

Analysis on Financial Conditions of Listed Pharmaceutical Manufacturing Companies Based on F-score Model in the Context of COVID-19 A Case Study of SHIYAO Pharmaceutical Group in China

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ABSTRACT

Against the background of the sudden outbreak of COVID-19, it has also been accompanied by a number of policy changes related to medicine. Pharmaceutical manufacturing industry is characterized by high investment, high risk and high income, so it is quite necessary for the listed pharmaceutical manufacturing industry to prevent financial risk and improve management level from both internal and external aspects [1]. In this paper, the F-score model is used to analyze the financial data of SHIYAO Group from 2017 to 2021, and obtain which ones are in good financial condition and which ones have bankruptcy risk, as well as the comparison of different kinds of drugs. Through the dynamic change process, this study analyzes the specific situation of different types of drugs, summarizes the adjustment experience of enterprises, draws lessons and seek innovation channels. In total, according to the research results, the financial condition was affected but still in good state.

Keywords: COVID-19, pharmaceutical manufacturing industry, financial condition, F-score model

1. INTRODUCTION

In 2020, the average growth rate of the pharmaceutical industry was about -11.2%, and in the first quarter of 2021, the total sales volume of China's pharmaceutical market reached 17.1 billion yuan, with a year-on-year growth of 20.9%, according to hospital end market data released by IQVIA due to factors such as the epidemic. In addition, in recent years, the national medical reform has been further promoted, with the national drugs centralized bidding and procurement policy as the breakthrough point, with the adjustment of medical insurance and key monitored varieties catalogue and drug usage and dosage management as the core of the medical security phase policy. Clinical drug use regulations for generic substitution of expired patent drugs and so on, is the policy focus of the pharmaceutical industry to achieve long-term development [2]. The F-score model has been used to analyze other companies, both the pharmaceutical manufacturing industry and other industries [3], but no one before has used it to research about SHIYAO Group from different perspectives. So the author did this study and find some special things.

This paper conducted financial condition analysis on the pharmaceutical firm called SHIYAO Group and its subsidiaries about patent medicine, vitamin C, antibiotics and so on. By using the F-score model, and making a simple calculation with the financial data from 2017 to 2021, the author tries to judge the risk degree and the financial situation of the firm to analyze the firm's whole situation. On the basis of in-depth analysis of the impact of the epidemic on SHIYAO Group, risk countermeasures are proposed to improve the ability to deal with financial risks and change the current situation [4], which makes it convenient to adopt positive coping strategies to improve capacity of cumulative profitability, financial liquidity and earning skills [5]. At the same time, it also helps investors make better decisions and avoid unnecessary losses.

In 1996, Zhou Shouhua and Yang Jihua considered the factor of cash flow changes on the basis of the Z-score model and conducted an empirical analysis with listed companies in China as samples, then they updated and revised the indicators of Z model, and put forward F-score model. The indicators adopted by Z model mainly reflect the financial status of enterprises comprehensively

from perspectives of operation capacity, repayment capacity, profitability, corporate financial structure and marketing capacity. But F-score model adds a cash flow indicator, which experts confirm is also an effective indicator for predicting bankruptcy and reflecting a company's financial status, making the forecast more reliable [6]. Moreover, the scholars who developed this model are Chinese, therefore it is more adaptable to analyze SHIYAO Group.

The model is as follows:

$$F = -0.1774 + 1.1091X_1 + 0.1074 X_2 + 1.9271X_3 + 0.0302X_4 + 0.4961X_5$$

Among this:

$X_1 = (\text{Current assets at the end of the term} - \text{Current assets at the start of the term}) / \text{Total assets}$,

$X_2 = \text{Retained earnings} / \text{Total assets}$

$X_3 = (\text{Net profit after tax} + \text{Depreciation}) / \text{Average total liability}$

$X_4 = \text{The market value of shareholder's equity} / \text{Total liability}$

$X_5 = (\text{Net profit after tax} + \text{Interests} + \text{Depreciation}) / \text{Total assets}$

The critical value of F fraction model is 0.0274. when F is lower than the critical value, it indicates that the company has financial risk and is predicted as a bankrupt

company. When the value is higher than the critical value, it indicates that the company does not have financial risk and is predicted as a viable company. If the value of F is between -0.1049 and -0.0501, which means the financial condition of the enterprise cannot be predicted, the final result can only be obtained after further analysis is combined with other information.

2. F-SCORE MODEL IS APPLIED TO ANALYZE THE FINANCIAL STATUS OF SHIYAO GROUP

2.1 Data preparation and model numerical calculation

Related to the financial data of SHIYAO Group from 2017 to 2021 (as shown in sheet 1 on the following page), the table is based on the financial reports and announcements of SHIYAO Group. Among them, the end of the stock price is based on the East Money Net's SHIYAO annual charts.

