

Financial Analysis of the Biopharmaceutical Industry Based on DuPont Analysis: A Case Study of Bio-Thera Solutions, Ltd

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Abstract: This paper conducts an in-depth analysis of the financial condition of Bio-thera from 2019 to 2023 using the DuPont analysis method. The study reveals that despite Bio-thera's innovative capabilities in the biopharmaceutical industry, its financial performance is not satisfactory. The company's short-term solvency has weakened, and although its long-term solvency is within a safe range, the asset-liability ratio has been increasing annually, indicating potential financial risks. In terms of operational efficiency, the asset turnover ratio has decreased, and the inventory turnover ratio continues to decline, indicating a need to improve asset management efficiency and inventory turnover capabilities. Profitability indicators are below industry benchmarks, with a long-term negative return on equity. A comparison with Shanghai Fosun Pharmaceutical Group highlights Bio-thera's lag in key metrics. Based on the analysis results, strategic recommendations are proposed in this paper, including increasing research and development investment, promoting product innovation and diversification, implementing cost control measures, actively expanding the market, and enhancing competitiveness and profitability. This study not only provides a perspective for improving the financial condition of the company but also offers strategies to enhance market competitiveness for other enterprises, demonstrating significant value.

1. Introduction

1.1 Overview of DuPont Analysis

DuPont Analysis[1][2][3][4] is a comprehensive method for evaluating a company's financial condition. It assesses a company's profitability and return on equity by examining the relationships between several key financial ratios. DuPont Analysis decomposes return on equity into net profit margin and equity multiplier, further breaking down net profit margin into operating profit margin and asset turnover ratio. This forms a complete set of indicators, culminating in the return on equity to provide a comprehensive reflection.

1.2 Current Research Status Abroad

The DuPont Analysis method was initially created in 1919 by Donaldson Brown, the financial manager of DuPont Corporation in the United States, hence known as the DuPont Financial Analysis System. In 1933, Professor Paley of Harvard University developed the financial system known as the "Paley Financial Analysis System," derived from and complementing the DuPont Financial Analysis System. Subsequently, Professor Zvi Bodie of Boston University, Professor Alex Kane of the University of California, and Professor Allen Marcus of Boston College proposed the Five-Factor DuPont Model system, incorporating factors such as taxes and interest expenses into the DuPont model.

1.3 Current Research Status in China

In 2019, Wang Jiaojiao proposed in the article "Application of DuPont Analysis in Financial Analysis of Listed Companies—A Case Study of BYD" that DuPont Analysis is an important financial analysis method for evaluating the comprehensive capabilities of enterprises, becoming a significant tool in contemporary financial analysis of numerous companies. In 2023, Chen Weiwei stated in the article "Application of DuPont Analysis in Business Model Analysis of Steel Manufacturing Enterprises—A Case Study of Company A" that DuPont Analysis, as a comprehensive financial analysis tool, can thoroughly analyze a company's financial condition and operational results, serving as the premise and foundation for scientific decision-making in enterprises.

1.4 Comparison of Traditional and Modern DuPont Analysis

Traditional DuPont Analysis primarily focuses on financial indicators such as return on equity, total asset net profit margin, and equity multiplier, using a hierarchical decomposition to reveal information about a company's profitability, operational efficiency, and financial leverage. Modern DuPont Analysis, while retaining the original indicators, introduces more financial metrics to more comprehensively and meticulously reflect a company's financial condition and operational results.

In practical applications, the traditional method is simple and easy to implement, providing basic financial analysis results quickly. However, due to its limited depth and breadth of analysis, it may not fully reflect a company's true situation. Modern DuPont Analysis, while having a more sophisticated analysis system, requires more data and information support and is relatively more operationally challenging. Its analysis results are more accurate and comprehensive, aiding companies in making wiser decisions.

Both traditional and modern DuPont Analysis methods have limitations. The traditional method heavily relies on historical financial data, making it weak in forecasting future trends. Additionally, it focuses too much on financial indicators, overlooking the impact of non-financial indicators on a company's value. While modern DuPont Analysis partly overcomes these limitations, it still cannot completely eliminate its dependence on financial data. Moreover, with the continuous changes in the business environment, existing financial indicators and analysis systems may not entirely meet new demands.

2. Main Content of the Study

2.1 Company Overview

Bio-thera Biopharmaceutical Co., Ltd.[5] is a leading biopharmaceutical company located in Guangzhou, China, operating in the commercialization stage. Embracing the motto "Innovation for

Life," the company is dedicated to developing a new generation of innovative drugs and biosimilars based on modern biological science research. These products are intended for treating tumors, autoimmune diseases, cardiovascular diseases, and other major diseases that pose a threat to human life or health. As a leader in the research and development of next-generation antibody drugs and biosimilars, Bio-thera has advanced multiple candidate drugs into late-stage pivotal clinical trials.

