gives

the SEZs the legislative privilege, for example, the experimental regulations and policies, which directly leads to two sets of different provisions inside and outside the SEZs, such as law enforcement and administrative management, minimum wage standards, social insurance, and mortgage loans [4]. With the approval of the State Council, the four traditional SEZs were expanded during 2010 to 2011. This expansion program was conducive to solving the problems such as regional disparity between the inside and outside SEZs, shortage of land supply in the inside SEZs, different policies and regulations in one city.

Table1. The development of the inside and the outside SEZs in 2010

	Land area (square kilometer)	GDP (hundred million yuan)	Residential population (ten thousand people)	GDP per capital (yuan)
The inside SEZs:				
Shenzhen	417.16	5167.92	354.26	145879
Zhuhai	546.27	663.90	86.80	76487
Shantou	434.33	460.12	143.32	32104
Xiamen	141.09	1122.74	186.13	60320
The outside SEZs:				
Shenzhen	1574.48	4413.59	682.94	64626
Zhuhai	1164.97	374.76	62.32	60135
Shantou	1764.71	672.11	380.79	17650
Xiamen	1432.07	937.34	167.00	56128

Note: The data comes from each city's statistical yearbook in 2011.
Source: author calculation.

The purpose of SEZs expansion program is clear, that is to achieve integrated development between the inside and outside SEZs. Take Shenzhen as an example, the government issued two related acts: the *Three-Year Implementation Plan for the Integration of Shenzhen Special Economic Zone during the Period 2010-2012* and the *Three-Year Implementation Plan for the Integration of Shenzhen Special Economic Zone during the Period 2013-2015*. The contents of the two acts are mainly to achieve six integrations, including the integration of regulations and policies, the integration of plannings, the integration of infrastructures, the integration of administrative management, the integration of environmental protection, and the integration of public basic services.

The integration of regulations and policies includes: clearing up and revising the suspended regulations and unifying public policies in the whole city. For example, unifying minimum wage standards between the inside and outside SEZ.

The integration of plannings includes: optimizing industry structure and layouts and accelerating urban renewal and upgrading. It is clearly stated that the city needs to eliminate backward and polluted industries, support the development of high-tech industries, modern services and cultural

[1] *See the news report "The expansion program of Shenzhen's SEZ successfully solved the problem of 'one city and two laws'", accessing from http://www.chinanews.com/gn /news/2010/06-02/2319447.shtml.*

industries, upgrade the old industrial zones and living areas, and improve the urban environment of the outside SEZ.

The integration of infrastructures includes: improving the construction of transportation networks and promoting the level of water, electricity, gas, sanitation and other infrastructures.

The integration of administrative management includes: allocating financial resources and security manning quotas to the outside SEZ; unifying the price of water supply in the city; and dividing up large sub-district offices in the outside SEZ.

The integration of environmental protection includes: deploying the pollutant emission reduction key projects to the outside SEZ; promoting cleaner production in polluting firms; banning heavily polluted boilers and yellow-labeled vehicles.

The integration of public basic services includes: expanding the size of public school, increasing the expenditure on education, and organizing high quality schools to provide one-to-one assistance to 101 primary and secondary schools in the outside SEZs.

Different from providing subsidies and tax credits for the targeted areas, the core objective of China's SEZs expansion program is to improve the comprehensive development of infrastructures, industries and urban governance in the outside SEZs. The major effects of the SEZs expansion program on firm financial performance may be as follows: first, upgrading the transportation, housing, industrial parks and other infrastructures, which will increase the wage, land rent and other factor prices in the expansion area, thus increase the costs of production and operation and reduce the profit of the firms; second, eliminating backward and polluted industries and supporting the development of high-tech and other high-end industries, which will make the government incentives incline to high-end industries, thus make the firms of low-end industries suffer more losses; third, raising the minimum wage standards in the expansion area, which will lead to a direct increase in labor costs for firms in the outside SEZs, especially for labor-intensive firms, the rise of labor costs will have a relatively greater impact on the financial performance.

3. Research Design

3.1. Identification strategy

The China's SEZs expansion program provides an ideal experiment for studying place-based policy. The outside SEZ in each city was intervened by the expansion program, thus the firms in the outside SEZs can be considered as the treated group. Due to the expansion program might affect the inside SEZs, the firms in the inside SEZs are not suitable as the control group. However, the firms in other cities are not affected by the expansion program, thus these firms can serve as the control group.

