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Research Article

The Influence of Government Intervention on the Performance of Independent Innovation under Financial Support Based on Data of Listed Companies in Strategic Emerging Industries

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Based on the data of the listed companies in strategic emerging industries in China, this paper uses GMM panel estimation method to measure the impact of government intervention on the performance of independent innovation and analyzes the impact of financial support on the effect of government intervention. The conclusions are as follows: Firstly, there is a lag effect in the performance of independent innovation, and there is also a lag effect in the patent application and main business income. In addition, there is an inverted U-shaped relationship between the patent application of one period lag and the current patent application, while there is no inverted U-shaped relationship between the main business income of one period lag and the current main business income. Secondly, government subsidies, additional deduction of R&D expenses, and value-added tax incentives have a significant effect on the number of patent applications, and the reduction of income tax burden can improve the main business income. Thirdly, after adding the financial support adjustment variables, we find that the influence direction of government intervention on the independent innovation performance has not changed, but the influence degree is weaker. Fourthly, the capital investment and labor input can significantly improve the performance of enterprise independent innovation.

1. Introduction

With the increasing uncertain factors of economic development, China urgently needs a new driving force of economic growth to ease the downward pressure of the economy. Strategic emerging industries play an important leading and exemplary role in economic development and have become the key areas to cultivate new impetus for economic development and realize economic transformation. In order to cultivate strategic emerging industries, the Chinese government has introduced a variety of supporting policies, such as taxation and subsidies, to improve the independent innovation ability of strategic emerging industries. However, the government only plays an "auxiliary role," which is difficult to achieve all-round support, and it cannot completely solve the problems of low enthusiasm and insufficient innovation ability of enterprises in strategic emerging industries. Therefore, the central government and local governments should set up special support funds, issue financial support policies, and improve the guidance mechanism of government intervention, so as to encourage enterprises in strategic emerging industries to carry out independent innovation to the greatest extent.

Scholars at home and abroad have rich research on the role of government intervention in enterprise independent innovation. The main research conclusions include incentive effect, inhibition effect, and ineffective use. Firstly, government intervention has an incentive effect. According to the national innovation system theory and triple helix theory, government intervention is one of the decisive factors to improve innovation capability [1, 2]. The empirical research results show that tax credit has a significant

incentive effect on enterprise innovation in the short term [3, 4], and government subsidies and tax incentives have a significant incentive effect on enterprise independent innovation in the long run [5–7]. Secondly, government intervention has a restraining effect. Some scholars have found that government intervention inhibits the independent innovation of enterprises in a specific industry and market environment [8–11]. Other scholars have found that when the innovation input is at a low threshold, the government intervention has a significant inhibitory effect on the independent innovation of enterprises [12–14]. Thirdly, government intervention is ineffective. Some studies believe that government intervention does not play a role in improving the independent innovation ability of enterprises [15–17].

At present, the research conclusions on the impact of government intervention on the independent innovation of enterprises have not been unified, and most scholars ignore the role of financial support in the study of government intervention in the independent innovation of enterprises. This paper takes financial support as a moderating variable into the dynamic panel data model of enterprise independent innovation performance analysis and uses the System GMM method to empirically study the influence of government intervention on enterprise independent innovation. The independent innovation performance of enterprises has the lag effect and accumulation effect, and the current independent innovation performance has an impact on the next period of independent innovation performance. Due to the endogenous problems in the performance of independent innovation, if the fixed effect model is used, the regression results will be biased and inconsistent estimates. Therefore, this paper constructs a dual dynamic panel data model for the performance analysis of enterprise independent innovation, which includes the dependent variable of one period of lag and the square term of dependent variable of one lag period.

The dual dynamic panel model constructed in this paper can reveal the dynamic and nonlinear relationship of economic variables. The model is widely used in the study of long-term equilibrium relationship and short-term nonlinear dynamic behavior of economic phenomena. Compared with the traditional dynamic panel data model, the dual dynamic panel data model established in this paper has made two improvements: one is to add the square term of dependent variable to reflect the nonlinear relationship between variables; the other is to select two dependent variables to reflect innovation output performance more comprehensively.

