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The Impact of Tax Incentives on the New Quality Productivity of Enterprises - based on Data Analysis of Chinese A-share Listed Companies

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Abstract: ***Tax incentives, as an important means for the state to conduct macro-control, play a great role in stimulating the development of new quality productivity of enterprises. Based on the data of A-share companies in Shanghai and Shenzhen from 2015 to 2023, this paper uses a two-way fixed effect model to empirically study the impact of tax incentives on the new quality productivity of enterprises, and conducts heterogeneous analysis according to the nature of equity, industry and region. The research shows that tax incentives have a significant positive impact on the new quality productivity of enterprises, but the incentive effect of tax incentives on the new quality productivity of enterprises varies significantly among enterprises with different equity natures, different industries and different regions.***

Keywords: Tax Incentives, Enterprise New Quality Productivity, Two-Way Fixed Effects**.**

1. Introduction

The concept of "new quality productivity" was first proposed in September 2023. It represents advanced productivity and has the characteristics of excellent efficiency, cutting-edge technology and excellent quality. In the context of the continuous and profound changes in the global economic structure and the increasingly fierce competition among enterprises, new quality productivity, as a new type of productivity with scientific and technological innovation as the core driving force, plays a key role in promoting high-quality economic development. At the third session of the 14th National People's Congress, Premier Li Qiang proposed to develop new quality productivity according to local conditions, continuously cultivate innovative enterprises, and promote the development and growth of specialized and new small and medium-sized enterprises, while improving the overall efficiency of national innovation. It can be seen that the development of new quality productivity has received close attention from the country. In the development of new quality productivity, the new quality productivity of enterprises plays a key role. As the main body of the national economy, enterprises play an important role in invigorating the economy, promoting innovation and promoting high-quality development. Accelerating the development of new quality productivity of enterprises is the basis for the development of the country's overall new quality productivity. As an important means for the country to conduct macro-control, tax incentives play a key role in promoting the development of new quality productivity. Therefore, conducting in-depth research on the impact of tax incentives on the new quality productivity of enterprises will not only help the country adjust its tax incentive policies according to actual conditions to better promote the development of new quality productivity, but also promote the transformation and upgrading of various industries and inject more new vitality into the high-quality development of my country's economy.

Existing literature has studied the development of new quality productivity of enterprises from different aspects: Gai Kaicheng et al. (2025) [1] studied the regional differences, evolution process and influencing factors of new quality productivity from the perspective of production relations; Wang Zhimao and Ji Feng (2025) [2] found that the digital economy has provided tremendous impetus for the development of new quality productivity, and it has a spillover effect in space; Song Jia et al. (2024) [3] constructed a new quality productivity index system based on the two-factor theory of production, and used the entropy method to measure it; Chai Yongdong et al. (2025) [4] studied the impact of science and technology finance on the new quality productivity of private enterprises and found that science and technology finance has a stronger empowerment for the development of new quality productivity of private enterprises, showing the advantages of science and technology finance as a new type of production factor allocation tool; Xu Hongdan and Wang Jiuhe (2025) [5] used a dual machine learning model to study the impact of artificial intelligence policies on the new quality productivity of enterprises. The study found that artificial intelligence policies promote the development of new quality productivity of enterprises by improving internal capabilities of enterprises and strengthening external drivers; Wang Yin et al. (2024) [6] Based on the theoretical framework of "technology-factor-industry", the research found that the green digital economy and new quality productivity develop synergistically and jointly promote high-quality economic development.

