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The Relationship between the Performance of Listed Companies in Pharmaceutical Manufacturing and Inventory Turnover, Operating Rate

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Abstract

As an important part of the pharmaceutical industry, the pharmaceutical manufacturing industry is always at the battlefield of the international public health and health industry. At the same time, as a basic and strategic sub-industry in China's manufacturing industry, the medical manufacturing industry closely related to people's livelihood which is not only related to social Responsibility but also plays a key role in China's economy today. For the Chinese people, the new medical reforms and the irreversible aging of the population have increased the nation's total expenditure on health care. From January to October 2017, the pharmaceutical industry's main business income was RMB 2,410.29 billion, a year-on-year increase of 13.10%. This is a 4.50 percentage point higher than the 10.30% growth rate in 2016. However, even if the circumstance of this industry is getting better，high growth also has a drag on the national health insurance system and the standard of living of the people.

This article chooses to analyze the financial and operating-level factors of China's pharmaceutical manufacturing listed companies such as Inventory turnover rate and operating rate. Study the impact on the performance of China's pharmaceutical manufacturing listed companies. The results of the study will fill gaps in the research of this industry and help pharmaceutical manufacturing listed companies choose the right capital size, liabilities, and expansion strategies, and more effectively absorb the current development dividends of China's "four new economy", and use them rationally and effectively. Markets and complex and limited capital and resources of enterprises, as China's industry benchmarks continue to guide the rapid growth of the market. on the other hand, to help investor the empirical point of view better choice of investment targets. This paper uses data from 2007-2016 for randomly selecting 19 companies from 118 medical manufacturing listed companies classified by China Securities Regulatory Commission. After dealing with panel data, multiple inspections are performed on panel data. To avoid the deviation from the actual level of the regression results, the panel-corrected standard deviation model was used to derive the relationship between the operating-level factors of pharmaceutical manufacturing listed companies and their performance. The results of the study indicate that there is a positive correlation between Inventory turnover rate, operating rate and performance, which fills the domestic empirical research on this issue. This area of industry company performance is blank.

Keywords: Pharmaceutical Manufacturing Listed Companies; Corporation Performance; Panel Data; Inventory Turnover; Operating Rate of Return

1 INTRODUCTION

In the process of economic development, the main body of productivity gradually shifts from labor to production materials. The concern for the life expectancy of the population has also shifted from economic demand to the important proposition of social welfare. The most relevant to this proposition is the international health cause. Undoubtedly, the medical industry is struggling at the forefront of this business field. Under the regulation of the China Securities Regulatory Commission in 2014, the main body of medical industry is divided into the pharmaceutical manufacturing industry and its seven sub-sectors. Today's pharmaceutical manufacturing industry

has become the backbone of China's manufacturing industry, accounting for nearly 10% of the output value. The development of industries that have been developed from health and economic development has made the most important contribution to China's development. At the same time, it has also played a vital role in the flow and development of China's capital market. Due to the listing system of China's secondary market, China's pharmaceutical manufacturing listed companies have extremely low foreign investment, which can better reflect the actual development of China's pharmaceutical manufacturing industry. For the country, China's pharmaceutical manufacturing industry shows that development is a symbol of the country's industrial strength. High-tech industry's pharmaceutical manufacturing industry is not only the vanguard of China's economic transformation, but also the performance of most intuitive consumption in new health era. From the data, in the first three quarters of 2017, the pharmaceutical manufacturing industry achieved a total income of 241.20 billion yuan, with an increase of 13.10%, and a growth rate of 4.5 percentage points over the same period. The profit was as high as 2.713 billion yuan, with an increase of 18.20%, which was 2.7 percentage points higher than the growth rate of 15.20% in the same period last year. According to the current stage of the overall situation, along with the comprehensive promotion of the supply-side structural reform, the further policy direction brought by the main line of the “four creations economy”. The increasing health care business consumption and the continued strong market demand will continue the recovery and maintain a good upward trend in growth rate.

First of all, through the study of financial indicators on the performance of China's pharmaceutical manufacturing listed companies, corporate managers can develop a more reasonable system to evaluate the company's financial status and real operating conditions more accurately and comprehensively. After that, discovering problems in daily operations can improve the company's financial management. Considering the impact of R&D investment intensity on the performance of China's pharmaceutical manufacturing listed companies, the pharmaceutical industry has important social responsibilities for national health. The development of new drugs and specific drugs is related to the survival of human beings and the happiness of the people, such as severe influenza in the autumn and winter seasons, death-causing infectious diseases with high-speed mutations, and different cancers in different tissues. Due to the long-term development cycle of the pharmaceutical manufacturing industry and the short-term return period, the social responsibility performance of the industry has a very important reference value compared with the financial aspect.