2. Research Design

2.1. Sample Selection. The sample of this paper is the listed strategic emerging industry enterprises in Shanghai and Shenzhen, and the research period is 2012–2018. We follow the following principles when selecting research samples: Firstly, according to *the latest guidance on industry classification of listed companies*, the strategic emerging industry listed companies in wind database are selected, and the initial starting time of the sample is set as 2012. Secondly, the selected listed companies are in the growth period and have certain business operation ability and R&D innovation ability; that is, the listed companies have certain economic strength to support enterprises to carry out R&D innovation activities. Thirdly, ST and *ST listed companies are excluded. Fourthly, the listed companies with a tax rate less than 0 or greater than 1 are excluded.

2.2. Data Sources. The financial information on listed companies in strategic emerging industries comes from wind database, and the number of patent applications and R&D personnel are from the Guotai'an database. Part of the data comes from the annual reports of listed companies.

2.3. Index Selection

2.3.1. The Performance of Independent Innovation. The independent innovation ability of enterprises is reflected not only in technology but also in economic benefits. Therefore, patent application and main business income are the indicators that can directly reflect the technical and financial performance. Patent application and main business income represent technical performance and enterprise financial performance, respectively, which can directly reflect the technological and economic achievements of independent innovation of strategic emerging industries. Therefore, in this paper, patent application and main business income are taken as the indicators of the performance of independent innovation.

(1) Number of patent applications (PAT): patent is the most direct expression of the performance of enterprises' independent innovation. Some scholars use the number of patent applications and the number of patent authorizations as indicators to measure the performance of enterprises' independent innovation. Among them, patent applications can reflect the enterprise's knowledge stock and technological innovation ability, while patent authorization is affected by policies and licensing cycle and needs to be tested and paid annual fees. There are many administrative influencing factors, so it is difficult to reflect the level of the independent innovation of enterprises in that year. Patents can be divided into three types: invention patents, practical patents, and appearance patents. However, from the concept of independent innovation and dual innovation, appearance patents are not within the scope of independent innovation. Therefore, this paper takes a number of patent applications to measure the innovation ability of enterprises. Referring to the research of relevant scholars [18, 19], this paper conducts Winsorize treatment on 1% and 99% percentiles of the number of patents and then adds 1 to take the natural logarithm.

(2) Main business income (MBI): the output indicators of enterprise independent innovation include new product income and main business income. It is

difficult for most enterprises to count the sales revenue of new products for several consecutive years, but the main business income can reflect the continuous economic benefit data after the R&D and innovation investment activities. Therefore, this paper takes the main business income as an indicator to measure the economic benefits of independent innovation.

2.3.2. Government Intervention. The explanatory variable is government intervention (G), and government subsidies and tax incentives are the main means of government intervention.

(1) Government subsidy: Government subsidy (S) includes financial discount, research, and development subsidies and policy subsidies. According to the practices of relevant scholars [20], we select the government subsidy index under other income accounting subjects in the enterprise financial statements as the measurement index.

(2) Tax preference: tax preference includes R&D expenses plus deduction, value-added tax preference, and income tax preference.

① Additional deduction of R&D expenses (EXP): additional deduction of enterprise R&D expenses is a kind of tax method and means for government intervention in enterprise R&D innovation activities. According to the actual amount of R&D expenditure, a certain proportion is added as the deduction of tax payable. Referring to the research of some scholars [21], this paper directly multiplies the actual amount of R&D expenses of enterprises by 50% during 2012–2016, and the actual amount of enterprise R&D expenses times 75% during 2017–2018, which are used as indicators to measure the additional deduction of R&D expenses.

② Value-added tax incentives (VAT): Value-added tax is one of the most important tax burdens of enterprises. The preferential policies of value-added tax mainly include VAT return and reduction and VAT deduction. Most of them are aimed at small- and medium-sized enterprises with insufficient profits. However, strategic emerging industries have certain enterprise scale and profitability. Most listed companies have no obvious preferential policies for tax return and exemption; especially, the sales of independent innovation products of strategic emerging industries need to go through a long period of time to enjoy VAT refund and exemption. Some scholars use VAT deduction as the VAT preference in the process of R&D and innovation, which mainly refers to the VAT deduction of new fixed assets. This paper uses the VAT deduction of newly added fixed assets of enterprises as the measurement index of value-added tax incentives [22].

