

Research On The Incentive Effect Of Government Tax Preference On Independent Innovation Of Emerging Enterprises

Furui Pang

School of Economics, Jilin University, Changchun, Jilin Province, China

pangfrjlu@163.com

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Abstract: Currently, emerging industries are gradually becoming the leading force to promote the transformation of China's industrial structure, and independent innovation is the driving force for the development of emerging industries. For the government, it has become an important policy to stimulate the independent innovation of emerging enterprises. Appropriate financial and tax incentive tools can make up for the loss brought by the externality of independent innovation to a certain extent, while reducing the risk of innovation activities and the cost of innovation. But whether these tax preferences can promote the independent innovation of enterprises, and what kind of preferential policies can have a better incentive effect? To explore these issues, in this paper, empirical analysis method is used to build a relationship model to study the incentive effect of tax incentives on independent innovation of enterprises, so as to provide reference for the formulation of government incentive policies. The regression analysis shows that, tax incentives can not only promote the innovation investment of strategic emerging enterprises, but also encourage them to develop more achievements and improve innovation efficiency.

1. Introduction

Emerging industries are industries based on major cutting-edge scientific and technological breakthroughs to develop new driving forces, with the characteristic of intensive knowledge and technology, less consumption of material resources, huge development potential and high comprehensive benefits. Under the strong call of the state, local governments have issued various policies to guide and encourage emerging enterprises to carry out independent innovation. However, because of innovation risk, innovation externality and other factors, enterprises are not willing to carry out innovation activities. In order to reduce the risk of enterprise innovation and promote enterprise independent innovation, the government has promulgated various fiscal and tax incentive policies. Some scholars hold that tax incentives have positive effects on enterprise innovation.^{[1]-[6]} Wang Yanchao pointed out that the effects of tax incentives and financial subsidies on different industries and enterprises with different property rights are quite different.^[7] Chen Hong points out that governmental subsidies and tax incentives have different effects on innovation performance at different stages of a firm's life cycle.^[8] Yuan Jianguo points out that the incentive effect of tax preference on enterprise innovation output is not obvious based on the regional differences.^[9] Due to the complexity of the implementation process of financial and tax tools, some enterprises use R & D to manipulate and apply government subsidies to carry out other activities, which leads to the reduction of the efficiency of R & D innovation. Therefore, in this paper, empirical analysis method is used to build a relationship model to study the incentive effect of tax incentives on independent innovation of enterprises, so as to provide reference for the formulation of government incentive policies.

2. Promotion Effect of Tax Preferences on Enterprises' Independent Innovation

Tax policies are necessary and effective for promoting independent innovation, although it has certain indirectness and lag. From the perspective of tax regulation, government function and

technological innovation process, we summarize the promotion role of tax preferential policies in promoting technological innovation of enterprises.

2.1. Policy Oriented Role in Independent Innovation

Tax policy is an important means of fiscal policy for the government to control Macro-economy. According to the economic development and industrial development, combined with the actual needs of enterprises, the government formulates different preferential tax policies for different regions to reflect the government's support and encouragement for an industry, to guide the rational allocation of resources, so that the industries that need to be developed can obtain the required resources. For example, if the government issues preferential policies for science and technology tax, it can not only directly reduce the burden of enterprises, but also promote the flow of social resources to high-tech enterprises.

2.2. Reduce the Risk of Independent Innovation Activities of Enterprises

The technological innovation activities carried out by enterprises have risks such as large investment in the early stage, long time of R & D and great uncertainty, which makes some enterprises reluctant to carry out technological innovation activities. To solve this dilemma, on the one hand, enterprises should strictly control the direction of research and development, and strengthen the industrialization of scientific research results; on the other hand, the government should issue corresponding fiscal and monetary policies to subsidize and support the R & D activities of enterprises, and tax incentives are a good solution. For example, through policies such as R & D expenses plus deduction and research instruments exemption from value-added tax, enterprises can reduce the costs and expenses of technological innovation; implement delaying tax payment policy, such as accelerated depreciation, to reduce the current tax payable, speed up the capital turnover recovery of investment in technological innovation, to reduce the risk of large capital investment, as well as the pressure of corporate liquidity; increase the after tax profit of the enterprise by adopting policies such as investment credit and pretax additional deduction of expenses.

