

Research on Profitability Diagnosis of Papermaking Enterprises in China Based on Improved Dupont Analysis

—Taking the Top Ten Listed Enterprises as Examples

Dan Wan¹, Jiaohui Tang¹, Weibin Yu^{2,*}

¹MBA School, Guangdong University of Finance & Economics, Guangzhou, 510320, China

²School of The Faculty of Economics, Guangdong University of Finance & Economics, Guangzhou, 510320, China

*Corresponding author. Email: weibin_yu@126.com

ABSTRACT

Profitability is an objective reflection of the level of enterprise management and is closely related to the growth of enterprise value. In the past two years, with the rising concentration of papermaking industry in China, the production enterprises are in a fierce competitive environment, and the pressure of sustained profitability is gradually increasing. Based on the improved Dupont analysis, this paper takes the top ten listed enterprises of papermaking industry in China as examples, analyses the specific reasons for their declining profitability, and puts forward some suggestions combined with the characteristics of the industry, which is of great practical significance for improving the profitability of enterprises, and also provides references for the sustainable and healthy development of papermaking enterprises in the future.

Keywords: Improved DuPont analysis, top ten listed enterprises, profitability

1. INTRODUCTION

As the basic industry of national economy, papermaking industry is closely related to social and economic development and people's life. Since 2017, with the continuous promotion of supply-side structural reform in China and the tightening of environmental protection policies, coupled with the complex and volatile domestic and international economic situation, the competition of papermaking industry is intensifying and the pressure of sustained profitability is gradually increasing, leading to the continuous decline in profitability of most enterprises, which is not conducive to the improvement of enterprise value and the creation of shareholders' wealth. Therefore, it is necessary to analyse the factors affecting the profitability of papermaking industry in China. Based on the improved Dupont analysis, this paper decomposes the profitability of the top ten listed enterprises of papermaking industry in China layer by layer to find out the specific affecting factors, and put forward targeted suggestions, so as to provide references for enterprises to improve profitability, and provide the basis for deepening reform of the industry.

2. THE IMPROVED DUPONT ANALYSIS

As shown in Figure 1, the traditional Dupont analysis takes return on stockholders' equity (ROE) as the core index and net profit margin on sales, total assets turnover

and equity multiplier as auxiliary indexes to realize the comprehensive evaluation of the financial status and operating results of enterprises, which is an effective method to evaluate the profitability of enterprises [1]. However, it has some defects, such as the mixing of economic income and financial income [2]. Through the improvement of domestic scholars, it overcame some of its own limitations and gradually matured and was fully applied in the diagnosis of profitability in finance, real estate, automotive and other industries [3-5]. On the premise of not destroying the traditional Dupont analysis system and calculation method, Xijuan Shao [6] and others introduced earnings before tax and earnings before interest and tax (EBIT) to decompose the traditional analysis formula into five ratios, as shown in Figure 2.

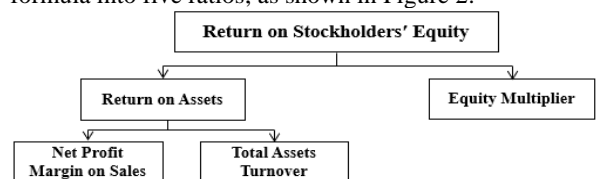


Figure 1 The traditional Dupont analysis

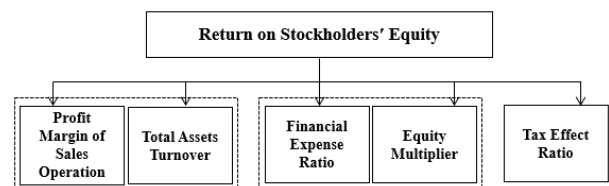


Figure 2 The improved Dupont analysis

The advantage of the improved Dupont analysis lies in the further separation of operating and financing activities, so as to clearly reflect the positive or negative effects of debt on profitability, and also show the impact of capital structure on profitability [7]. Combined with the characteristics of papermaking industry, this paper introduces the improved Dupont analysis into this industry for the first time, and makes a diagnosis of the reasons for the decline in profitability of the top ten listed enterprises.

3. OVERVIEW OF PAPERMAKING INDUSTRY IN CHINA AND THE PROFITABILITY STATUS OF TEN LISTED ENTERPRISES

3.1. Overview of Papermaking Industry in China

In recent years, under the background of the deepening supply-side structural reform and ecological civilization construction, the papermaking industry has accelerated the elimination of backward production capacity, which makes the concentration of the papermaking industry continue to increase [8]. According to the data from the National Bureau of Statistics, the number of large-scale papermaking enterprises in China decreased from 2,791 in 2015 to 2,524 in 2019, among which the proportion of loss-making enterprises showed a V-shaped development trend. By 2019, the proportion of loss-making enterprises was as high as 22.19%, and the survival pressure of papermaking enterprises increased sharply.

