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Impact of the "Value-Added Tax (VAT) Credit Refunds" on the Share Price of Listed Companies in the Pharmaceutical Industry

Shi Yingyin[a,*], Xu Xuejun[b]

School of Management, University of Shanghai for Science and Technology, Shanghai, China
[a]1152456722@qq.com, [b]luoyangxxj@163.com
[*]Corresponding author

Abstract: *In April 2019, the state launched the tax retention and credit refund, a nationwide tax incentive policy, which aims to promote the innovative development of high-tech industries. This paper examines the impact of the policy on the share price of listed companies by using multiple regression analysis with listed companies in the Chinese medicine sector of the industry classification of Zhongtai Securities from 2015 to 2023. It is found that the policy has a significant positive impact on the stock price, and the market reacts positively; at the same time, there is a significant difference in the impact of the policy on the stock price of different types of pharmaceutical listed companies. The results of the study have certain reference significance for further optimising the collection preference policy.*

Keywords: *Pharmaceutical Industry, Retained Tax Rebate Policy, Share Price*

1. Introduction

Innovation and the pursuit of quality growth have become the dominant model of economic development in China. In order to reduce the tax burden of enterprises, increase cash flow, and encourage innovation, on 1 April 2019, China launched the "tax refund", a tax incentive to encourage enterprises to expand production. As a representative of the high-tech industry in the pharmaceutical sector, does the 'VAT Credit Refund' help it in the development of corporate innovation and have a positive impact on the share price of the company? At the same time, what is the relevant impact mechanism? At present, there is an obvious lack of research on the above issues in the pharmaceutical industry. In view of this, this paper selects the listed companies in the pharmaceutical industry of the industry classification of Zhongtai Securities, and on the basis of an in-depth analysis of the mechanism of the role of policy on the company's stock price, we use multi-factor analysis to conduct an empirical study on the market response to the policy. Our study finds that the impact of policies on stock prices is positive, and there is some heterogeneity in the responses of different types of listed companies. Our findings can be used not only as a basis for policy makers to assess and optimise the effects of policies, but also as a reference for investors' investment choices.

2. Literature review

2.1 Studies on the impact of the "tax credit policy" on the share price of enterprises

Academic research on the retained tax rebate policy and its impact on corporate stock prices has gradually increased in recent years, resulting in some valuable results.

Regarding the effect of the value-added tax (VAT) credit refunds, most studies believe that the policy can significantly reduce the tax burden of enterprises and improve their cash flow.

The improvement of the financial situation and competitiveness of enterprises will obviously affect the share price of enterprises. There are two main views in related studies: one view is that value-added tax (VAT) credit refunds is able to enhance the market value of enterprises by improving their financial condition, thus positively affecting share prices, for example, Huang, Zhiping et al. [3] (2022) use the event study method to examine the short-term impact of the policy on enterprise share prices and find that the share prices of enterprises on the day of the policy announcement rise significantly; the study by Guo, Hongxia et al. [4] (2022) also supports this view, arguing that policies can enhance investors'

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expectations of firms' future development, thus driving up share prices. In contrast, another viewpoint suggests that the the impact of policies on stock prices depends on other factors. Deng Zhong et al. [4] (2022) point out that although policies can improve firms' financial position in the short term, their impact on firms' long-term value is unclear and needs to be analysed in the context of firms' specific situations. Zhao Keran et al. [2] (2022) show that policies may even increase firms' tax-related risks.