This paper first reviews a large number of relevant literatures, summarizes the definitions and measurement methods of domestic and foreign scholars on the performance of manufacturing enterprises, and selects representative representatives for the industry characteristics of the pharmaceutical industry due to the pharmaceutical industry characteristics and development trends of China's pharmaceutical industry. Then, this paper organizes the conclusions of the research on performance in terms of innovation and manpower level, social responsibility, enterprise scale, business management and financial indicators. Then in the empirical part, this paper mainly explores the impact of inventory turnover rate and operating rate on the performance of listed companies in pharmaceutical manufacturing, and finds the influencing factors of performance. This paper also finds the unique investment characteristics of the industry at this stage, help people understanding the industry company for investors and provides ideas and reference for the operation and management of the company.

This paper selects the data of China's medical manufacturing listed companies from 2007 to 2016 for a total of 10 years as a sample through empirical research. As far as possible, the data fits the characteristics of high-return and long-term investment, selects the performance measurement method and the main indicators that affect performance. Then this paper produces panel data, establishes and screens the model, analyzes the correlation of various influencing factors and the performance of listed pharmaceutical manufacturing companies.

The remaining part of this paper is organized as follows. Section two reviews related literature. Section three introduces the data. Section four presents empirical results. Section five concludes the paper and proposes policy implications.

2 RELATED LITERATURE

The literature has studied the influencing factors of pharmaceutical company performance through empirical research, mainly focusing on the following aspects:

2.1 Measurement and Definition of the Performance of Pharmaceutical Manufacturing Companies

Scholars at home and abroad have proposed different standards for the measurement of company performance. Lebas (1995) believes that performance can be used as a measure of whether a business achieves its intended business objectives. In Walker R (1985), the performance of the company was first reflected in the market position of the company, which was reflected in the market coverage of products and services; the second performance is the ratio of input to output, which is mainly reflected in indicators such as return on assets; the third is the embodiment of the company's ability to resist risks, mainly determined by the sales and solvency of the market during the success of the company. In the general sense, there are three most intuitive ways to measure the performance of a company: Return on Assets, Return on Equity, and Earnings Per Share. The definition of performance in China's "State-owned Capital Performance Evaluation Rules" can be interpreted as the two-sidedness of the results of the company's performance, which can also affect each other. Zhu Wenqing (2015) believes that the overall performance of listed companies in the pharmaceutical manufacturing industry is at a relatively high level, and they all perform well in terms of financial and business performance, but there is still much room for improvement from the overall industry perspective. In addition, there are significant differences in the social performance of listed companies in the pharmaceutical industry. Therefore, in the subsequent research, the data on social responsibility performance was not selected as an indicator. The empirical results of Ding's (2010) paper show that the traditional Chinese medicine is very unsatisfactory in the normal performance of listed companies under the track of biomedical technology, showing a phenomenon of polarization. Xia Lizheng (2009) used the factor analysis method to turn the multi-index problem into fewer comprehensive evaluation indicators, thus giving the weight calculation of the comprehensive score of the listed companies, and comprehensively evaluating the performance of the listed companies. However, the study pointed out the shortcomings of such research. Financial indicators only reflect the results of past business, can not reflect the reasons for the results and the current value creation activities, and have certain subjectivity in terms of weight.

2.2 Innovative Factors Affecting Performance

Si Yujuan (2015) considered the proportion of employees with bachelor degree or above. She believes that the staff training expenditure and the intensity of pharmaceutical R&D investment can represent the extent of the future development of pharmaceutical companies to a certain extent. Su Shi (2017) found that the qualifications of employees have no influence on the growth of enterprises through empirical analysis of the growth of pharmaceutical listed companies. Storey (2002) takes the UK's mid-sized companies as the research direction and believes that employee training and re-education classes help to improve the company's development capabilities. The R&D investment intensity of medicine can reflect the proportion of R&D investment in the main business income, and it is divided into two parts: expense and capitalization, which are respectively "R&D expenses" under "Management expenses" in the notes to the report and "development expenditure." In the new accounting standards of 2007, the accounting statements have merged the two into "total R&D investment". This paper is instructive for the choice of performance in pharmaceutical innovation.

2.3 Capital Structure Factors Affecting Performance

Zhang Tongbin (2012) stated that the total asset size of the company's scale has a negative impact on the performance of the company. Xiang Yu (2015) selected the asset-liability ratio as an explanatory variable to study the impact of financing structure on firm performance, and concluded it is unreasonable that the long-term liabilities and short-term liabilities are negatively related to the performance of China's pharmaceutical manufacturing enterprises. Song Xianzhong, Wu Yineng, and Ning Ji'an (2014) selected the asset-liability ratio as an explanatory variable to measure the impact of solvency on corporate performance. Xu Luping (2011) stated that the quick ratio and the current ratio are indicators for measuring the short-term solvency of enterprises, and the study of the rationality of this capability is indispensable.