To estimate the effect of the expansion program on firm financial performance, the Difference-in-Differences (DID) approach are employed. The model is as shown by Eq. (1).

$$P_{it} = \alpha + \gamma \left(D_i \times Post_t \right) + Z_{it}'\beta + \lambda_i + \mu_t + \varepsilon_{it} \quad (1)$$

where P_{it} represents firm i's financial performance in year t; D_i represents the dummy variable of policy intervention, which equals to 1 if the firm in the expansion area otherwise 0; $Post_t$ represents the period dummy variable, which equals to 1 if the year larger than 2010 otherwise 0; $\mathbf{Z}$ represents the vector of control variables; λ_i represents firm-level fixed effects; and μ_t represents year fixed effects; ε_{it} is the random error term; α is the coefficient of

constant term; and γ is the coefficient to be estimated. If the coefficient γ is statistically significant and positive, indicating the expansion program has a positive effect on firm financial performance; reversely, if the coefficient is statistically significant and negative, indicating the expansion program leads to a loss of firm financial performance.

The consistent estimation of the policy impacts (γ) depends on whether Eq. (1) satisfies the conditional independent assumption. To satisfy the condition as much as possible, we adopted propensity score matching (PSM) approach to select matched control group from other cities with similar characteristics to firms in the expansion area, which can greatly reduce the systematical differences between the control group and the treated group. To be specific, we take 2009 as the base year to conduct logistic regression. The dependent variable is binary variables, which equals 1 if the firm in the expansion areas and 0 if in other cities. The independent variables are firm-level characteristics, including firm size ($\ln Size$), firm age ($\ln Age$), share of current assets ($Quick$), debt to asset ratio ($Debt$), cost to sales ratio ($Cost$), return on sales (ROS), return on assets (ROA), return on equity (ROE), labor productivity ($\ln PL$), and assets turnover ratio ($Turnover$). According to the predicted propensity scores, the 1:2 nearest neighbor matching method is used and these successfully matched firms act as the control group. For robustness check, the 1:1 nearest neighbor matching, kernel matching and radius matching methods are also considered.

The policy impacts of expansion program may have to do with the length of time. Thus, an event study approach is used to estimate the dynamic effects of expansion program, which is as shown by Eq. (2).

$$P_{it} = \alpha + \sum \gamma_k \left(D_i \times Post_t^k \right) + \mathbf{Z}_{it}'\boldsymbol{\beta} + \lambda_i + \mu_t + \varepsilon_{it} \quad (2)$$

where $Post_t^k$ represents the dummy variables of the k th year after the expansion program, γ_k is the policy impact in the k th year. If γ_k increase with time, indicating the effect of expansion program on firm financial performance is increasing every year; reversely, if γ_k decrease with time, indicating the effect is decreasing every year.

3.2 Data description

The data used in this paper comes from the annual surveys for the period 2008-2013 by China's National Bureau of Statistics, which includes information for all industrial firms with sales above 20 million RMB. We excluded the data in 2010 for the serious problems with authenticity. Table 2 reports the number of firms in each year before and after matching. After conducting the PSM procedure, the number of firms in the control group in each year is 8159, and the number of firms in the treated group in each year is 4520 or less.

Table 2. The number of firms in each year before and after matching

	2008	2009	2011	2012	2013
Before matching:					
Number of firms in the expansion areas	10215	10271	6575	7076	7812
Number of firms in other cities	397032	410767	293022	301237	333946

After matching:					
Number of firms in the expansion areas	4520	4520	4328	4077	3717
Number of firms in other cities	8159	8159	8159	8159	8159

Source: author calculation.

The overcapacity industries are defined by two documents: Several Opinions on Suppressing Overcapacity and Duplicate Constructions in Some Industries to Guide the Healthy Development of Industries, which was issued by the State Council in 2009; Shenzhen's Action Plan for Eliminating Backward Production Capacity in 2019, which was issued by the government of Shenzhen city. The first document listed the six traditional industries as overcapacity industries, including steel, cement, flat glass, coal chemical industry, polycrystalline silicon and wind power equipment. The second document listed twelve industries as overcapacity industries, including steel, cement, electrolytic aluminum, flat glass, papermaking, printing and dyeing, leather-making, lead-acid battery, copper smelting, lead smelting, small thermal power, and ceramics. Accordingly, 15 industries mentioned above are defined overcapacity industries in this paper. We manually divide these overcapacity industries into the four-digit industries according to China's Industrial Classification, which are shown in Table 3.