In the field of taxation, research on new productivity focuses on tax policy, tax collection and management, and tax governance. In terms of tax policy, Wen Laicheng and Mo Yujie (2025) [7], Li Jianjun and Wu Zhouyi (2024) [8], Gu Cheng et al. (2025) [9], Zeng Guanghui (2024) [10], and Sun Yixin et al. (2025) [11] believe that tax policy plays an important role in promoting the development of new productivity of enterprises, and it is necessary to continuously strengthen the accuracy and guidance of tax policy. In terms of tax collection and management, Liu Xiangling et al. (2025) [12] found that digital tax collection and management can effectively improve the new productivity of enterprises. In terms of tax governance, Zhang Xiaofang and Zhou Zhibo (2025) [13], Ma Haitao et al. (2024) [14] believe that tax governance should provide a good environment for the cultivation and development of new productivity, stabilize the

macro tax burden, optimize the tax system structure, and promote the construction and development of tax rule of law, thereby adding impetus to the development of new productivity. In other aspects, Li Tao et al. (2024) [15] used tariff shocks as a starting point to study the impact of taxes on corporate digital technology. The study found that tariff shocks have a significant inhibitory effect on the application of corporate digital technology, which is not conducive to the development of new quality productivity of enterprises; Kuang Xiaoping and Li Chaolong (2024) [16] believe that the tax-sharing reform has effectively mobilized economic and social resources, transformed production relations, and promoted the development of new quality productivity. The new round of fiscal and tax reforms must deepen the tax-sharing reform to further activate new quality productivity.

From the analysis of existing literature, it can be seen that tax incentives play an important role in promoting the development of new quality productivity. However, the existing literature on the impact of tax incentives on the new quality productivity of enterprises mainly focuses on the theoretical level, while there are few empirical studies. Therefore, this paper uses the data of A-share listed companies in Shanghai and Shenzhen to conduct empirical tests to study the specific impact of tax incentives on the new quality productivity of enterprises, and conducts heterogeneous discussions on enterprises with different equity natures, different industries and different regions, discusses the impact of tax incentives on the new quality productivity of enterprises from multiple aspects, and provides inspiration for the formulation and updating of national tax incentive policies through research conclusions.

2. Theoretical Analysis and Hypothesis Proposal

2.1 Analysis of the Impact of Tax Incentives on Enterprise's New Quality Productivity

2.1.1 Analysis based on the three supply factors of productivity

Shi Diwen (2025) [17] and others pointed out in their research that the measurement of the new quality productivity of enterprises needs to be analyzed from three aspects of the supply factors of productivity, namely, workers, labor objects and labor materials. The study of the impact of tax incentives on the new quality productivity of enterprises also needs to start from these three aspects: from the perspective of labor factors, enterprises can enjoy relevant tax incentives to bring financial advantages, and use the saved funds to improve the remuneration of relevant talents, thereby attracting high-tech talents and high-quality managers. At the same time, enterprises can also increase investment in employee capacity training, improve the overall quality of existing employees, and provide new vitality for the development of new quality productivity of enterprises; from the perspective of labor object factors, tax incentives can increase the cash flow of enterprises, allowing enterprises to invest more resources in purchasing new production materials and production technologies, and promote the development of new quality productivity of enterprises; from the perspective of labor materials factors, tax incentives such as additional deductions for R&D expenses can encourage enterprises to develop new production tools and new production methods, improve enterprise production efficiency and bring more benefits. These innovation benefits also feed back to enterprise innovation, promote enterprise production intelligence, and have a positive impact on enterprise new quality productivity.

2.1.2 Analysis based on the innovation level

The core driving force of the new quality productivity of enterprises is scientific and technological innovation, and the relevant impact of tax incentives on innovation directly affects the development of the new quality productivity of enterprises. Through tax incentives such as additional deductions for R&D expenses, the innovation costs of enterprises are reduced, and the risk of innovation has also decreased. The implementation of strong tax incentives can boost the confidence of enterprises in innovation, promote enterprises to carry out independent research and development, product innovation and market development, thereby enhancing the overall innovation ability of enterprises, and then promoting the development of new quality productivity of enterprises. In addition to independent research and development, tax incentives can also encourage enterprises to introduce advanced production technology and equipment. In this way, not only can the production efficiency of enterprises be improved, but also more markets can be brought to high-tech enterprises, thereby stimulating high-tech industries to continuously carry out technological innovation and product research, promote the innovation of production methods and production processes, and bring beneficial effects to the development of new quality productivity of enterprises. In addition, tax incentives can help enterprises absorb talents, reduce the cost of enterprises recruiting technical and innovative talents, encourage enterprises to form their own innovation teams, improve their own R&D capabilities, and improve the level of new quality productivity of enterprises.