2.4 Factors Affecting Performance and Growth

Zhang Long (2014) used DuPont analysis to analyze the financial situation of China's bio-pharmaceutical industry. He believed that the operational capacity is the most important part for pharmaceutical companies to strengthen self-examination and further improvement. Wu Xiaoyu (2004) selected the growth rate of main business income and the average growth rate of net profit per share in the past three years as the research indicators for the evaluation of corporate growth. Chen Yuwei, Li Ye, and Xu Jing (2011) selected the growth rate of sales revenue to explain their growth ability in the production evaluation model of China's biomedical industry. Wen Xianming (2006) used average return on equity and gross profit margin of the main business to measure the profitability of the company. Li Jinzhou and Zhou Minqian (2008) selected the return on net assets, the return on total assets, the net sales rate and the gross profit margin. Zhang Long (2014) based on the DuPont analysis method to analyze the financial status of China's bio-pharmaceutical industry, also believes that the pharmaceutical companies' operational capabilities need to strengthen self-examination and further improvement. This paper integrates the enterprise profitability indicators, and finally chooses the operating profit rate and inventory turnover rate as the operating capacity indicators of pharmaceutical companies.

2.5 Literature Review

The literature has done a very detailed study on the definition and measurement standards of pharmaceutical manufacturing enterprises. Representative data to measure firm performance are mainly Return on Assets, Return on Equity, and Earnings Per Share. The literature on the influencing factors of corporate performance in the past is mainly based on the accounting staging assumptions to extract some intuitive financial data as research objects, such as business operating costs, profits, etc. And these data consider the business level of the company at the end of the accounting period, and ignore some of the dynamic level of capital turnover. Therefore, based on important financial data, this paper will focus on some indicators related to the company's growth, and uniquely select the indicators at the enterprise scale as the research goal. Besides, this paper tries to summarize the impact of firm size on performance in the high-tech manufacturing industry through the regression results. Due to the particularity of the Chinese pharmaceutical industry market, this paper eliminates vendor-level indicators such as accounts payable turnover.

In terms of research methods, Wall analysis and DEA factor analysis methods have been adopted in a large number of literatures, but both have some shortcomings. With the modified Wall analysis method, the correction itself has this certain subjectiveness. The DEA model, although adopting the idea of dimensionality reduction in data processing, is mainly based on human judgment when selecting variables, so the selected variables are inevitably more subjective. Therefore, using these two methods, it is difficult to carry out effective operational management and policy recommendations for the complex industrial classification of pharmaceutical manufacturing enterprises.

The innovations of this paper are as follows:

In terms of topic selection, the development of China's pharmaceutical manufacturing industry is still at a preliminary stage compared with China's potential market volume. There are few studies on the factors affecting performance evaluation. The pharmaceutical manufacturing industry, as a subordinate of the manufacturing sub-sector classified by the CSRC, has been selected as a research object in the medical or pharmaceutical industry. It has certain inadequacy for the existing industry research. Therefore, this study will help to fully understand the logical relationship between the factors affecting the performance of listed companies in China's pharmaceutical manufacturing industry, and help to comprehensively clarify the development direction of China's pharmaceutical manufacturing listed companies.

In terms of empirical aspects, the method is unique. The predecessors research the factors affecting the company's performance by using multi-factor analysis method. Through the dimensional reduction of the normalization coefficient matrix and the calculated factor score, these papers reflect the influence of each factor on performance, and there is a certain subjective influence on the correction weight. This article uses short-panel data and uses Stata for software analysis. Based on summarizing the senior literature, this article attempts to verify performance impact factors in different ways. It combines the different characteristics of the high-tech industry and manufacturing

industry where the pharmaceutical manufacturing industry is located. It carries out empirical analysis and supplements the research of the predecessors.

3 INDUSTRY BACKGROUND

Since the universal medical insurance in 2007, China's pharmaceutical manufacturing industry has maintained a rapid development under the slant of capital and policy. According to wind information data, as of the first half of 2016, there were more than 7,300 pharmaceutical manufacturing enterprises in China. The main business income surged from 477.37 billion yuan in 2006 to 2,533.7 billion yuan, with an average annual compound growth rate of 20.59%.