③ Enterprise income tax (EIT): Enterprise income tax is an important tax burden of enterprises, and it is an important means of government intervention. Referring to the existing literature [23, 24], this paper directly uses income tax as the reverse indicator of tax preference to explain the impact of government intervention on independent innovation investment.

2.3.3. The Input of Enterprise Independent Innovation. The input of enterprise independent innovation includes capital input of independent innovation and personnel input of independent innovation.

(1) Capital input of independent innovation (R&D): Capital input of independent innovation is the investment of strategic emerging industry enterprises for research and development, which is mainly used in basic research, applied research, and experimental development. In this paper, the expenditure in R&D is taken as a measure of the scale of capital input of independent innovation [25].

(2) Personnel input of independent innovation (L): The personnel input of independent innovation is one of the important resources for enterprises' independent innovation and the key source of enterprise's independent innovation vitality. Therefore, this paper takes the proportion of technical personnel in the whole company as an index to measure the personnel input of independent innovation.

2.3.4. Financial Support. In the process of independent innovation of strategic emerging enterprises, financial capital plays an important role. It is an important capital input for enterprises to realize financing of independent innovation, medium-term resource integration, and value-added new products. Financial support (F) belongs to microenterprise level and will be affected by government intervention. Therefore, this paper takes financial support as a moderating variable to study the impact of financial support on independent innovation investment of enterprises. Financial support here includes bank loans and foreign direct investment.

(1) Bank loan: Bank loans include short-term loans and long-term loans. ① Short-term loans from banks (SI): The special support fund policy for strategic emerging industries clearly points out that it is necessary to expand financial support means and support enterprises to implement major industrialization projects by means of bank loans and bond financing. Bank short-term loan is an important source of funds for enterprises to invest in innovation projects and activities. Referring to the existing literature, we select short-term bank loans as one of the indicators to measure financial support [26]. ② Long-term loans from banks (LI): bank long-term loan is the key source of funds for

enterprises to invest in R&D and innovation and maintain production and operation projects. It is mainly divided into fixed assets investment loan, renewal and transformation loan, science and technology development, and new product trial production loan. Referring to the practice of existing literature [27], this paper chooses the long-term loan of banks as another indicator to measure financial support.

(2) Foreign direct investment (FDI): FDI is one of the important capital investments for enterprise independent innovation. Referring to the existing literature, we choose the funds borrowed from overseas of enterprises in the total project investment approved by the relevant government departments as the measurement of foreign direct investment [28].

2.3.5. Control Variables. In order to control the influence of other factors on the empirical results, we select size of the enterprise (size), profitability of the enterprise (ep), age of the enterprise (age), capital structure of the enterprise (lev), and ownership type of the enterprise (own) as control variables [29]. Generally speaking, if an enterprise's scale is larger, its profitability is stronger, and its capital is sufficient, the enterprise will be able to provide sufficient R&D and innovation funds. According to the life cycle theory of strategic emerging industries, the age of enterprises can reflect the development stage of enterprises and judge the investment in independent innovation. The level of capital structure can reflect the investment decision-making ability and debt-paying ability of listed companies for R&D innovation projects. The type of enterprise ownership determines whether the development of an enterprise is determined by the private or the government. In order to study the holding of state-owned enterprises, we take the value of state-owned holding as 0 and that of other controllers as 1.

The variables and their calculation methods are shown in Table 1.

2.4. Model Construction. The independent innovation of enterprises can realize knowledge increase, technological innovation, and economic benefit growth and meet the characteristics of Romer Jones' knowledge production function. Therefore, based on Romer Jones' knowledge production function, we establish the following performance function of the independent innovation of enterprises:

$$Y_{it} = \left[(1 - a_K)K_{it}\right]^{\alpha}\left[(1 - a_L)L_{it}\right]^{1-\alpha}, \tag{1}$$

where Y represents the performance of independent innovation, K represents the capital input of independent innovation, L represents the personnel input of independent innovation, and a and $a - 1$ are elasticity coefficients of K and L, respectively.