3.2. Profitability Status of Papermaking Enterprises in China

According to the data released by China Paper Association, the prime operating revenue and total profit of papermaking industry in China presented an inverted V-shaped trend from 2015 to 2019, which reached a peak in 2017, and then both of them declined rapidly. In order to further analyse the current situation of profitability, it is necessary to analyse the relative ratio. According to the total revenue of 2019, this paper selects the top ten enterprises from A-share listed enterprises of papermaking industry in China (hereinafter referred to as the "top ten listed enterprises") and analyses the return on stockholders' equity (ROE) over the past five years, as shown in Table 1.

Through horizontal analysis, there was no obvious positive correlation between the average ROE and operating revenue of the top ten listed enterprises in recent five years, and there was a big difference among them. Moreover, only four listed enterprises had a ROE of more than 10%, and the overall level of profitability was low. Through longitudinal analysis, the annual ROE showed an inverted "V" distribution pattern from 2017 to 2019, which reached a high point in 2017 and then decreased from 14.7% to 8.39% year by year. To sum up, the profitability of top ten listed enterprises showed a significant downward trend from 2017 to 2019.

4. DIAGNOSIS OF THE REASONS FOR THE DECLINING PROFITABILITY OF TOP TEN LISTED ENTERPRISES

Based on the analysis above, the profitability of the top ten listed enterprises in China had been declining continuously from 2017 to 2019. As shown in Table 2, the following part selects the financial data from 2017 to 2019 for longitudinal comparison, and gradually finds out the factors affecting the decline.

Table 1 Comparison table of ROE of top ten listed enterprises in recent five years

Stock Name	2015	2016	2017	2018	2019	The average
Chenming Paper	6.19%	10.16%	14.23%	9.14%	6.72%	9.29%
Shanying Paper	3.41%	4.92%	21.40%	28.65%	9.51%	13.58%
Sun Paper	11.42%	14.72%	23.49%	19.12%	16.08%	16.97%
Huatai Paper	0.72%	2.71%	9.70%	9.44%	8.03%	6.12%
Bohui Paper	1.02%	4.91%	18.52%	5.07%	2.57%	6.42%
Yueyang Forest & Paper	-7.24%	0.54%	5.31%	4.56%	3.80%	1.39%
C & S	3.69%	10.15%	12.16%	12.81%	16.35%	11.03%
Jingxing Paper	0.07%	9.90%	18.88%	8.58%	4.58%	8.40%
Xianhe Corp	9.80%	12.53%	18.56%	10.49%	12.41%	12.76%
Qifeng New Material	9.16%	4.20%	4.71%	1.72%	3.86%	4.73%
The average	3.82%	7.47%	14.70%	10.96%	8.39%	—

Table 2 Decomposition table of factors affecting ROE of top ten listed enterprises

