IOSR Journal of Business and Management (IOSR-JBM)
e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 21, Issue 7. Ser. VI (July. 2019), PP 42-49
www.iosrjournals.org

Empirical analysis on corporate tax burden and innovation output

Ma, Bao-Chun
Shantou University

Abstract: *Enterprise income tax is an important component of enterprise tax payable. Excessive tax burden occupies enterprise funds, thus reducing enterprise R&D output (Li , 2013). This paper uses the "income tax expense" and "main business income" items in the financial reports of Chinese a-share listed companies to construct tax burden indicators and the cumulative value of effective invention patents of enterprises to measure the R&D output of enterprises. It is found that corporate income tax burden is negatively correlated with R&D output, and this negative relationship is only significant in non-high-tech enterprises. This article has the reference significance to the present tax revenue optimization reform and the promotion profession healthy development.*

Key words*: pharmaceutical industry; Tax burdens; High-tech enterprise*

Date of Submission: 06-07-2019 Date of acceptance: 23-07-2019

I. Introduction Of Bright Dairy

From the perspective of the current global development direction, enterprise technological innovation has occupied an increasingly important position in international competition.In recent years, the core of China's strategic development has emphasized to improve the ability of technological innovation of enterprises and build an innovation-oriented country. In 2017, China spent 1.750 billion yuan on research and development (R&D), an increase of 11.6 percent over the previous year, accounting for 2.12 percent of GDP. The number of invention patent applications was 3.698 million, up 6.72 percent over the previous year, and the number of patents authorized was 1.836 million, up 4.68 percent over the previous year.

The number of invention patent applications continues to increase, but the growth rate has slowed down, and there is still a significant gap between China and developed countries in terms of technological innovation capacity.Compared with developed countries, the proportion of total R&D expenditure and growth rate is still in the middle and lower level.Therefore, in order to strengthen the innovation and research efforts of enterprises, it is necessary to start with the relevant policies to stimulate the technological innovation ability of enterprises, understand the practical problems faced in the current innovation process, study the actual effect of tax policies to stimulate technological innovation, realize the optimal allocation of resources, and help enterprises with innovation and research.

In recent years, the state has increased investment in medical and health services. The overall growth rate of the pharmaceutical industry is fast and it is at the forefront of the whole industry. To increase the output of innovative research and development is of great strategic significance to this industry.This paper focuses on the pharmaceutical manufacturing industry and observes the impact of the income taxburden rate on the R&D output of the pharmaceutical manufacturing industry.In order to further study the benefits of tax incentives, this paper divides pharmaceutical manufacturing enterprises into high-tech enterprises and non-high-tech enterprises.Then, it studies the effect of tax preferential policies on the R&D output of enterprises, provides theoretical basis for industry technology adjustment, and enriches the research on the economic consequences of tax policies.

This paper has the following contributions to the existing literature and the practical practice in China: based on the effect of tax policy, this paper analyzes the relationship between the income tax burden rate and the R&D output of pharmaceutical manufacturing industry with the method of mathematical empirical research, and divides enterprises into high-tech group and non-high-tech group for the first time.According to the marginal benefit theory, the negative correlation between tax burden and R&D output is only significant in the non-high-tech group, which enriches the research on the economic consequences of tax policy. In addition, there is a clear direction for the implementation of tax policies in the future work, and reasonable Suggestions are put forward to promote the rapid growth of enterprises' profitability and improve the competitiveness of China's innovative industries.

In this paper, methods of data search and empirical research are adopted.The medical manufacturing industry was mainly selected as the research object. Financial data of 215 pharmaceutical manufacturing enterprises in a-share from 2012 to 2017 were collected as samples, and 427 sample observed values were obtained through data screening.Through the construction of multiple linear model, the corresponding analysis is

conducted according to the output results of SPSS and Stata, and the corresponding conclusions are finally drawn based on the analysis results.

This paper is divided into five chapters, the specific arrangements are as follows：

Chapter 1 introduction.

Chapter 2 research and development status of pharmaceutical manufacturing industry.

Chapter 3 literature review and hypothesis.

Chapter 4 research design and sample selection.

Chapter 5 empirical results and analysis.