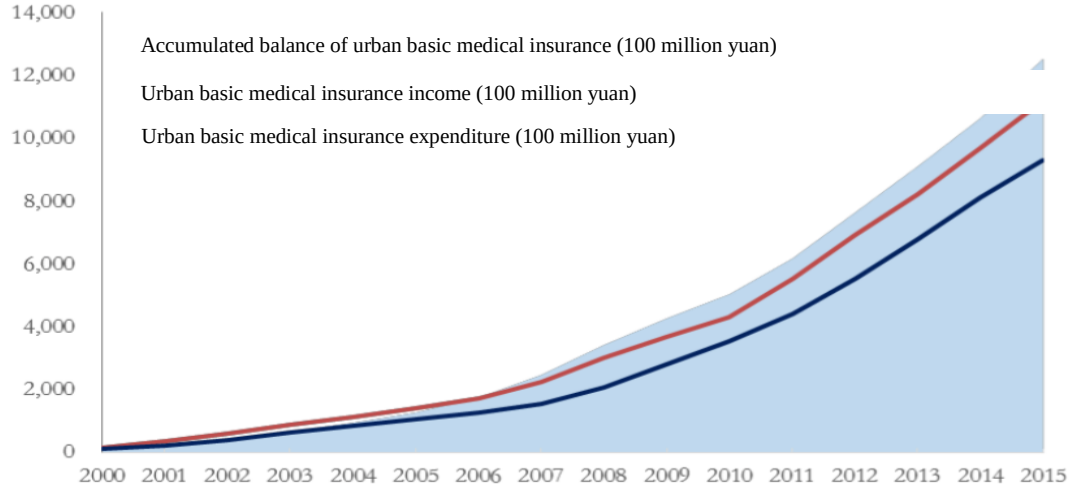

FIGURE 3-1 HEALTH INSURANCE INCOME AND EXPENDITURE FROM 2000 TO 2015

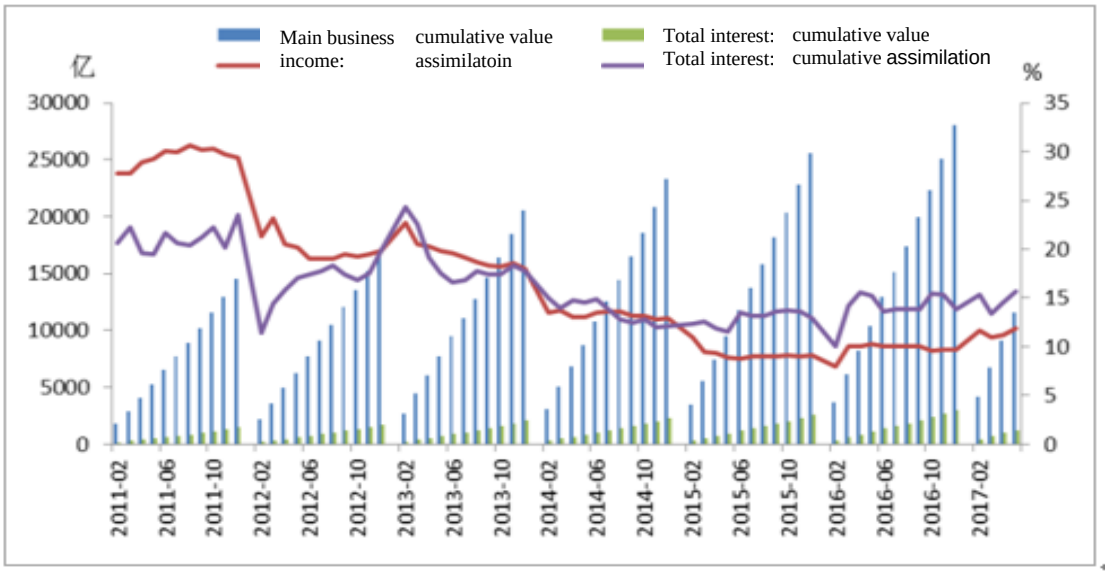

FIGURE 3-2 INCOME AND PROFIT OF THE PHARMACEUTICAL MANUFACTURING INDUSTRY IN 2011-2017

In the first half of 2016, the sales revenue of China's pharmaceutical manufacturing enterprises totaled 1.294 trillion yuan, a year-on-year increase of 10.00%. From 2006 to 2015, the total profit of China's pharmaceutical manufacturing industry surged from 37.1 billion yuan to 262.7 billion yuan, maintaining a compound annual growth rate of 24.29%.

As of the end of 2018, there are 118 listed companies in the pharmaceutical manufacturing category classified by the CSRC. This paper randomly selected 24 data from the implementation of the new financial standards in 2007 to

2016, and excluded 5 samples that did not satisfy the empirical research and descriptive analysis in 24 household data according to the following criteria:

3.1 Excluding the sample of listed companies that experienced a risk of delisting warnings between 2007 and 2016. Because with the delisting warning, the company has suffered losses for two consecutive years and there is a risk of bankruptcy.

3.2 Excluding companies that have a low percentage of their main business, and avoiding using data that is not relevant to the pharmaceutical manufacturing industry.

TABLE 3-3 DESCRIPTIVE STATISTICS OF VARIABLES

Variables	Observation value	Mean	Standard deviation	Minimum value	Maximum
Return on Assets	190	11.26	8.769	-26.80	41.44
Fixed asset turnover	190	3.939	4.367	0.914	40.78
Fixed asset turnover	190	3.242	1.565	0.162	8.492
Accounts receivable turnover	190	13.76	33.36	1.118	446.3
Current ratio	190	2.069	2.701	0.401	25.99
Asset-liability ratio	190	38.45	17.40	4.087	80.60
Total asset growth rate	190	22.35	39.49	-21.51	389.0
Company Size	190	4368	6338	175.0	54824
Net profit growth rate	190	32.64	177.9	-1279	1618
Operating profit margin	190	11.72	11.90	-64.24	37.86
R&D investment intensity	190	6.07	6.701	0.101	29.68

3.3 Excluding companies with critical data incompleteness and outliers from 2007 to 2016, these problems are usually caused by information disclosure violations and will affect the authenticity and accuracy of the regression.