	Stock Name	2017	2018	2019	Trend	
					(2017-2018)	(2018-2019)
Profit Margin of Sales Operation	Chenming Paper	22.58%	20.59%	16.33%	Down	Down
	Shanying Paper	16.29%	19.10%	8.64%	Up	Down
	Sun Paper	18.54%	15.80%	13.91%	Down	Down
	Huatai Paper	6.81%	7.46%	7.11%	Up	Down
	Bohui Paper	16.60%	9.28%	6.71%	Down	Down
	Yueyang Forest & Paper	9.99%	8.72%	6.87%	Down	Down
	C & S	10.09%	9.97%	11.19%	Down	Up
	Jingxing Paper	16.68%	8.51%	5.49%	Down	Down
	Xianhe Corp	15.93%	10.92%	12.89%	Down	Up
	Qifeng New Material	5.85%	2.04%	5.42%	Down	Up
The average	13.94%	11.24%	9.46%	Down	Down	
Total Assets Turnover	Chenming Paper	0.31	0.27	0.30	Down	Up
	Shanying Paper	0.74	0.78	0.59	Up	Down
	Sun Paper	0.82	0.78	0.74	Down	Down
	Huatai Paper	0.94	1.04	0.97	Up	Down
	Bohui Paper	0.71	0.52	0.51	Down	Down
	Yueyang Forest & Paper	0.41	0.46	0.47	Up	Up
	C & S	0.90	1.04	1.19	Up	Up
	Jingxing Paper	0.89	0.94	0.87	Up	Down
	Xianhe Corp	0.72	0.79	0.71	Up	Down
	Qifeng New Material	0.82	0.83	0.74	Up	Down
The average	0.726	0.745	0.709	Up	Down	
Financial Expense Ratio	Chenming Paper	0.68	0.54	0.41	Down	Down
	Shanying Paper	0.78	0.84	0.78	Up	Down
	Sun Paper	0.84	0.79	0.82	Down	Up
	Huatai Paper	0.77	0.84	0.83	Up	Down
	Bohui Paper	0.78	0.40	0.22	Down	Down
	Yueyang Forest & Paper	0.77	0.76	0.79	Down	Up
	C & S	0.90	0.90	0.97	-	Up
	Jingxing Paper	0.90	0.80	0.76	Down	Down
	Xianhe Corp	0.92	0.77	0.86	Down	Up
	Qifeng New Material	0.91	0.81	0.83	Down	Up
The average	0.82	0.74	0.73	Down	Down	
Equity Multiplier	Chenming Paper	3.56	3.76	3.89	Up	Up
	Shanying Paper	2.49	2.62	2.76	Up	Up
	Sun Paper	2.41	2.37	2.26	Down	Down
	Huatai Paper	2.07	1.86	1.70	Down	Down
	Bohui Paper	2.69	3.15	3.64	Up	Up
	Yueyang Forest & Paper	2.26	1.89	1.85	Down	Down
	C & S	1.80	1.72	1.51	Down	Down
	Jingxing Paper	1.63	1.52	1.35	Down	Down
	Xianhe Corp	1.98	1.86	1.82	Down	Down
	Qifeng New Material	1.27	1.30	1.27	Up	Down
The average	2.22	2.20	2.21	Down	Up	
Tax Effect Ratio	Chenming Paper	0.85	0.80	0.86	Down	Up
	Shanying Paper	0.88	0.88	0.86	-	Down
	Sun Paper	0.77	0.82	0.85	Up	Up
	Huatai Paper	0.79	0.78	0.82	Down	Up
	Bohui Paper	0.76	0.83	0.94	Up	Up
	Yueyang Forest & Paper	0.74	0.79	0.82	Up	Up
	C & S	0.83	0.80	0.84	Down	Up
	Jingxing Paper	0.86	0.89	0.92	Up	Up
	Xianhe Corp	0.90	0.85	0.87	Down	Up
	Qifeng New Material	0.84	0.96	0.91	Up	Down
The average	0.82	0.84	0.87	Up	Up	

4.1. Decomposition of Factors Affecting Return on Stockholders' Equity (ROE)

The profit margin of sales operation reflects the control level of cost and expense in the process of production and operation management. In the two consecutive fiscal years from 2017 to 2019, most of the top ten listed enterprises showed a decline to varying degrees. Through analysing the average, the index dropped from 13.94% in 2017 to 9.46% in 2019, with a decrease rate of 32.14%. In a word, the performance of top ten listed enterprises in this index was generally poor, which indicated that the decline of ROE was affected by the profit margin of sales operation to some extent.

Total assets turnover reflects the efficiency of asset utilization and the decision-making level of enterprise investment. From 2017 to 2018, seven enterprises showed an upward trend, while the performance of this indicator was quite different from 2018 to 2019, with the total assets turnover of all seven enterprises declining. Through analysing the average, from 2017 to 2019, the index of the top ten listed enterprises first rose from 0.726 to 0.745, with an increase rate of 26.17%, and then dropped from 0.745 to 0.709, with a decrease rate of 48.32%. In general, from 2017 to 2019, the total assets turnover of the top ten listed enterprises increased slightly and then decreased significantly, resulting in a downward trend as a whole.

The financial expense ratio is less than or equal to 1, which has a negative impact on the profitability; the equity multiplier is greater than or equal to 1, which indicates that financing activities have a positive impact on the profitability; if the multiplication of the two is greater than 1, it indicates that the positive effect is greater than the negative effect, and the financing decision is beneficial to enterprises; if it is less than 1, it weakens the profitability. Through analysing the average of the two indices, from 2017 to 2019, the financial expense ratio of top ten listed enterprises declined year by year, equity multiplier also presented the downward trend at the same time. In addition, through calculating and comparing the two indices' multiplications of enterprises, only one was less than 1, while the rest were greater than 1, which indicated that the financing activities had a positive effect on the profitability. Through analysing the average of the multiplications, it decreased from 1.79 in 2017 to 1.56 in 2018, and then further decreased to 1.44 in 2019. To sum up, the positive effect of financing activities on the

profitability of top ten listed enterprises was gradually weakening.