2.2 Financial Statement Analysis of Bio-thera Biopharmaceutical Co., Ltd.

2.2.1 Solvency

Solvency refers to a company's ability to repay various debts with its operating income. From a solvency perspective, one can assess the company's financial condition and its ability to sustain operations. Solvency can be divided into short-term solvency and long-term solvency based on the maturity of the obligations. Short-term solvency is measured by liquidity ratio and quick ratio, while long-term solvency is assessed using indicators such as the asset-liability ratio and equity ratio. It is essential to analyze both long-term and short-term solvency together to more accurately evaluate the overall solvency of the company.

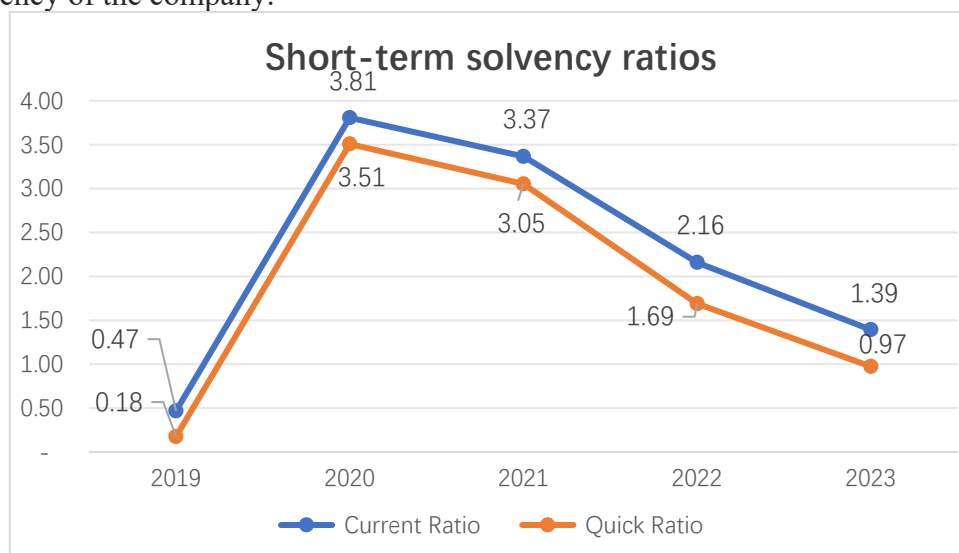


Figure 1: Short-term Solvency Ratio Trend Chart of Bio-thera Pharmaceuticals Co., Ltd. 2019-2023

The current ratio is an indicator used to analyze a company's short-term solvency. A higher current ratio indicates better short-term debt-paying ability, providing greater security for creditors' interests and demonstrating that the company has sufficient working capital. The ideal value for the current ratio is generally 2; if the ratio falls below 1, it suggests the company may struggle to meet its short-term obligations.

As it showed in Figure 1. Bio-thera Biopharmaceutical Co., Ltd.'s current ratio and quick ratio experienced a significant increase from 2019 to 2020, but declined annually from 2020 to 2023, ultimately dropping to 1.39 in 2023. This indicates a substantial improvement in the company's short-term debt-paying ability between 2019 and 2020, attributed to a sharp increase in current assets to approximately 7 times the original level and a substantial increase in quick assets to around 20 times the original level, while current liabilities only increased by 12.8%. However, the subsequent four-year decline suggests a continued decrease in short-term solvency. This is due to the increase in current liabilities from 2022 to 2023, coupled with a rapid reduction in quick assets. The decrease in quick assets is primarily attributed to a significant increase in inventory, which was about 4 times higher in 2023 compared to 2020, indicating an issue of inventory backlog within the company.

