The Effect of Tax Incentives on High-Tech Industries Innovation

Hongxia Li
lihongxia@shcc.edu.cn

School of Business Administration and Customs, Shanghai Customs College, Shanghai 201204

Abstract. High tech industry is the core force of national industrial development, covering medical, electronic communication, computer and other important fields. In recent years, the U.S. Department of Commerce has successively included Chinese enterprises involved in scientific and technological R&D in its "entity list" for import and export control. ZTE, Huawei and other enterprises relying on high-tech industry development have been seriously affected. Therefore, only by accelerating the development of independent high-tech industries can we have a say in the international competition. In order to quantify the effect of preferential tax, this paper divides preferential tax into general preferential tax and special preferential tax according to different incentive objects and scope of the application of preferential tax, studies the impact of these two policies on innovation efficiency of high-tech industries, and puts forward targeted suggestions on the basis of empirical analysis conclusions. In terms of innovation capacity efficiency, first, R&D expenses should be calculated and deducted in progressive proportion to further encourage the enthusiasm of high-tech industry in innovation input; Second, consideration should be given to both input and output when formulating preferential tax policies. In terms of innovation economic efficiency, first, the criteria for the identification of high-tech enterprises should be further optimized; Second, specific preferential policies should be formulated in line with industrial characteristics to increase the overall innovation economic efficiency of the high-tech industry.

Keywords: Tax Incentive; High technology industry; Enterprise Innovation

1 introduction

High-tech industry is the core force in our country's scientific research field to cope with the complex changes of both internal and external environment. However, high-tech industry itself is characteristic of remarkable externalities and high risks, etc. which are easy to cause problems such as frustration of both industry R&D (research and development) enthusiasm, shortage of R&D funds, high input in R&D with low returns, and waste of R&D resources. Li Weian (2016) believes that preferential tax enables enterprises to have the desire to increase the amount of innovation investment, because tax relief reduces the instability of innovation project capital flows from a risk perspective. In order to encourage innovation, the government should be willing to give up part of the tax rights to mitigate the innovation risk of enterprises [1]. Deng Weihong (2021) believes that preferential tax plays an important role in reducing the risk of innovation and encouraging the enthusiasm of it, therefore, it has an important impact on the innovation investment of enterprises [2]. Liu Lanjian, Alina Zhang (2021) believe that preferential tax can offset the innovation risk through a post-event compensation mechanism,

MSIEID 2022, December 09-11, Chongqing, People's Republic of China

DOI 10.4108/eai.9-12-2022.2327654

enhance the motivation and confidence of enterprises, thus enterprises will be motivated to increase research and develop high-quality patents [3]. Xu Lingling and others (2021) also believe that obtaining the certificate of high-tech enterprise is a sign shown to the industrial world that the enterprise has acquired the authoritative recognition, thus helping the enterprise to obtain more external financing. The high-tech enterprise enjoys the preferential enterprise income tax rate of 15%, which substantially increases the available cash flow [4].

Originally, the preferential tax policy by the government intends to encourage enterprises to innovate. Wei Shuyu and Xiao Peng (2021) believe that preferential tax has an elastic effect on R&D investment. By giving low-tax treatment and the policy of adding and deducting R&D expenses, enterprises are attracted by preferential tax in the R&D investment stage, and the investment amount will increase with the increase of incentives, thus stimulating the enthusiasm of the enterprise for research [5]. Zhang Mingdou (2020) pointed out that preferential tax is a form of incentives after the event, for example, the deduction of R&D expenses is done through the reduction or exemption of the already occurred R&D expenses before taxation in order to raise the enthusiasm of the innovation efforts of enterprises by compensating the enterprises in their innovation behavior after the event [6]. Bronwyn, Hall (2000) and other studies have also concluded that preferential tax policies have a promoting effect on R&D investment [7]. In order to quantify the incentive effect of preferential tax more accurately, this paper classifies preferential tax into general preferential tax and special preferential tax according to the different incentive objects and application scope of preferential tax, and studies the impact of the two types of policies on innovation efficiency of high-tech industries respectively.

