ATLANTIS PRESS
Advances in Intelligent Systems Research, volume 130
6th International Conference on Mechatronics, Computer and Education Informationization (MCEI 2016)

Study on the Influencing Factors of TFP in Development Zone Enterprises——Take Baoshan Industrial zone as an Example

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Keywords: Baoshan industrial zone; TFP; Impact mechanism; Policy recommendations

Abstract. With the Commission's data of Baoshan industrial zone, this paper empirically tests the differences of total factor productivity between of the enterprises in the development zone and non-development zone. Meanwhile, combining theoretical analysis and empirical methods, tests the impact mechanism of development policy on Enterprise TFP. Past industrial policy and regional policy are often randomly, while this paper provides a scientific basis for specific policy development to different industries and regions through rigorous academic research and empirical analysis, hereby reducing copycats and reduce market distortions. This paper provides the Government with both scientific and operational policy recommendations.

Introduction

Since the early 1980s of the 20th century, from the central to the local, the Chinese Government has gradually approved the establishment of a special economic zone, economic and technological development zones, development zones and border economic cooperation zones, bonded areas, export processing zones, and national tourist vacation areas in different types and different levels of development, various development zones becoming China's vibrant economic growth. Meanwhile, as an important policy tool, the development zone becoming an important carrier for local governments to attract investment, improves the productivity of enterprises in the development zone, promotes the economic development of the regions.

This paper is divided into three parts. Firstly estimates whether Baoshan industrial zone has a higher productivity; Secondly, examines the development policies and channels through which ultimately impact business performance; Finally provides with policy recommendations. In other words, this section answers the following questions through empirical methods: what impact development policies on production? How big are these effects? And what channels and channels these impacts are mainly through? With the rigorous data, validate the relationship between zone policy and business efficiency as well as the mechanisms.

Data Illustration. Firm-level data used in this paper is from Baoshan industrial zone Committee. The database includes the following data: number of employee, export delivery value, new industry code, total asset, total industrial output, total intermediate input, long-term investment and the main financial indicators of enterprises included in the balance sheet. Filtered according to principles proposed, we find no exceptions in the sample database.

The Impact of Development Zone Policy on Enterprise Efficiency

TFP Estimation and Model Assumptions of Impact on Corporate Efficiency of Development Zone. Estimation of Baoshan industrial zone TFP in this chapter uses GMM method, primarily considering that GMM estimator of TFP is more robust.

After estimating the TFP of the enterprise, we can estimate the influence of the development zone policy on the enterprise efficiency. Specific regression model is as follows:

$$TFP_{it} = \alpha + \beta_1 dummy_{it} + \beta_2 X_{it} + indus_i + \varepsilon_{it}$$

TFP_{it} is total factor productivity of enterprise ; $dummy_{it}$ is a dummy variable that shows enterprises whether located in development zone, 1 represents located in the zone, and 0 means not; X_{it} are control variables of enterprise; $indus_i$ represents industry fixed effects; ε represents random variables and measurement errors, and other factors.

The variables of Baoshan Industrial Zone Administrative Committee database are not consistent with that of Chinese industrial enterprises database, among which there are no key variables such as enterprise age and the industrial added value and so on. Therefore, we select control variables such as industrial output, finished goods, long-term debt and costs of production and operation, based on the variables exiting in Baoshan Industrial Park Administrative Committee database, to alleviate the endogenous problems.

Regression Result

Table 1 Development zone and enterprise efficiency: Panel data FE results（tfp_gmm）

Variables	(1) TFP	(2) TFP	(3) TFP
State capital	1.46e-07*	1.32e-07**	
	(6.30e-08)	(6.19e-08)	
foreigners' capital	2.70e-06	2.65e-06	2.70e-06
	(2.43e-06)	(2.41e-06)	(2.43e-06)
individual capital	6.78e-07		
	(1.50e-06)		
Dummy variable	0.374**	0.376**	0.375**
	(0.176)	(0.176)	(0.176)
N	2,961	2,961	2,961

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 1 is regression result calculated on a GMM method of the TFP for explanatory variables. As you can see, coefficients before the dummy in table 1 are significantly positive, and highly stable, on average, production efficiency in the Baoshan development zone is about 0.374 higher than enterprise out of this zone, showing development policies have great impact on production efficiency in Baoshan district.