The variables of government intervention and financial support belong to the capital input of enterprise R&D innovation. Therefore, the variables of government intervention and financial support are added to equation (1), and the innovation performance (Y) is replaced by the number of patent applications, so as to obtain the following two innovation performance functions:

$$\begin{aligned} \mathrm{PAT}_{it} = {} & \left[(1 - a_1)G_{it}\right]^{\alpha}\left[(1 - a_2)K_{it}\right]^{\beta} \\ & \cdot \left[(1 - a_3)L_{it}\right]^{\gamma}\left[(1 - a_4)F_{it}\right]^{1-\alpha-\beta-\gamma}, \end{aligned} \tag{2}$$

$$\begin{aligned} \mathrm{MBI}_{it} = {} & \left[(1 - a_1)G_{it}\right]^{\alpha}\left[(1 - a_2)K_{it}\right]^{\beta} \\ & \cdot \left[(1 - a_3)L_{it}\right]^{\gamma}\left[(1 - a_4)F_{it}\right]^{1-\alpha-\beta-\gamma}, \end{aligned} \tag{3}$$

where PAT represents the number of patent applications, MBI represents the enterprise's main business income, G represents the government intervention, and F represents the financial support.

In order to eliminate the heteroscedasticity problem, we establish the following panel dynamic models based on formulas (2) and (3):

$$\begin{aligned} \ln \mathrm{PAT}_{it} = {} & \beta_0 + \beta_1 \ln \mathrm{PAT}_{it-1} + \beta_2 \ln AT^2_{it-1} + \beta_3 \ln S_{it} \\ & + \beta_4 \ln \mathrm{EXP}_{it} + \beta_5 \ln \mathrm{VAT}_{it} + \beta_6 \ln \mathrm{EIT}_{it} + \beta_7 \ln K_{it} \\ & + \beta_8 \ln L_{it} + \beta_9 \ln \mathrm{SI}_{it} + \beta_{10} \ln \mathrm{LI}_{it} \\ & + \beta_{11} \ln \mathrm{FDI}_{it} + \sum_{\lambda=1} \lambda \mathrm{Contr}_{it} + \mu_i + \varepsilon_{it}, \end{aligned} \tag{4}$$

$$\begin{aligned} \ln \mathrm{MBI}_{it} = {} & \beta_0 + \beta_1 \ln \mathrm{PAT}_{it-1} + \beta_2 \ln \mathrm{PAT}^2_{it-1} + \beta_3 \ln S_{it} \\ & + \beta_4 \ln \mathrm{EXP}_{it} + \beta_5 \ln \mathrm{VAT}_{it} + \beta_6 \ln \mathrm{EIT}_{it} \\ & + \beta_7 \ln K_{it} + \beta_8 \ln L_{it} + \beta_9 \ln \mathrm{SI}_{it} + \beta_{10} \ln \mathrm{LI}_{it} \\ & + \beta_{11} \ln \mathrm{FDI}_{it} + \sum_{\lambda=1} \lambda\, \mathrm{Contr}_{it} + \mu_i + \varepsilon_{it}, \end{aligned} \tag{5}$$

where β_0 is a constant term, $\beta_1, \beta_2, \ldots, \beta_{11}$ are the coefficient corresponding to each variable, λ is the coefficient corresponding to the control variable, μ_i is the year effect, which is used to control the impact of time change, and ε_{it} is the error term.

Due to the lag term and fixed effect of dependent variables in dynamic panel model, the traditional OLS method will lead to the deviation of estimation results. GMM method can effectively control the endogeneity of dynamic panel model and solve the problem of biased estimation. Compared with the difference GMM method, System GMM method can not only realize the estimation of difference equation but also realize the estimation of horizontal equation and eliminate the bias caused by short-term panel data [30]. Therefore, this paper uses System GMM method to analyze the dynamic panel model of enterprise independent innovation performance.