2.1.3 Analysis based on industrial transformation and upgrading

Tax incentives also play an important role in industrial transformation and upgrading. Tax incentives can ease the financial pressure of enterprises through tax reduction and exemption, provide enterprises with more financial space for innovation and transformation and upgrading, and promote the development of the entire industry in the direction of high-tech content and high added value. At the same time, tax incentives can also encourage enterprises to carry out green production, guide enterprises to transform towards sustainable development, and then accelerate the overall transformation and upgrading process of the industry.

Based on the above analysis, this paper proposes Hypothesis 1.

Hypothesis 1: Tax incentives have a positive impact on the new quality productivity of enterprises.

2.2 Analysis of the Heterogeneous Impact of Tax Incentives on the New Quality Productivity of Different

Enterprises

2.2.1 The impact of tax incentives on the new quality productivity of enterprises with different equity types

According to the nature of equity, Chinese enterprises can be divided into two categories: state-owned enterprises and non-state-owned enterprises. These two types of enterprises differ in many aspects, such as corporate goals, market competition pressure, and policy implementation. In terms of corporate goals, state-owned enterprises usually assume certain social functions. The operating goals of state-owned enterprises are not limited to profit maximization, but also focus on the policy goals they need to achieve and the social responsibilities they shoulder. Even if they enjoy tax incentives, they may invest more funds in social functions and sustainable operations rather than in innovation and other aspects related to the new quality productivity of enterprises. The general goal of non-state-owned enterprises is to pursue profit maximization and be market-oriented. Tax incentives can directly reduce the tax burden of non-state-owned enterprises, allowing them to have more funds to invest in research and development and innovation to occupy market share. In terms of market competition pressure, state-owned enterprises have a monopoly in certain industries (such as the energy industry) and have little market competition pressure, which makes state-owned enterprises lack the motivation to innovate by enjoying tax incentives. Non-state-owned enterprises generally face fierce market competition, so they are more inclined to reduce their tax burden by enjoying tax incentives, thereby carrying out innovation and other activities to improve the level of new quality productivity of enterprises and gain a favorable position in market competition. In terms of policy implementation, state-owned enterprises may be subject to more regulatory pressure and administrative resistance when implementing tax incentives, which may reduce the impact of tax incentives. Non-state-owned enterprises can implement various tax incentives more flexibly, expand the impact of tax incentives, and transform them into an increase in the new quality productivity of enterprises. Based on the above analysis, this paper proposes Hypothesis 2.

Hypothesis 2: Compared with state-owned enterprises, tax incentives have a more significant impact on the new quality productivity of non-state-owned enterprises.

2.2.2 The heterogeneous impact of tax incentives on the new quality productivity of enterprises in different industries

There are great differences between my country's manufacturing enterprises and service industry enterprises in terms of industry characteristics and production models: manufacturing enterprises mainly produce physical products, and are labor-intensive and capital-intensive. The impact of tax incentives on the new quality productivity of manufacturing enterprises is mainly reflected in product innovation, equipment renewal, production technology upgrades and increased R&D investment; while service industry enterprises mainly provide intangible services, and are knowledge-intensive and technology-intensive. The impact of tax incentives on service industry enterprises is mainly reflected in human capital investment, information technology upgrades and service innovation. It can be concluded that tax incentives have a more direct impact on the new quality productivity of manufacturing enterprises, while their impact on the new quality productivity of service enterprises is more indirect. Based on the above analysis, this paper proposes Hypothesis 3.

Hypothesis 3: Compared with service industry enterprises, tax incentives have a more significant impact on the new quality productivity of manufacturing enterprises.