On the contrary, Zheng Chunmei and Li Pei (2015) believe that the income tax exemption is more based on the sales income of old products, while the sales of new products are relatively low, and combined with the impact of R&D time costs, it is concluded that tax incentives not only do not increase the efficiency of enterprises' innovation economy, but sometimes have a negative impact on them [8]. Bloom and Griffiths (2002) found that tax breaks can make R&D investment costs and promote increased R&D investment intensity [9]. Li Wenjing and Zheng Mani (2016) believe that companies incentivized by tax incentives have significantly increased patent applications, but only pursue "quantity" and ignore "quality", and the actual effective invention patents have not increased significantly, making the innovation behavior of enterprises vain and have no real value [10]. Yuan Jianguo et al. (2016) found that although tax incentives have a significant impact on enterprises' investment in technological innovation, the incentive effect on innovation output is not enough to generate obvious incentives, indicating that enterprises' capital investment cannot be effectively rewarded, resulting in a decline in profitability [11].

To sum up, the existing studies on the impact of preferential tax on enterprise innovation all analyze the enterprise innovation as a whole, but do not analyze the impact of different types of preferential tax on enterprise innovation. In fact, however, the impact mechanism and effect results of different types of preferential tax on enterprise innovation performance are different. Therefore, this paper divides the preferential policies of enterprise income tax into general preferential policies and special preferential policies, studies the impact of the two policies on the innovation level and innovation performance of enterprises respectively, and then puts forward suggestions for optimizing preferential tax policies.

2 Research Assumptions

The preferential tax policies certainly have impact on the innovation efficiency of high-tech industries. As different types of preferential tax policies have different mechanisms and effects on enterprise innovation, the preferential policies are divided into general preferential policies and special preferential policies.

2.1 The impact of general preferential tax on high-tech industry innovation efficiency mechanism

The operating revenue of high-tech industry is closely related to its own core technology level. Core technology is the most important wealth of high-tech industry and the most important factor to measure the value of high-tech industry. The more advanced technology an enterprise has, the higher its operating efficiency achieves. Therefore, the high-tech industry will have the motivation and need to actively improve its own technological level for its own profit purpose, and the profit it acquired will in turn raise its own technological innovation level. The improvement of this part of enterprise innovation level is mainly driven by enterprise autonomy, but has less incentive effect by general preferential tax policies.

The strength of the R&D expense deduction depends on the increase of its expense, and the effect of the preferential tax policy is ex post facto, which results in the preferential R&D investment before the preferential strength of R&D investment, and also makes the effect of reducing capital risk generated by the preferential tax policy work in the following year instead of this year. The direct economic benefits it brings to the enterprise can only be reflected through a new round of innovation. To this end, the paper proposes that:

Hypothesis 1: General preferential tax has no incentive effect on innovation efficiency of high-tech industry in its present round.

Hypothesis 2: General preferential tax has an incentive effect on the new round of innovative behavior of enterprises.

2.2 The mechanism of special preferential tax impact on high-tech industry innovation efficiency

Special preferential tax can only be enjoyed by enterprises with the qualifications of high-tech enterprises. In order to meet the preferential threshold conditions, enterprises need to increase the amount of R&D input and output, which means that the threshold compels enterprises in high-tech industries to increase their capital investment. But for small-scale enterprises, such situation may appear: their own innovation level is difficult to reach the threshold but very close to it, which compels enterprises to outsource innovation projects. However, these innovative projects may not bring any benefits to their own products or services. Enterprises only generate additional expenditures to increase the number of innovations. Such expenditures are likely to become sunk costs of enterprises, which undoubtedly increase the capital burden of enterprises and even waste resources. Therefore, the special preferential tax will have a negative impact on the innovative economic efficiency of the enterprise, but combined with the economic effect of the preferential tax after the event, the overall impact will still be positive, because the enterprise is rational, it will not pay more than the cost of policy benefits to enjoy a certain preferential tax. To this end, the paper proposes that:

Hypothesis 3: special preferential tax has incentive effect on innovation capability of high-tech industry

Hypothesis 4: Special preferential tax has inhibitory effect on innovation economy of high-tech industry

3 Variable Selection and Data Sources

The data in this paper are from China Science and Technology Statistics Yearbook, China Torch Plan Statistics Yearbook and China High-tech Industry Statistics Yearbook. When studying the impact of general preferential tax on innovation in high-tech industry, the author of this paper selects the provincial panel data from 2011 to 2019. However, due to the difference among statistical sources of each yearbook and the change of statistical items in each year, the 2018 data items are incomplete, so the 2018 data are omitted in the selection of data years.