This paper finally uses the data of 19 listed companies in the pharmaceutical manufacturing industry. The IPO of the pharmaceutical manufacturing companies in China is extremely low, and the information of the 19 listed companies has high credibility. The financial data used in this paper mainly comes from the China Securities Network data platform, and a small part comes from the Wande data platform. This paper selects some descriptive analysis that can reflect the operating status data of listed companies in China's pharmaceutical manufacturing industry. The data of all variables are shown in Table 3-3:

Asset data for a decade shows that the industry’s asset size has raised steadily and rapidly. This means that the concentration of industry is also silently improving. Under the trend of new supply-side medical reform system and good money to drive out bad money, major manufacturers have rapidly expanded due to scale effect, improved industrial concentration and profit.

This paper uses the total asset growth rate and net profit growth rate at the beginning of the year to assess the growth capacity of the company, and the average growth rate of 22% and 33% is amazing. The highest total asset growth rate of nearly 400 times performance and 40 standard deviations represent a very hot attitude towards the industry, and the subdivision situation also has a polarized performance. More exaggerated things happen on the net profit growth rate. Because of the characteristics of high technology, high investment, high risk and high return in the pharmaceutical industry, the standard deviation of net profit growth rate is as high as 177%. while the highest 16 times annual growth and the lowest negative 13 times performance in one year have to let the investors realize that this high-growth industry is also a high-risk industry full of speculative opportunities. From the perspective of the overall industry's net profit growth, after maintaining a high growth rate and starting to decline in 2010, there is a clear trend of growth in 2016-2018. In line with the policy, this should be the dividend from the supply-side medical

reform, the new medical insurance catalogue, and the further reform and deepening of “double creation to four new”. The expansion of the over-the-counter drug market, the prospect of generic drugs going global, and the development of new drugs supported by the state, together with the performance of the data, can be seen in the future development of the pharmaceutical manufacturing industry.

The fixed asset turnover rate, accounts receivable turnover rate and inventory turnover rate respectively reflect the company's utilization of equipment, land and plant, utilization of funds and efficiency of management and operation. In these three data, according to the "Enterprise Performance Evaluation Standard Value" issued by the State Council's State-owned Assets Supervision and Administration Commission of the State Council in 2016, the pharmaceutical manufacturing industry is excellent as a high-tech industry. But there is still much room for improvement in intersecting with other mature technical industries. From the perspective of accounts receivable turnover, the average performance of almost one month and the standard deviation of up to 33% may represent the lack of utilization of funds in the industry. From the perspective of business performance, the data may indicate that the industry lacks certain standards, and the performance of the attitudes and relationships of distributors at all levels is also very scattered, or the market's connectivity is not enough.

R&D investment intensity is calculated by the company's annual total R&D expenditures as a percentage of annual operating costs. The industry average is as high as 6.07%, of which Chinese medicine and Chinese medicine industry have the lowest investment, with an average of 1%. And the proportion of R&D investment in biopharmaceuticals and other aspects is as high as 20%. What is more noteworthy is that even in the case of rising turnover, the proportion of R&D investment in the pharmaceutical manufacturing industry has increased significantly with the growth of the year. With the gradual development and maturity of the most important generic drug industry in China's pharmaceutical industry, the new drug and special effects drug industry has become the new blue ocean of the pharmaceutical industry. Because the development rate of new drugs is extremely low (the success rate of the United States is 1/5000, the success rate of Japan is 1/4000), and the development cycle is as high as 10-20 years, the annual increase of R&D investment intensity is very reasonable, and it will also changes with the development of the pharmaceutical innovation market. The highest value of 29.68% of Hongri Pharmaceutical is a well-known high-tech medical and health enterprise. The research and development investment includes many fields such as pharmaceutical research and development, medical device research and development, and Internet medical research and development.

4 EMPIRICAL ANALYSIS

This paper selects the data of 19 pharmaceutical manufacturing listed companies listed on the A-share market in China from 2007 to 2016, uses short-panel data, builds and selects models, and empirically analyzes the impact of operational and management factors on company performance.

