Research on the Efficiency of Industrial Policy Incentive Resource Allocation Based on DID Model

Tingting Chang

Hong Kong Baptist University, Hong Kong, 999077, China

284131928@qq.com

Keywords: DID, Industrial policy, Resource allocation efficiency

Abstract: The implementation of industrial policies has an important impact on the allocation of resources among industries, but it has been difficult to draw a conclusion about the role of industrial policies. This paper makes an empirical investigation by using DID (difference-in-differences) model. It is found that the influence of industrial policies on the efficiency of resource allocation shows different trends with time, and has obvious preference. Encouraging industrial policies can significantly and continuously improve the efficiency of resource allocation. The implementation of industrial policies has a significant role in promoting industrial land transfer, and the area of industrial land transfer in industries stimulated by industrial policies is significantly higher than that in industries not affected by industrial policies. Therefore, in the follow-up work, on the one hand, we should be cautious about industrial policies; On the other hand, when formulating and implementing industrial policies, we should have sufficient information and take into account the actual situation of development in various regions.

1. Introduction

Industrial policy is an important policy form in which the state directly or indirectly intervenes in industrial behavior through industrial protection, industrial support, industrial adjustment and restriction, etc., which has a significant impact on national industrial development and growth, industrial structure change, industrial competitiveness improvement and economic and social development. Therefore, the effects of industrial policy have long been deeply concerned by experts and scholars. How to give full play to the government's role in macroeconomic regulation and control and the decisive role of the market in the process of resource allocation has become a major theoretical and practical issue of concern to academic circles and regulators in the new era. Investigating the intermediary role of market sentiment in the process of industrial policy guiding enterprise resource allocation from the perspective of investors' limited rationality is of great research value and practical significance for a deeper understanding of the relationship among national policy, market role and enterprise behavior from the perspective of micro-enterprises.

Theoretically, industrial policy is conducive to pooling resources and giving play to “late-comer advantage”. Overcome the inefficiency caused by market failure, and promote industrial growth and efficiency improvement. However, in reality, due to the confusion of behavior boundaries and behavior patterns in the process of formulating and implementing industrial policies, resource mismatch occurs. Therefore, this paper will establish DID (difference-in-differences) model from the economic point of view to analyze and study the differences and internal mechanism of encouraging industrial policies that affect the efficiency of resource allocation.

2. Literature Review

Finance plays an important role in the production activities of enterprises, and a good financial market environment will affect the cost of obtaining capital for enterprises, thus affecting the allocation efficiency of capital [1]. Literature [2] holds that the interest rate difference among enterprises in the market is the main reason for the decrease of capital allocation efficiency in

  DOI: 10.25236/ssehr.2021.037

China, and the study also finds that there are huge differences in interest rates of enterprises with different ownership. The interest rates faced by state-owned enterprises and group enterprises are the lowest. Literature [3] Based on micro-level data, it is found that industrial policies to promote enterprise competition are conducive to the improvement of production efficiency. The existing literature mainly explores the influence of “intrinsic factors” of investors' psychological deviation (such as representative deviation, overconfidence and conservatism) on the psychological state and subjective expectations of investors in the stock market [4-6]. Literature [7] The common view of scholars is that industrial policy has both positive and negative effects. A country's industrial policy can only have a promoting effect under certain conditions, and its total influence is difficult to determine.

At present, the research on industrial policies and corporate investment decisions mainly studies whether and how industrial policies affect the resource allocation behavior and efficiency of micro-enterprises from the perspective of specific policy support forms such as tax incentives, government subsidies and bank credit. Literature [8] holds that the key industrial policies are not conducive to the spatial allocation of land resources, and the local competition is the important reason. Literature [9] also found that if the industry is supported by industrial policies, the degree of productivity dispersion among enterprises will become larger, and there will be resource misplacement effect in industrial policies.

This paper provides microscopic evidence for the dual characteristics of the implementation effect of industrial policies. Whether the industrial policy, as an important tool for the Chinese government to guide the allocation of resources and optimize the industrial structure, is effective or not, has always been a major concern of the theoretical and practical circles. This paper finds that industrial policy may aggravate or alleviate the over-investment and under-investment of enterprises through the intermediary effect of investor sentiment. This provides new evidence that the implementation effect of industrial policy has two sides from the point of view of micro-enterprise resource allocation efficiency.

3. Research Design

3.1 Model Building

This paper uses DID model to analyze the difference and internal mechanism of encouraging industrial policies affecting resource allocation efficiency. The DID model is an important model to test the effect of policy implementation. First, the samples should be divided into treatment group and control group. The samples in treatment group started to implement a certain policy at a certain time, but the control group DID not implement the policy. By comparing the changes between the treatment group and the control group before and after the implementation of the policy, the implementation effect of the policy is tested. If the changes in the treatment group are greater than those in the control group, the policy is effective.