2.2 Relevant studies on the mechanism of tax incentives affecting the share price of enterprises

Tax incentives have a positive impact on the share price of enterprises by reducing their tax burden, increasing their cash flow, and increasing their R&D investment. Scholar Jiang Yanfeng[1] (2018) showed that tax preferential policies provide financial security for enterprises' R&D activities by increasing after-tax profits, reducing R&D risks, incentivising enterprises to increase R&D investment, and improving the efficiency and quality of R&D; moreover, indirect tax preferential policies, such as the additive deduction policy, are more able to significantly enhance enterprises' R&D investment compared to direct preferential policies. Liu Yi's[4] (2018), study proves that tax preferential policies have asymmetric effects on enterprise investment activities at different stages of the economic cycle, and the incentive effect is stronger in the economic boom period, and since the level of enterprise investment is one of the important factors affecting the stock price, the tax preferential policies may indirectly affect the stock price by affecting the enterprise investment activities. Yuanhui Li's[2] (2021) study shows that tax incentives have a significant promotional effect on invention patent applications, while there is no significant effect on non-invention patent applications, which may have a positive impact on stock prices by improving the innovation ability and market competitiveness of enterprises, and thus on stock prices. However, some studies have also shown that the specific impact of policies on firms' stock prices may be affected by a variety of factors, such as firm characteristics, industry characteristics, the level of regional economic development, and the degree of government intervention, showing significant heterogeneity. For example, Wu [2] (2023) points out that there are a number of major influences of taxation on the financial statements of listed firms, of which the most directly relevant is the tax policy itself (tax planning, tax rate, tax policy fulfilment conditions, etc.), followed by the sensitivity of firms to the tax policy, including the quality of the financial personnel, and so on.

2.3 Entry points for the research in this paper

The problem with the above research is that it mainly explores the overall impact of tax policy, but does not conduct a targeted study on the newly proposed "tax credit refund" in 2019. At the same time, the previous research mainly focuses on the impact of the policy on the overall productivity or capital utilisation efficiency of the manufacturing industry, but does not focus on the impact on the volatility of stock prices for specific industries. The entry point of this paper is to compare the time series data before and after the implementation of the tax policy of "tax credit rebate", and compare the share prices of more than one hundred and seventy enterprises in the pharmaceutical sector listed before 2019, in order to explore the mechanism of its impact on the volatility of the share prices of enterprises in the pharmaceutical sector, the effect of its impact and the heterogeneity of its impact.

3. Theoretical analysis and research hypotheses

The free cash flow theory points to a more serious agency cost problem between internal management and shareholders in firms that have ample cash flow remaining after all operating expenses and capital expenditures have been paid. For example, in the case of sufficient free cash flow, company managers are more inclined to invest the excess cash in non-profit projects that can expand the size of the company and whitewash their performance, rather than using it to pay dividends or buy back bonds, and the phenomenon of overinvestment using cash flow is more serious, which leads to higher sensitivity to invested cash flow and deviates from the goal of maximising shareholder value. The theory suggests that a company's investment behaviour tends to become more frequent as the company's free cash flow increases. According to Zhang Zhonghua [2] (2006), corporate investment is always sensitive to the internal cash flow of the firm. This is demonstrated by the fact that firms overinvest when their internal cash flow is high and underinvest when their internal cash flow is low. This argument further confirms that the internal cash flow of the firm has an impact on the investment behaviour of the firm. This paper argues that the tax retention policy, by releasing the internal cash flow of listed companies in the pharmaceutical sector, will have an impact on their investment behaviour, which in turn affects the share price. Secondly, according to the expectation theory, tax incentives, as a kind of fiscal policy, is an

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effective means for the government to stimulate the economy, and by stimulating the aggregate demand, it not only promotes the economic growth, but also guides the investors to expect better, and invests in advance in the enterprises that are expected to benefit, pushing up their share prices. Based on these two theories, we believe that the tax retention policy will have a positive impact on the share prices of companies listed in the pharmaceutical sector. As a result, this paper proposes the following hypothesis:

H1: The stay-at-the-bottom exit policy has a positive impact on the share prices of companies listed in the pharmaceutical sector

The extent to which policy affects a company's share price is also influenced by the nature of the listed company's enterprise. SOE stocks refer to stocks issued by enterprises directly held by the central government and those held by local governments. Compared to non-state-owned enterprises, SOEs are backed by government background and have strong market competitiveness and influence in key industries in China. From the perspective of financing preference theory, compared with costly external funds, enterprises will prefer low-cost internal funds for supplementation. However, because the stability, profitability and reputation of SOEs are widely recognised by investors in the domestic market, and the stocks released are more favoured by investors in the capital market, SOEs are more likely to be supplemented by low-cost external funds than non-SOEs, and therefore SOEs do not rely as much on internal cash flow as non-SOEs. In contrast, although non-SOE stocks have a quantitative advantage, there is still a gap in the degree of transparency of internal company information compared to SOEs. Second, according to the theory of behavioural finance, investors in non-SOEs tend to have a higher risk appetite, and the purpose of their holdings is mainly speculative, looking for short-term price fluctuation opportunities. Based on these two theories, we argue that investors who choose NSEs tend to demand higher risk compensation. On the other hand, from the Keynesian liquidity theory, stocks issued by SOEs are more easily recognised and accepted by investors, their secondary markets are more developed and their stocks are more liquid, so investors choosing non-SOEs' stocks will demand higher liquidity compensation. In summary, we believe that it is more costly for NSOEs to obtain funds from external sources, and that NSOEs tend to rely more on their internal cash flows for their operations. Tax incentives affect the stock price by influencing the internal cash flow of the enterprise, which causes the implementation of the tax credit policy may have a different impact on the stock price of SOEs and non-SOEs. Thus, this paper proposes hypothesis 2.