The tax effect ratio is less than 1, which reflects the negative effect of enterprise income tax on the profitability. According to the calculation results, the tax effect ratio increased steadily from 0.82 in 2017 to 0.87 in 2019, indicating that the tax revenue played an overall role in promoting the profitability.

In summary, from 2017 to 2019, the decline in ROE of top ten listed enterprises was mainly affected by profit margin of sales operation, total assets turnover, and financing activities.

4.2. Layer by Layer Analysis of Improved Dupont System

Through the above diagnosis, this paper further analyses the profit margin of sales operation and the total assets turnover. As shown in Table 3, Table 4.

The operating profit margin of sales is mainly affected by costs and expenses. As for the top ten listed enterprises, their operating costs account for the highest proportion, and the average showed an increasing trend year by year, rising from 76.54% in 2017 to 79.90% in 2019. In addition to operating costs, the proportion of sales expenses and administrative expenses was not low compared with other expenses. The average sales expense ratio decreased from 5.48% in 2017 to 4.94% in 2018, and then rose back to 5.35% in 2019. Compared with 2017, sales expenses in 2019 had fluctuated but the overall range was not large. The average management expense ratio declined slightly from 2017 to 2018, and then increased to 3.13% in 2019, with the increase significantly greater than the decrease. Compared with 2017, management expense ratio in 2019 generally showed an upward trend.

According to the characteristics of papermaking industry, this paper analyses the accounts receivable turnover and inventory turnover, which mostly affect the total asset turnover. The average accounts receivable turnover rose from 9.06 in 2017 to 9.667 in 2018, and then dropped to 9.48 in 2019. The comprehensive analysis shows that the accounts receivable turnover had a slight fluctuation from 2017 to 2019, but the overall situation was slightly better. On the other hand, within two consecutive years, most enterprises showed a decline of inventory turnover, resulting in the average from 6.71 to 5.77. Overall, the performance of inventory turnover was not good.

Table 3 The table of main factors affecting profit margin of sales operation

	Stock Name	2017	2018	2019	Trend	
					(2017-2018)	(2018-2019)
Operating Cost Ratio	Chenming Paper	66.95%	68.73%	71.61%	Up	Up
	Shanying Paper	76.99%	76.94%	80.94%	Down	Up
	Sun Paper	74.01%	76.53%	77.46%	Up	Up
	Huatai Paper	83.97%	85.30%	85.89%	Up	Up
	Bohui Paper	75.97%	83.97%	85.42%	Up	Up

Operating Cost Ratio	Stock Name	2017	2018	2019	Trend	
					(2017-2018)	(2018-2019)
Sales Expense Ratio	Yueyang Forest & Paper	76.12%	79.21%	81.09%	Up	Up
	C & S	65.09%	65.93%	60.36%	Up	Down
	Jingxing Paper	80.06%	87.40%	89.03%	Up	Up
	Xianhe Corp	80.80%	82.77%	81.30%	Up	Down
	Qifeng New Material	85.47%	88.72%	85.94%	Up	Down
	The average	76.54%	79.55%	79.90%	Up	Up
	Chenming Paper	4.42%	4.12%	4.27%	Down	Up
	Shanying Paper	3.98%	3.96%	4.63%	Down	Up
	Sun Paper	3.51%	3.45%	4.14%	Down	Up
	Huatai Paper	4.53%	3.15%	2.52%	Down	Down
Management Expense Ratio	Bohui Paper	5.18%	3.96%	4.11%	Down	Up
	Yueyang Forest & Paper	4.37%	4.42%	4.46%	Up	Up
	C & S	19.11%	17.84%	20.65%	Down	Up
	Jingxing Paper	3.13%	2.51%	3.07%	Down	Up
	Xianhe Corp	4.06%	3.34%	3.21%	Down	Down
	Qifeng New Material	2.55%	2.64%	2.49%	Up	Down
	The average	5.48%	4.94%	5.35%	Down	Up
	Chenming Paper	3.03%	3.35%	3.73%	Up	Up
	Shanying Paper	3.56%	3.52%	4.59%	Down	Up
	Sun Paper	2.28%	2.55%	2.48%	Down	Down
Accounts Receivable Turnover	Huatai Paper	2.70%	2.71%	2.78%	Up	Up
	Bohui Paper	1.57%	2.03%	2.82%	Up	Up
	Yueyang Forest & Paper	4.13%	3.83%	3.65%	Down	Down
	C & S	3.57%	3.56%	4.44%	Down	Up
	Jingxing Paper	2.18%	1.99%	2.26%	Down	Up
	Xianhe Corp	3.07%	2.47%	1.92%	Down	Down
	Qifeng New Material	2.30%	1.90%	2.65%	Down	Up
	The average	2.84%	2.79%	3.13%	Down	Up