2.3. Encourage Enterprises to Take the Initiative in Technological Innovation

The effective tax incentive policy can make the enterprises take the initiative to carry out innovation activities, especially emerging enterprises. China's government has made new regulations on the recognition conditions of emerging technology enterprises, including R & D expenditure, proportion of R & D personnel, core competitiveness of enterprises formed by continuous R & D activities, etc. These regulations are clear and specific, and the standards are stricter. In order to enjoy a series of preferential tax policies for high-tech enterprises, emerging technology enterprises must actively increase their R & D expenditure. More importantly, these regulations abolished the life-long system recognized by enterprises and adopted dynamic management. Considering their own interests, enterprises will increase investment in R & D funds and human resources, and actively promote independent innovation.

3. Current Situation of Preferential Tax Policies for Emerging Enterprises in China

Current preferential tax policies for strategic emerging industries in China are shown in Table 1. At present, the preferential tax system formulated by the Chinese government for strategic emerging industries is still imperfect. The preferential income tax for strategic emerging industries is mainly concentrated in the new generation of information technology industry, integrated circuit industry, energy conservation and environmental protection industry. Compared with the flow tax preference, the income tax preference is mainly aimed at the reduction of taxable income tax of strategic emerging enterprises, which directly increases the free capital flow of enterprises. Moreover, the impact of income tax preference is more extensive, and some of its preferential terms can reduce the overall income tax burden of strategic emerging industries. At present, the income tax preferences are mainly concentrated in the middle and later stages of innovation activities. The incentive scope of the turnover tax preference related to strategic emerging industries is smaller, the main reason is the

turnover tax preference mainly focuses on the industrialization stage of innovation achievements, and provides tax relief for innovative products in the market circulation process. The basis of the reduction is the increase of turnover, and the amount of the preferential policy is less. At present, the preferential policy of turnover tax has been implemented in various industries of strategic emerging industries.

Table 1. Current preferential tax policies for strategic emerging industries in China

Tax category	Specific preferential policies
Income tax preference	For the R & D expenses that the enterprise has not formed intangible assets and are included in the current profits and losses, on the basis of deduction according to the provisions and facts, 75% of the R & D expenses shall be added and deducted. If the intangible assets are formed, 175% of the cost of the intangible assets shall be amortized
	The part of technology transfer not exceeding 5 million Yuan is exempted from tax, and the part exceeding 5 million Yuan is reduced by half.
	Integrated circuit design enterprises enjoy the income tax preference of "two exemptions and three reductions" or "five exemptions and five reductions".
	Enterprises engaged in qualified environmental protection, energy conservation and water conservation projects can enjoy the preferential income tax according to the three exemption and three half reduction.
	For the purchase of the specified special equipment for environmental protection, energy conservation and water saving, and production safety, 10% of the taxable income shall be credited according to the investment amount of the equipment.
	The income from the comprehensive utilization of resources and the production of products in line with the provisions of the state industrial policies can be reduced by 90% and included in the total income.
	The income tax of high and new technology enterprises and advanced technology service enterprises that meet the state key requirements shall be calculated according to the 15% tax rate.
Value added tax preference	For the new generation of technology and information industry, the general taxpayers who sell the software products developed and produced by themselves shall collect the value-added tax at 16% of the legal tax rate, and refund the part whose actual tax burden of value-added tax exceeds 3%.
	The export tax rebate rate for biological industry, biomedical products and some high-tech products encouraged by national industrial policies has been increased from 13% to 16%; the export tax rebate rate of biomedical products such as HIV drugs and recombinant human insulin lyophilized powder increased from 5% to 11% and 13% respectively.
	For the new material industry that sells some new material products produced by itself, the realized value-added tax shall be levied or refunded by 50%.
Consumption tax preference	Solar cells, fuel cells and other new energy batteries are exempt from consumption tax.
Other tax preference	The vehicle and ship tax and vehicle purchase tax of new energy vehicles and vessels shall be exempted, and the vehicle and ship tax of energy-saving vehicles and vessels shall be reduced by half.