H2: Tax retention and refund policies have different impacts on the share prices of SOEs and non-SOEs

4. Empirical studies

4.1 Data sources

Since 2019, China has gradually established a VAT incremental tax rebate system, focusing on supporting the manufacturing industry and high-tech industries. Considering the availability and accuracy of data and the comprehensiveness and typicality of the sample, this paper chooses 2019-2023 as the time interval, and selects 175 listed companies listed in the pharmaceutical sector before 2019 as the sample companies. The data in this paper mainly comes from Wind domestic stock database, and for the few omissions and missing data of tax retention and refund degree indicators and operating performance indicators, they are collected and organised from the annual and related financial reports disclosed by each listed company in the pharmaceutical industry, while other macro data come from the China Statistical Yearbook and the CSMAR.

4.2 Variable setting

4.2.1 Explanatory variables: VAT tax incentives

Academics generally adopt the amount of government grants disclosed in the appendix to the annual financial statements of enterprises as a measure of tax incentives, but this indicator includes monetary and non-monetary assets acquired by enterprises from the government at no cost, and its measure of tax incentives is not pure, and a large number of studies have shown that tax incentives do not have the same effect as the implementation of direct government grants, and thus this paper adopts the same approach as that of the scholar Zhao Yifan (2020) that separates tax benefits from government grants separately and establishes a purer measure.

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$$\mathbf{VTax} = \frac{\mathbf{Tax\ refunds\ received}}{\mathbf{Tax\ refunds\ received} + \mathbf{Taxes\ paid}}$$

The indicators for each of the tax rebates received, and each of the taxes and fees paid were taken from the CSMAR, respectively.

4.2.2 Explained variable: stock prices

This paper uses the closing price of a stock as a measure of its price, which is the volume-weighted average price of all trades made one minute prior to the last trade in that security on that day (including the last trade). If there are no transactions on the day, the previous closing price is the closing price for the day.

4.2.3 Control variable indicators

Control variables refer to other factors affecting the business performance of organisations listed in the pharmaceutical industry, mainly including macro and micro variables. The variable should not be selected too much, too many control variables will affect the effect of model estimation, by summarising the existing literature, this paper chooses GDP to represent the macro environment variable indicators, the negative asset ratio and asset size of listed companies in the pharmaceutical industry as the micro variable indicators.

(1)GDP year-on-year growth rate

Macroeconomic environment is the condition and foundation of enterprise operation, and it is an important factor affecting the operation of enterprises.

(2) Gearing ratio (CD)

The enterprise's gearing ratio refers to the value of various types of capital in the enterprise and the proportion of the relationship, reflecting the relationship between the enterprise's assets and liabilities, its value largely determines the enterprise's solvency and refinancing capacity, and determines the enterprise's future profitability, is an important indicator of the enterprise's financial situation.

(3) Sz300 closing price (SZ)

The CSI 300 is the most representative index for the overall performance of the A-share market.

4.3 Descriptive statistics

From the statistical results of the whole sample in Table 1, it can be seen that the average value of the closing price of the explanatory variables is 1336, which shows that the overall closing price of the listed companies in China's pharmaceutical industry is relatively high; the minimum value is 1, the maximum value is 2660, and the standard deviation is 811.6, which shows that the closing price of different listed companies in the pharmaceutical industry at the same time, and of the same listed companies in the pharmaceutical industry at different time sections, has a large difference. The data distribution of the core explanatory variable value-added tax (VAT) credit refunds is different from the closing price, and the degree of dispersion is small. It indicates that the extent of the variable tax rebate policy varies less among different listed companies in the pharmaceutical industry, with a maximum value of 1.160 and a minimum value of -0.0900.