Table 3. The definition of overcapacity industries

Name of industries	Four-digit industry code
Steel	0890, 3210, 3220, 3230, 3240
Cement	1101, 3591, 3111, 3121, 3122, 3123, 3124, 3129
Flat glass	3141
Coal chemical industry	0610, 0620, 0690, 2520, 4230
Polycrystalline silicon	2665
Wind power equipment	4723, 3148, 3911
Electrolytic aluminum	0916, 3316, 3351
Papermaking	2210, 2221, 2222, 2223, 2231, 2239
Printing and dyeing	1712, 1743
Ceramics	1019, 3132, 3151, 3152, 3153, 3159, 3169
Lead-acid battery	3490
Copper smelting	0911, 3311
Lead smelting	0912, 3312
Small thermal Power	4411
Leather-making	1910, 1921, 1922, 1923, 1924, 1929

Source: author calculation.

3.3 Descriptive analyses

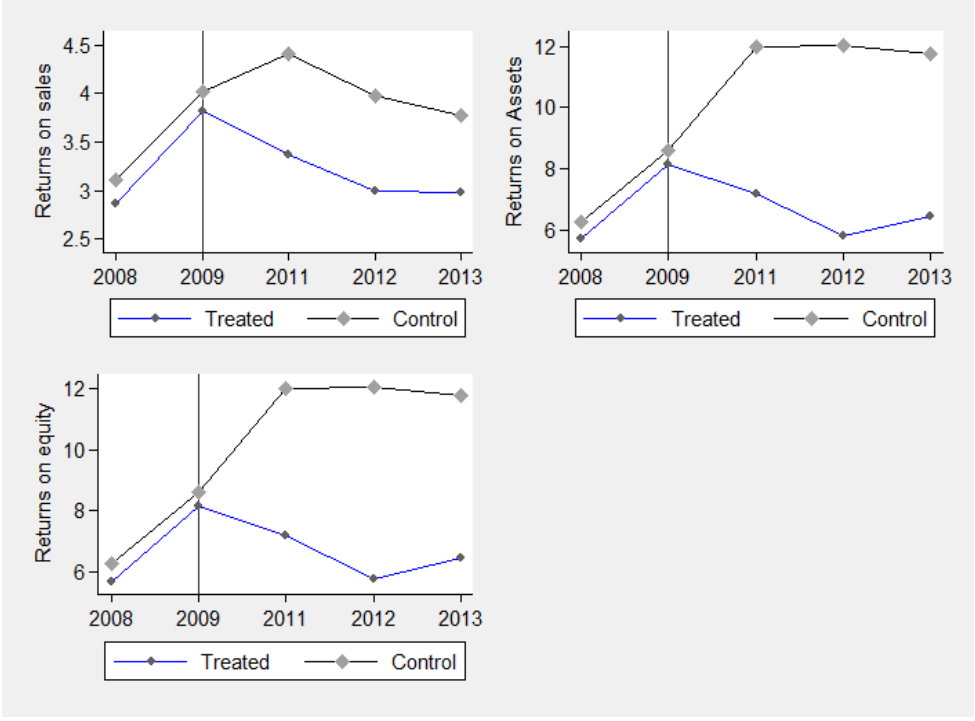
Table 4 reports the mean value for each firm-level characteristics before the implementation of the SEZs expansion program. The results show that the differences between the control group and the treated group basically disappeared after matching, and t-statistics show that the differences are not statistically significant.