This paper constructs the DID model as follows:

$$y_{cit} = \alpha_0 + \alpha_1 g_{cit} + \alpha_2 year_t + \alpha_3 mix_{cit} + \alpha_4 control_{cit} + r_c + h_i + \mu_{cit}$$

Among them, y_{cit} is the explained variable, which represents the allocation of land resources, and the subscript c,i,t represents the region, industry and year respectively. $control_{cit}$ controls the characteristics of regional economy and government behavior in order to control the variable group. r_c, h_i represents regional dummy variable and industry dummy variable respectively. g_{cit} is a policy grouping variable. $year_t$ groups variables for time. mix_{cit} is the interactive term of policy grouping variable and time grouping variable, which is the key concern variable of this paper. Its coefficient α_3 is the key concern coefficient, which measures the “net impact” of industrial policies on regional land resource allocation. If the regression coefficient is significantly positive, it shows that the allocation of land resources in industries affected by industrial policies is significantly higher

than that in industries not affected by industrial policies.

When the role of industry individual characteristics on whether to implement relevant industrial policies depends entirely on observable control variables, the probability of control group samples is similar to that of treatment group samples. Regression of matched samples can overcome the common trend hypothesis of DID model to a certain extent, and also overcome the endogeneity of the model to a certain extent. Therefore, after DID regression, this paper uses DID tendency score matching again to verify and test the regression results.

3.2 Data Source

This paper takes all A-share listed companies in China's Shanghai and Shenzhen A-shares from 2010 to 2019 as the initial sample. First, exclude companies in the financial industry; Then eliminate the companies with missing relevant data; Finally, in order to eliminate the influence of extreme value, the extreme value samples whose main continuous variables are between 0.1% and 99% 100% are processed.

4. Empirical Result Analysis

4.1 Descriptive Statistics of Main Variables

Among all the samples, 34.1% were supported by the relevant national industrial policies, only 11.5% of the samples were restricted by the state from being eliminated, and the other samples belonged to industries that were not explicitly supported or eliminated by the industrial policies, which indicated that China's industrial policies had “selective characteristics” [10].

The minimum value of investor sentiment is -4.037, while the maximum value is 8.867, with a standard deviation of 1.905. The investor sentiment fluctuates greatly, which is consistent with the actual situation of China's capital market and has good research value and opportunities.

Figure l Shows the Year-by-Year Change Process of the Average Resource Allocation Efficiency Level of the Treatment Group and the Control Group during Two Event Windows.

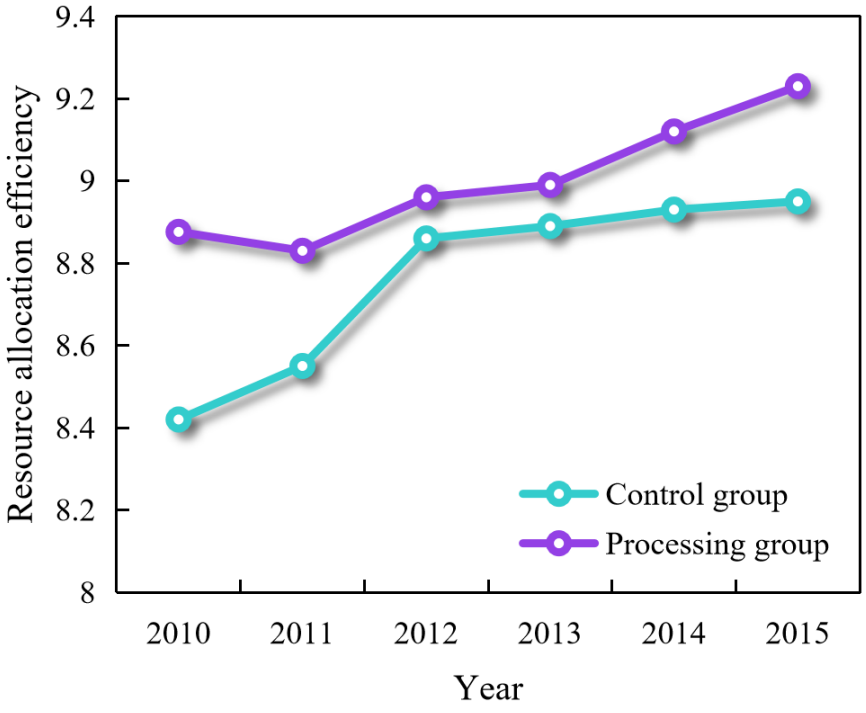

Fig.1 Changes of Resource Allocation Efficiency under Policy Incentives

It can be seen from Figure 1 that before the introduction of the encouraging industrial policy, the resource allocation efficiency of the treatment group and the control group basically followed the same time trend. After the incentive policy incident in 2011. The average level of resource

allocation between the two groups began to separate. The added value of the average resource allocation level of the processing group is obviously higher than that of the control group.