4. Measurement Model of Incentive Effect of Tax Preference on Emerging Enterprises Independent Innovation

4.1. Hypothesis

According to the relevant theory of public economics, tax preference can increase the private income of technological innovation investment, effectively alleviate the loss of technological innovation externality, and promote technological innovation of enterprises. Tax preference includes income tax preference and turnover tax preference. Income tax preference directly relieves and relieves the enterprise's payable income tax, mainly focusing on the intermediate stage of R & D activities; the turnover tax preference is to reduce the amount of tax payable based on the circulation increment. The main object of the preference is the innovative products through the industrialization of innovative achievements, and then indirectly increase the profits of enterprises and the cash available for distribution. Both of them can increase the resources owned by enterprises, but they play an incentive effect in different stages of R & D. This paper studies the relationship between government's preferential tax policies with enterprises' independent innovation, and proposes the following assumptions:

Hypothesis 1: Tax preference has an incentive effect on independent innovation of emerging enterprises; Hypothesis 2: Income tax preference has an incentive effect on independent innovation of emerging enterprises; Hypothesis 3: Turnover tax preference has an incentive effect on independent innovation of emerging enterprises.

4.2. Variable Selection

There is no unified standard for the measurement of indicators of enterprises' independent innovation capabilities. Some scholars regard the intensity of R&D investment as the measurement index of innovation input, and the number of patent applications as the measurement index of innovation output.^[10] On this basis, the innovation efficiency is regarded as the third measurement index of independent innovation capability of enterprises through data envelopment analysis.

4.2.1. Explained Variables

In this paper, we measure the independent innovation capabilities of the explained variables from three perspectives: innovation input, innovation output, and innovation efficiency.

Innovation input (inp): The higher the intensity of R&D investment, the more important the enterprise attaches to independent innovation and the higher the level of innovation capital invested.

Innovation output (outp): we take the number of patent applications as indicators of innovation output.

Innovation efficiency (effi): innovation efficiency is measured by the data envelopment analysis method in the frontier production function.

4.2.2. Explanatory Variables

We choose the, total tax burden, income tax burden and turnover tax burden as explanatory variables. Total tax burden (tax): we use the ratio of the taxes and fees actually paid by the enterprise in the current period to the current operating income as a measure of the total tax burden.

Income tax burden (itax): due to the difference in the nominal income tax rate of different companies, we choose the ratio of actual income tax to total profit to measure the income tax burden. For one enterprise, the higher the income tax burden, the less the tax preference.

Turnover tax burden (ttax): The turnover tax includes not only the value-added tax but also the consumption tax and the tariff, so the calculation result of only subtracting the actual turnover tax rate from the nominal value-added tax rate is not accurate. We use the ratio of turnover tax to current operating income to measure turnover tax.

4.2.3. Control Variables

In this paper, total assets scale, revenue growth rate, asset turnover rate, return on equity and asset liability ratio are selected as control variables.

Total assets scale (tas): total assets scale is measured by the logarithm of total assets. The larger the total assets of an enterprise, the richer the resources it has. Compared with small-scale enterprises, large-scale enterprises have more abundant resources and are more willing to carry out R & D

innovation. Therefore, we take enterprise total assets scale as a control variable to study the impact of fiscal and tax incentives on R & D investment.

Revenue growth rate (rgr): the growth rate of business income can evaluate the growth ability of enterprises. The higher the growth rate of business income, the better the growth ability of the enterprise, and the greater the development potential in the future. Therefore, such enterprise usually has a stronger willingness to carry out independent innovation.

Asset turnover rate (atr): asset turnover rate is an important index to evaluate the asset management and utilization efficiency of an enterprise from the perspective of operating capacity. When enterprises carry out innovation activities, the faster the turnover of assets, the more liquidity they have, which may reduce the R & D risk to some extent. Therefore, there is a certain relationship between the growth rate of total assets and the independent innovation activities of enterprises.

Return on equity (roe): return on equity measures the profitability of an enterprise. The more profitable an enterprise is in the same period, the more resources it has for free distribution. After these resources meet the needs of production and operation at this stage, the more resources it has left for innovation. Therefore, there is a certain relationship between return on net assets and independent innovation activities of enterprises.

Asset liability ratio (alr): asset liability ratio measures the ability of an enterprise to use its creditors' funds for production and operation. The higher the asset liability ratio is, the higher the debt of the enterprise is and the higher the operational risk is. In order to reduce the comprehensive risk of enterprises, the willingness of independent innovation will be reduced.