Table 4. The pre-differences between the control and treated groups

	2009				2008			
	Treated group	Control group	Std. Dev.	t-value	Treated group	Control group	Std. Dev.	t-value
lnAge	2.15	2.16	-0.004	-0.28	2.00	1.99	0.011	0.72
lnSize	5.35	5.36	-0.006	-0.25	5.31	5.31	0.002	0.09
Quick	0.45	0.45	0.001	0.30	0.41	0.41	0.001	0.22
Debt	419.83	426.39	-6.56	-0.37	363.90	359.03	4.870	0.34
Cost	86.40	86.23	0.166	0.80	86.42	86.21	0.207	0.92
ROS	3.80	3.91	-0.118	-0.80	2.84	2.96	-0.119	-0.82
ROA	8.13	8.29	-0.163	-0.53	5.66	5.91	-0.257	-1.06
ROE	19.72	20.77	-1.051	-1.01	14.60	15.38	-0.777	-0.83
lnPL	5.56	5.55	0.015	0.86	5.52	5.50	0.017	0.95
Turnover	0.39	0.38	0.008	0.46	0.43	0.42	0.004	0.27

Source: author calculation.

Figure 2. Firm financial performance before and after the expansion program



Source: own contribution in Stata 15.

Figure 2 shows the changes in return on sales, return on assets, and return on equity before and after the expansion program. Before the implementation of the expansion program, the mean value of ROS, ROA and ROE in the treated group and the control group are very similar, but the mean value in the treated group are significantly lower than the matching control group after the expansion program. These imply that the expansion program may have a reduction effect on firm financial performance.

4. Empirical Analyses

4.1 Baseline regression

Table 5 reports the regression result of changes in firm financial performance on SEZs expansion program by using PSM-DID approach. After controlling firm size, firm age, year fixed effects and firm fixed effects, the treatment effect of the expansion program on ROS, ROA and ROE is -0.794, -4.678 and -12.63, respectively. All of them are statistically significant at 1% level, indicating that the expansion program leads to a loss of firm financial performance. From the dynamic perspective, the reduction effect of the expansion program on firm financial performance still exists after three years.

Table 5. Baseline regression results

	(1) ROS	(2) ROA	(3) ROE
Panel A: Average treatment effect			
D×Post	-0.794***	-4.678***	-12.63***
	(-7.052)	(-18.90)	(-16.13)
Panel B: Dynamics of the treatment effect			
$D\times Post^1$	-0.758***	-3.965***	-11.18***
	(-6.263)	(-15.08)	(-12.28)
$D\times Post^2$	-0.817***	-5.379***	-13.38***
	(-6.330)	(-18.50)	(-13.98)
$D\times Post^3$	-0.809***	-4.690***	-13.36***
	(-5.951)	(-15.21)	(-13.39)
Control variables	Yes	Yes	Yes
Year Fes	Yes	Yes	Yes
Firm Fes	Yes	Yes	Yes
Observations	61476	61474	61328

*Notes: robust clustered t value in parentheses; *, ** and *** indicate significance at 10%, 5% and 1%, respectively.*
Source: author calculation.

The loss of firm profits is mainly caused by rising costs of production and operation. As we have mentioned in Section 3, the SEZs expansion program probably leads to the increase of labor wages, land rent and other factor prices in the expansion areas, which will increase the production costs and operating expenses of firms. Table 6 reports the regression results of changes in firm costs on SEZs expansion program. The results show that the expansion program significantly

increases the production costs and operation expenses by about 0.358 and 0.557, respectively. When further decomposing the ratio of expenses to sales, the expansion program increases the management expense ratio, selling expense ratio and financial expense ratio by about 0.286, 0.194 and 0.099, respectively.

Table 6. The cost effect of the expansion program

	(1) Ratio of costs to sales	(2) Ratio of operation expenses to sales	(3) Management expense ratio	(4) Selling expense ratio	(5) Financing expense rate
D×Post	0.358**	0.557***	0.286***	0.194***	0.099***
	(2.523)	(5.515)	(4.005)	(4.532)	(3.605)
Control variables	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes
Observations	61511	60177	61419	60423	61189

*Notes: robust clustered t-value in parentheses; *, ** and *** indicate significance at 10%, 5% and 1%, respectively.*
Source: author calculation.

On the other hand, the SEZs expansion program include eliminating overcapacity industries and raising the minimum wage standard as well. For the overcapacity industries, the expansion program is possible to make these firms suffer more losses by regulations. As shown in Table 7, columns (1)-(6) show that the effect size of the expansion program on firm financial performance in the overcapacity industries is larger than that in the non-overcapacity industries. For the labor-intensive industries, raising the minimum wage standard significantly increase the wage cost of labor-intensive firms, which will make these firms suffer more losses in profit. As shown in columns (7)-(12), the effect size of the expansion program on firm financial performance in labor-intensive industry is greater than that in capital-intensive industry.