3.1 Interpreted variables

This paper divides innovation efficiency into innovation capability efficiency and innovation economic efficiency. For innovation capability efficiency, it is divided into R&D input level (ARD) and R&D output level from two dimensions. The level of R&D investment is measured by the average index of the R&D cost of high-tech industries in each province, and the level of R&D output is measured by the logarithm of the sales revenue of new products in each region. When studying the innovation economic efficiency of high-tech industries, the author of this paper chooses the ratio of new product sales revenue to R&D expenses as a variable indicator of innovation economic efficiency. Innovation economic efficiency represents the industry's ability to transform each R&D output into income. New product sales revenue and R&D expenses can well explain the efficiency of each R&D expense input into industry wealth.

3.2 Explanatory variables and control variables

In the choice of independent variables, for two different types of preferential tax, R&D expenses plus deductions are chosen to represent general preferential tax; while the high-tech enterprises are chosen according to 15% ratio tax reduction to represent special preferential tax. The number of high-tech enterprises is chosen as the variable of the special tax preference. The reasons for selecting this indicator are as follows:

(1) Due to the limitation of data acquisition, and the difference of the data types of the statistical yearbook survey in different years, the quantity is selected as the indicator of this explanatory variable in order to unify the data types in each year.

(2) The number of high-tech enterprises can clearly reflect the level of the preferential treatment of special tax rates in different regions, which to a large extent excludes the influence of other factors in the region on this variable.

As to selection of control variables, the total number of R&D institutions in each region determines the radiation effect of the region's overall scientific research and innovation level on high-tech industries; The average number of high-tech industry employees in each region

determines the size of high-tech industry enterprises; The enterprise funds in the R&D expenses of high-tech industries in various regions determines the impact of the enterprise's own funds on technological innovation; The profit margin of high-tech industries in each region determines the driving effect of the economic level in each region on the industrial revenue; The number of state-owned and state-controlled enterprises in each region determines the impact of the nature of the enterprises on the innovation efficiency of regional high-tech industries.

In addition, for the sake of the completeness of the logical structure of the full text, this paper adds financial subsidies as a control variable of preferential tax as a comparative study. The specific approach is to select the amount of government funds from R&D expenses, and select "number of enterprises" as the variable of R&D expenses deduction. Through the impact of the scale of application of this policy in different industries of high-tech industry on the average R&D expenses of each industry, this paper explains the impact of the R&D expenses deduction policy on industrial innovation investment. See Table 1 and Table 2 for description of variables and statistical description:

Table 1 Variables and Interpretations

Variable			Variable Description
Interpreted variable:			
Innovation capability efficiency:	Innovation input	ARD	The averaged total R&D expenditure of high-tech industry
	Innovation output	AS	logarithmic revenue from sales of new products in high-tech industry
Innovative economic efficiency		Inov	Total revenue from sales of new products/expenses for R&D in high-tech industry
Explanatory variables:			
General preferential tax		GTap	Number of high-tech enterprise industries
Special preferential tax		STap	Number of high-tech enterprises in each region
General preferential tax		APs	R&D expenses plus deduction ratio multiplied by the statutory tax rate/number of enterprises in the region
Control variable:			
Enterprise capital		LnEf	logarithm of the number of corporate funds in R&D expenses
Average number of employees		ARdp	Average number of employees in high-tech industries by region
Grant-in-aid		LnGf	Government grants
Profit rate		Pm	Total profit/operating income
Number of state-owned and state-controlled enterprises		Soe	Number of China's Owned and State-controlled Enterprises in High-tech Industries in Each Region
Number of R&D institutions		Rdo	Number of R&D institutions in each region