2.2.3 The impact of tax incentives on the new quality productivity of enterprises in different regions

According to various factors such as geographical location and economic development level, my country can be divided into three major regions: the east, the middle and the west. The economic development level, industrial structure, enterprise scale and innovation ability, talent resources, infrastructure and market environment of different regions are different: the economic development level of the eastern region is relatively high, and most of the enterprises belong to high-tech industries, advanced manufacturing industries, etc., and most of them are large enterprises, with strong enterprise innovation ability, abundant regional talent resources, complete infrastructure and superior market environment; the economic development level of the central region is between the eastern and western regions, and is in a critical stage of industrial upgrading and transformation. Compared with the eastern region, the scale of enterprises is smaller, the innovation ability is weaker, the talent resources are relatively limited, and the infrastructure and market are better; the economic development level of the western region is relatively low, and the industrial structure is dominated by resource-based industries and primary processing industries. The scale of enterprises is generally small, the innovation ability is insufficient, the talent resources are relatively scarce, and the infrastructure and market environment are relatively backward. The differences in the above aspects of the eastern, central and western regions will greatly affect the impact of tax incentives on the new quality productivity of local enterprises. Based on the above analysis, this paper proposes hypothesis 4.

Hypothesis 4: Compared with the western region, tax incentives have a more significant impact on the new quality productivity of enterprises in the eastern region and the new quality productivity of enterprises in the central region of China.

3. Research Design

3.1 Data Source

This article selects A-share listed companies in Shanghai and Shenzhen from 2015 to 2023 as research samples. The data comes from the Guotai An database, the China City Statistical Yearbook and the State Intellectual Property Office. Referring to the existing research practices, this paper eliminated financial sample companies; eliminated ST and ST* sample companies; eliminated sample companies with missing variable data, and performed 1% tailing processing on all continuous variables, and finally studied a sample of 4,725

listed companies.

3.2 Variable Description

3.2.1 Explained variable: Enterprise new quality productivity

3.2.1.1 The connotation of new quality productivity of enterprises

The new quality productivity of enterprises is driven by scientific and technological innovation, gathers high-end factors, focuses on green and sustainable development, promotes industrial synergy and integration, and is an advanced productivity state that prioritizes quality and efficiency. Its connotation can be decomposed into the qualitative upgrade of labor and capital. In the labor upgrade part, unlike the traditional general labor input, the new quality productivity of enterprises represents more knowledge-based workers, and workers can expand the boundaries of their capabilities through new technologies such as big data. At the same time, the accumulation of these human capital is also the core driving force of technological progress. In the capital upgrade part, the new quality productivity of enterprises is different from traditional tangible means of production such as factories. It is based on new means of production, including intelligent capital, green capital, etc., and is innovative, environmentally positive externalities, and low marginal costs. In general, the essence of the new quality productivity of enterprises is to promote the transition of labor and capital from "quantity" accumulation to "quality" through technological and institutional innovation, and ultimately achieve high-quality development of enterprises.

3.2.1.2 Measurement of new quality productivity indicators of enterprises

Referring to the research of Song Jia et al. (2025) [3], based on the two-factor theory of production, a new quality productivity index system is constructed from the two aspects of labor and production tools, and the entropy method is used to calculate the weight of each index to form the final new quality productivity index. Among them, labor consists of living labor and labor objects: living labor indicators include the proportion of R&D personnel salary, the proportion of R&D personnel, and the proportion of highly educated personnel; labor object indicators include the proportion of fixed assets and the proportion of manufacturing expenses. Production tools are composed of hard technology and soft technology. Hard technology indicators are measured by the proportion of R&D depreciation and amortization, the proportion of R&D rental fees, the proportion of R&D direct investment, and the proportion of intangible assets; soft technology indicators are measured by total asset turnover and the inverse of equity multiplier. The final new quality productivity index is shown in Table 1.