In the dynamic panel data model, the combination of highly continuous time series and significant individual heterogeneity may lead to the problem of weak instrumental variables in System GMM estimation. In view of the limitations of the model, we can choose the objective function of the continuous update estimator and use more effective tool

Table 1: The variables and their calculation methods.

Variable properties	Primary variable	Secondary variable	Variable symbol	Calculation method of variables
Explained variable	Performance of independent innovation	Number of patent applications	PAT	Logarithm of the number of enterprise patent applications plus 1
		Main business income	MBI	Logarithm of the income from main business
Explanatory variable	Government intervention	Government subsidies	S	Logarithm of government subsidies
		Additional deduction of R&D expenses	EXP	Logarithm of R&D expenses multiplied by the specific deduction proportion
		Value-added tax incentives	VAT	Logarithm of VAT deduction for new fixed assets of enterprises
		Income tax	EIT	Logarithm of enterprise income tax
	Input of enterprise independent innovation	Capital input of independent innovation	K	Logarithm of R&D expenditure
		Personnel input of independent innovation	L	Logarithm of the number of R&D personnel
Adjustment variable	Financial support	Short-term loans from banks	SI	Logarithm of bank short-term loan
		Long-term loans from banks	LI	Logarithm of long-term bank loans
		Foreign direct investment	FDI	Logarithm of capital borrowed from abroad
Control variable	Intervention within enterprises	Size of the enterprise	size	Logarithm of the total assets of the enterprise
		Profitability of the enterprise	ep	Ratio of net profit to operating income
		Age of the enterprise	age	The difference between research year and listed year
		Capital structure of the enterprise	lev	Asset liability ratio of enterprises
		Ownership type of enterprise	own	The holding value of state-owned enterprises is 0, and the value of others is 1

variables to improve and optimize the System GMM, so that it can avoid the use of weak tool variables and have a good large sample and limited sample properties.

3. Empirical Results and Analysis

Because of the endogenous problems in the performance of independent innovation, we first test and analyze the lag effect of independent innovation and then empirically study the influence of government intervention and financial support on the output stage of independent innovation.

3.1. Model Test. Through the autocorrelation test, it is found that AR (1) accepts the original hypothesis and AR (2) rejects the original hypothesis, which indicates that there is an endogenous problem. In this paper, stata12.0 software is used to conduct Hansen test and Sargan test. It is found that rejecting the original hypothesis that all variables are exogenous variables indicates that the selection of test tool variables is effective, and there is no problem of overidentification of tool variables. It shows that the tool variables selected are effective; that is, the econometric model is robust. We further tested the significance of the joint coefficient. The test results show that the dynamic panel estimation results are reliable.

3.2. Lag Effect Analysis of Independent Innovation Output. The empirical results are shown in Table 2. The regression results of models 1 and 3 reflect the impact of government intervention on patent application and main business income of strategic emerging enterprises. The performance variables of the lag period are added in both models to study the lag effect of independent innovation. From the regression result of model 1, in the case of only government intervention, the number of patent applications in the previous period has a positive correlation with the number of patent applications in the current period and has passed the 1% significance level. The correlation coefficient is 0.503; that is, for every 1% increase in the number of patent applications in the previous period, the number of patent applications in the current period will increase by 0.503%, indicating that, in the process of R&D and innovation, knowledge has continuity and accumulation, and the status of R&D and innovation in the early stage has a great impact on the current period.

In order to test the nonlinear relationship between the number of patent applications in the previous period and the current patent applications, we add the square term of the number of patent applications in the previous period into the regression analysis model. Regression analysis results show that the correlation coefficient between the square term of the previous patent application and the current patent application is negative, indicating that there is an inverted U-shaped relationship between the number of patent applications in the previous period and that in the current period. The reason is that after the patent application is successful, the period of patent protection is fixed. Even within the protection period, there will still be many enterprises imitating in the market, which will damage the

Table 2: Dynamic panel model estimation results of independent innovation output stage.