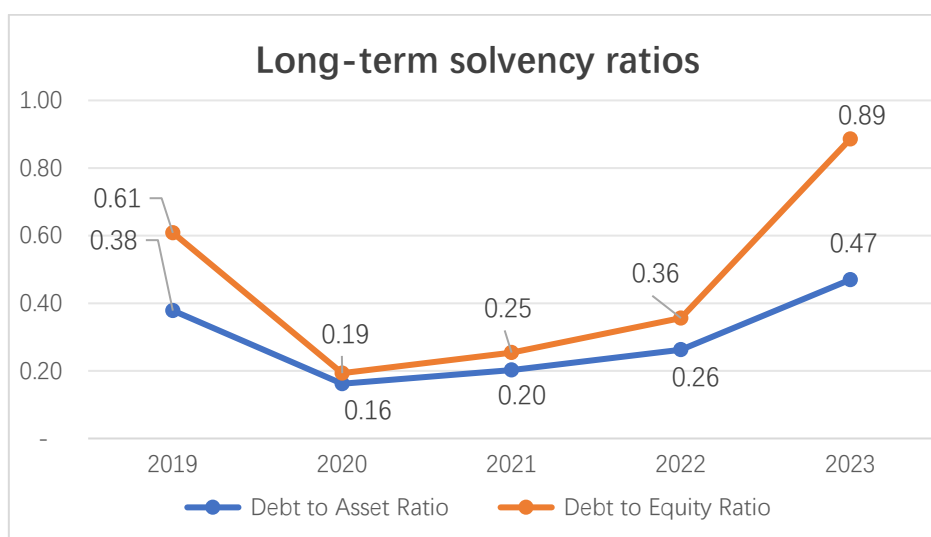


Figure 2: Long-term Solvency Ratio Trend Chart of Bio-thera Pharmaceuticals Co., Ltd. 2019-2023

The debt-to-equity ratio is an indicator used to analyze a company's long-term debt-paying ability. This metric measures the company's ability to utilize funds provided by creditors for operational activities. A higher debt-to-equity ratio means the company relies more on debt to support its operations and expansion, which could increase the company's financial risk. As it showed in Figure 2. The ideal debt-to-equity ratio for the biopharmaceutical industry is typically between 40% and 60%. If a company's debt-to-equity ratio exceeds 60%, it indicates the company may struggle to meet its debt obligations.

Bio-thera Biopharmaceutical Co., Ltd.'s debt-to-equity ratio decreased by 19% from 2019 to 2020, gradually increasing from 2020 to 2023, especially rising to 0.47 from 2022 to 2024. This increase suggests a slight elevation in financial risk but still remains within a safe range. This indicates that the company effectively managed its debt-to-equity ratio from 2019 to 2023, demonstrating good long-term debt-paying ability. The rise in this metric is due to a continuous increase in total liabilities, notably doubling in 2023 compared to the previous year. This increase is primarily attributed to the company's commitment to an innovation-driven development strategy, constantly enriching its research and development pipeline, increasing R&D investments, and continuously increasing R&D expenses during the reporting period, leading to a significant increase in short-term borrowings and accounts payable.

2.2.2 Operational Efficiency

Operational efficiency refers to the effectiveness of a company's asset utilization. The higher a company's asset utilization efficiency, the stronger its profitability. From the perspective of operational efficiency, one can understand the effectiveness of the company's management in utilizing funds and assets, as well as identify any issues within the company's operational activities. Operational efficiency serves as a complementary analysis to a company's debt-paying ability and profitability.

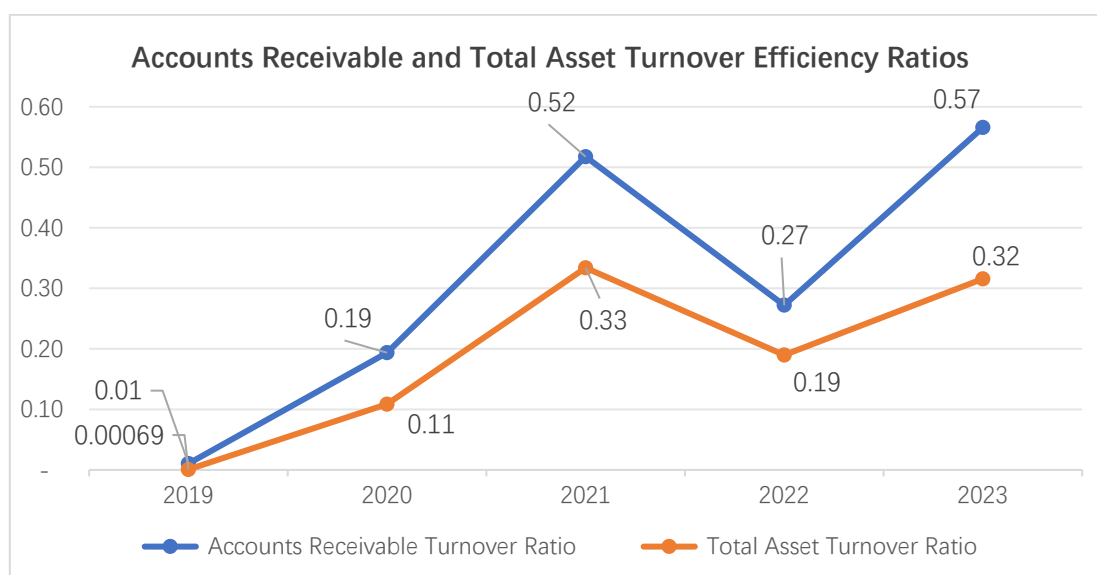


Figure 3: Trend Chart of Bio-thera Pharmaceuticals Co., Ltd.'s 2019-2023 Accounts Receivable Turnover Ratio and Total Asset Turnover Ratio

The total asset turnover ratio refers to the correlation between the scale of investment in assets and sales revenue within a company. It is an important indicator that measures the overall asset management quality and efficiency of a company. As it showed in Figure 3. From 2019 to 2021, the company's total asset turnover ratio steadily increased to 33%, indicating an acceleration in Bio-thera's asset turnover and enhanced operational efficiency during this period. However, from 2021 to 2022, Bio-thera's total asset turnover ratio significantly declined to 19%, suggesting a decrease in asset management capability. This decline was primarily due to a substantial decrease in sales revenue, mainly attributed to a reduction in licensing revenues.

