



The Impact of Corporate Tax Burden on Total Factor Productivity-- Based on the Evidence of Small and Medium-sized Listed Companies

Jingxian Yu

School of Economics, Anhui University

yjx18336446212@163.com

Abstract. Based on the data of manufacturing SMEs from 2013 to 2019, this paper empirically analyzes the relationship between total tax burden and total factor productivity of manufacturing SMEs. The research proves that the reduction of total tax burden of enterprises can promote the improvement of total factor productivity of manufacturing SMEs. Further analysis shows that the influence of tax burden reduction on the total factor productivity of enterprises with different financing constraints is heterogeneous. This paper holds that the government tax reduction policy should consider the heterogeneity of enterprises, so that the policy can play a better role.

Keywords: corporate tax burden; Total factor productivity; small and medium-sized enterprises

1 Introduction

Report to the 20th CPC National Congress of the Communist Party of China put forward that high-quality development is the primary task of building a socialist modern country in an all-round way. China's small and medium-sized enterprises have a huge base and strong innovation ability, which are the main force to alleviate employment pressure and are of great significance to maintaining social stability and promoting high-quality economic development. Tax policy is an important measure for the government to control the economic behavior of enterprises and influence the investment decision and development direction of enterprises. According to the statistics of State Taxation Administration of The People's Republic of China, in 2022, the scale of new tax reduction and fee reduction and tax refund and fee deferral in China exceeded 4.2 trillion yuan,^[1] and the effect of tax reduction and fee reduction was remarkable, and the sense of enterprise acquisition was enhanced. In 2023, the state will continue to improve the tax and fee support policies and focus on alleviating the difficulties of enterprises. Then, does the decline of corporate tax burden contribute to the improvement of total factor productivity of SMEs? Is there any room to further reduce the tax burden under the existing tax burden level?

© The Author(s) 2024

L. Moutinho et al. (eds.), *Proceedings of the 2023 International Conference on Management Innovation and Economy Development (MIED 2023)*, Advances in Economics, Business and Management Research 260, https://doi.org/10.2991/978-94-6463-260-6_33

Most of the existing literatures support that tax reduction can promote the improvement of total factor productivity, the existing literature uses "camp reform",^[2] western development,^[3] preferential income tax rate,^[4] additional deduction of R&D expenses,^[5] accelerated depreciation of fixed assets^[6] and other different tax reduction methods have studied the impact on the total factor productivity of enterprises. Although the effects are different, they have promoted the overall performance.

The improvement of total factor productivity of enterprises mainly depends on the improvement of technological innovation level and the improvement of resource allocation. The reduction and exemption of corporate tax burden can be specifically from optimizing resource allocation^[7] and encouraging technological progress,^[8] easing financing constraints,^[9] and increasing investment in fixed assets and other aspects affect the total factor productivity of enterprises.

Through literature review, it is found that the existing literature has deeply studied the relationship between corporate tax burden and total factor productivity, but few articles have studied it from the perspective of small and medium-sized enterprises. Based on this, this paper analyzes the influence of corporate tax burden on total factor productivity and the relationship between tax burden and total factor productivity under the influence of financing constraints from the perspective of manufacturing SMEs. The possible marginal contribution of this paper broadens the research perspective of total factor productivity, and studies the relationship between corporate tax burden and total factor productivity of small and medium-sized enterprises from the perspective of small and medium-sized enterprises.

2 Theoretical analysis and research hypothesis

2.1 Corporate tax burden and total factor productivity

The improvement of total factor productivity of enterprises mainly depends on technological innovation and improvement of resource allocation efficiency. Enterprises' R&D and investment activities will be restricted by funds. The reduction of corporate tax burden can increase the after-tax net income of enterprises, provide financial support for innovative activities of enterprises. Reducing the tax burden can increase corporate cash reserves, reduce corporate financial burden risks, increase corporate risk prevention ability in investment activities, thus attracting foreign investment and optimizing the allocation efficiency of various resource elements. Compared with large enterprises, it is difficult for small and medium-sized enterprises to obtain financing, and it is difficult to obtain external funds. The reduction of corporate tax burden relieves the financing constraints of enterprises by using internal financing, which is conducive to promoting the high-quality development of small and medium-sized enterprises. Based on this, hypothesis 1 is proposed.