Variables	lnPAT		Variables	lnMBI	
	Model 1	Model 2		Model 3	Model 4
$\ln PAT_{it-1}$	0.5030*** (13.87)	0.4583*** (12.27)	$\ln MBI_{it-1}$	1.1920*** (12.85)	1.1056*** (10.06)
$\ln PAT^2_{it-1}$	−0.0867* (−8.2)	−0.0676* (−6.62)	$\ln MBI^2_{it-1}$	−0.00169 (−0.10)	−0.0013 (−0.09)
lnS	0.0118* (1.91)	0.0106 (1.06)*	ln*S*	0.0062 (−0.57)	0.0017 (−0.06)
lnEXP	0.0968*** (4.83)	0.9300*** (4.05)	lnEXP	−0.0005 (−0.13)	−0.0056 (−0.40)
lnVAT	0.0136** (2.37)	0.0125** (2.07)	lnVAT	−0.0032 (−0.22)	−0.0033 (−0.23)
lnEIT	−0.0001 (−0.01)	−0.0097 (−0.29)	lnEIT	−0.0246** (−2.18)	−0.0252** (−2.70)
lnK	1.0120*** (10.77)	1.1150*** (11.36)	ln*K*	0.6051*** (14.25)	0.5311*** (14.24)
lnL	1.0918*** (9.12)	1.1587*** (9.48)	ln*L*	0.0818*** (4.88)	0.0388** (1.98)
lnSI	—	0.0737(4.43)	lnSI	—	0.1813*(5.28)
lnLI	—	−0.0608(−0.4)	lnLI	—	−0.1721**(−2.24)
lnFDI	—	0.0014(0.40)	lnFDI	—	0.0004(0.10)
lnsize	0.0248 (0.17)	0.0231 (0.11)	lnsize	0.01583 (0..09)	0.01517 (0.06)
Ep	0.00489 (0.009)	0.007 (0.0038)	ep	0.0398 (0.19)	0.0324 (0.15)
age	0.00733 (0.88)	0.00639 (0.34)	age	0.0347 (1.72)	0.0299 (1.35)
lev	0.00165 (0.51)	0.00929 (1.22)	lev	0.0199 (0.76)	0.00677 (0.94)
Own	−0.1590*** (−0.64)	−0.2190*** (−1.94)	own	−0.0796*** (−0.64)	−0.262*** (−0.46)
Constant	0.6441*** (3.09)	−4.3547 (−0.6)	Constant	2.0382*** (4.72)	−0.5776 (−0.43)
AR(1)	0.0002	0.0026	AR(1)	0.000	0.0002
AR(2)	0.9182	0.4197	AR(2)	0.175	0.331
Hansen	0.5183	0.5595	Hansen	0.6288	0.6735
Sagan test	0.88	0.92	Sagan test	0.96	0.9
Wald test	0.000	0.000	Wald test	0.000	0.000

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, and the corresponding values in brackets are t values.

economic interests of innovators. That is to say, the more the R&D and innovation achievements of innovators are, the more the economic losses they will suffer, until the loss of economic benefits exceeds the economic benefits brought by patented inventions and the number of patent applications decreases.

From the regression result of model 3, the main business income of the previous period has a positive effect on the current main business income, and the correlation coefficient is 1.1920. If the economic benefit of the enterprise is improved, the enterprise will expand production and further reduce the unit production cost. Therefore, enterprises will increase R&D innovation efforts, and the economic benefits of enterprises will continue to improve without decreasing the scale economy.

After adding the square item of the main business income of the lag phase, it failed to pass the significance level of 10%, which indicates that there is no "inverted U" relationship between the square item of the main business income of the lag phase and the current main business income, which corresponds to the "inverted U" relationship of patent application. The regression results show that there is no "inverted U" relationship in the main business.

3.3. The Impact of Government Intervention on the Output of Independent Innovation. From the results of model 1 and model 3, the coefficient between government subsidies and patent applications is positive at the 10% significance level; the estimation coefficient of government subsidies and main business income is positive, but it does not pass the significance level of 10%. This shows that government subsidies have a certain positive effect on the increase of patent applications, but its effect on improving the main business income is not obvious.