The accounts receivable turnover ratio is a crucial indicator that measures the speed at which a company collects its accounts receivable, reflecting the speed of customer payments. A high accounts receivable turnover ratio indicates that the company can collect payments promptly, reducing the risk of bad debts. From 2019 to 2021, the company's accounts receivable turnover ratio saw a significant increase, rising from 1% to 52%, indicating a substantial improvement in the collection efficiency. This improvement is likely due to changes in Bio-thera's accounts receivable collection policy. In 2022, the company's accounts receivable turnover ratio slightly decreased, attributed to a significant decline in sales revenue, primarily stemming from a reduction in licensing revenues.

As it showed in Figure 4. company's level of investment in production, inventory management, and sales recovery capability. A higher inventory turnover ratio indicates a stronger ability of the company to realize inventory assets, leading to a faster turnover of inventory and the funds tied up in it. Bio-thera's inventory turnover ratio gradually declined from 2019 to 2023, indicating a weakening ability to convert inventory into cash. This decline suggests a reduction in the speed of inventory turnover and the utilization of funds tied up in inventory for the company. The gradual decrease in this metric is attributed to Bio-thera facing a relatively tight cash flow situation, with an imbalance between cash inflows and outflows, low cash utilization efficiency, resulting in the inability to timely purchase raw materials or pay sales expenses, thereby impacting inventory turnover.



Figure 4: Trend Chart of Bio-thera Pharmaceuticals Co., Ltd.'s Inventory Turnover Ratio 2019-2023

2.2.3 Profitability

Profitability refers to a company's ability to generate profits and increase capital value through its daily operational activities. The higher the profit margin, the stronger the profitability and the higher the shareholder return. Companies with high profits can not only enhance their value but also increase their social visibility, attracting more investors and providing more high-quality resources for the sustainable development of the company. Profitability indicators include net profit margin on total assets, return on equity, gross profit margin, and net profit margin on sales.[6]

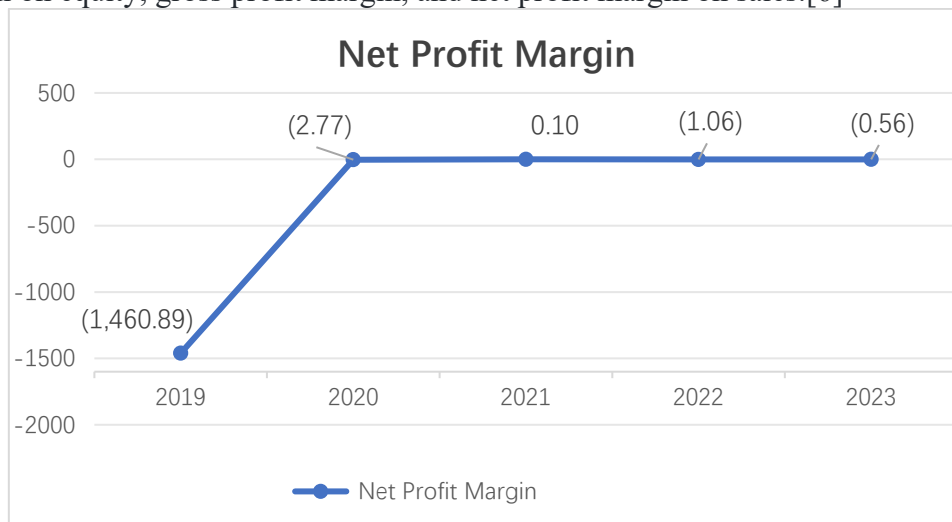


Figure 5: Trend Chart of Bio-thera Pharmaceuticals Co., Ltd.'s Net Profit from Sales 2019-2023

The net profit margin on sales is a metric that compares a company's net profit to its sales revenue, measuring the company's ability to generate profit from its sales revenue over a specific period. This indicator reflects how much operating profit a company can achieve. It is directly proportional to net profit and inversely proportional to sales revenue. As a company increases its sales revenue, it must correspondingly generate more net profit to maintain or improve the net profit margin on sales. As it

showed in Figure 5. In the biopharmaceutical industry, the ideal net profit margin on sales ranges from 11% to 13%. If a company's net profit margin on sales falls below 11%, it indicates a lower-than-expected profitability level.