According to the financial data on the table 1 and the author uses Excel to calculate the index of F-score model, the value of each indicator is calculated from 2017 to 2021 (as shown in table 2 on the following page).

2.2 Numerical analysis of F-Score model from 2017 to 2021

Table 1. SHIYAO Group financial data from 2017 to 2021

unit: ten thousand yuan

Year Item	The second half of 2016	The first half of 2017	2017	2018	2018	2019	2019	The first half of 2020	The second half of 2020	The first half of 2021
Non-current assets	566,455	604,179	661,034	811,302	937,270	1,127,765	1,262,137	1,267,702	1,414,884	1,373,409
Current assets	753,859	845,078	1,139,740	1,369,910	1,374,388	1,304,355	1,369,696	1,649,004	1,592,137	1,911,700
Non-current liability	43,313	47,829	31,379	47,502	43,832	66,848	56,338	55,742	66,729	62,445
Current liability	365,376	434,447	481,476	726,430	721,572	613,823	623,677	790,411	630,184	692,242
Total assets	1,320,314	1,449,257	1,800,774	2,181,212	2,311,658	2,432,120	2,631,833	2,916,706	3,007,021	3,285,109
Retained earnings	-33,839	48,948	207,740	380,809	414,011	661,509	861,876	980,612	1,220,166	1,440,482

Total liability	408,689	482,276	512,855	773,932	1,154,404	680,671	680,015	846,153	696,913	754,687
Sales revenue	1,106,423	625,039	667,489	909,492	933,058	1,117,800	1,092,539	1,258,960	2,494,220	1,382,228
Growth rate			16.8204%		42.554%		0.19960		0.128433	
Interests	3,731	1,344	2,226	3,047	7,672	2,691	3,243	555	1,223	478
Depreciation	/	26,990	49,129	30,814	65,372	33,759	69,160	38,905	80,881	43,048
Net profits	189,030	114,448	117,941	155,270	162,670	188,827	184,508	235,047	287,854	310,911
The sum of shares (ten thousand strand)	/	609,148.1	6,091,48.1	6,242,08.3	6,242,08.3	1195496.7	1195496.7	1195457	1195457	1195457
Final share price (yuan)	3.346	4.745	6.527	9.789	4.822	5.495	8.335	7.917	6.549	9.209

Table 2. The index value of the F-score model

Year index	2017	2017	2018	2018	2019	2019	2020	2020	2021
X ₁	0.283	0.366	0.295	0.282	0.284	0.283	0.294	0.320	0.371
X ₂	0.0338	0.115	0.175	0.179	0.272	0.327	0.336	0.406	0.438
X ₃	0.318	0.566	0.289	0.398	0.243	0.650	0.359	0.783	0.488
X ₄	5.993	7.744	7.895	2.607	9.651	14.653	11.185	11.234	14,587
X ₅	0.103	0.104	0.0949	0.1049	0.095	0.1015	0.099	0.1249	0.113
F	0.9845	1.6512	1.0115	1.0863	0.9728	1.9554	1.2639	2.1696	1.718

The F value of SHIYAO Group showed a rapid upward trend, rising from 0.9845 in 2017 to 1.9554 in 2019, which demonstrates that the company's financial situation has gradually improved. However, in 2020, the F value was suddenly much smaller than that of the second half of 2019. Although it was still above the safe limit which indicates that its financial situation was good, it was riskier than that in the previous year.

In F-score model, X₁ is the ratio of working capital to total assets, reflecting the liquidity capacity and model characteristic of the enterprise. This value did not change significantly at the beginning of 2020, which manifests that there are no major problems in the liquidity and

operating capacity of the company. X₂ is the measurement of the ability to reap benefits, which continue to grow steadily and it also illustrates that the vitality capacity is not affected too much. However, X₃ and X₅ have been gradually increasing from 2017 to 2019, but in the first half of 2020, this value decreased sharply. X₃ is the ratio of corporate cash flow to total responsibility, and it is the measurement of the ability of an enterprise to repay its liabilities with operating cash flow. In the first half of 2020, the value of X₃ decreased to only half of that in the second half of 2019 (0.650), which was about 0,359. it reflects that the capital chain is obviously tighter than in 2019. With the outbreak of COVID-9, there are financial problems, and the company has financial losses. It even leads to the difficulty to repay

debts and increases the risk and possibility of falling into financial difficulties. X5 is the value that needs to be considered to evaluate the ability of the total assets of an enterprise to create cash flow, which is similar to X1. It plays a significant role in this index. Besides, interest is also a crucial driving factor. In the first half of 2020, X5 descended to 0.09, which indicates a decline in profits and a fall in the power to generate cash. In addition, in terms of X4, it adopts the ratio of ending market value of shareholders' equity to ending total debt, which embodies the capital structure of the firm. The period between 2017 and 2019 also witnessed an upward tendency from 5.993 to 14.653 year by year. But when 2020 came around, the index went down to just over 11(11.185). It has fallen by nearly 9 in only three years, the ratio of corporate self-owned capital to liabilities is falling. If this situation continues, the profit of the capital will be further reduced, the situation will be worse and even bankrupt. But according to the data in the figures in sheet 2, SHIYAO Group is far from reaching this point.