4.1 Assumptions

Hypothesis 1: The inventory turnover rate of listed companies in pharmaceutical manufacturing has a positive impact on company performance. The inventory turnover rate can reflect the liquidity of the inventory, and can simultaneously examine the company's production capacity and management capacity for inventory capital occupation. Most of the products in the pharmaceutical manufacturing industry have high requirements for inventory management. At the same time, the lengthy supply chain also has the huge cost, even the inefficient capital transfer efficiency of the upstream and downstream inventory backlog of the industry chain. As a high-tech manufacturing industry that requires a lot of financial support, every penny of the pharmaceutical manufacturing industry should be used in the cutting edge. The backlog of inventory occupies limited resources is not feasible, so that the pharmaceutical manufacturing listed companies with good operating performance should have a good inventory turnover rate.

Hypothesis 2: Operating profit margin has a positive impact on the performance of listed companies in the pharmaceutical manufacturing industry. Operating profit margins reflect the efficiency of the company's operations. For the pharmaceutical industry, which is still in the high-speed development period, the depth and breadth of the

potential market may focus on considering the rapid expansion of business rather than reducing costs and sales expenses. For the pharmaceutical manufacturing industry, which relies on extreme sales, operating margins are extremely important to the company's performance.

The remaining variables are used as control variables during the study to ensure the true validity of the regression.

4.2 Variable Selection

Explained variable:

Return on assets (ROA). It means the ratio of total revenue to total assets. The formula is:

$$\text{Return on assets} = (\text{total profit} + \text{interest income}) / \text{total assets} \quad (4.1)$$

The return on assets index can combine the profit of the income statement with the assets in the balance sheet to express the company's ability to use its entire assets and funds to obtain profit. The scale of assets of pharmaceutical manufacturing companies is often large, and this indicator has certain representativeness in measuring the performance of listed companies in pharmaceutical manufacturing.

TABLE 4-1 DEFINITION OF VARIABLES

	Variable	**Definition of variables**
Explained variable	Return on total assets（ROA）	Net profit and total assets ratio
Explanatory variables	Fixed asset turnover（FAT）	The ratio of sales revenue to the net value of fixed assets, used to measure the utilization and management capabilities of listed companies in the pharmaceutical manufacturing industry.
	Inventory turnover（IT）	The ratio of cost of sales to average inventory balance reflects the company's excellent operational management in terms of production capacity, inventory management, and cost control.。
	Accounts receivable turnover（AR）	The ratio of sales income to average receivables, which reflects the liquidity of pharmaceutical companies, can also indirectly reflect the indicators of the bad debt rate of enterprises.
	Current ratio（CR）	The ratio of current assets to current liabilities reflects the company’s ability to repay short-term debt immediately
	Asset-liability ratio（DAR）	The ratio of total liabilities to total assets reflects the company's existing level of debt risk. The impact of this indicator on company performance is theoretically two-sided.
	Total asset growth rate（EXP）	The growth rate of total assets at the end of the year is used to evaluate the ability of pharmaceutical manufacturing listed companies with high R&D and manufacturing capabilities in research and development capabilities and capacity.
	Company Size（SIZE）	Total assets at the end of the period, helping to evaluate the impact of the expansion of asset size on the company's performance in the short term
	Net profit growth rate（NPG）	The year-on-year growth rate of net profit at the end of the period is the most intuitive expression of the company's ability to grow profits. For listed companies, it is the most important consideration for all parties to measure the value of the company.
	Operating profit margin（OM）	The proportion of operating profit in total business income represents the proportion of operating profit of the company in total operating income.
	R&D investment intensity（RD）	The proportion of total R&D investment in output value, showing the importance of the company's emphasis on innovation and the contribution of innovation in the production process

TABLE 4-2 PEARSON CORRELATION COEFFICIENT TEST

10.5	FAT	IT	AR	CR	DAR	EXP	SIZE	NPG	OM	RD
FAT	1									
IT	0.048	1								
AR	0.105	-0.040	1							
CR	-0.008	-0.144	0.148	1						
DAR	-0.021	0.036	-0.142	-0.475	1					
EXP	0.043	-0.095	0.333	0.325	-0.110	1				
SIZE	0.206	-0.071	-0.023	-0.026	0.015	0.067	1			
NPG	0.006	0.054	0.004	-0.006	-0.043	0.063	-0.018	1		
OM	0.062	-0.036	0.241	0.277	-0.414	0.270	0.091	0.289	1	
RD	-0.263	-0.220	0.285	0.148	-0.198	0.246	-0.185	-0.018	0.116	1

4.3 Factors Affecting the Performance of Listed Companies in Pharmaceutical Manufacturing——Based on Panel Data

1) Correlation Analysis

The Pearson correlation coefficient is the most commonly used correlation coefficient, also known as the product difference correlation coefficient. It is the standard deviation of two random variables divided by the covariance, and is used to measure whether two data sets are above one line and measure the distance of the linear relationship between variables. The value is -1 to 1, positive and negative indicate positive and negative correlation. The larger the absolute value, the stronger the correlation. This paper uses the Pearson test to examine the correlation between variables. It can be seen from Table 4-2 that the correlation coefficients between the variables are less than 0.5, indicating that there is no serious multiple co-linearity problem between the variables.