Bio-thera's net profit margin on sales experienced a rapid increase from 2019 to 2020, achieving profitability from 2020 to 2021. However, the net profit margin on sales remained below 11%, indicating a relatively low level of profitability from the company's sales revenue. The rapid increase in this metric from 2019 to 2020 was due to the launch of Geleli (an independently developed injection of Adalimumab, the first domestically approved Adalimumab on the market, used to treat autoimmune diseases such as uveitis, pediatric psoriasis, pediatric Crohn's disease, and juvenile idiopathic arthritis) by Bio-thera, which received market approval. The profitability from 2020 to 2021 was attributed to Bio-thera producing 242,708 Geleli units and selling 208,985 units, resulting in annual operating revenue of 185 million yuan. The decrease in this metric from 2021 to 2023 was caused by intense competition in the Adalimumab biosimilar track, leading to a slowdown in revenue growth from Geleli introduced by Bio-thera and a decline in the net profit margin on sales.

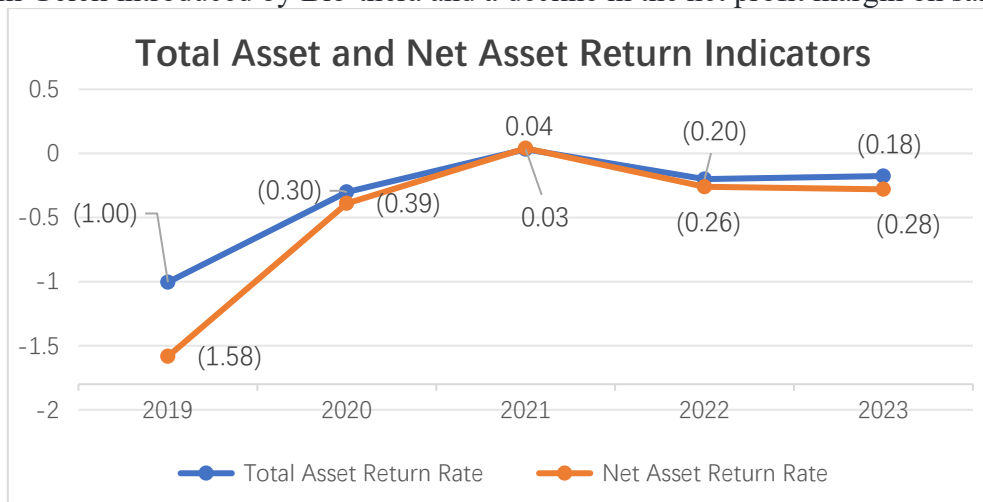


Figure 6: Trend Chart of Bio-thera Pharmaceuticals Co., Ltd.'s Return on Total Assets and Return on Equity 2019-2023

The return on total assets is an effective measure of how efficiently a company generates profit using its capital. A higher value for this indicator signifies a higher return on investment, indicating better asset operational efficiency, profitability, and effective cost management within the company. As it showed in Figure 6. From 2019 to 2021, Bio-thera's return on total assets increased from -1 to 0.04, indicating a strengthening of profitability. This increase was attributed to Bio-thera signing a licensing and commercialization agreement with Biogen International GmbH for BAT1806 (Tuzumab), resulting in a significant increase in licensing revenue, along with a year-on-year increase in Geleli sales. However, from 2021 to 2023, this metric turned negative again, indicating a weakening profitability. This decline was due to Bio-thera allocating a disproportionately high percentage of its resources to research and development, as well as a relatively limited variety of products in production and sales.

The return on equity is the ratio of a company's net profit to its average equity, reflecting the level of return on equity for shareholders. This indicator demonstrates the efficiency of a company in utilizing its own capital. A higher value indicates a higher return on investment. In the biopharmaceutical industry, the ideal return on equity is around 15%. If a company's return on equity is too low, it may be due to a decrease in sales profit margins, a slower turnover of total assets, or changes in the company's financial structure, resulting in a lower-than-expected return on equity. Bio-thera's return on equity experienced a rapid increase from 2019 to 2020, achieving profitability from

2020 to 2021. However, the return on equity remained below 15%, indicating relatively low returns on investments made by the company. The rapid increase in this metric from 2019 to 2020 was due to Bio-thera actively expanding its market presence, gradually increasing its business scale, and boosting sales revenue through the increasing sales volume of Geleli. The profitability from 2020 to 2021 was attributed to Bio-thera actively expanding its global market share and engaging in commercial collaborations with numerous domestic and international enterprises. Additionally, the company's drug, Pubeixi, obtained a Drug Registration Certificate approved by the National Medical Products Administration, meeting the milestone conditions in the licensing and commercialization agreement signed with BeiGene, leading to a significant increase in licensing revenue.