Table 1: Enterprise new quality productivity indicators

Factor	Sub-factors	Index	Indicator Description	Weight
Labor Force	Living Labor	R&D staff salary ratio	R&D expenses-salary/operating income	28
		R&D personnel ratio	Number of R&D personnel/Number of employees	4
		Proportion of highly educated personnel	Number of employees with bachelor degree or above/Number of employees	3
		Percentage of fixed assets	Fixed assets/total assets	2
	Labor Object	Manufacturing cost ratio	(Subtotal of cash outflow from operating activities + depreciation of fixed assets + amortization of intangible assets + impairment provision - cash paid for goods and services - wages paid to and for employees) / (Subtotal of cash outflow from operating activities + depreciation of fixed assets + amortization of intangible assets + impairment provision)	1
Production Tools	Hard Technology	R&D depreciation and amortization ratio	R&D expenses-depreciation and amortization/operating income	27
		R&D rental fee ratio	R&D expenses-rental fees/operating income	2
		R&D direct investment ratio	R&D expenses-direct investment/operating income	28
		Intangible assets ratio	Intangible assets/total assets	3
	Soft Technology	Total asset turnover	Operating income/average total assets	1
		Reciprocal equity multiplier	Total assets/total ownership equity	1
New quality productivity			Total weight	100

3.2.2 Explanatory variables: tax incentives

Referring to the approach of Liu Guangqiang (2016) [18], the tax incentives are measured by the ratio of the tax refunds received by the enterprise to the amount of tax refunds received plus the taxes paid.

3.2.3 Control variables

This paper refers to existing literature and selects industry operating income growth rate, enterprise scale, asset-liability ratio, equity concentration, enterprise growth, board size, and institutional investor shareholding ratio as control variables. The specific variable definitions are shown in Table 2.

Table 2: Variable definitions

Type	Variable	Variable Code	Variable Definition
Explained variable	New quality productivity of enterprises	$Npro$	New quality productivity of enterprises calculated by entropy method
Explanatory variables	Tax Benefits	Tax	Tax refunds received/ (Tax refunds received + Taxes paid)
Control variables	Industry operating income growth rate	$Indgro$	(Operating income for this period of the current year - Operating income for the same period of the previous year) / Operating income for the same period of the previous year
	Enterprise scale	sze	The natural logarithm of the total of each asset item
	Debt-to-asset ratio	lev	Total Liabilities/Total Assets
	Equity Concentration	top	Shareholding ratio of the company's largest shareholder

	Enterprise growth	gro	The company's total operating income growth rate
	Board size	bos	The natural logarithm of the number of directors on the board
	Shareholding ratio of institutional investors	sri	The proportion of total shares held by institutional investors to the total shares of the company

The descriptive statistics of each variable are shown in Table 3. Among them, the maximum value of the enterprise's new quality productivity is 5.8805, the minimum value is 1.9394, and the maximum value of tax incentives is 0.8676, and the minimum value is 0.0000. This shows that there are obvious differences in the level of new quality productivity and the degree of tax incentives enjoyed by enterprises.

Table 3: Descriptive statistics results

Variable Code	Sample size	Mean	Standard Deviation	Minimum	Maximum
$Npro$	25819	2.9007	0.7078	1.9394	5.8805
Tax	25819	0.2191	0.2238	0.0000	0.8676
$Indgro$	25819	0.1341	0.1700	-0.2090	0.9663
sze	25819	22.2653	1.2784	20.0000	26.2700
lev	25819	0.4034	0.1961	0.0567	0.8872
top	25819	32.8731	14.5548	8.2264	72.8037
gro	25819	0.1431	0.3473	-0.5154	1.9745
bos	25819	2.0981	0.1930	1.6094	2.5649
sri	25819	41.8120	25.1200	0.3500	91.4264

3.3 Model Setting

In order to verify the impact of tax incentives on the new quality productivity of enterprises, this paper constructs the following econometric model:

$$Npro_{it} = \alpha_1 + \alpha_2 Tax_{it} + \alpha_3 Control_{it} + \sum FE + \xi_{it} \quad (1)$$

Among them, represents the explained variable, represents the new quality productivity of the enterprise; Taxrepresents tax incentives; represents all control variables; FErepresents the two-way fixed effects at the enterprise individual and year levels; and is the disturbance term.