In summary, the explanatory variables and 12 explanatory variables selected in this paper are stationary data, so there is no need to perform co-integration testing of non-stationary data.

2) Data Stability Test

The unit root test method of panel data mainly includes the LLC test (proposed by Levin, Lin and CHU (2002)) and IPS test (Peserarn, Shin (2003)). However, in view of the fact that the data in this paper is a short panel, it is suitable to use the IPS test method to test the data for the stability of the variables. The results show that the data is generally stable.

3) Model Comparison and Selection

The data selected in this paper is in the form of short panel data. The alternative basic models are Fixed Effect, Mixed Regression Model (OLS), Random Effect Model and Panel Corrected Standard Deviation (PCSE) model. After testing to determine the model that may be used in this paper, the data will be tested for Heteroscedasticity and autocorrelation, and the final model will be determined.

Breusch-Pagan Lagrange Multiplier Test finds that random effect is better than OLS. F test finds that fixed effect outperforms OLS. Hausman test finds that fixed effect model is more suitable for the data than random effect model.

4) Heteroscedasticity Test and Autocorrelation Test

For the Heteroscedasticity test, the LR chi2 of the test is 158.67 and the probability value is 0.000, indicating that the null hypothesis of “same variance” is rejected, that is, the model has Heteroscedasticity. For the autocorrelation test, the F of the test is 107.022, and the probability value is 0.000, indicating that the null hypothesis of “there is no autocorrelation” is rejected, that is, there is autocorrelation.

5) Regression Results and Robustness Test

To return to the return on total assets, set the model as follows:

$$ROA_{it} = \alpha_{it} + \beta_1 FAT_{it} + \beta_2 IT_{it} + \beta_3 AR_{it} + \beta_4 CR_{it} + \beta_5 QR_{it} + \beta_6 DAR_{it} + \beta_7 EXP_{it} + \beta_8 SIZE_{it} + \beta_9 NPG_{it} + \beta_{10} OM_{it} + \beta_{11} RD_{it} + \varepsilon_{it} \quad (4.2)$$

In the above model, α is the intercept, β_i (i = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12) is the model regression coefficient, ε is the random error term. ROA stands for return on assets, FAT stands for solid asset turnover, IT stands for inventory turnover, AR stands for accounts receivable turnover, CR stands for current ratio, CR stands for current ratio, DAR stands for asset turnover, and EXP stands for relative assets at the beginning of the year, SIZE represents the total assets (million yuan), NGP represents the net profit growth rate, OM represents the operating profit rate, and RD represents the total R&D expenditure as a percentage of operating costs.

The regression results are shown in Table 4-11:

The first column is the mixed OLS regression result, the second column is the Fixed Effect model result, the third column is the Random Effect model regression result, and the fourth column is the panel correction standard deviation model regression result.

TABLE 4-3 REGRESSION RESULTS AND ROBUSTNESS TEST OF TOTAL RETURN ON ASSETS (ROA)

Independent variable	**Dependent variable: return on total assets ROA**			
	Return One	Return Two	Return Three	Return Four
	Coefficient	Coefficient	Coefficient	Coefficient
	(Standard Deviation)	(Standard Deviation)	(Standard Deviation)	(Standard Deviation)
FAT	0.250*	0.005	0.250***	0.264***
	(1.874)	(0.044)	(2.710)	(2.602)
IT	1.133***	1.571***	1.133***	0.864***
	(3.493)	(4.291)	(4.138)	(3.866)
AR	-0.001	-0.000	-0.001	-0.009
	(-0.046)	(-0.012)	(-0.050)	(-0.505)
CR	-0.244***	-0.287**	-0.244*	-0.355***
	(-2.694)	(-2.048)	(-1.710)	(-2.866)
DAR	0.047*	0.081***	0.047*	0.007**
	(1.810)	(3.131)	(1.928)	(2.203)
EXP	-0.017*	-0.012**	-0.017***	-0.012**
	(-1.950)	(-2.080)	(-2.608)	(-2.450)
SIZE	-0.000	-0.000	-0.000	-0.000
	(-0.177)	(-0.249)	(-0.165)	(-0.824)
NPG	0.004*	0.004**	0.004**	0.003**
	(1.884)	(2.601)	(2.536)	(2.583)
OM	0.608***	0.586***	0.608***	0.561***
	(7.011)	(17.639)	(18.842)	(19.707)
RD	0.013	-0.093	0.013	0.026
	(0.093)	(-0.920)	(0.162)	(0.265)
_cons	-1.635	-2.487	-1.635	1.496
	(-0.601)	(-1.204)	(-0.881)	(0.757)
N	190	190	190	190
R^2	0.7871	0.7369	0.7253	0.7983

Note: ***, **, and * indicate significant at 1%, 5%, and 10%, respectively.