3. Comparative Analysis Using DuPont Analysis—Comparison with Fosun Pharma Group

Shanghai Fosun Pharmaceutical (Group) Co., Ltd.,[4] founded in 1994, is a globally oriented pharmaceutical and healthcare industry group rooted in China and driven by innovation. The strategic layout of its business areas encompasses the healthcare industry chain, directly operating businesses in pharmaceuticals, medical devices and diagnostics, medical health services, and also extends to pharmaceutical commerce through its stake in China National Pharmaceutical Group Corporation. In 2023, Fosun Pharmaceutical achieved operating revenue of 41.4 billion RMB, excluding COVID-19-related products, with a year-on-year growth of approximately 12.43% during the reporting period.

3.1 Return on Equity

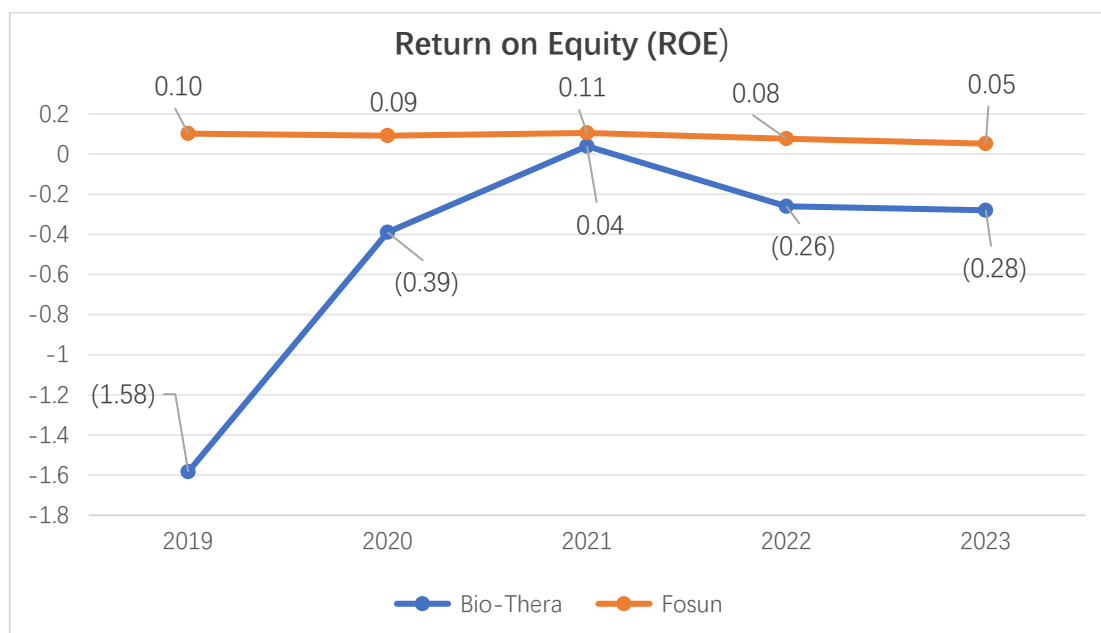


Figure 7: Trend Chart of Net Return on Equity (ROE) for Bio-thera and Shanghai Fosun 2019-2023

The Figure 7 illustrates that Bio-thera Company experienced a trend of initially rising and then declining return on equity (ROE) from 2019 to 2023, consistently remaining negative. In comparison to Fosun Pharma during the same period, Bio-thera's ROE consistently remained below the level of Fosun. This indicates that Bio-thera Company's return on equity from capital investments was lower than that of Fosun Pharma. Here, we will explore the main reasons for the decrease in Bio-thera Company's return on equity from 2021 to 2023.