Table 2 Descriptive Statistics

Variable	Observed Value	Average Value	Standard Deviation	Minimum Value	Maximum Value
AS	240	10,690	8,289	126.8	57,132
ARD	240	907.9	511.1	13.87	2,465
Inov	240	61.04	59.10	10.22	597.6
GTap	240	962.2	1,431	14	9,542
STap	240	3,124	5,660	37	49,991
APs	240	129.9	82.58	1.734	462.2
lnGf	238	9.883	1.862	3.401	13.66
Pm	240	0.0824	0.0370	-0.00424	0.235
ARdp	240	406.9	161.8	153.7	1,086
Rdo	240	118.0	68.26	18	396
Soe	239	52.68	45.76	0	189
lnEf	240	12.27	1.811	5.888	16.23

4 Model Setting

Based on the four assumptions proposed by the impact path, a fixed effect model is established on the basis of provincial panel data, and robustness error is set to solve the heterogeneity variance. Model (1) and model (2) are used to test the impact of general preferential tax on the innovation capability efficiency of high-tech industries; Model (3) and model (4) are used to verify the impact of special preferential tax on high-tech innovation efficiency; Model (5) is used to test the impact of special preferential tax on innovation economic efficiency of high-tech industries. Model (6) is used to test the impact of preferential tax on the new round of R&D investment level of high-tech industries.

$$ln\mathrm{ARD}_{it} = \beta_0 + \beta_1 \mathrm{Gtap}_{it} + \beta_2 \mathrm{Control}_{it} + \mu_i + \eta_t + \varepsilon_{it} \quad (1)$$

$$ln\mathrm{AS}_{it} = \beta_0 + \beta_1 \mathrm{Gtap}_{it} + \beta_2 \mathrm{Control}_{it} + \mu_i + \eta_t + \varepsilon_{it} \quad (2)$$

$$ln\mathrm{ARD}_{it} = \beta_0 + \beta_1 \mathrm{Stap}_{it} + \beta_2 \mathrm{Control}_{it} + \mu_i + \eta_t + \varepsilon_{it} \quad (3)$$

$$ln\mathrm{AS}_{it} = \beta_0 + \beta_1 \mathrm{Stap}_{it} + \beta_2 \mathrm{Control}_{it} + \mu_i + \eta_t + \varepsilon_{it} \quad (4)$$

$$ln\mathrm{Inov}_{it} = \beta_0 + \beta_1 \mathrm{Stap}_{it} + \beta_2 \mathrm{Control}_{it} + \mu_i + \eta_t + \varepsilon_{it} \quad (5)$$

$$L\mathrm{nARD}_{it} = \beta_0 + \beta_1 L.\mathrm{Aps}_{it} + \beta_1 \mathrm{Gtap}_{it} + \beta_2 \mathrm{Control}_{it} + \mu_i + \eta_t + \varepsilon_{it} \quad (6)$$

The data uses provincial panel data from 2010 to 2019 (excluding incomplete data from 2018). The following table I represents the I-th region, T represents the T-th year, μ_i is an

unobservable provincial effect, η_t is an annual virtual variable, and ε_{it} is an error term. $\mathrm{Ln}ARD_{it}$ is the R&D input of the I-th region in the T-th year, $\mathrm{Ln}AS_{it}$ is the R&D output of the I-th region in the T-th year, and $\mathrm{Ln}Inov_{it}$ is the R&D economic efficiency of the I-th region in the T-th year. Aps_{it} represents the R&D plus preferential tax of the I-th region, and $Control_{it}$ represents the control variables such as corporate capital, average number of employees, financial subsidies, profit margins, number of state-owned and state-owned enterprises holding shares, and number of R&D institutions.