Table 1: Descriptive statistics of variables.

variant	variable	mean	sd	min	max
closing price	Price	1336	811.6	1	2660
Tax credit policy	Vtax	0.0900	0.180	-0.0900	1.160
gearing	CD	2208	1280	1	4462
gross national product (GNP)	GDP	6.290	7.950	-6.800	184.5
PE ratio	PE	72.93	139.0	0	1938
Sz300 Closing Price	SZ	4722	893	3037	6667

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4.4 Setting of the model

4.4.1 Selection of models

According to the research purpose of this paper and the characteristics of the selected data, the study chooses the panel regression model to conduct an empirical study on the impact of the degree of tax retention and refund on the operating performance of listed companies in the pharmaceutical industry. This is because the model has lower requirements for the selected data and can well solve the deficiencies in the multiple regression model and produce more accurate estimates. In the panel regression analysis, the unbiased estimation of the parameters of the model can be obtained for some neglected explanatory variables without actual observations, mainly by controlling the influence of the variable on the explanatory variables. However, when using panel regression models for estimation, it is necessary to choose the appropriate form of panel model in order to obtain valid estimated parameters. In this paper, we first determine the model as a fixed-effects model or random-effects model through Hausman test (Hausman), and then conduct the corresponding empirical research through Stata16 software.

4.4.2 Modelling

First of all, this paper collates the panel data of 175 listed pharmaceutical industry listed companies from 2019-2023, according to which regression models are constructed for research, and the overall sample is divided into two sub-samples of SOEs and non-SOEs for regression analysis respectively, and the models are constructed as follows:

$$price_{i,t} = \alpha_{i,t} + \beta_1 VATX_{i,t} + \beta_2 CD_{i,t} + \beta_3 SZ_{i,t} + \beta_4 GDP_{i,t} + C_i + \varepsilon_{i,t}$$

where i represents the ith listed company, t represents year t, price(i,t) is an explanatory variable representing the stock price of listed companies in the pharmaceutical industry, VATX(i,t) is a core explanatory variable representing the degree of tax retention and rebate policy, SZ(i,t) represents the total amount of assets of listed companies in the pharmaceutical industry, CD(i,t) represents the negative asset rate, Ci represents the fixed-effects model with different individual heterogeneity characteristics of the sample pharmaceutical industry listed companies, ε(i,t) represents the independent random error term.

4.5 Analysis of results

4.5.1 Hausman test

As shown in table 2,according to the results of Hausman's test for each sample,the p-value of listed companies in the full sample and sub-sample is greater than 0.05, which does not pass the test of significance, and the random effect model is chosen.

Table 2: Hausman test results

	Hausman test results	Selected Models
full sample	6.66 (0.0835)	stochastic effect
non-state enterprise	5.45 (0.142)	stochastic effect
state enterprise	4.665 (0.198)	stochastic effect

4.5.2 Analysis of regression results

In this paper, a random effects model was regressed on the full sample and the results of this regression are shown in the following table 3.

Table 3: Analysis of regression results

Price	Coef.	Std.Err.	Z	p>|z|	[95% Conf .	Interval]
Vtax	259.4778	109.9145	2.36	0.018	44.04927	474.9063
CD	.0544681	.0142491	3.82	0.000	.0265404	.0823957
GDP	.9150297	1.739634	0.53	0.599	-2.494591	4.32465
SZ	.0279532	.0121546	2.30	0.021	.0041306	.0517757
_cons	1050.223	70.39752	14.92	0.000	912.2459	1188.199
sigma_u	400.37295					
sigma_e	690.56108					
rho	.25157763	(fraction of variance due to u_i)				

According to the regression results of the whole sample, it can be seen that the regression coefficient

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of the explanatory variable value-added tax (VAT) credit refunds (Vtax) is positive and significant at the level of 99%, which indicates that Vtax has a significant positive correlation with price, that is to say, there exists a positive correlation between the degree of value-added tax (VAT) credit refunds and the stock prices of listed companies in the pharmaceutical industry, the higher the degree of the value-added tax (VAT) credit refunds is, the higher the stock prices of listed companies in the pharmaceutical industry are, thus proving that the value-added tax (VAT) credit refunds has the ability to help the operation of listed companies in the pharmaceutical industry. The higher the degree of value-added tax (VAT) credit refunds, the higher the stock price of listed companies in the pharmaceutical industry, thus proving that the value-added tax (VAT) credit refunds has the ability to help the operation of listed companies in the pharmaceutical industry.