Hypothesis 1: The reduction of tax burden can effectively improve the total factor productivity of SMEs.

2.2 Corporate tax burden, financing constraints and total factor productivity

One of the main factors restricting the development of Chinese enterprises is financing constraint. Financing constraints will affect pure technical efficiency by urging enterprises to optimize organizational structure and improve management methods, and restrict the production scale of enterprises to affect scale efficiency. The investment intensity of human capital, technology and equipment acting on enterprises will affect the efficiency of technological progress, and the total factor productivity will change under the superposition of these three efficiencies, showing an inverted U shape as a whole. Different enterprises have different financing constraints, and the financing constraints of small and medium-sized enterprises are more serious. Under the constraints of different financing constraints, there will be differences in the management system, organizational structure, financing channels, investment decisions and development direction of enterprises, which leads to differences in the impact of tax relief on the total factor productivity of SMEs receiving different financing constraints. Based on this, the article puts forward hypothesis 2:

Hypothesis 2: The reduction of tax burden has heterogeneity on the total factor productivity of SMEs with different financing constraints.

3 The research design

3.1 Sample selection and data sources

In this paper, China A-share manufacturing listed companies from 2013 to 2019 are selected as the research object, and according to the screening conditions of small and medium-sized enterprises by Zhou D.Y. et al. (2023),^[10] samples of listed small and medium-sized enterprises in manufacturing are selected from the databases of CSMAR and Wind. In this paper, the original data are processed as follows: (1) Excluding ST and ST enterprise samples; (2) Exclude samples of enterprises that meet the indicators of small and medium-sized enterprises for only one year in the sample period; (3) Eliminate the samples of enterprises with missing key indicators; (4) In order to eliminate the influence of extreme values, 1% of continuous variables are truncated.

3.2 Definition of variables

Explained variables. Total factor productivity, calculated by LP method.^[11] Explain variables. Total tax burden, the total tax burden of an enterprise is expressed by deducting the tax refund received by the enterprise and dividing it by the operating income. Control variables. See Table 1 for the development ability, profitability, property right nature, capital intensity, solvency and cash flow calculation methods. Threshold variables. Financing constraints, measured by SA index.

Table 1. Definition of variables

Variable Name	Symbol	Definition
Total factor productivity	tfplp	Calculation of total factor productivity by LP method
Total tax burden of enterprises	tax _{it}	Taxes actually paid/operating income
Financing constraint	sa	SA index
Develop ability	growth	Operating income growth rate = current operating income-previous operating income)/previous operating income
Profitability	roe	Return on net assets = net profit/total assets at the end of the year
Nature of the property right	soe	Dumb variables, state-owned enterprises assigned to 1, otherwise assigned to 0.
Capital intensity	fix	Fixed assets ratio = net fixed assets/total assets
debt paying ability	lev	Asset-liability ratio = total liabilities/total
Cash Flow	cash	Total cash/assets received from selling goods and providing services

3.3 Model setting

This paper selects the balanced panel data from 2013 to 2019, and constructs Formula (1) to analyze the impact of tax burden of manufacturing SMEs on their total factor productivity.

$$tfplp_{it} = \alpha_0 + \alpha_1 tax_{it} + \alpha_2 controls_{it} + firm_i + year_t + \varepsilon_{it} \quad (1)$$

Where i stands for enterprise and t stands for year; $tfplp_{it}$ represents the explained variable, the total factor productivity of enterprise i in the t year; tax_{it} represents the explanatory variable, the total tax burden of enterprise i in the t year, and its coefficient α_1 represents the estimated result of the influence of enterprise tax burden on total factor productivity; $controls_{it}$ is a series of control variables; $firm_i$ stands for firm fixed effect, $year_t$ stands for year fixed effect, and ε_{it} stands for random disturbance term.