3.2 Net Profit Margin

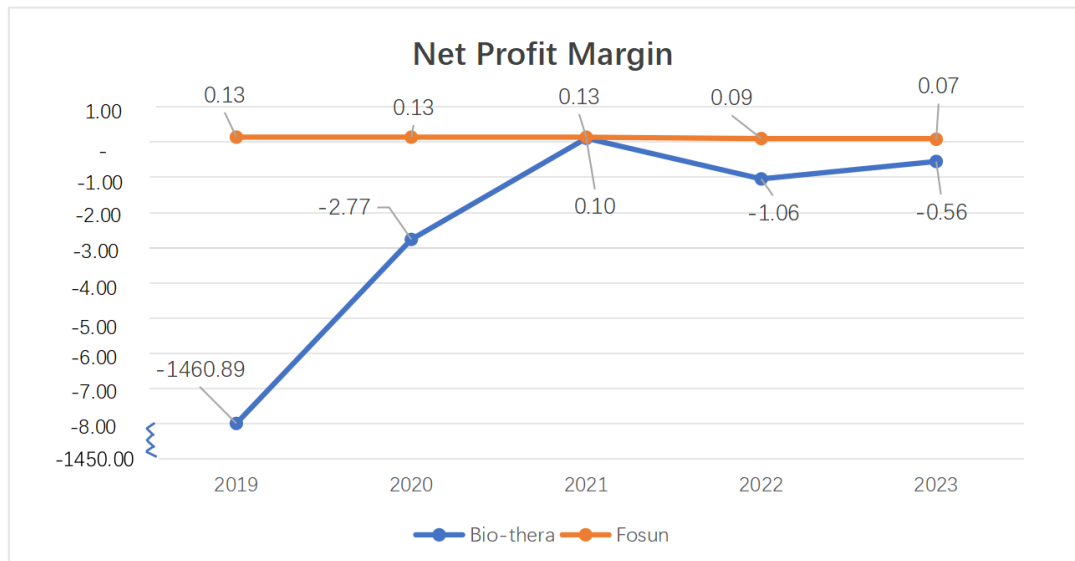


Figure 8: Trend Chart of Net Profit Margin for Bio-thera and Shanghai Fosun 2019-2023

As it showed in Figure 8. The net profit margin of Bio-thera surged into positive territory in 2021 but rapidly declined thereafter. Although there was a slight recovery in 2023, it dropped by 44% from its peak in 2021. In contrast, Fosun Pharma's net profit margin, while decreasing annually, remained consistently higher than that of Bio-thera, with a significant difference. This indicates that the net profit margin is the primary factor leading to the decline in Bio-thera's return on equity from 2021 to 2023.

3.3 Total Asset Turnover Ratio

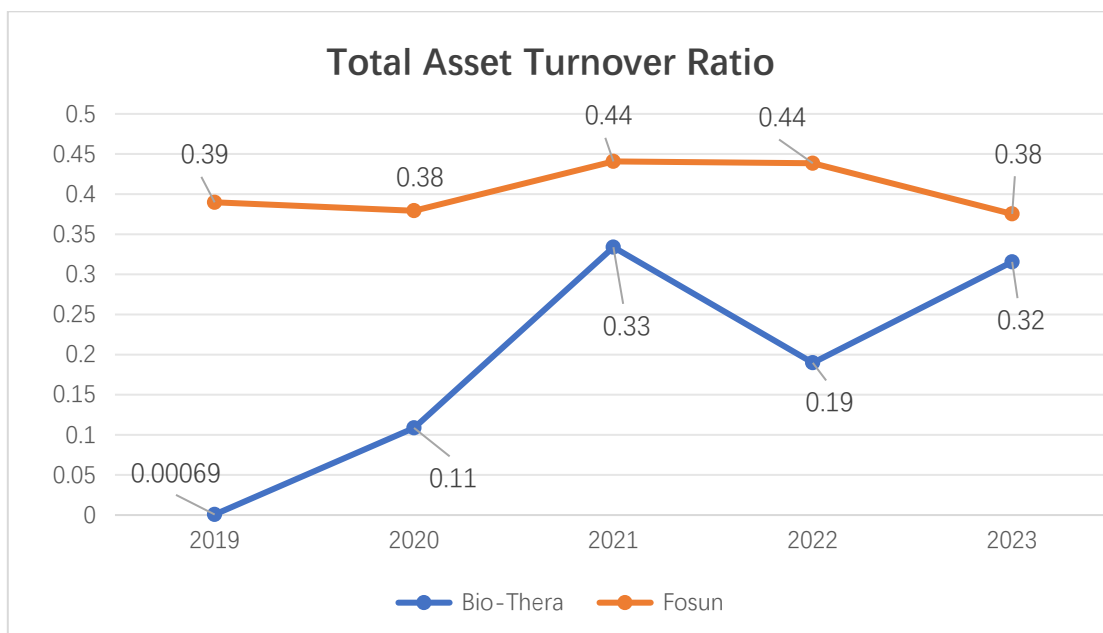


Figure 9: Trend Chart of Total Asset Turnover for Bio-thera and Shanghai Fosun 2019-2023

As it showed in Figure 9. The total asset turnover ratio of Bio-thera initially rose and then declined.

From 2021 to 2023, Bio-thera's total asset turnover ratio decreased only slightly from 33% to 32%. While there was a certain gap compared to Fosun Pharma, the change was relatively stable. Therefore, it is not the primary factor leading to the decline in Bio-thera's return on equity during this period.