Chapter 6 conclusions and deficiencies.

II. Analysis of pharmaceutical manufacturing problems

（1） Problems faced

i. The number of enterprises increased, but the research and development capacity is insufficient

In recent years, the number of pharmaceutical manufacturing enterprises in China is increasing gradually.However, due to the high failure rate and high cost of medical research and development, this has high requirements on the scale and technology of enterprises.At present, a considerable number of pharmaceutical manufacturing enterprises in China are still in the initial stage of the industry and do not have such conditions. Therefore, the pharmaceutical manufacturing industry has insufficient independent research and development capacity.

ii. Inefficient research and development

The development of pharmaceutical manufacturing industry is largely dependent on technological innovation. Only through the research and development of new drugs and the use of new technology instead of old technology can pharmaceutical manufacturing continue to innovate and enhance the competitiveness of enterprises.The fund of technological innovation comes from the investment of enterprise research and development.In order to encourage enterprises to invest in research and development, the state has implemented a series of tax preferential policies, and some achievements have been made in recent years. However, compared with other industries in the high-tech industry, the efficiency of research and development still lags behind.

（2） Cause analysis

i. Weak sense of independent research and development

At present, most Chinese pharmaceutical manufacturing enterprises lack the consciousness of independent innovation and are only satisfied with the economic benefits brought by existing technologies, while ignoring the long-term interests of enterprises.At the same time, there are high risks and uncertainties in the development of technology. A large amount of people and funds need to be invested in the preliminary research, and the results are still uncertain. Many enterprises are not willing to take risks in research and development.In short, due to the weak awareness of independent research and development of enterprises, China's pharmaceutical manufacturing industry research and development input-output imbalance.

ii. Excessive dependence on external input and insufficient internal research and development

Compared with foreign enterprises, China's pharmaceutical manufacturing industry is relatively late in large-scale production, and its technology lags behind western developed countries. Many drugs are imitation production of existing foreign drugs, and the capacity of independent research and development is limited.At the same time, the research and development of new drugs requires a large amount of capital investment, and the enterprise's own capital cannot keep up with the demand of enterprise's research and development, leading to excessive dependence on government capital investment, thus hindering the research and development of new drugs to some extent.To some extent, external investment is beneficial to the development of enterprises, which can generate profits in a short period of time due to capital withdrawal. However, in the long run, it is not conducive to the development of enterprises, but also a threat to the overall technological progress of China.

III. Literature review and research hypothesis

Czarnitzki (2011) research R&D tax credit to Canadian manufacturing enterprise innovation activities, found that compared with no hypothetical situation of R&D tax credit, most enterprises with tax credits in the number of new products, new product sales, innovation ideas showed obvious superiority, so come to the conclusion that tax credit can bring additional innovation output. Dagenais (1997) studied relevant tax incentive policies of Canada and other countries and concluded that tax burden of enterprises in innovation and research can be reduced through tax incentives, and the output growth of enterprises in innovation and research can be promoted to some extent. Cappelen (2011) studied the effect of Norway's tax preferential policies on enterprise patents and innovation and found that tax preferential policies promoted new product output at the enterprise level to a certain extent. The study also believed that strengthening cooperation with other enterprises could

improve the probability of successful innovation activities. Guellec(2003) analyzed the data of 17 countries and found that tax incentives play a good role in promoting the innovation output of the whole society.

In view of the tax burden and R&D output of Chinese pharmaceutical manufacturers, scholars have discussed it from different perspectives.According to Fan (2018), the main influencing factors of China's new drug R&D output are: input capacity, innovation capacity, support capacity and policy strength.In terms of policy intensity, the author mainly selects tax preferential policies and intellectual property rights protection system as the measures of policy intensity.The study found that the higher the tax rate of enterprises, the less new drug research and development output, that is, there is a negative correlation between the two.Ling(2017) studied the tax burden of China's pharmaceutical manufacturing industry from the perspective of medium and micro levels, and came to the conclusion that from 2000 to 2014, the value added tax burden of China's pharmaceutical manufacturing industry showed a downward trend, while the corporate income tax burden showed a downward trend first and then upward trend. Compared with the tax burden of other subsectors of the manufacturing industry, the value added tax burden of the pharmaceutical manufacturing industry is relatively high, while the income tax burden is at a medium or high level. Cao, Meng and Xi (2017), biological pharmaceutical listed companies in Shanghai and shenzhen two city as an example, based on panel data from 2004 to 2014, using double difference model. Found income tax preferential policies to promote the strategic research output in emerging enterprises, and with the passage of time, the incentive of tax incentives for research and development of output will be more significant, but the policy effect will be affected by the period of other policies at the same time. Zhang (2013) analyzed the five years' data of listed companies and concluded that the income tax preference was more conducive to the improvement of enterprise performance than the turnover tax preference, and the influence of different taxes within the turnover tax on enterprise performance was different.