The Impact Mechanism of Development Zone Policy on the Efficiency of Enterprises. The preceding analysis empirically examined the impact of development policies on enterprise efficiency, result shows that enterprises in development zone actually have higher rates of total factor productivity than enterprises not in development zone. Development zone by what kind of mechanism to affect TFP is not clear, so we carry out further empirical analysis and inspection mechanisms of development policy.

Model Assumptions and Regression Results. The basic pattern of Baoshan Industrial zone is manufacturing industry as the leading industry, and there are a lot of government subsidies and other related policies, we expect that the government subsidies to enterprises in Baoshan Industrial zone will increase significantly than non-industrial zone enterprises. In addition, there are ownership-oriented subsidies for enterprise; we expect that different nature of the corporate government subsidies may be different. To test effects of government subsidies on TFP of

developing enterprises in industrial zones, our empirical model is:

$$btsr_{it} = \alpha + \beta_1 dummy + \beta_2 X_{it} + indus_i + \varepsilon_{it}$$

Where $btsr_{it}$ is subsidy income; other variables are consistent with the model, regression result are as the following table 2

Table 2 Development zone and subsidy value：Panel data FE results

Variables	(1) subsidy income	(2) subsidy income	(3) subsidy income
Total industrial vale	0.00129***	0.00181***	
	(0.000269)	(0.000151)	
National capital	-0.00113		-0.00173
	(0.00159)		(0.00177)
Individual capital	0.00450		0.0129***
	(0.00303)		(0.00315)
Foreigner capital	-0.00120		-0.000567
	(0.00182)		(0.00126)
Dummy variable	160.3**	63.32*	290.0
	(95.55)	(85.28)	(236.2)
N	4,898	4,898	4,898

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2 is the regression results, from which we can see that the coefficient of the Dummy is positive, in equations (1) and (2) are significant. On the condition of all the control variables, on average, subsidy income of the enterprises in industrial zone is about 1.603 million Yuan higher than non-industrial enterprises. In addition, the coefficients both of the number of employee and industrial output value are significantly negative, suggesting that subsidies for labor-intensive and larger companies, is more effective to improve Enterprise TFP.

Above analysis shows that compared with non-industrial enterprises, firms in Baoshan industrial zone enjoy higher subsidies from the Government. Further, from above impact mechanism of government subsidies for industry development, we know that, because of government subsidies, making Baoshan industrial zone, on the basis of industry there is less uncertainty in terms of financing, also smooth the uncertainty of investing in innovation activities of enterprises and ultimately have a positive effect on Enterprise TFP.

Conclusions and Countermeasures

According to the empirical study of Baoshan District, on the overall, enterprises in the park get more financial subsidies than non-park enterprises, which means that the efficiency improvement of enterprises in the park directly benefit from the increase of subsidy income. Therefore, this paper argues that the government should be more cautious in the implementation of the subsidy policy. In view of the actual situation, the government of the industrial zone takes big risks in the process of economic subsidies; the actual effect of enterprise may be different from government expected. There are two reasons, one from the perspective of the enterprise, enterprise whose economy's performance in the market is not stable, is the carrier of subsidy income, a series of factors, such as the development of the internal structure of enterprises and industry macroeconomic conditions will cause a great impact on its performance. Secondly, information asymmetry, the government cannot get complete information because of credit system problems, asymmetric information makes

chances for enterprises to exploit the flaw to deceive the government subsidies. Once this happens, the influence of government measures on the local economy will be far less than expected, or even to bear a heavy financial burden.

Independence of the government of Baoshan District and the country's local government subsidies paid to the enterprise is quite strong, and relevant laws and regulations are not unified and not perfect, so the government subsidies received little constraint, that is, there are loopholes in the subsidy system, and this will provide a theoretical possibility for rent-seeking. On the one hand, those in power can be set up for personal economic benefits; on the other hand, enterprises in order to obtain government subsidies to do everything possible to rent.

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