4. Empirical Analysis of the Impact of Tax Incentives on Enterprise New Quality Productivity

4.1 Benchmark Regression

Table 4: Benchmark regression results

Variable	(1) $Npro$	(2) $Npro$	(3) $Npro$
Tax	0.2881 ***	0.2975 ***	0.1130 ***
	(0.0212)	(0.0210)	(0.0349)
$Indgro$	no	-0.4469 ***	-0.0671 ***
		(0.0231)	(0.0168)
sze	no	0.0286 ***	0.0238
		(0.0043)	(0.0155)
lev	no	-0.3481 ***	0.1575 ***
		(0.0269)	(0.0526)
top	no	-0.0035 ***	-0.0017
		(0.0004)	(0.0011)
gro	no	-0.0325 ***	-0.0315 ***
		(0.0126)	(0.0102)
bos	no	-0.0601 **	0.0119
		(0.0241)	(0.0415)
sri	no	0.0015 ***	-0.0005
		(0.0002)	(0.0006)
Fixed effects	no	no	yes
N	25819	25819	25819
R^2	0.0083	0.0318	0.2028

*Note: *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively; the data in brackets are robust standard errors; the same below*

Based on the above model setting, an empirical analysis is conducted to study the impact of tax incentives on the new quality productivity of enterprises. The results are shown in Table 4. Among them, column (1) is the direct regression result without adding control variables and fixed effects; column (2) is the regression result with adding control variables; column (3) is the regression result with adding control variables and fixed effects. The results show that regardless of whether control variables are added or whether fixed effects are controlled, the coefficient value of tax incentives is always significantly positive, which indicates that tax incentives have a significant positive impact on the new quality productivity of enterprises, and Hypothesis 1 is established.

4.2 Robustness Test

4.2.1 Replace the explained variable

The new quality productivity of an enterprise is driven by innovation as its core, and among the new quality productivity indicators selected in this article, the cumulative weight of R&D innovation exceeds 90%. Therefore, this paper refers to the approach of Qing Tao and Huang Xianhai (2021) [19] and uses enterprise patent application information as a measure of enterprise innovation behavior and degree. At the same time, it takes the logarithm of enterprise patent application information to replace the enterprise's new quality productivity for testing. The results are shown in column (1) of Table 5. The sign and significance of the tax incentive coefficient have not changed significantly, indicating that the conclusions of this study are robust.

4.2.2 Eliminating the impact of abnormal years

Since the COVID-19 pandemic will have a certain impact on the new quality productivity of enterprises, causing deviations in the research results, this paper removes the enterprise samples in the epidemic year and conducts a regression analysis. The results are shown in column (2) of Table 5. The direction and significance of the coefficient of tax incentives have not changed significantly, indicating that the results of this study are robust.

4.2.3 Changing the standard error clustering level

Table 5: Robustness test results

Variable	(1) $Zhuanli$	(2) $Npro$	(3) $Npro$
Tax	0.1316 **	0.0744 **	0.1130 **
	(0.0579)	(0.0351)	(0.0442)
Control variables	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes
N	23339	11271	25819
R^2	0.2147	0.0637	0.2028

Taking into account that the development levels of new quality productivity of enterprises in the same industry may have commonalities, while the development levels of new

quality productivity of enterprises in different industries may be different, this paper raises the level of clustering standard errors from the enterprise level to the industry level for research. The results are shown in column (3) of Table 5. The sign and significance of the coefficient value of do not change significantly, which once again verifies the robustness of the results of this study.