According to the above literature research, it can be seen that domestic and foreign scholars are studying the relationship between tax revenue and enterprise innovation and research.Most people believe that tax preferential policies and tax burden reduction have a positive effect on increasing the output of enterprise research and development, promoting the transformation of research and development results, and encouraging enterprise technological innovation. Starting from the tax burden ratio, this paper first studies the relationship between the tax burden ratio and the innovation and R&D output of enterprises, and then divides enterprises into high-tech enterprises and non-high-tech enterprises, respectively studying the impact of tax incentives on the R&D output of enterprises.

As one of the main taxes, income tax payment constitutes an important part of the tax payable of enterprises. The heavier the tax burden of enterprises is, the less cash flow they can freely spend.Companies may spend less on innovation and research in order to maintain day-to-day operations. Therefore, Li (2013) believes that reducing the enterprise income tax burden can increase the internal cash flow of enterprises, reduce the financing pressure of enterprises' investment in innovation and research, and thus stimulate enterprises to invest more money in research and development. Ma (2011) took high-tech listed companies on the board of small and medium-sized enterprises as the research object. By comparing the effects of financial subsidies and tax incentives on enterprises' R&D investment, she found that preferential income tax policies could promote enterprises' R&D investment.Zhang(2014) conducted an empirical analysis based on the data of China's information technology industry from 2008 to 2011.The empirical results show that the implementation of income tax preferential policy has a significant positive impact on the R&D investment. Feng (2015) used panel data of manufacturing enterprises to prove that tax incentives can increase enterprises' R&D investment.Fan (2018) believes that the tax burden ratio of enterprises and the degree of intellectual property protection have different influences on the R&D output of new drugs in China. Among them, from the perspective of policy intensity, the enterprise tax burden ratio has a long-term stable equilibrium relationship with the knowledge output and market output of new drug research and development. The research finds that the higher the enterprise tax burden ratio is, the less the new drug research and development output is, namely, there is a negative correlation between the two. In conclusion, this paper proposes the first hypothesis:

Hypothesis 1: corporate income tax burden is negatively correlated with corporate R&D output.

On the basis of hypothesis 1, considering the marginal utility between tax burden rate and R&D output, the selected enterprises are divided into high-tech enterprises and non-high-tech enterprises. Compared with high-tech enterprises which have enjoyed preferential policies, non-high-tech enterprises are more sensitive to the same income tax reduction. Therefore, this paper further proposes the second hypothesis:

Hypothesis 2: compared with high-tech enterprises, non-high-tech enterprises show more significant negative correlation between enterprise income tax burden and enterprise R&D output.

IV. Study design and sample selection

（1） Sample selection and data sources

The pharmaceutical manufacturing industry targeted in this study is classified according to the industries in the industry classification of China securities regulatory commission, and the listed companies belonging to the pharmaceutical manufacturing industry are counted according to the industry classification.As of December 2017, there are 215 listed companies in the pharmaceutical manufacturing industry. However, the financial data of some companies are missing or incomplete, so the following principles should be followed in the selection of samples:

i. Enterprises with incomplete financial data from 2013 to 2017 are not considered.
ii. enterprises with missing data such as income tax expense and valid invention patent number for 5 consecutive years shall not adopt.
iii. Excluding companies with pre-tax profits less than or equal to 0.

After screening the data according to the above three principles, 427 valid sample observations were finally obtained.Among them, the number of effective invention patents of enterprises comes from Guotai an database, and the rest data are all from Wind database.