Table 4-3 shows the regression results between explanatory variables and total return on assets (ROA):

Inventory turnover (IT) has a positive impact on the performance of listed companies in pharmaceutical manufacturing. The data shows that it is significant at the 1% significant level, and for every 1% increase in inventory turnover, corporate performance can be increased by 0.864%. When the inventory turnover rate is highly

correlated with corporate performance, the receivables turnover ratio (AR) which is usually used in conjunction with the inventory turnover rate does not have a significant impact. This reflects the fact that the inventory turnover rate in the pharmaceutical manufacturing industry is mainly in the inventory problem. Combine it with the non-financial return rate matching the accounts receivable turnover rate. First, because the upstream and downstream of the pharmaceutical manufacturing supply chain are highly tight, the relationship is stable, and the company's liquidity is abundant. The production and operation process does not depend on the revolving of inventory funds. Second, inventory and transportation costs are high. Most biomedical products and special consumables are neither convenient for transportation nor convenient for inventory. The shelf life and storage conditions under the food and drug supervision standards are demanding. The sales of products mainly depend on large orders and seasonal purchases, and the industry features are high investment and high returns. Corporate profits are highly dependent on sales, resulting in high inventory levels. In addition, sales information as one of the final production materials of the industry, the “bullwhip effect” caused by information asymmetry, which leads to high inventory safety factor. High inventory cost and inventory depletion result in high inventory turnover rate.

Operating profitability (OM) has a factor of up to 0.561 on corporate performance at a significant level of 1%. Operating profit margins can highly reflect the efficiency of a company's revenue, and profitability has a high impact on the performance of the company. The price effect of reducing the cost of products and services can be an extremely efficient way to improve business performance, rather than accelerating the quantitative effect of expanding the market.

5 Conclusion And Policy Recommendations

5.1 Conclusion

This paper adopts the panel data of China's pharmaceutical manufacturing listed companies from 2007 to 2016. Through the panel correction standard deviation model, the relationship between inventory turnover rate and operating rate and the performance of listed companies in pharmaceutical manufacturing is analyzed. The conclusions are as follow:

The operating capacity of China's pharmaceutical manufacturing listed companies directly determines the performance level of enterprises. The good inventory turnover rate reflects the ability of the inventory cost management to greatly improve the performance of the enterprise. It proves that the pharmaceutical manufacturing industry is biased towards the manufacturing industry in terms of operational capability. It can help improve the inventory management level and performance level through the linkage system of supply chain information management, internal production and internal sales.

Cost control is most evident in the performance of listed companies in the pharmaceutical manufacturing industry, except that the inventory turnover rate in terms of operational capability is highly correlated with inventory costs and performance. The operating profit margin is also highly correlated with performance. Although the industry is still in the period of rapid development to seize the market, but taking into account cost control has a more direct impact on current performance. In the long run, it is also possible to increase the level of investment in R&D and the degree of capital attraction due to the increase in profits and cash flow, which will contribute to long-term corporate performance.

5.2 Policy Recommendations

The operational capacity is highly correlated with the performance of China's pharmaceutical manufacturing listed companies, and the inventory turnover rate is significant at 1%. Enterprises need to pay special attention to improving the level of inventory management. The inventory turnover rate of the pharmaceutical manufacturing industry is in a continuous growth stage. Compared with other mature stable markets, pharmaceutical manufacturing enterprises in the high-speed market growth period do not improve their own operational management level. However, from the regression results, this is the embodiment of short-sightedness. As a manufacturing industry, inventory turnover is directly related to the realization of the company's operational capabilities. First of all,

enterprises in this industry need to establish a system management method under the guarantee of technology and resources. Enterprises need to pilot the procurement and production management links, balance information, develop suppliers, and link the needs of the upper and lower supply chain to achieve centralized inventory control, realize centralized procurement, and improve seasonal forecasting accuracy. It can reduce the safety stock factor of each node, inventory losses, or reduce production costs through centralized procurement. Secondly, it is necessary to strengthen the sales plan management system, establish data contact with the sales end and the inventory end in the entire production line, which can quickly respond to changes in the sales end to adjust the production level, and reduce the inventory cycle as much as possible to directly reduce the inventory cost.

Operating profit margins also contribute significantly to improving the performance of listed companies in the pharmaceutical manufacturing industry. Therefore, for listed companies in the pharmaceutical manufacturing industry, it is more important to increase the gross profit margin and strengthen the management of their product lines than to strengthen the sales performance. In addition, controlling the inventory costs for raw materials to control, vendor selection, marketing costs reasonable and lawful control costs may have a more direct impact on the performance of the business. Due to the high interest bundle between China's pharmaceutical manufacturing suppliers, distributors and hospitals, the entire regulatory department needs to manage the behavior of medical representatives, improve the liberalization and transparency of the market, and allow free competition to help reduce procurement costs. In addition, optimizing the quality inspection process and developing new technologies will also be an important means to improve cost control.

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