Table 7. The effect size in different groups of industry

	Overcapacity industries			Non-overcapacity industries		
	(1) ROS	(2) ROA	(3) ROE	(4) ROS	(5) ROA	(6) ROE
D×Post	-1.193***	-5.307***	-13.63***	-0.756***	-4.599***	-12.49***
	(-3.701)	(-7.801)	(-6.597)	(-6.534)	(-18.15)	(-15.54)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	42421	42421	42315	59804	59802	59659

Continued

	Labor-intensive industry			Capital-intensive industry		
	(7) ROS	(8) ROA	(9) ROE	(10) ROS	(11) ROA	(12) ROE
D×Post	-0.861***	-4.769***	-16.03***	-0.654***	-4.458***	-10.10***
	(-6.409)	(-14.09)	(-13.21)	(-3.982)	(-14.52)	(-11.69)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	51109	51107	50969	51116	51116	51005

*Notes: robust clustered t-value in parentheses; *, ** and *** indicate significance at 10%, 5% and 1%, respectively.*
Source: author calculation.

Based on the above analyses, the SEZs expansion program increases the production costs and operating expenses of firms, and makes the overcapacity industries and labor-intensive industry suffer more profit losses due to stricter regulations and higher minimum wage standard in the expansion areas. This is why the expansion program leads to the loss of firm financial performance.

4.2 Robustness check

Considering the estimation of policy impact may be affected by the matching method, we check the robustness by taking such alternative methods as the 1:1 nearest neighbor matching, kernel matching, and radius matching. The results are shown in Table 8. We can see that the estimations by adopting the 1:1 nearest neighbor matching and the kernel matching are very close to the baseline regression, and the estimations by adopting the radius matching are slightly lower, but the coefficients are still statistically significant at 1% level. Hence, it can be concluded that no matter what matching methods are used, the estimations always support the basic findings that the expansion program leads to the loss of firm financial performance in the expansion areas.

Table 8. Robustness check results

	1:1 nearest neighbor matching			kernel matching			radius matching		
	(1) ROS	(2) ROA	(3) ROE	(1) ROS	(2) ROA	(3) ROE	(1) ROS	(2) ROA	(3) ROE
D×Post	-0.839***	-4.724***	-14.65***	-0.736***	-4.434***	-12.60***	-0.464***	-3.837***	-9.065***
	(-6.731)	(-16.21)	(-13.51)	(-8.178)	(-23.03)	(-17.64)	(-5.143)	(-19.62)	(-12.46)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	41954	41952	41858	548649	548619	546945	548649	548619	546945

*Notes: robust clustered t value in parentheses. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.*
Source: author calculation.

A worrying question is whether the policy impact really comes from the SEZs expansion program or it comes from other policies. If the policy impact comes from other policies before or after the implementation of the expansion program, then we believe that the policy impact should have existed before or after the implementation of the expansion program. Therefore, if we set a pseudo policy variable before or after the implementation of the program, and observe that there is no significant difference in the firm financial performance between the treated group and the control group, then we can believe that the policy impact comes from the expansion program.

Since it is essential to ensure that at least one period of data exists before the policy implementation, the possible choices of pseudo policy time in our sample period are 2009, 2012 and 2013. The placebo regression results are shown in Table 9. First, the coefficients of policy variable are not statistically significant if we set the pseudo policy time to 2009. Second, if the pseudo policy time is set to 2012, the regression coefficient changes in ROS on the expansion program is statistically insignificant; the coefficients of changes in ROA and ROE on the expansion program are statistically significant, but they are economically insignificant as the coefficients are obviously lower than the baseline results. Third, the coefficients of policy variable are also not statistically significant if we set the pseudo policy time to 2013. Overall, the above results confirm that the policy impact does not come from policies implemented at other time, but mainly from the SEZs expansion program.

Table 9 Placebo test results

	2009			2012			2013		
	(1) ROS	(2) ROA	(3) ROE	(1) ROS	(2) ROA	(3) ROE	(1) ROS	(2) ROA	(3) ROE
D×Post	0.0486	0.194	0.0930	-0.0655	-1.128***	-2.516**	-0.0555	-0.0415	-1.202
	(0.408)	(0.824)	(0.0816)	(-0.663)	(-4.367)	(-2.446)	(-0.606)	(-0.199)	(-1.280)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25358	25358	25358	36118	36116	35970	36118	36116	35970

*Notes: Robust clustered t value in parentheses; *, ** and *** indicate significance at 10%, 5% and 1%, respectively.*
Source: author calculation.

