



Analysis of the Effects of the Enterprise Income Tax Reduction Policy on the Manufacturing Industry in Heilongjiang Province

Defa Cai^(✉), Xiaoxiao Yu^(✉), and Ying Fan

School of Public Finance and Administration, Harbin University of Commerce, Harbin, China
abcd04754@126.com, yuxiaoxiao0612@163.com

Abstract. This study employs the difference-in-differences model as the empirical analysis framework, and selects the annual reports data of 20 listed enterprises in Heilongjiang Province from 2016 to 2021 as samples, in which 10 listed enterprises in manufacturing are used as the processing group, and 10 listed enterprises in non-manufacturing are used as the control group. Taking the tax reduction policy to reduce tax burden effect as the starting point, the current enterprise income tax reduction and exemption policy for small and micro-profit enterprise was selected to put forward a hypothesis, establish a model, and select several relevant variables for analysis. Finally, the model passed the parallel trend test, descriptive statistics, empirical analysis and robustness test.

Keywords: the enterprise income tax reduction · Manufacturing · Effects analysis

1 Introduction

Manufacturing industry is a pillar industry of the national economy and an important embodiment of the country's creativity, competitiveness and comprehensive national strength. Industrial clusters are crucial in promoting the specialised division of labour and aggregation of innovative resources, serving as a crucial pathway for China's endeavour to become a major manufacturing powerhouse and elevate its industries to the high end of the value chain. The report to the 20th National Congress of the CPC proposed to promote high-end, intelligent and green development of the manufacturing industry. The Government Work Report of The State Council in 2023 proposed that the manufacturing industry should be the focus of developing the real economy. The 13th Party Congress of Heilongjiang Province stressed that it is unswervingly fighting the battle of improving the mode of structural adjustment to turn over the battle and accelerate the construction of a modern industrial system.

2 Model Construction and Variable Selection

2.1 Sample Selection and Data Source

This study employs a “difference-in-differences” analysis to classify enterprises based on their registration types. The treatment group consists of manufacturing industries, while the control group comprises other types of enterprises. As of March 2023, there are 38 listed enterprises in Heilongjiang Province. This paper collects the relevant data of listed companies from 2016 to 2021, which can cover the development process of China’s tax reduction policy and before and after its implementation. In order to ensure the accuracy and rationality of the study, this paper excluded some abnormal samples. After sorting, 10 manufacturing listed enterprises were selected as the treatment group and 10 non-manufacturing listed enterprises as the control group. The data mainly came from the annual reports of listed companies, and some of the data were collected and calculated manually.

2.2 Variable Selection and Model Hypothesis

Hypothesis 1: The enterprise income tax reduction policy has a negative effect on the tax burden rate of listed manufacturing enterprises in Heilongjiang Province.

The variables and their meanings are shown in Table:

To test the hypothesis, build the model:

$$Y_{it} = a_0 + a_1DID + a_2CONL + \epsilon_{it}$$

DID represents the interaction term of policy dummy variable and time dummy variable, CONL represents the control variable, a_0 represents the constant term, ϵ_{it} represents the random disturbance term, a_i represents the regression coefficient, and the coefficient a_1 of DID represents the effect of the selected policy on listed manufacturing enterprises in Heilongjiang Province.

3 Model Statistics and Analysis

3.1 Parallel Trend Test

The hypothesis of satisfying parallel trend is the premise of effective policy evaluation of the “difference-in-differences” analysis, that is, when the policy is not implemented, the development trend between the treatment group and the control group is parallel, and there is no systematic difference over time, that is, the parallel trend is satisfied. This paper draws on Beck et al.¹’s practice and uses event study method to plot parallel trend test regression of the model. The results are shown in Fig. 1:

As can be seen from Fig. 1, before the policy occurred, the 95% confidence interval crossed the horizontal dotted line with coefficient = 0, indicating that it was not

¹ BECK T, LEVINE R, LEVKOV A. (2010) Big bad banks? the winners and losers from bank deregulation in the United States. *The Journal of Finance*,65(5):1637–1667.