The estimated coefficient of additional deduction of R&D expenses and patent application is positive and passes the significance level of 1%. The correlation coefficient is 0.0968, which indicates that for every 1% increase in additional deduction of R&D expenses, the enterprise patent application increases by 0.9680%. It can be seen that additional deduction of R&D expenses has a positive effect on patent application. The estimated coefficient of additional deduction of R&D expenses and main business income is negative and fails to pass the significance level of 10%, which indicates that additional deduction of R&D expenses has a negative impact on the main business income, but it is not obvious.

The estimated coefficient of value-added tax incentives and patent application is positive and has passed the significance level of 5%, which indicates that the value-added tax incentives promote the patent application of enterprises. The estimated coefficient is 0.0136, which means that the number of patent applications increases by 0.0136% for every 1% increase of value-added tax incentives. The correlation coefficient between the value-added tax incentives and the enterprise's main business income is negative, but it fails to pass the significance level of 10%, which indicates that the value-added tax incentives have a negative impact on the enterprise's main business income, but this effect is not obvious.

The estimated coefficient of income tax and patent application is negative, but it fails to pass the significance test, which indicates that the influence of tax preference on enterprise patent application is not obvious. The estimated

coefficient of income tax and the enterprise's main business income is negative, and the significance test shows that tax preference can promote the improvement of the enterprise's main business income.

The reason is that the government has increased government subsidies, an additional deduction of R&D expenses, and value-added tax concessions to the independent innovation of strategic emerging industries, which is equivalent to reducing the R&D innovation cost of enterprises, but it does not directly increase the economic benefits of enterprises. Therefore, the effect of government intervention measures such as government subsidies, an additional deduction of R&D expenses, and value-added tax incentives on the main business income of enterprises is not significant. The reduction of income tax can directly increase the income of enterprises. Therefore, the impact of income tax preference on the main business income is more obvious.

3.4. The Influence of Government Intervention on the Performance of Independent Innovation under Financial Support. On the basis of government intervention, the financial support adjustment variable is added to get the regression results of model 2 and model 4, so as to further analyze the impact of government intervention on the presence of financial support.

According to the regression result of model 2, the estimated coefficients of government subsidies, an additional deduction of R&D expenses, and value-added tax incentives are still positively correlated with enterprise patent application, and the estimated coefficient of income tax and enterprise patent application is also negatively correlated. Similar to the results of model 1, except for income tax, the correlation coefficients between the other three kinds of government intervention and enterprise patent application have passed the significance test, indicating that government intervention has a positive incentive effect on the number of enterprise patent applications.

According to the regression result of model 4, considering the financial support, the influence of government intervention on the main business income of enterprises has not changed significantly. The estimated coefficient between government subsidies and the enterprise's main business income is positive, but it fails to pass the significance test. The estimated coefficients of additional deduction of R&D expenses, value-added tax incentives, and the enterprise's main business income are negative and have not passed the significance test. The estimated coefficient of income tax and the enterprise's main business income is negative and has passed the significance test.

According to the regression results of model 2 and model 4, the estimated coefficient of short-term loans from banks and patent application is positive, but it fails to pass the significance test. The estimated coefficient of short-term loans from banks and main business income is positive, which has passed the significance level of 10%. It can be seen that short-term loans from banks have no obvious impact on patent application, but it has an obvious deposit effect on the increase of main business income. The reason is that short-term loans from banks are the financing of enterprises through financial institutions, which are mainly used for the investment of high-yield projects. The economic benefits of these financing far exceed the patent application.

The estimated coefficient of long-term loans from banks and patent application is negative, but it fails to pass the significance test, indicating that long-term loans from banks will hinder enterprise patent application, but this effect is not obvious. The estimation coefficient of long-term loans from banks and main business income is also negative, but the significance test shows that long-term loans from banks will reduce the increase of the enterprise's main business income. The reason is that long-term loans from banks will bring great financial risks to enterprises. When the profit before interest and tax is reduced, the profit after tax will be reduced by a greater margin. The estimated coefficients of FDI, patent application, and main business income are all positive, but they have not passed the significance test.