4.2.4 Instrumental variable method

Table 6: Instrumental variable method test results

Variable	(1) Phase 1	(2) Phase II
$L.Tax$	0.8071 *** (0.0062)	
Tax		0.2165 *** (0.0452)
Control variables	Yes	Yes
Fixed effects	Yes	Yes
N	20003	20003
R^2	0.6610	0.1245

In order to eliminate the endogeneity problem as much as possible and reduce the reverse causality problem between tax incentives and the new quality productivity of enterprises, this paper refers to the approach of Zhu Yan et al. (2023) [20], takes the first-order lag of the tax incentives obtained by the enterprise as an instrumental variable, and uses the two-stage least squares method for regression. The results are shown in Table 6. From the second-stage regression results in column (2), the coefficients of the impact of tax incentives on the new quality productivity of enterprises are all significantly positive, indicating that tax incentives have a significant positive impact on the new quality productivity of enterprises, which once again verifies the robustness of the research conclusions.

5. Heterogeneity Analysis

5.1 Heterogeneity of Equity Nature

Table 7: Equity heterogeneity and industry heterogeneity

Variable	(1) State-owned enterprises $Npro$	(2) Non-state-owned enterprises $Npro$	(3) Manufacturing Enterprises $Npro$	(4) Service Industry Enterprises $Npro$
Tax	0.0536 (0.0556)	0.1299 *** (0.0450)	0.1347 *** (0.0472)	0.0337 (0.1211)
Control variables	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes
N	7459	17351	14595	3519
R^2	0.1495	0.2264	0.2358	0.1847

In order to study the heterogeneity of equity nature, this paper divides all enterprise samples into two categories: state-owned enterprises and non-state-owned enterprises, and conducts regression analysis on each category. The regression results are shown in columns (1) and (2) of Table 7. It can be seen from the regression results that, compared with state-owned enterprises, tax incentives have a more significant impact on the new quality productivity of non-state-owned enterprises. This is the result of the differences in corporate goals, corporate incentive mechanisms, market competition pressure, and policy implementation mentioned above. Tax incentives have a greater incentive effect on the new quality productivity of non-state-owned enterprises, and Hypothesis 2 proposed above is verified.

5.2 Industry Heterogeneity

When studying industry heterogeneity, according to the 2012 version of the China Securities Regulatory Commission's Industry Code, this paper selected manufacturing enterprises and service industry enterprises as two different groups of samples for regression analysis. The regression results are shown in columns (3) and (4) of Table 7. The regression coefficient shows that tax incentives have a significant impact on the new quality productivity of manufacturing enterprises, while the incentive effect on the new quality productivity of service enterprises is relatively limited. This may be because tax incentives have a direct impact on the new quality productivity of manufacturing enterprises, and an indirect impact on the new quality productivity of service enterprises. The indirect impact is relatively limited, so the impact of tax incentives on the new quality productivity of manufacturing enterprises is more significant, which verifies Hypothesis 3 proposed above.

5.3 Regional Heterogeneity

Table 8: Regional heterogeneity

Variable	(1) Eastern Region Enterprises $Npro$	(2) Central Region Enterprises $Npro$	(3) Western Region Enterprises $Npro$
Tax	0.0986 ** (0.0416)	0.2591 *** (0.0437)	0.0940 (0.0881)
Control variables	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes
N	18836	3313	2760
R^2	0.2269	0.1726	0.1306

When studying regional heterogeneity, according to the above division, this paper divides my country into three major regions: east, central, and west. The enterprises in the three regions are subjected to regression analysis respectively. The results are shown in columns (1), (2), and (3) of Table 8. The regression results show that tax incentives have a significantly positive impact on the new quality productivity of enterprises in the central and eastern regions, but have an insignificant impact on the new quality productivity of enterprises in the western region. This is caused by the differences in various factors mentioned above, such as the economic development level, industrial structure, enterprise scale and innovation capability: the reason why tax incentives have a more significant impact on the new quality productivity of enterprises in the central region than in the eastern region may be that the central region is in a critical stage of industrial transformation and upgrading, and the demand for innovation is stronger, and tax incentives have a more significant impact on the new quality productivity of enterprises; while most eastern regions have formed an industrial structure dominated by high-tech industries, and the marginal benefits of tax incentives are relatively small, and their effect on improving the new quality productivity of enterprises is not as significant as in the central region; tax incentives in the western region are more reflected in the improvement of the basic production capacity of enterprises, and the improvement of new quality productivity is relatively weak. Hypothesis 4 proposed above

was confirmed.