Table 1. Model variables and their meanings

Types of Variables	Variable name	Variable symbol	Meaning and calculation instructions
Dependent variable	Tax burden rate (%)	sf	Various taxes paid/gross business income \times 100%
Independent variables	Policy dummy variables	treat	The group of enterprises that benefiting from the corporate income tax policy is assigned a value of 1; The group that not benefiting from the corporate income tax policy is assigned a value of 0.
	Time dummy variable	post	The value assigned before the enterprise income tax policy is 0; Enterprise income tax policy is assigned a value of 1 after it occurs.
	Interactive item	did	The interaction term of policy dummy variable and time dummy variable, whose coefficient represents the effect of enterprise income tax policy on the tax burden of manufacturing listed enterprises.
Control variable	Return on assets (%)	zcbcl	(Total profits + interest expense)/average total assets \times 100%. It is an important index to evaluate the operating efficiency of enterprise assets.
	Total assets of the company	gszcc	All assets owned or controlled by the business, reflecting the size of the company.

(continued)

Table 1. (continued)

Types of Variables	Variable name	Variable symbol	Meaning and calculation instructions
	Various taxes and fees	gxsfqk	The natural logarithm of each tax paid in the cash flow statement is taken for the experiment.
	Gross operating income	yyzsrqk	Total operating income in the income statement, taking the natural logarithm for the experiment.

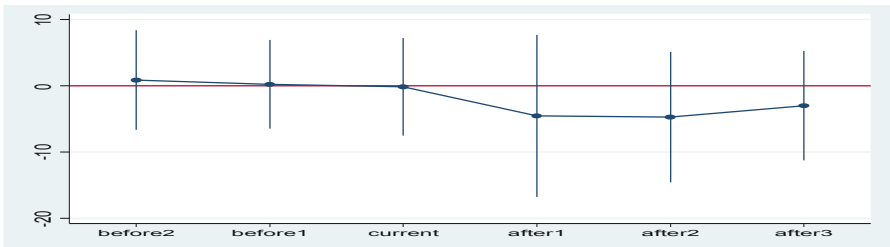


Fig. 1. Parallel trend test regression results for model

significant before the policy occurred. The parallel trend test only requires that the pre-occurrence is not significant, and the post-occurrence is not significant without affecting the pre-occurrence conclusion². Therefore, models have passed the parallel trend test and can be empirically demonstrated in the next step.

3.2 Sample Descriptive Statistics

This paper makes descriptive statistical analysis of the mean value, standard deviation, minimum value and maximum value of variables in the model, the mean value of the tax burden rate of the explained variable is 9.22%, which is basically consistent with the description of relevant literature, and the standard deviation is 9.62, indicating that the data is highly discrete. The mean value of explanatory variable treat is 0.5, indicating that the number of individuals in the sample who enjoy the enterprise income tax exemption policy is equal to that of those who do not. The mean of the explanatory variable post is 0.67, indicating that 67 percent of the years in the sample were before the policy was implemented and 33 percent were after. The mean of the explanatory variable did is 0.33, indicating that 33% of the sample of manufacturing firms in the sample were

² The criteria for the parallel trend test can be found in KEMOSABER’s original article, reproduced with a link to the original source and this statement.

affected by the corporate income tax reduction policy. Among the control variables, the standard deviations of return on assets and total corporate assets are 19.83 and 701.92, respectively, indicating that the data dispersion of return on assets and total corporate assets among the sample enterprises is large. The standard deviation of the logarithm of various taxes and revenues is 1.72 and 1.40 respectively, indicating that the data of various taxes and revenues are relatively stable among the sample enterprises, which is also related to the operation of taking the natural logarithm of the two.

4 Empirical Analysis and Test Results

4.1 Analysis of Empirical Results

The regression result showing, that the estimated coefficient of the interaction term DID is -1.776, which is significantly negative at the 5% level, indicating that the enterprise income tax reduction policy has a negative impact on the tax burden rate of listed manufacturing enterprises in Heilongjiang Province, which verifies the hypothesis.

4.2 Robustness Test

The stability of the model is tested by tail-shrinking processing, deletion of outliers, and re-analysis of empirical results. If the data is still significant after the outliers are deleted, it proves that the model passes the robustness test. That the data of model is still significant after indentation processing to delete outliers, which proves that model passes the robustness test.

4.3 Conclusions

Based on the above empirical analysis, the following conclusions can be drawn: Tax relief policies can effectively reduce the tax burden and cost of enterprises. According to Model, the enterprise income tax exemption policy has a negative impact on the tax burden rate of listed manufacturing enterprises in Heilongjiang Province. Therefore, the tax reduction and exemption policy helps reduce production cost of enterprises and stabilize the profit expectations. The new combined tax support policy enables small and micro enterprises in the manufacturing industry to further enjoy the welfare.

Acknowledgments. Projects in Higher Education Think Tanks in the Province (ZKKF2022066).

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