5 Analyses of Empirical Results

Based on the selection and definition of indicators of empirical variables, the determination of sample data sources and time, and the construction of basic model, this paper uses the software Stata15.1 to conduct empirical regression analysis on different types of preferential tax and innovation efficiency of high-tech industries; The empirical analysis is carried out by applying the fixed effect model and adding the standard error of stability; The specific empirical results are shown in the empirical regression results (1) and (2) in Table 3. In order to make the conclusion of the empirical study comprehensive, the robustness test is made on the estimation results (the specific results are omitted).

Table 3 Empirical Regression Results (1)

	(1)	(2)	(3)	(4)	(5)
VARIABLES	ARD	AS	ARD	AS	INOV
STap			0.016***	0.092	-0.000
			(3.16)	(1.27)	(-0.05)
GTap	0.033	0.432			
	(0.58)	(0.63)			
lnGf	98.464**	815.472**	95.012**	805.811**	1.752
	(2.10)	(2.57)	(2.12)	(2.50)	(1.55)
ARDP	0.279	11.871	0.706*	13.655*	0.004
	(0.66)	(1.51)	(1.80)	(1.72)	(0.20)
RDO	-0.686	-50.141**	-0.250	-47.154**	-0.066**
	(-0.56)	(-2.38)	(-0.23)	(-2.18)	(-2.07)
PM	729.784	21,083.799**	629.106	20,513.442**	24.014
	(1.07)	(2.30)	(0.94)	(2.23)	(0.55)
SOE	-1.229	55.701	-2.106	52.547	0.159*
	(-0.44)	(1.57)	(-0.92)	(1.45)	(1.94)
lnEf	252.332***	771.255	241.766***	735.263	-9.119***
	(9.38)	(0.90)	(9.99)	(0.86)	(-3.51)
Constant	-3,229.401***	-10,866.667	-3,255.856***	-11,069.464	104.876***
		(-1.05)		(-1.06)	

	(-4.70)		(-4.86)		(3.98)
Observations	237	237	237	237	237
Number of PROVI	30	30	30	30	30
R-squared	0.454	0.064	0.499	0.067	0.099

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5.1 Analysis of the empirical results of general preferential tax on the innovation efficiency of high-tech industries

The empirical results of model (1) show that: 1. General preferential tax has a positive relationship with the average R&D costs of each region, but the degree of correlation is not significant. 2. State financial subsidies and corporate financial support have a positive correlation with the average R&D costs of each region and the correlation degree is relatively significant, which is significant at the statistical level of 5% and 1% respectively. The correlation degree of corporate funds on the level of R&D costs is slightly higher. From the empirical results of model (1), the results are basically in line with hypothesis 1: general preferential tax has a positive effect on the innovation input of enterprises, but has no significant effect on the first round of output of high-tech industries.

The empirical results of model (2) show that:

(1) General preferential tax has a positive impact on the innovation output capacity of each region, but the significance level is not high.

(2) Financial subsidies have a significant positive impact on the innovation output efficiency of high-tech industries, which is the same as the innovation output efficiency. 3. Corporate capital has a positive impact on the innovation output capacity of each region, but the significance level is not high. During the process of the conversion of input of high-tech industry into its output, the utilization efficiency of various resource elements is limited.

5.2 Analysis of the empirical results of special preferential tax on innovation efficiency of high-tech industries

The empirical results of model (3) show that special preferential tax has a significant positive incentive effect on innovation investment in high-tech industries, and the impact of other variables such as state financial subsidies on innovation investment is basically consistent with the results in model (1). It indicates that the higher the coverage level of obtaining the high-tech enterprise qualification certification in the region is, the higher the average investment level of R&D expenses in the region will be. It also indicates that the threshold conditions set by the special preferential tax for the high-tech enterprise qualification certification can really motivate the high-tech industry to increase the investment in R&D expenses.

The empirical results of model (4) show that the special preferential tax has a positive effect on the industry's innovation output level, but the effect is not significant. It further proves that the high-tech industry has the problems of low resource utilization efficiency and waste of

resources between innovation input and innovation output.