4 The empirical results analysis

4.1 Basic regression analysis

In this paper, the fixed effect model is tested by Hausman before the benchmark regression. The results are shown in Table 2, and the p value is 0.000, which shows that Hausmann test rejects the original hypothesis, that is, the fixed effect model should be adopted in this paper. Table 2 shows the benchmark regression of the influence of total

tax burden of manufacturing SMEs on total factor productivity. Generally speaking, the coefficient of tax_{it} of the total corporate tax burden is negatively significant at the level of 1%, which shows that corporate tax burden is negatively correlated with the total factor productivity of enterprises, that is, reducing corporate tax burden can promote the total factor productivity of enterprises. Hypothesis 1 is verified.

Table 2. Benchmark Regression

Variable	(1)tfplp	(2)tfplp	(3)tfplp	(4)tfplp
tax_{it}	-2.488*** (0.198)	-2.301*** (0.191)	-2.091*** (0.219)	-1.374*** (0.201)
Controls	YES	YES	YES	YES
Year	NO	YES	NO	YES
Firm	NO	NO	YES	YES
Hausman Test	103.90(0.000)			
N	2632	2632	2632	2632
R ²	0.426	0.474	0.404	0.531

Note: *, ** and *** respectively mean significant at the level of 10%, 5% and 1%, the same below.

4.2 Further analysis

The previous empirical results have proved that the tax burden has a negative impact on the growth of the enterprise's total factor productivity. Considering that the degree of financing constraints on the enterprise itself will also have an impact on the enterprise's total factor productivity (tfplp) as the explained variable, the total tax burden (tax) as the explained variable, and the degree of financing constraints (sa) as the threshold variable, a threshold model is constructed, as shown in Formula (2). In this paper, the SA index is used to measure the financing constraints of enterprises. The larger the SA value (non-absolute value), the more serious the financing constraints of enterprises.^[8]

$$tfplp_{it} = \alpha_0 + \alpha_1 tax_{it}(sa_{it} \leq \eta_1) + \alpha_2 tax_{it}(\eta_1 < sa_{it} \leq \eta_2) + \dots + \alpha_n tax_{it}(\eta_{(n-1)} < sa_{it} \leq \eta_n) + \alpha_{(n+1)} control-s_{it} + firm_t + year_t + \varepsilon_{it} \tag{2}$$

The test results of threshold effect are shown in Table 3. The threshold variable sa failed the significance test in the triple threshold test, and there is no triple threshold. The F values of single threshold and double threshold are 97.35 and 120.19, respectively, and both of them are significant at the level of 1%, indicating that there is a double threshold effect on the influence of corporate tax burden on the total factor productivity of enterprises under the constraint of corporate financing.

Table 3. Threshold Test Results

Threshold value	F value	P value	Threshold value	Lower limit of confidence interval	Upper limit of confidence interval
Single threshold	97.35***	0.002	-4.061	-4.086	-4.041
Double threshold	120.19***	0.004	-3.662	-3.682	-3.655
Triple threshold	67.27	0.964	-3.463	-3.478	-3.452

The regression results in Table 4 show that when the financing constraint sa is less than or equal to -4.061 , the coefficient of the total corporate tax burden is 1.560 , which is positively related to the total factor productivity at the significance level of 5% . At this time, the financing constraints of enterprises are small, that is, the cost difference between internal financing and external financing is not big, and the smaller the sa value, the larger the age and scale of the enterprise, and the current operating income generated by such enterprises can offset the reduced cash flow due to tax burden, so the increase of tax burden will not be detrimental to the improvement of total factor productivity. When the financing constraint sa is greater than -4.061 and less than or equal to -3.662 , the coefficient of total corporate tax burden is -1.527 , which is significant at the level of 5% . When the financing constraint sa is greater than -3.662 , the coefficient of total corporate tax burden is -3.741 , which is significant at the level of 1% . This shows that the more serious the financing constraint, the more tense the cash flow of the enterprise, and the lack of financial support for its development, organizational optimization and technological innovation. At this time, the change of corporate tax burden will have a greater impact on the total factor productivity of the enterprise. Hypothesis 2 is verified.