4.2 Regression Analysis

The results of full sample-based regression are shown in (1) and (2) in Table 1, in which (1) only the core explanatory variable of industrial policy is included, and (2) all control variables are added.

Table 1 Sample-Based Regression Results and Double Difference Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)
Policy	5.326*** (0.933)	5.417*** (0.928)				
Group			-1.186 (2.075)	-1.336 (2.068)	-1.428 (2.771)	-1.461 (2.671)
Year			-0.863 (1.835)	1.138 (2.031)	-2.181 (2.668)	-0.208 (2.823)
Mix			5.012** (2.018)	5.564*** (2.069)	7.003** (2.841)	7.418*** (2.836)
Sell		-0.955** (0.398)		-0.458 (1.027)		-0.715 (1.063)
Fdi		-1.983** (0.531)		-6.012*** (1.338)		-6.034*** (1.445)
Fix		1.406** (0.608)		-1.501 (1.896)		-2.237 (2.017)
Fund		0.387*** (0.043)		0.441*** (0.128)		0.4248*** (0.139)
Inv		-0.043* (0.023)		-0.136** (0.056)		-0.158** (0.061)
Sec		-0.117 (0.417)		-1.208*** (0.415)		-1.462*** (0.438)
Thi		-0.384** (0.173)		-2.238*** (0.491)		-2.591*** (0.519)

Note: “*”, “* *” and “* * *” indicate the significance levels of 10%, 5% and 1% respectively.

From the regression results of (1) and (2), we can see that the coefficient of industrial policy is positive, and the significance level reaches 1%. It shows that the industrial policy has a significant impact on the industrial land transfer of various industries in the region. It also shows that the industrial land transfer area of industries affected by industrial policies is higher than that of industries not affected by industrial policies. This also shows that under the incentive of industrial policies, local governments will actively allocate land to industries and departments that are encouraged by industrial policies.

In order to further explore the policy effect of industrial policies on industrial land allocation of regional industries, the following “separate” the “net impact” of industrial policies on industrial land allocation of regional industries through DID model. Check the parallel trend of the treatment group and the control group.

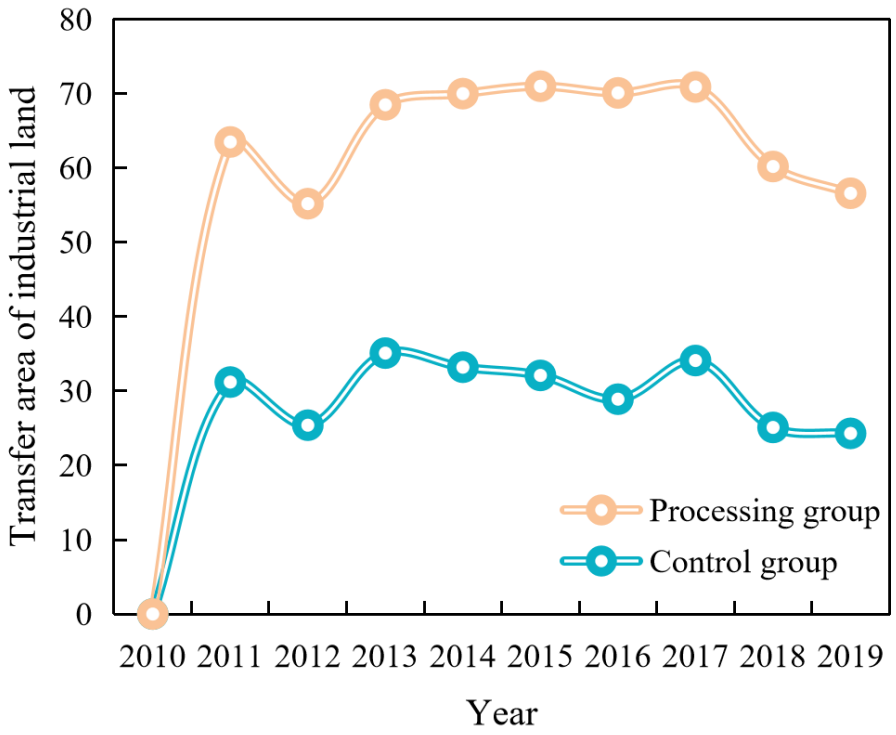

Fig.2 Parallel Trend Chart of Industrial Land Transfer Area

By drawing the parallel trend test chart (Figure 2), it can be seen that although the control group and the treatment group had similar development trends before 2010, there was a big difference between them. Therefore, after the subsequent use of DID model, the data was subjected to DID trend score matching regression again to test its robustness. After 2010, the difference between the treatment group and the control group showed a changing trend of first expanding and then decreasing, and the average transfer area of industrial land in the treatment group was larger than that in the control group.