The empirical results of model (5) show that although there is a negative correlation between special preferential tax and regional innovation economic efficiency, the results are not significant. This is not in line with hypothesis 4 that special preferential tax inhibits the innovative economic efficiency of high-tech industries. It shows that the qualification accreditation of high-tech enterprises has certain requirements for R&D input on the one hand and on the other hand, innovation output of enterprises also has certain requirements, such as sales income of new products, the number of patent applications and the level of scientific research output, etc. Therefore, although special preferential tax has a negative effect on the innovation economic efficiency, yet due to the requirements by high-tech enterprises for innovation output, it will not have a significant inhibitory effect on innovation economic efficiency. In comparison, in the empirical results of model (5), it is found that the industry's own capital also has a significant inhibitory effect on the innovation economic efficiency of the industry, that is, the more capital the industry itself invests in R&D, the smaller the conversion ratio of new product sales revenue to R&D expenses will be, and the poorer the economic efficiency will achieve. This is due to the arbitrariness of the industry's own funds and less external restrictions. In the case of low output and high input, the increase in the high-tech industry's own funds will have a stronger inhibitory effect on the ratio of sales revenue of new products to the output of R&D expenses.

5.3 Analysis of the empirical results of the impact of general preferential tax on the new round of industrial innovation efficiency

The empirical results of model (6) show that the strength of preferential tax generated by the addition and deduction of R&D expenses of high-tech industries has a significant positive incentive effect on the innovation investment effect of the new round of high-tech industries. Comparing the empirical results of model (6) with model (1), it can be found that the general preferential tax has no significant incentive effect on the current round of R&D investment, but has significant incentive effect on the new round of R&D investment.

Table 3 Empirical Regression Results (2)

	(6)
VARIABLES	ARD
L.APS	1.157***
	(3.01)
lnGf	85.844**
	(2.35)
ARDP	0.347
	(1.40)
RDO	0.989
	(1.25)

PM	1,029.433* (1.88)
SOE	-0.042 (-0.02)
lnEf	154.631*** (4.61)
Constant	-2,323.410*** (-5.19)
Observations	179
Number of PROVI	30
R-squared	0.411

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5.4 Robustness test

In order to increase the stability and accuracy of the empirical results, on the basis of the above regression, this paper will further carry out robustness test on the key models (1), (3), (5) and (6), shorten the time window to 2013-2019 by adding virtual variables such as time-fixed effect and province-fixed effect and adjusting the sample period, and exclude the years far away from 2011 and 2012 for robustness test. The robustness test results are basically consistent with the above regression results.

6 Conclusions and Suggestions

6.1 The research conclusions drawn from the benchmark regression of the model through the fixed effect are summarized as follows:

(1) In terms of efficiency in stimulating enterprises' innovation ability

General preferential tax has no significant incentive effect on the innovation input efficiency and output efficiency of this round of high-tech industry. Special preferential tax has significant positive incentive effect on innovation input efficiency, but has no significant effect on innovation output efficiency. The paper presents the following specific explanations: 1. The high-tech industry has the problems of low resource utilization rate and waste of resources between input and output; 2. The index is selected from the regional average level, and there is a large gap in technological income of high-tech industries in the region, which makes it difficult for average index to reflect the policy effect; 3. Affected by the features of high-tech industry, high-tech industry has the characteristics of instability and long-term, which result in the fact that incentive effect of special preferential tax on innovation output cannot have significant effect on innovation input effect.

(2) In terms of innovation input

The reason why the special preferential tax has a more significant incentive effect than the

general preferential tax is that the special preferential tax has a high intensity of incentives attraction. There are certain threshold conditions of stimulation, so that high-tech industries are willing to increase R&D efforts to meet the threshold requirement of the special preferential tax. The general preferential tax is generally used for many years, which will make the industry lose sensitivity to this policy. However, the preferential strength generated by the general preferential tax has a significant incentive effect on the new round of industrial innovation investment. This is because the preferential tax is ex post facto. This round of policy incentives takes place after the industry has carried out innovative behavior, while the actual preferential tax acts on a new round of innovation investment with a significant incentive effect.