（2） Model setting and variable definition

In order to investigate the relationship between enterprise income tax rate and enterprise research and development, this paper establishes the following linear regression model:

$$\text{Patent}_{i,t} = \alpha_0 + \alpha_1 \text{Tax}_{i,t} + \alpha_2 \text{Controls}_{i,t} + \varepsilon_{i,t} \quad (1)$$

Where subscript i represents the company and t represents the year.

Based on the practices of Liu (2018) and Fan (2018), this paper defines explanatory variable TAX as income tax burden rate. In this paper, "income tax expense/main business income" in financial statements is used to measure income tax burden. The ratio is more representative than the data, and the interference of some factors can be eliminated. The smaller the proportion, the smaller the proportion of income tax that the company undertakes in the main business income, the lighter the tax burden of the enterprise.

The explained variable in the model is Patent. Invention patent is a new technical scheme for product method or process, which is difficult to obtain and has high technical requirements, so it can better represent the innovation ability of enterprises.Therefore, in order to more comprehensively measure the level of R&D output of enterprises, the measurement method of Yu , Fan and zhong (2016) is referred to. This paper uses the number of valid invention patents as an indicator to measure the output of research and development. At the same time, considering that the number of effective invention patents of different enterprises varies greatly, even some enterprises do not have the number of effective invention patents. Therefore, this paper adopts the natural logarithm of the number of effective invention patents of listed companies and their subsidiaries plus 1.

According to Liu (2018) 's research, it is found that enterprise size and financial indicators will have an impact on enterprise technological innovation. The following control variables are set in this paper: enterprise size (InAsset) is the natural logarithm of enterprise total assets; Leverage refers to the ratio of total liabilities to total assets.Net sales interest rate (PM) is the ratio of net profit to sales revenue; Return on equity (ROE) is the ratio of net profit to shareholders' equity at the end of the period.

In order to verify hypothesis 2, the enterprise samples were divided into high-tech enterprise samples and non-high-tech enterprise samples according to the standards of high-tech enterprises, and then the regression of model (1) was carried out.

Table 1： variable definitions

VarName	Variable symbol	Description
Enterprise R&D output	Patent	The cumulative value of effective invention patents of enterprises is added by 1 and taken as the natural logarithm
Income taxburden rate	Tax	Corporate income tax/main business income
scale of company	InAsset	The natural log of total assets
debt-to-assets ratio	Leverage	Total liabilities/total assets
Net profit margin	PM	(net profit/sales) *100%
return on equity	ROE	Net profit/ending shareholders' equity

V. Empirical results and analysis

（1） descriptive analysis

Table 2： descriptive statistical results of main variables

VarName	Obs	mean	SD	Min	median	Max
Patent	427	3.4751	1.0499	1.0986	3.4965	6.7822
TAX	427	0.0131	0.0122	0.0000	0.0096	0.0879
InAsset	427	12.8472	0.8930	11.0358	12.7584	15.5171
Leverage	427	0.3229	0.1867	0.0261	0.3021	0.9550
PM	427	15.4461	14.3361	-91.9100	13.0800	111.4400
ROE	427	11.3561	10.1138	-85.4900	10.9100	74.1400

Table 2 shows the descriptive statistical results of the variables.Analysis of explained variables: the standard deviation of Patent is 1.0498, the maximum value is 6.7822, and the minimum value is 1.0986, which means that among the listed pharmaceutical manufacturing companies in China, the number of effective invention patents of different companies varies greatly, that is to say, the innovation output level of companies varies greatly.Analysis of explanatory variables: the mean value, standard deviation and maximum value of income taxburden rate (TAX) are 0.0131, 0.0122 and 0.0879, indicating that among the listed companies in China's pharmaceutical manufacturing industry, the TAX rate of some enterprises is much higher than the average level of the whole pharmaceutical manufacturing industry.

Analysis of control variables: the standard deviation of sales net profit (PM) was 14.3361, the maximum value was 111.4400, and the minimum value was -91.9100.The standard deviation of return on equity (ROE) is 10.1138, the maximum value is 74.1400, and the minimum value is -85.4900, which means that among the listed pharmaceutical manufacturing companies in China, the profitability of different companies varies greatly, which also reflects the huge difference in business performance of different companies. In addition, there are no abnormal conditions in other control variables.