But in detail, the condition of this firm is good. As a pharmaceutical enterprise engaged in drug research and development, production and marketing, SHIYAO Group maintained growth in both operating revenue and net profit for the whole year in 2020 despite the impact of COVID-19. In particular, the net profits growth rate reached 27.391% from the second half of 2019 to the first half of 2020, recording the highest of all. The growth rate of SHIYAO Group's sales revenue in 2020 was 12.843% year-on-year, which was lower than that in 2019. Probably, one of the reasons for the slowdown in revenue growth rate is the decrease in drug sales in the hospital market due to the fall in hospital visits caused by COVID-19 in 2020. According to CMH data, the drug sales volume of public grade hospitals in 2020 was 897 billion yuan, dropping about 10.2% compared with that in 2019. Overall, total sales in the market are decreasing, so it is inevitable to go down for the firm.

According to its annual report, the author argued that ENPIP remains the backbone of the capital chain, although price cuts weigh on future growth. In the composition of SHIYAO Group's revenue in 2020, patent medicine business accounted for nearly 82%. During the period, the market development of newly launched products was also carried out in an orderly manner, bringing new sales revenue contribution and making the product structure of patent medicine business more balanced. And vitamin C occupied the second largest part of the total revenue, antibiotics are closely followed by them. Moreover, both the numbers of revenue of vitamin C and antibiotics are only one-tenth of patent medicine. At the same time, the operating performance of vitamin C business improved significantly in the second quarter of this year because of the outbreak. The innovative drugs in ENPIP accounted for more than 26% of all sales, series of ENPIP includes BUTYPHTHALIDE chloride injection and

BUTYPHTHALIDE soft capsule, which are used in the first aid period and convalescence period of stroke treatment respectively. Since they were listed separately on the Medicare directory in 2009 and 2017, they have been driving up the firm's revenue.

In 2020, many types of medicines protected by national patents, for instance, anticoagulant drugs are also under continuous development and research. RIVAROABAN tablets have been registered, which is a big step of this area. So anticoagulant drug is also an important products series of the group.

All three products in the oncology therapeutics segment say double-digit sales growth in 2020, bringing the overall growth rate for oncology products to 29%. And SYHA1811 tablets clinical trial application was accepted. Good progress has also been made in research and development. BPI-7711 has also entered a new phase of clinical trials. The new drug, ALMB-0168, was approved for clinical trials in Australia. In the first half of 2020, the saleroom of anti-tumor products had a 44% increase reached to 3,131 billion, but total revenue rose just 12.6% which represents that these products play an extremely vital role in the whole firm. For the whole 2020, the sales revenue of anti-tumor products reached 6.294 billion yuan and the growth rate still kept over 10%, but the growth rate of overall sales revenue was only 4.85%. Combined with the steep climb, this type of product is expected to become the biggest therapeutic field of SHIYAO Group in the future. And sales in other therapeutic areas have risen or dipped slightly due to the launch of new products. So the author supposed that chronic medicine made the financial status of the enterprise steady.

3. CONCLUSION

Affected by the outbreak of COVID-19, the hospital attendance rate in the first quarter declined rapidly, hindering market activities, which causes certain negative effects of the management and operation of the firm. The group has actively carried out online promotion and flexible sales strategies to reduce the impact on sales and try to adjust internal policies to meet this sudden change. From the beginning of the second quarter, the epidemic was gradually brought under the control of China, the hospital attendance rate and various marketing activities were also recovered, and the running of the Group returned to a normal level. Despite the effect of COVID-19, drugs have helped firm's finance a lot. In the first half of 2020, the group's performance maintained relatively good growth. Through new drug research and development, hospitals promotion, marketing sink, clinical application and scope expansion, professional sales teams' expansion and other works, key patent medicine products can maintain a sharp growth from a place to different kinds of places such as from city to burg, or even to a small village, which make the market

layout more thorough. The COVID-19 pandemic influenced the condition of SHIYAO, but it made a timely adjustment and nothing serious.

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