(3) In terms of innovative economic efficiency

Special preferential tax has no significant inhibitory effect on innovation economic efficiency. On the contrary, compared with the significant inhibitory effect of corporate capital on the positive efficiency of innovation, special preferential tax has, to a certain extent, a mitigating effect on the economic efficiency of innovation. Due to the particularity of preferential tax in the recognition of high-tech enterprise qualification, preferential tax emphasizes a certain level of the industry R&D expenses in R&D investment, and requires a certain index of the industry in the R&D output of new products sales income. Therefore, although the resource utilization efficiency of high-tech industry is not high due to various reasons, the threshold effect makes less significant of the inhibition of special preferential tax on innovation economic efficiency.

6.2 Suggestions

In order to enhance the impact of preferential tax on the innovation efficiency of high-tech industries, improve the efficiency of industrial innovation capability and innovation economy, combined with the current situation of China's high-tech industries and related tax policies and the corresponding empirical analysis results, this paper puts forward targeted suggestions as follows:

First, the enthusiasm of high-tech industries in innovation investment can be further enhanced by adopting progressive proportion plus deduction of R&D expenses; Second, when formulating preferential tax policies, we should give consideration to the dual benefits of both input and output, that is, tax preferences should not only consider how to stimulate industrial innovation input, but also give policy-based encouragement and recognition to innovation output. In addition, in terms of innovation economic efficiency: first, we should further improve the qualification conditions for high-tech industries, specifically reducing the restrictions on enterprises' input and stressing the threshold of output, so as to improve the economic efficiency of industrial innovation and improve the conversion rate of input and output; secondly, specific preferential policies in line with industrial characteristics should be made. The development level of various enterprises within the high-tech industry is uneven. Only by formulating more specific tax policies and allocating resources to the enterprises that need development, can the overall innovation economic efficiency of high-tech industries be increased.

References

[1] Li Weian, Li Haobo, Li Huicong. Innovation incentives or tax shields? -Research on Preferential tax for High-tech Enterprises [J]. Research Management, 2016,37(11):61-70.

[2] Deng Weihong. The impact of preferential tax on corporate innovation-an empirical analysis based on micro-survey data [J]. Systems Engineering, 2021,39(03):37-47.

[3] Liu Lanjian, Alina Zhang, Huang Tianhang. The impact of government subsidies and preferential tax on the quality of patents and their threshold effect-based on the empirical analysis of listed companies in the new energy automobile industry [J]. Research Management, 2021,42(06):9-16.

[4] Xu Lingling, Yang Zheng, Liu Fang. Identification of High-tech Enterprises, Preferential tax and Technological Innovation of Enterprises-Regulation of Marketization Level [J]. Management Review, 2021,33(02):130-141.

[5] Wei Shu Yu, Xiao Peng. Preferential tax, financial subsidies and corporate R&D investment-based on the empirical analysis of Shanghai and Shenzhen A-share listed companies [J]. Tax Research, 2021(05):40-46.

[6] Zhang Mingdou. The impact of government incentives on the innovation quality of high-tech enterprises-promotion effect or extrusion effect? [J]. Journal of Southwest University for Nationalities (Humanities and Social Sciences Edition), 2020,41(05):122-134.

[7] Hall B, Reenen J V . How effective are fiscal incentives for R&D? A review of the evidence[J]. Research Policy, 2000, 29(4/5):449-469.

[8] Zheng Chunmei, LI Pei. The impact of government subsidies and tax incentives on the innovation performance of enterprises: An empirical study based on high-tech enterprises on ChiNext[J].Science and Technology Progress and Countermeasures,2015,32(16):83-87.)

[9] Bloom, Griffith, Reenen. The economics of regulation of high technology industries[C]. Oxford: Oxford University Press, 2002:207-223.

[10] Li Wenjing, Zheng Mani. Substantive innovation or strategic innovation? The impact of macro-industrial policy on enterprise innovation[J].Economic Research Journal,2016,51(04):60-73.)

[11] Yuan Jianguo, Fan Wenlin, Cheng Chen. Tax Incentives and Enterprise Technology Innovation-An Empirical Study Based on Chinese Listed Companies[J].Taxation Research, 2016(10):28-33.