（2） relativity test

In order to verify the hypothesis in this paper, multiple independent variables are introduced to establish three regression models.At the same time, in order to avoid confusion of regression results due to high correlation between variables, correlation tests were conducted on model 1, 2 and 3 respectively before regression analysis and interpretation of the model. SPSS was used to process and analyze the results as follows.

i. Model 1

It can be concluded from table 3 that the pair of independent variables with the highest correlation are scale and enterprise R&D output, and the correlation coefficient is 0.586.Therefore, there is no high correlation between the variables in the regression model. In addition, there is a significant negative correlation between income taxburden rate and enterprise R&D output in the whole sample.

Table 3： results of linear correlation analysis of variables of full sample regression equation

Statistics of correlation coefficients of the full sample regression equation

	Patent	Tax	InAsset	Leverage	PM	ROE
Patent	1					
Tax	-0.157**	1				
InAsset	0.586**	-0.043	1			
Leverage	0.244**	-0.164**	0.301**	1		
PM	-0.055	0.362**	0.038	-0.491**	1	
ROE	0.099*	0.222**	0.035	-0.210**	0.526**	1

* represents the test level of 0.05, and * * represents the test level of 0.01

ii. Model 2

It can be concluded from table 4 that the pair of independent variables with the highest correlation are the sales net interest rate and return on equity, with the correlation coefficient of 0.554. Therefore, there is no high correlation between the respective variables in the regression model.

In addition, the negative correlation between income tax burdenrate and enterprise R&D output is not significant in the high-tech group.

Table 4 ： results of linear correlation analysis of regression equation variables of high-tech group

Statistics of correlation coefficient of regression equation of high-tech group

	Patent	Tax	InAsset	Leverage	PM	ROE
Patent	1					
Tax	-0.123	1				
InAsset	0.537**	0.097	1			
Leverage	0.321**	-0.154*	0.334**	1		
PM	-0.172*	0.507**	0.030	-0.466**	1	
ROE	0.007	0.246**	0.034	-0.154*	0.554**	1

* represents the test level of 0.05, and * * represents the test level of 0.01

iii. Model 3

As can be seen from table 5, the pair of independent variables with the highest correlation are scale and enterprise R&D output, with a correlation coefficient of 0.594. Therefore, there is no high correlation between the variables in the regression model. At the same time, the income tax burden ratio was negatively correlated with R&D output in the non-high-tech group.

Correlation coefficient statistics of non-high and new group regression equation

	Patent	Tax	InAsset	Leverage	PM	ROE
Patent	1					
Tax	-0.186**	1				
InAsset	0.594**	-0.140*	1			
Leverage	0.170**	-0.179**	0.242**	1		
PM	0.000	0.292**	0.044	-0.517**	1	
ROE	0.125	0.213**	0.016	-0.258**	0.519**	1

* represents the test level of 0.05, and * * represents the test level of 0.01

Table 5 ： linear correlation analysis results of regression equation variables of non-high and new groups

（3） Regression analysis

After passing the correlation test, SPSS was used to import the selected data and conduct regression analysis. The specific results are shown in the figure below:

Table 6 ： results of overall regression analysis

	R-Square	Adj.R-Square	F	p value
All the samples	0.384	0.376	52.435	.000[a]
Group of High-tech	0.347	0.329	19.17	.000[a]
Group of Non-high-tech	0.389	0.376	29.911	.000[a]

* represents the test level of 0.05, and * * represents the test level of 0.01

Before for a single variable to explain, the regression equation of the first take a look at the overall situation, the table 6 shows that the regression equation of the sample group to adjust R 0.376, shows that independent variable on the dependent variable to explain overall, can reach more than 37%, the fit of the regression equation is good, and the P value is less than 0.01, shows that the regression equation is significant as a whole, and the whole samples. The high-tech group's regression equation has to adjust R-square to 0.329, which shows that the explanatory degree of independent variables to dependent variables can reach more than 32%, the regression equation fits well, and P value is less than 0.01, which indicates that the regression equation of high-tech group is significant as a whole; the non-high-tech group's regression equation has to adjust R-square to 0.376, which shows that the independent variables can be interpreted to dependent variables as a whole. The degree of interpretation can reach more than 37%, and the fitting degree of regression equation is good, and the P value is less than 0.01, which indicates that the regression equation of non-high-tech group is also significant as a whole.