4.3 Further analysis

In the above analyses, the core finding is that the SEZs expansion program will increase the production costs and operation expenses, and then reduce the firm financial performance. As we known, the compositions of ROA and ROE not only include profit margin, but also include the asset turnover ratio and debt to asset ratio, which are associated with the firm's leverage ratio. In other words, firms may increase ROA and ROE by increasing the leverage ratio. The decompositions of ROA and ROE can be shown in Eq. (3) and Eq. (4), respectively.

$$ROA = ROS \times Turnover \tag{3}$$

$$ROE = \frac{ROS \times Turnover}{1 - Debt} \tag{4}$$

where $Turnover$ represents the asset turnover ratio, and $Debt$ represents the debt to asset ratio. The ROA and ROE of firms will increase with the rises of asset turnover ratio and debt to asset ratio.

Table 10 reports the regression results of changes in ROA and ROE on the expansion program. As shown in panel A, the expansion program decreases the asset turnover ratio of firms in the expansion areas by 0.4 percentage. The differences do not differ greatly between overcapacity industries and non-overcapacity industries and between labor-intensive industry and capital-intensive industry. The panel B shows that the expansion program has no significant effect on the debt to asset ratio of firms in the expansion areas, except for the labor-intensive industry. Specifically, the expansion program roughly increases the debt to asset ratio of labor-intensive industry by 30.76 percentage. In general, the expansion program does not significantly increase the leverage ratio of firms in the expansion areas, as it only increases the debt to asset ratio of labor-intensive industry, but does not increase the debt to asset ratio of capital-intensive industry, and has no effect on both overcapacity industries and non-overcapacity industries. Besides, the expansion program has a reduction effect on the asset turnover ratio of firms in the expansion areas.

Table 10 The leverage effects of the expansion program

	(1) Whole samples	(2) Overcapacity industries	(3) Non-overcapacity industries	(4) Labor-intensive industry	(5) Capital-intensive industry
Panel A: Asset turnover ratio					
D×Post	-0.400***	-0.362***	-0.400***	-0.431***	-0.370***
	(-12.31)	(-3.963)	(-12.11)	(-9.337)	(-10.48)
Observations	61514	42460	59842	51146	51156
Panel B: Debt to asset ratio					
D×Post	-5.374	-39.08	-2.400	30.76**	-19.97
	(-0.489)	(-1.525)	(-0.212)	(2.395)	(-1.410)
Control variables	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes
Observations	61459	42410	59787	51093	51104

*Note: Robust clustered t-value in parentheses; *, ** and *** indicate significance at 10%, 5% and 1%, respectively.*
Source: author calculation.

5. Concluding Remarks

Although the four traditional SEZs have been established about 40 years in China, they are still "experimental fields" for deepening China's reform and opening up. The economic development of SEZs is not only of interests to local cities, but more importantly, the SEZs also represent the development directions of the country. For example, the SEZ of Shenzhen has an excellent

economic performance among cities around the world, hence the successful experience is very important for China.

We conclude three features of the SEZ expansion program in China, and then empirically investigate the treatment effects of the expansion program on firm financial performance. We find that the expansion program has reduction effects on the ROS, ROA and ROE of firms in the expansion areas through increasing the production costs and operation expenses. Meanwhile, the expansion program has allocation effects on the industry structure, as it can eliminating the overcapacity industries and labor-intensive industry by imposing stricter regulations and raising minimum wage standard. We also find that the expansion program does not pass on the costs and expenses by increasing leverage ratio.

The study rigorously investigates the quantitative effects of China's SEZs expansion program on firm financial performance. To our best knowledge, this is the first empirical study to discuss the impacts of China's four traditional SEZs expansion program. The findings are very interesting. As we known, the economic transitions in the developing countries are prevalent, but difficult as well. The expansion program is a typical case, as it makes the firms in the expansion areas suffer profit losses, but at the same times it improves the industry structure and the quality of economy. If we look back, especially after seeing the rapid development of Shenzhen city, we must be believed that the SEZs expansion program was undoubtedly a right choice.

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