Regarding the control variables, the regression coefficient of gearing ratio (CD) is positive, which indicates that CD is significantly positively correlated with PRICE, and the result is significant and good, i.e., there is a positive correlation between gearing ratio and stock price of listed companies in the pharmaceutical industry, and the enhancement of the liabilities of the listed companies in the pharmaceutical industry will improve the operating performance of the listed companies in the pharmaceutical industry in China.

In addition to the individual factors of the sample, the stock prices of the listed companies in the pharmaceutical industry are also affected by the industry factors and the macro-environment. the relationship between GDP growth rate and price is also positive, although not significant, but in line with the common sense expectation. The regression coefficient of the closing price of Sz300 is positive, which indicates that the sz and price are moving positively, that is, there is a positive correlation between the macro stock market situation and the stock closing prices of the listed companies in the pharmaceutical industry.

4.5.3 Sub-sample regression analysis

In order to study the differential impact of the degree of tax rebate on the operating performance of different types of listed companies in the pharmaceutical industry, this paper conducted regressions on the sample of non-SOEs and the sample of SOEs respectively, and the regression results are shown in Table 4.

Table 4: Analysis of regression results for the subsample

	state enterprise	non-state enterprise
Vtax	-50.344*	12.485***
	(-1.68)	(2.89)
CD	-38.240***	-21.492***
	(-2.74)	(-4.79)
GDP	-0.194	0.047
	(-0.19)	(0.15)
SZ	0.005***	0.004***
	(3.21)	(10.15)
_cons	18.449**	5.939**
	(2.28)	(2.42)
Observations	323	1,121
R-squared	0.073	0.140

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

As shown in table 5,the regression coefficient of the explanatory variable of value-added tax (VAT) credit refunds (Vtax) for the non-SOE sample is positive and significant, indicating that value-added tax (VAT) credit refunds can significantly improve the business performance of enterprises, and the regression coefficient of the control variable of year-on-year growth rate of GDP (GDP) and the SZ coefficient are significantly positive, indicating that the better the economic situation is, the better the business performance of enterprises, which is in line with the conventional cognition. The regression coefficient of the explanatory variable of the SOE sample, value-added tax (VAT) credit refunds (Vtax), is negative and significant, indicating that the tax credit refund policy can significantly reduce the operating performance of SOEs. The regression coefficient of capital debt ratio (CD) is negative, indicating that the more indebted an enterprise is, the worse its operating performance is.

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4.5.4 Ordinary panel model robustness tests

Table 5: Robustness test results

	PE
Vtax	58.456**
	(23.285)
CD	-0.001
	(0.003)
GDP	0.547*
	(0.326)
SZ	0.001
	(0.002)
_cons	62.598***
	(11.493)
N	3894.000
r2	0.003
r2_a	-0.046

Standard errors in parentheses
* p < 0.1, ** p < 0.05, *** p < 0.01

In this paper, the stock return (PE) instead of stock price (PRICE) again panel regression, both can represent the stock return situation, through the regression results are basically the same as shown above, to verify the stability of the model. The specific regression results are shown in the table.

5. Conclusions

Based on the empirical analysis of the impact of the value-added tax (VAT) credit refunds on the stock price of listed companies in the pharmaceutical sector, this study concludes that the value-added tax (VAT) credit refunds has a significant positive impact on the overall stock price of listed companies in the pharmaceutical sector, which has a positive effect on the stock price. Especially for stocks issued by non-SOEs, the positive impact of the value-added tax (VAT) credit refunds on stock prices is very obvious. However, for stocks issued by SOEs, the implementation of the value-added tax (VAT) credit refunds has a negative effect on their stock prices.

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