Table 7：univariate regression analysis results

	All the samples	Group of High-tech	Group of Non-high-tech
Tax	-11.025**	-8.978	-10.358*
InAsset	0.666**	0.592**	0.702**
Leverage	0.225	0.377	0.1
PM	-0.007	-0.013	-0.005
ROE	0.017**	0.015	0.018**
constant term	-5.095**	-4.146**	-5.543**
Obs	427	186	241

* represents the test level of 0.05, and * * represents the test level of 0.01

Table 7 shows that in the regression results of the whole sample, there is a negative correlation between the tax burden rate of income tax and the logarithmic lag of the number of effective patents for one year, and the correlation is significant, and the regression coefficient is - 11.025. The results of the equation show that under the condition that other independent variables remain unchanged, the logarithm of effective patents in the next year will decrease by 11.025 units for every unit of increase in the tax burden rate of enterprise income tax in the current year. Thus, the increase of the tax burden rate of enterprise income tax will reduce the output of enterprise R&D, and its direct manifestation is the effective specialization of enterprise. On the other hand, if the tax burden rate of enterprise income tax is reduced by one unit, the logarithm of effective patents will increase by 11.025 units in the next year. Thus, it can be concluded that the reduction of tax burden rate of enterprise income tax is conducive to strengthening the R&D output of enterprises, which verifies hypothesis 1.

Table 7 shows that in the regression results of the high-tech group, there is a negative correlation between the tax burden rate of income tax and the logarithmic lag of effective patents for one year, but the correlation is not significant, and the regression coefficient is - 8.978. The result of the equation shows that under the condition that other independent variables remain unchanged, the logarithm of effective patents in the next year will increase by 8.978 units for every unit of reduction in the tax burden rate of income tax in the current year of the high-tech group, but this change relationship is not significant.

Table 7 shows that in the regression results of the non-high-tech group, there is a negative correlation between the tax burden rate of income tax and the logarithmic lag of the number of effective patents for one year, and the correlation is significant, and the regression coefficient is - 10.358. The result of the equation shows that under the condition that other independent variables remain unchanged, the logarithm of effective patents in the next year will increase by 10.358 units when the tax burden rate of income tax in the non-high-tech group is reduced by one unit in the current year. It can be seen that the reduction of the tax burden rate of enterprise income tax will increase the R&D output of enterprises, and its direct manifestation is that enterprises have Increase in the number of valid patents.

Compared with the results of the non-high-tech group and the high-tech group, the effective patent number of the non-high-tech group increases by 10.358 and 8.978 for each unit of reduction in the tax burden rate of enterprise income tax, and this change relationship is significant in the non-high-tech group, but not in the non-high-tech group. It can be concluded that other conditions remain unchanged. Under the same circumstances, reducing the tax burden rate of one unit of income tax, the R&D output effect of non-high-tech group enterprises is greater than that of high-tech group enterprises, which verifies hypothesis 2.

VI. Conclusion And Suggestion

This paper makes use of the statistical data of a number of listed pharmaceutical manufacturing companies in China from 2013 to 2017, and analyzes the R&D output of China's pharmaceutical manufacturing industry from the perspective of the logarithm lag of effective invention patents by one year and income tax