Industrial policy surplus distribution effect, enterprise investment effect, policy transmission effect, output effect, income effect, cost effect, social welfare effect and market evolution effect all change with the market competition incentive state, industrial policy incentive level and structure, government strategy and risk preference conditions. The same industrial policy intervention has different effects under different market conditions. It is meaningful to determine the specific effect of an industrial policy only by combining the specific market state, interest competitor preference and government policy implementation interaction.

5. Conclusion

The DID strategy is used to empirically test the degree of influence of industrial policies on the efficiency of resource allocation. It is found that both the encouraging policy and the restraining policy have improved the efficiency of resource allocation: the effect of implementing industrial policies in industries with high state-owned economy is good; the influence of industrial policies on the eastern region is relatively light. On the whole, the implementation of industrial policies has a significant role in promoting industrial land transfer in various industries in the region, and the area of industrial land transfer in industries stimulated by industrial policies is significantly higher than that in industries not affected by industrial policies. Therefore, in the follow-up process of industrial policy formulation, we should not only refer to the successful development experience of the eastern region, but also further investigate the actual situation of economic development in the central and western regions. By grasping more sufficient information, we should carry out targeted industrial policies, and then give full play to the policy's incentive role and release the policy dividend.

References

[1] Xie Xingheng. Analysis of the impact of economic responsibility audit on local government investment efficiency. Accounting Study, no. 10, pp. 4, 2021.

[2] Huang Rui, Xu Qian. The efficiency lock-in and efficiency change of industrial development--Based on the vision of “culture + tourism” industrial integration. Jianghan Forum, no. 8, pp. 9, 2020.

[3] Zhao Xiaofei, Huang Ning, Wang Weibin. Competitive neutrality, state-owned enterprise governance and high-quality economic development. Fujian Finance, no. 5, pp. 7, 2020.

[4] Hua Guiru, Zhou Shuli, Liu Zhiyuan, et al. Industrial policy, investor sentiment and the efficiency of enterprise resource allocation. Financial Research, no. 1, pp. 17, 2021.

[5] Wu Lixue, Yin Junya, Ju Jing. Urban scale, resource allocation and government behavior. Industrial Organization Review, no. 4, pp. 34, 2019.

[6] Du Jianhua, Cao Ruidan. Research on the Impact Mechanism of Industrial Policy on Investment Efficiency--Based on the Perspective of Differentiated Resource Allocation. Finance and Economy, no. 3, pp. 8, 2020.

[7] Yang Yue, Cheng Liwei. The phase characteristics of regional financial development affecting energy efficiency. Scientific Research Management, no. 4, pp. 10, 2019.

[8] Cai Fang. Productivity, New Momentum and Manufacturing: How China's Economy Improves the Efficiency of Resource Reallocation. China Industrial Economics, no. 5, pp. 14, 2021.

[9] Zhou Y, Kong Y, Sha J, et al. The role of industrial structure upgrades in eco-efficiency evolution: Spatial correlation and spillover effects[J]. Science of the Total Environment, vol. 687, no. 15, pp. 1327-1336, 2019.

[10] Alsaleh M, Abdul-Rahim A S, Mohd-Shahwahid H O. Determinants of technical efficiency in the bioenergy industry in the EU28 region[J]. Renewable and Sustainable Energy Reviews, vol. 78:1331-1349, 2017.

[11] Davies W J, Zhang J, Yang J, et al. Novel crop science to improve yield and resource use efficiency in water-limited agriculture[J]. Journal of Agricultural Science, vol. 149, no. S1, pp. 123-131, 2011.

[12] Wardyn B M, Russell W K. Resource Allocation in a Breeding Program for Phosphorus Concentration in Maize Grain[J]. Crop Science, 2004, 44, no. 3, pp. 753-757.

[13] Du Yuwei. Industrial system reconstruction from the perspective of high-quality development: a logical framework. Modern Economic Research, no. 12, pp. 9, 2019.