Table 4. Threshold Regression Estimation Results

tfplp	Coef.	t	P> t
_cat#c.taxit			
tax($sa \leq -4.061$)	1.560**	2.06	0.040
tax($-4.061 < sa \leq -3.662$)	-1.527**	-2.40	0.017
tax($sa > -3.662$)	-3.741***	-6.36	0.000
Controls		YES	
N		2632	
R ²		0.465	

5 Conclusions and policy implications

Based on the panel data of manufacturing SMEs in China from 2013 to 2019, this paper makes an empirical study on the relationship between corporate tax burden and total factor productivity, and draws the following conclusions: (1) The reduction of tax burden of manufacturing SMEs can significantly promote the improvement of total factor productivity; (2) The incentive effect of tax burden reduction on the improvement of total factor productivity of enterprises with high financing constraints is stronger than

that of enterprises with low financing constraints. When the financing constraints of enterprises are small, the tax burden reduction will inhibit the improvement of total factor productivity.

Based on the above conclusions, the following policy suggestions are put forward: First, the reduction of corporate tax burden is conducive to SMEs to reduce costs, increase investment, achieve technological progress and technical efficiency, and then achieve the growth of total factor productivity, so the government tax reduction policy should continue to be maintained and optimized. Second, it is difficult for small and medium-sized enterprises to raise funds, and they need to rely on government support and regulatory policies to broaden the financing channels of small and medium-sized enterprises, reduce their borrowing costs and promote their further development.

References

1. Wang, G. (2023). In 2022, the new tax reduction and fee reduction and tax refund deferred fee exceeded 4.2 trillion yuan. *People's Daily*, 001. <https://doi:10.28655/n.cnki.nrmrb.2023.000905>
2. Ding, T., Qian, X.D. (2019). Does the "VAT reform" policy have spillover effect on the total factor productivity of manufacturing enterprises? *Discussion on Modern Economy* (01), 77-85. <https://doi:10.13891/j.cnki.mer.2019.01.011>.
3. Wu, H.H., Liu, X.B., Ji Y.B. (2017). Can tax reduction improve the production efficiency of enterprises? -Research based on the quasi-natural experiment of western development. *Financial Research* (04), 55-67. <https://doi:10.16538/j.cnki.jfe.2017.04.005>.
4. Han, F.Q., Chen, Y.P. (2020). Selective tax incentives, catering R&D investment and R&D performance. *Scientific Research* (09), 1621-1629. <https://DOI:10.16192/j.cnki.1003-2053.2020.09.010>.
5. Guo, J., Liu X.T., Song, S.B. (2020). Enterprise Heterogeneity, R&D Expenditure Plus Deduction and Total Factor Productivity. *Macroeconomic Research* (05), 130-144. <https://doi:10.16304/J.CN.KI.11-3952/F.2020.05.012>.
6. Lin, Z.F., Liu, S.Y. (2022). How do tax incentives affect enterprise innovation? -empirical evidence from the accelerated depreciation policy of fixed assets. *Statistical Research* (01), 91-105. <https://doi:10.19343/j.cnki.11-1302/c.2022.01.007>.
7. Liu, J.H., Zhou, Z.B., Zhang, M. (2018). The Impact of Resource Tax Reform on the Efficiency of Resource Allocation -- An Empirical Analysis Based on Malmquist Index. *Tax Research* (06), 54-59. <https://doi:10.19376/j.cnki.cn11-1011/f.2018.06>.
8. Li, Y.L. (2018). Preferential tax policies and the innovation efficiency of high-tech industries. *Research on Quantitative Economy, Technology and Economy* (01), 60-76. <https://doi:10.13653/j.cnki.jqte.20171228.004>.
9. Fan, R., Yu, M.G., Chen, D. (2020). Can reducing the corporate tax rate promote enterprise innovation? *Journal of Zhongnan University of Economics and Law* (04), 74-84. <https://doi:10.19639/j.cnki.issn1003-5230.2020.0033>.
10. Zhou, D.Y., Dong, B.R. (2022). Bank Credit and Dual Innovation Investment of SMEs. *Economic Management* (12), 118-137. <https://doi:10.19616/j.cnki.bmj.2022.12.007>.
11. Liu, L.Y., He, Y.L., Wang, Z.F., Cheng, T.X. (2015). Will financing constraints affect China enterprises' foreign direct investment? -Theoretical and empirical analysis based on micro-perspective. *Financial Research* (08), 124-140. <https://doi:CNKI:SUN:JRYJ.0.2015-08-009>.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