From the perspective of control variables, the estimation coefficients of enterprise scale, profitability, debt repayment ability, enterprise age, and independent innovation performance are positive, indicating that the larger the enterprise scale, the stronger the profitability and debt-paying ability, and the longer the production and operation time, the greater the performance of independent innovation. The estimated coefficients of enterprise nature, patent application, and main business income are all negative, indicating that the state-owned enterprise system is not conducive to enterprise independent innovation.

3.5. The Impact of the Input of Enterprise on the Performance of Independent Innovation. Capital and personnel are important input variables of independent innovation. According to the regression analysis results of model 1 and model 3, the correlation coefficients of capital input of independent innovation, personnel input of independent innovation, and patent application are all positive and pass the significance test. The two correlation coefficients are 1.0120 and 1.0918, respectively, which indicates that the patent application increases by 1.0120% and 1.0918% for every 1% increase in capital and personnel input. The correlation coefficients of the capital input of independent innovation, personnel input of independent innovation, and main business income are also positive and pass the significance test. The two correlation coefficients are 0.6051 and 0.0818, respectively, which indicates that the main business income increases by 0.6051% and 0.0818% for each 1% increase in capital input of independent innovation and personnel input of independent innovation. It can be seen from the research results that personnel input of independent innovation has a better promotion effect on enterprise independent innovation, which is because innovative talents provide new knowledge and technology for enterprises and are the developers and creators of enterprise R&D innovation.

According to the regression analysis results of model 2 and model 4, after adding financial support as a moderating variable, the estimated coefficients of capital input of independent innovation, personnel input of independent

innovation, and patent applications are still positive, but the estimation coefficient becomes larger, which indicates that financial support can increase the promotion effect of capital and personnel input of independent innovation on enterprise's independent innovation performance. The estimated coefficients of capital input of independent innovation, personnel input of independent innovation, and main business income are positive, and the estimated coefficient becomes smaller, which indicates that financial support reduces the promotion effect of capital and personnel input of independent innovation on the independent innovation performance of enterprises.

The reason is that capital input and personnel input of independent innovation are directly applied to enterprise R&D activities, which has a direct impact on enterprise patent application. However, the impact of capital and personnel input of independent innovation on the enterprise's main business income needs to go through the production and operation stage of the enterprise, and the impact effect becomes weaker.

4. Conclusions and Suggestions

The main conclusions of this paper are as follows: Firstly, the performance of enterprise independent innovation has a lag effect and there is an inverted U-shaped relationship. The patent application and main business income with a lag period have a significant incentive effect on the current patent application and main business income. At the same time, after adding the square term of independent innovation output of the lag phase, there is an inverted U-shaped relationship between the patent application of the lag phase and the current patent application, but there is no inverted U-shaped relationship between the main business incomes. Secondly, there are differences in the effects of various means of government intervention on independent innovation performance of strategic emerging industry enterprises. Government subsidies, R&D expenses' additional deduction, and value-added tax incentives have a significant effect on increasing the number of patent applications, while the reduction of income tax burden can improve the main business income. Thirdly, after the financial support is added, short-term loans from banks have no significant effect on the patent application of enterprises, but it has a significant effect on the main business income of enterprises. Fourthly, capital input and personnel input can significantly increase the number of patent applications and increase the main business income of enterprises.

On how to promote the effect of government intervention on independent innovation of strategic emerging industry enterprises, we put forward the following suggestions:

First of all, the government intervention means of enterprise's technical performance and financial performance need to be differentiated, such as increasing government subsidies, R&D expenses' additional deduction, and value-added tax incentives to improve enterprise's technical performance and reducing enterprise's income tax burden to improve enterprise's financial performance.

Secondly, we should improve the innovation of financial support tools and encourage enterprises in strategic emerging industries to carry out independent innovation. Financial support is an important regulatory variable for the government to intervene in the independent innovation of strategic emerging industries and an important signal for the government to release policy dividends. The innovation of financial support tools can solve the problem of financing difficulties of strategic emerging industry enterprises, so as to mobilize the enthusiasm of independent innovation of enterprises.

Finally, we should pay close attention to the short-term goal of government intervention, closely monitor the independent innovation activities of strategic emerging industry enterprises, and prevent patent duplication and product duplication.

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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