Table 4 The table of main factors affecting total assets turnover

	Stock name	2017	2018	2019	Trend	
					(2017-2018)	(2018-2019)
Accounts Receivable Turnover	Chenming Paper	7.72	8.17	10.25	Up	Up
	Shanying Paper	9.31	9.46	7.75	Up	Down
	Sun Paper	12.57	14.01	14.82	Up	Up
	Huatai Paper	11.80	16.36	14.79	Up	Down
	Bohui Paper	10.27	8.93	9.84	Down	Up
	Yueyang Forest & Paper	7.19	8.35	8.08	Up	Down
	C & S	8.14	8.49	8.58	Up	Up
	Jingxing Paper	11.01	11.11	11.01	Up	Down
	Xianhe Corp	6.17	6.29	5.66	Up	Down
	Qifeng New Material	6.41	5.5	4.06	Down	Down
Inventory Turnover	The average	9.06	9.667	9.48	Up	Down
	Chenming Paper	3.62	3.10	3.77	Down	Up
	Shanying Paper	6.70	7.81	8.09	Up	Up
	Sun Paper	10.49	9.02	7.63	Down	Down
	Huatai Paper	11.22	9.34	8.36	Down	Down
	Bohui Paper	4.80	4.21	5.49	Down	Up
	Yueyang Forest & Paper	0.92	0.98	0.98	Up	-
	C & S	6.24	5.33	4.34	Down	Down
	Jingxing Paper	11.58	10.15	9.33	Down	Down
	Xianhe Corp	4.56	4.17	3.76	Down	Down
Qifeng New Material	7.00	6.48	5.95	Down	Down	
The average	6.71	6.06	5.77	Down	Down	

5. SUGGESTIONS FOR IMPROVING THE PROFITABILITY

Through the above analysis, the profitability decline of the top ten listed enterprises is affected by operating cost ratio, management expense ratio, inventory turnover, and financing activities. According to the diagnosis results, combined with the characteristics of the papermaking industry, this paper puts forward the following suggestions for references.

5.1. Strengthening Supplier Management

In addition to strengthening internal management and controlling expenses, each papermaking enterprise should also pay attention to the control of operating costs to improve its cost advantage. Papermaking enterprises have a huge demand for raw materials, so the quality of suppliers is particularly important for the development of enterprises. Enterprises can obtain supplier information through multiple channels, optimize the supplier evaluation system, and join hands with excellent suppliers to achieve multi-win.

5.2. Standardizing the Process of Expense Reimbursement

Enterprises can standardize their financial reimbursement behaviors, strictly control expenses, and strengthen expense management by formulating an effective expense reimbursement review process, so as to improve the profitability of enterprises. At the same time, the enterprise should also carry out regular staff training to improve the professional level of relevant personnel.

5.3. Improving the Efficiency of Inventory Management

Enterprises can introduce modern management technology to improve the ability of inventory management. Enterprises should reduce all kinds of material preparation inventory, optimize the product inventory structure, and coordinate the supply and marketing relationship in time, so as to alleviate the enterprise inventory.

5.4. Optimizing Financing Decisions

Enterprises should timely take the initiative to understand the current situation of the financial market, so as to accurately grasp financing opportunities; while broadening financing channels, enterprises should strictly control the risks and reduce the costs.

6. CONCLUSION

In this paper, the improved Dupont analysis is used to diagnose the profitability of top ten listed enterprises in the papermaking industry. The results show that in the consecutive fiscal years from 2017 to 2019, the declining of ROE is affected by the decrease of operating cost ratio and management expense ratio, the increase of inventory turnover and the unsatisfactory financing activities of enterprises. According to the diagnosis results and the characteristics of the industry, this paper puts forward some suggestions to strengthen the supplier management, standardize the process of expense reimbursement, improve the efficiency of inventory management and optimize the financing decisions, so as to enhance the profitability of papermaking enterprises, provide references for the growth of enterprise value, and promote the sustainable development of the papermaking industry.

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