6. Conclusion and Policy Recommendations

This paper adopts the data of A-share listed companies in Shanghai and Shenzhen, and uses a two-way fixed effect model to empirically analyze the impact of tax incentives on the new quality productivity of enterprises and its heterogeneity. The conclusions are as follows: First, tax incentives have a significant positive impact on the new quality productivity of enterprises, and this conclusion still holds after a series of robustness tests; Second, compared with state-owned enterprises, tax incentives have a more significant impact on the new quality productivity of non-state-owned enterprises, which is caused by the special nature and responsibilities of state-owned enterprises; Third, compared with service industry enterprises, tax incentives have a more obvious incentive effect on the new quality productivity of manufacturing enterprises, which is mainly because tax incentives have different effects on the new quality productivity of enterprises in different industries; Fourth, compared with the western region, tax incentives have a more prominent incentive effect on the new quality productivity of enterprises in the eastern and central regions, which is closely related to multiple factors such as geographical location and economic development level.

In order to make the tax incentive policies more accurate and efficient in promoting the new quality productivity of enterprises, this article puts forward the following suggestions:

First, for non-state-owned enterprises, the intensity of differentiated tax incentives should be increased. The corresponding R&D expense deduction ratio can be adjusted according to the different R&D intensity of enterprises, and "R&D intensity-linked" tax incentives can be implemented to encourage non-state-owned enterprises to carry out higher levels of R&D innovation. For state-owned enterprises, indicators such as "R&D efficiency" can be designed to encourage internal innovation of state-owned enterprises and promote state-owned enterprises to improve efficiency through mixed ownership reform. At the same time, the tax department can work with the Ministry of Science and Technology to establish an enterprise R&D data sharing platform to automatically calculate R&D intensity and avoid enterprises manipulating data.

Second, for the manufacturing industry, we will formulate industry tax policies based on the industrial chain, with a focus on supporting advanced manufacturing. We will establish special deductions for the industrial chain, deduct a certain percentage of the upstream procurement costs of manufacturing companies listed in the "List of Key Links of Strategic Emerging Industries", and encourage innovation in the entire chain. At the same time, we will expand the tax incentives for companies to purchase new smart equipment. In addition to accelerating depreciation, we can also design relevant tax credits and other policies to encourage manufacturing companies to transform and upgrade.

Third, establish a regional coordinated compensation policy to balance the policy effects between the east and west. The state can design a tax incentive transfer payment policy, where the eastern region pays a certain amount of funds to support innovation in the western region when enjoying tax incentives. At the same time, establish a "enclave R&D center" mechanism to give greater tax incentives to central and eastern enterprises that set up R&D centers in the western region, and judge R&D efficiency based on whether the R&D results are industrialized, thereby providing differentiated tax incentives.

Fourth, we should speed up the digitalization of tax incentive management, use advanced technologies such as big data and artificial intelligence to supervise and innovate the implementation of tax incentives, and establish a policy effectiveness evaluation system. After the implementation of tax incentive policies, the government should use technologies such as big data systems to strengthen the supervision of tax incentive policies, ensure their fairness and effectiveness, improve their execution efficiency, and ensure that tax incentives can be effectively transformed into the improvement of the new quality productivity of enterprises. At the same time, we should use artificial intelligence to analyze the shortcomings of tax incentives in design, implementation and management, and continue to innovate to increase the role of tax incentives in improving the new quality productivity of enterprises.

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