3.4 Equity Multiplier

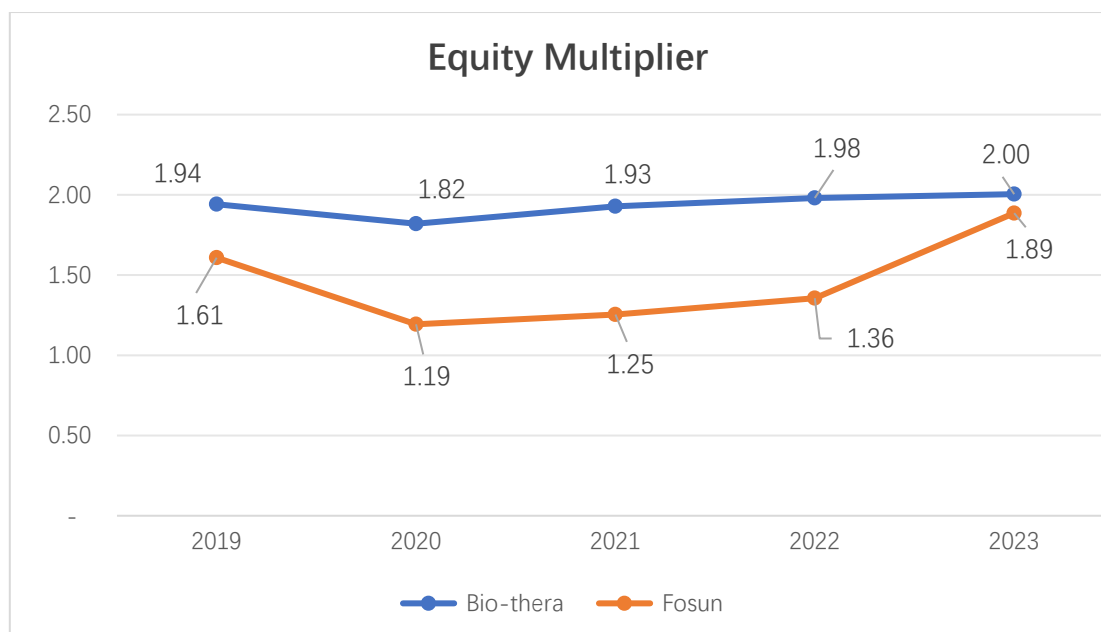


Figure 10: Trend Chart of Average Equity Multiplier for Bio-thera and Shanghai Fosun 2019-2023

Based on the Figure 10, it is evident that Bio-thera's equity multiplier declined from 2019 to 2020, but gradually rose from 2020 to 2023, rapidly reaching 1.89 in 2023. Although Bio-thera's equity multiplier consistently remained lower than that of Fosun Pharma, with a significant gap, the difference was only 0.11 in 2023. Therefore, Bio-thera's improving equity multiplier over the years has played a positive role in its return on equity and is not the cause of the decline in net assets.

4. Conclusion

Bio-thera Biopharmaceutical Co., Ltd.'s financial performance from 2019 to 2023 was generally unsatisfactory. The company faced a decline in solvency, with both the current ratio and quick ratio showing a downward trend after initial improvements from 2019 to 2020, indicating weakened short-term debt-paying ability. While long-term solvency remained within a safe range, the increasing debt-to-asset ratio suggested an escalation in financial risk.

In terms of operational efficiency, the decrease in total asset turnover ratio and accounts receivable turnover ratio indicated a decline in asset management efficiency, while the decrease in inventory turnover ratio reflected a weakening ability to realize inventory. Profitability-wise, both the net profit margin and return on total assets were below industry benchmarks, with the net profit margin significantly dropping from 2021 to 2023, primarily influenced by intense competition in the adalimumab biosimilar drug market.

The return on equity (ROE) remained negative throughout, lower than that of Fosun Pharma, indicating lower returns on capital investments.

In summary, from 2019 to 2023, all financial indicators of Bio-thera were consistently lower than those of Fosun Pharma, especially in terms of profitability, where there was a significant gap. The main reasons for the decline in Bio-thera's return on equity over these five years were the decrease in

net profit margin and return on total assets, with the net profit margin plummeting by 44% over two years. The intense competition in the adalimumab biosimilar drug market led to a slowdown in revenue growth for Bio-thera's Gelilei product, resulting in a decrease in net profit margin.

Fosun Pharma's successful experience demonstrates that product diversification, cost control, market positioning, research and development investment, and market expansion are key factors in enhancing profitability and competitiveness. Bio-thera can draw lessons from these experiences by increasing research and development investment, promoting product innovation and upgrades, diversifying its product range, and enhancing market competitiveness. Effective cost control strategies such as lean production and supply chain management can help improve the net profit margin. Additionally, Bio-thera can actively expand domestic and international markets to increase sales channels and revenue sources.

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