burden.The research results show that there is a negative correlation between income tax burden and the logarithm lag of effective patents for one year, which indirectly indicates that the income tax burden is negatively correlated with the R&D output effect of enterprises: for every 1 unit of income tax reduction, the logarithm lag of effective patents for one year increases by 11.025%.In addition, under this correlation, the income tax burden and R&D output effect of the pharmaceutical manufacturing enterprises with high-tech accreditation and those without high-tech accreditation show different results.For non-high-tech enterprises, the income tax rate is negatively correlated with the number of valid patents and inventions.For high-tech enterprises, the regression coefficient is not significant.By comparison, it can be seen that the R&D output effect of non-high-tech enterprises is more sensitive to the change of income tax burden. Other conditions remain unchanged, the income tax burden also drops by 1 unit, and the R&D output effect of non-high-tech enterprises is higher than that of high-tech enterprises.At present, our country in the income tax preferential policy, is to reduce the tax rate of new and high technology enterprises to collect the enterprise income tax rate of 15%, non-new and high technology enterprises to collect the tax rate of 25% is obviously higher.In such a policy environment, high-tech enterprises as the enterprise income tax preferential treatment object.As can be seen from the diminishing marginal effect of economics, the output effect of reducing the income tax burden rate of high-tech enterprises is not so high. On the contrary, if the government also reduces the tax burden rate of non-high-tech enterprises, the output effect will be more considerable.

Suggestions :(1) local governments can formulate corresponding preferential policies for income tax according to the tax burden ratio of local enterprises, so as to effectively enhance the R&D output of enterprises by reducing the tax burden ratio and drive the development of the pharmaceutical industry.(2) considering the difference in sensitivity of high-tech and non-high-tech enterprises to the income tax burden rate, the government can consider how to formulate other preferential tax policies for non-high-tech enterprises from other aspects, so as to maximize the output effect.

Reference

[1]. Bérubé, C., & Mohnen, P. (2009). Are firms that receive R&D subsidies more innovative?. The Canadian Journal of Economics / Revue canadienne d\"Economique, 42(1), 206-225.
[2]. Cappelen, A., Raknerud, A., &Rybalka, M. (2008). The effects of R&D tax credits on patenting and innovations. Discussion Papers, 41(2), 334-345.
[3]. Cao,Y., Meng,Y.&Xi,X.Y. (2017).The innovative role of income tax preferential policies on strategic emerging industries -- a sample of biomedical industry data. Journal of finance and accounting, (03),112-117.
[4]. Czarnitzki, D., Hanel, P., & Rosa, J. M. (2011). Evaluating the impact of R&D tax credits on innovation: a microeconometric study on canadian firms. Research Policy, 40(2), 217-229.
[5]. Dagenais,M.,Mohnen,P,.&Thierrien,P. (1997).Do Canadian Firms Respond to Fiscal Incentices to Research and Development [J].CIRANO Working Papers,34.
[6]. Fan,y.l. (2018).Research on influencing factors and incentive policies of China's new drug R&D output. Shenyang pharmaceutical university.
[7]. Feng,H.H.,Qu,W.&Li,M.L. (2015).Is tax preferential policy conducive to enterprises to increase investment in research and development?. Scientific research ,33(05),665-673.
[8]. Guellec,D., & Potterie,B.V.P.D.L.(2013) .THE IMPACT OF PUBLIC R&D EXPENDITURE ON BUSINESS R&D[J]. Economics of Innovation and New Technology,12(3).
[9]. ling,F.(2017). Research on tax burden of China's pharmaceutical manufacturing industry. Guangdong university of foreign studies.
[10]. Lliu,X.Y. (2016). Impact of income tax preference on R&D investment in pharmaceutical industry. Yunnan university.
[11]. Li,B.(2013). Research on macro tax burden based on economic growth. Financial theory and practice, (05),63-65.
[12]. Ma,W.H. (2011). An empirical study on the impact of tax incentives and government funding on enterprises' R&D investment -- based on panel data of listed high-tech enterprises. Science and technology progress and countermeasures, 28(17),111-114.
[13]. Yu,M.G.,Fan,R.&Zhong,H.J. (2016). China's industrial policy and enterprise technology innovation. China industrial economy,(12),5-22.
[14]. Zhang,L.L.(2013). An empirical study on the impact of structural tax cuts on corporate performance. Harbin Institute of Technology.
[15]. Zhang,B.(2014). Problems and Suggestions on tax preferential policies for high-tech enterprises in China. Financial supervision,(01),70-71.

Ma, Bao-Chun" Empirical analysis on corporate tax burden and innovation output" IOSR Journal of Business and Management (IOSR-JBM), Vol. 21, No. 7, 2019, pp. -.42-49.