4.3. Model Building

According to the research hypothesis and variable index as above, we build the relationship model between independent innovation ability and tax burden as follow:

$$Inno_{i,t} = \beta_0 + \beta_1 tax_{i,t} + \beta_2 tas_{i,t} + \beta_3 rgr_{i,t} + \beta_4 atr_{i,t} + \beta_5 roe_{i,t} + \beta_6 alr_{i,t} + \varepsilon \quad (1)$$

$$Inno_{i,t} = \beta_0 + \beta_1 itax_{i,t} + \beta_2 tas_{i,t} + \beta_3 rgr_{i,t} + \beta_4 atr_{i,t} + \beta_5 roe_{i,t} + \beta_6 alr_{i,t} + \varepsilon \quad (2)$$

$$Inno_{i,t} = \beta_0 + \beta_1 ttax_{i,t} + \beta_2 tas_{i,t} + \beta_3 rgr_{i,t} + \beta_4 atr_{i,t} + \beta_5 roe_{i,t} + \beta_6 alr_{i,t} + \varepsilon \quad (3)$$

In the above formulas, *Inno* represents the enterprise's independent innovation capability, which includes innovation input, innovation output, and innovation efficiency. *i* represents different companies; *t* represents different years; β_i is estimated parameters; ε is the random error term of the model. Model (1) ~ (2) is built to test Hypothesis 2 and Hypothesis 3. They verify the relationship between income tax burden and turnover tax burden and corporate independent innovation, to indirectly verify whether the preferential income tax and turnover tax policies implemented by the government will encourage enterprises to innovate independently.

4.4. Data Sources

In 2012, in the national strategic emerging industry development plan issued by the Chinese government, the strategic emerging industry was clearly regarded as an important development object. In this paper, we select A-share listed strategic emerging industry companies from 2014 to 2019 as the research object, and select 1916 sample stocks from the sample of China strategic emerging industry comprehensive index jointly issued by China Securities Index Co., Ltd. and Shanghai Stock Exchange in 2019. And then, after eliminating the new third board enterprises, ST companies and companies with missing data, the sample data is finally determined as 548 companies with 3217 observations.

4.5. Analysis Results

We perform regression analysis on the sample data, and the analysis results are shown in Table 2.

Table 2. Regression analysis results of sample data

Variables	inp	outp	effi
tax	-0.0529** (-2.38)	-4.7391*** (-6.09)	-0.0032*** (-5.51)
tas	-0.5122*** (-5.27)	98.4342*** (29.36)	0.0923*** (35.03)
rgr	-7.0338*** (-11.59)	-73.8362*** (-3.48)	-0.0237 (-1.39)
atr	-0.0061 (-0.01)	75.7211 (1.68)	0.2246*** (5.93)
roe	-4.1818*** (-11.79)	55.0158*** (4.45)	0.0654*** (6.65)
alr	0.0005* (1.69)	-0.0122 (-1.15)	-0.0002 (-0.53)
Sample size	3217	3217	3217
<i>F</i> value	110.1	236.07	371.28
<i>R</i> ² value	0.1639	0.2973	0.3992

It can be seen that, there is a significant negative correlation between the total tax burden of emerging companies and innovation input at 5%, and the total tax burden regression coefficient is -0.0529, which indicates that for every unit increase in the total tax burden of emerging companies, the company's R&D investment will be reduced 0.0529 units; there is a significant negative correlation between the total tax burden of emerging companies and innovation output at 1%, and the regression coefficient is -0.7391, which indicates that the higher the total tax burden of emerging enterprises, the lower the innovation output of enterprises; there is a significant negative correlation between the total tax burden of emerging companies and innovation efficiency at 1%, and the regression coefficient is -0.0032, so increasing the total tax burden will reduce the innovation efficiency of strategic emerging companies. The *F* values of the model are 110.1, 236.07, and 371.28, respectively, and the overall regression effect of the model is good. The adjusted *R* values are 0.1639, 0.2973, and 0.3992, respectively, indicating that the three models have 16.39%, 29.73%, and 39.92% reliability for the explanatory variables, and the model fits the observations ideally.

To sum up, the total tax burden of emerging enterprises plays a restraining role in the independent innovation activities. The reduction of the total tax burden of emerging enterprises by the government will encourage enterprises to carry out innovation activities, and the tax preference will promote the independent innovation of enterprises.

5. Conclusion

At present, the emerging industries that play a leading role in the industrial transformation are the wind vane of the country's future technological innovation. The government attaches great importance to the independent innovation and development of emerging industries, and is committed to encouraging strategic emerging enterprises to carry out independent innovation through the implementation of various policies. In this paper, to verify the incentive effect of tax preference on independent innovation of emerging enterprises, we build the relationship model between independent innovation ability and tax burden. The regression analysis shows that, tax incentives can not only promote the innovation investment of strategic emerging enterprises, but also encourage them to develop more achievements and improve innovation efficiency.

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