

A Comparative Study on the Financial Performance of Listed Companies in the Semiconductor Industry in the Yangtze River Delta

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Abstract: The sudden outbreak of COVID-19 in early 2020 has had varying degrees of impact on all walks of life. By analyzing the development status, development prospects and needs of the semiconductor industry in the Yangtze River Delta region, the article selects 33 listed companies in the semiconductor industry as a representative sample of the Yangtze River Delta region, selects 12 financial indicators, and uses factor analysis to analyze their performance in 2019 and 2020. The annual financial performance is analyzed and compared, the payment ability, profitability, performance ability and development ability of 33 listed companies in the same period are compared, and the financial performance changes of the same company in different operating periods are evaluated and compared. The results show that due to the impact of the new crown pneumonia epidemic, the financial performance of most sample companies in 2020 is better than that in 2019. Finally, according to the actual bottleneck of the development of the semiconductor industry in the Yangtze River Delta region, corresponding suggestions are put forward.

Keywords: Semiconductor industry, Financial performance evaluation, Factor analysis.

1. Introduction

The sudden outbreak of the new crown pneumonia epidemic in early 2020 has caused varying degrees of impact on all walks of life. As the forefront of contemporary technological development, the semiconductor industry has become one of the important engines of global economic development, playing an increasingly important role in promoting economic development and industrial transformation and upgrading. From 2019 to 2020, China not only experienced the COVID-19 outbreak, a public health emergency, but analyzing and evaluating the financial performance of listed companies in the semiconductor industry helps us understand the impact of macro-level events such as major public emergencies on the financial performance of micro-level companies, and whether the financial performance of companies operating different products will be affected by social emergencies. At the same time, it helps us to understand the development of the semiconductor industry in the Yangtze River Delta region.

2. Literature Review

Financial performance evaluation is a method of comparative analysis of enterprise performance using financial indicators. According to the actual situation of the selected enterprises, select specific financial indicators, compare the enterprises with the average level of the same industry in the same period, and then score the comprehensive evaluation results according to the selection criteria. The final score is divided into different grades, so as to objectively and intuitively reveal the overall operation status and management level of the enterprise, and provide a reference for managers and investors to make correct investment and financing decisions. The function of financial performance evaluation is to help investors to comprehensively judge the operation status of the enterprise, discover the problems in the

operation of the enterprise, and reveal the risks faced by the enterprise.

Zhang Jie(2018) and others used principal component analysis to select and evaluate the financial performance levels of 40 listed companies in the biopharmaceutical industry, and found the ability to pay. Operating capacity affects the financial performance of Listed Companies in the biopharmaceutical industry [1]. Tang Wanyu (2020) conducted a grey entropy correlation analysis on 49 items of financial data in the 2016 annual reports of 197 listed pharmaceutical companies, and made a comprehensive ranking of their overall performance levels .After using the multiple regression equation method, it is believed that the main indicators that affect the financial performance of listed pharmaceutical companies are the total asset profit rate, the current asset profit rate, the total profit and the accounts receivable turnover rate [2]. (2021) used the entropy weight - TOPSIS model and introduced the obstacle factor diagnosis model to analyze the obstacle factors of financial performance evaluation of 20 listed pharmaceutical companies. The results show that the biggest obstacle factors affecting financial performance are the inefficient transportation of total assets and the low level of accounts receivable management [3]. At present, the widely used financial performance evaluation methods are: correlation analysis method, Wall's specific weight score evaluation method, factor analysis method, cluster analysis method, EVA evaluation method, AHP evaluation method, fuzzy comprehensive analysis method, TOPSIS evaluation method, DEA evaluation method, etc. [4]. Each of these evaluation methods has advantages and disadvantages. This paper mainly uses factor analysis to evaluate the financial performance of listed companies in the semiconductor industry.

3. Determination of Samples and Selection of Financial Evaluation Indicators

3.1. Determination of Samples

The data selected in this article comes from the Oriental Fortune Choice financial database, and the financial data of the annual report data of 33 semiconductor listed companies in the Yangtze River Delta region are selected as samples.

3.2. Establishment of Financial Indicators

This paper selects 12 financial indicators in four areas of profitability, performance capability, development capability, and payment capability to understand and estimate the financial performance of companies in the semiconductor industry, including demonstrating the ability to use companies to obtain operating performance benefits. This paper selects ROA, ROE, Net sales, cost of sales and other indicators to evaluate the audit company's profits: Operational capability mainly estimates the effectiveness of corporate performance, reflects the audit company's efficiency in corporate management, and the use of performance capabilities in the daily operations and performance of listed companies is a headache. This paper selects inventory cycle rate and dealer cycle to evaluate the operating ability of audit companies. The construction of teaching staff is the development potential of an enterprise formed through products and operations. The N-year operating income growth rate and N-year operating cost growth rate of the map are selected to reflect the development of the teacher evaluation company. Solvency refers to the ability of a business to use its assets to repay short-term and long-term debt. Whether an enterprise has the ability to pay cash and repay debts is related to the health and safety of the enterprise.

3.3. Determine the Method and Steps

First, the financial data of 33 listed companies in the semiconductor industry in 2019 and 2020 are provided for

factor analysis, and SPSS 26.0 is used for factor analysis. From the 12 financial indicators that reflect the profitability, performance capability, development capability, and payment capability of the company's listing, the basic data related to the original information is extracted, and each factor is clearly identified, scored, and sorted. Then, based on the score of each factor, the 2019 data is compared with the 2020 data, the economic activity of the semiconductor industry companies in 2019 and 2020 is evaluated and compared, and the financial performance of the 33 reviewed companies in the semiconductor industry is compared.

4. Financial Performance Evaluation of Listed Companies in the Semiconductor Industry Based on Factor Analysis

4.1. Applicability Test of Factor Analysis

KMO value and Bartlett's significance test value are usually used to judge whether the sample data is suitable for factor analysis. When the KMO value is greater than 0.5 and the Bartlett's significance test value is less than 0.01, it is considered that a reliable conclusion can be drawn through the factor analysis of the sample data. It can be seen from Table 1 that the KMO value in 2020 is 0.597, which is between 0.5 and 0.6, indicating that factor analysis is suitable. The sig value of Bartlett's sphericity test is less than 0.01, indicating that there is a significant correlation between variables, and common factors can be extracted.

Table 1. KMO and Bartlett tests

KMO Sampling Suitability Quantity		.537
Bartlett's sphericity test	Approximate chi-square	759.742
	Degrees of freedom	66
	Saliency	.000

4.2. Extract Common Factors

Table 2. Total variance explained

Element	Initial eigenvalues			Extract the load sum of squares			Rotational load sum of squares		
	Total	Percent variance	Cumulative %	Total	Percent variance	Cumulative %	Total	Percent variance	Cumulative %
1	4.685	39.040	39.040	4.685	39.040	39.040	4.061	33.842	33.842
2	3.174	26.454	65.494	3.174	26.454	65.494	2.598	21.648	55.490
3	2.078	17.315	82.810	2.078	17.315	82.810	2.292	19.103	74.594
4	.988	8.234	91.043	.988	8.234	91.043	1.974	16.450	91.043
5	.727	6.056	97.100						
6	.125	1.042	98.142						
7	.106	.882	99.024						
8	.072	.602	99.626						
9	.040	.335	99.961						
10	.004	.030	99.991						
11	.001	.006	99.997						
12	.000	.003	100.00						

Extraction method: principal component analysis.

The total extraction of common factors can be determined by various interpretations and graphs of the calculation. According to the established principle that the eigenvalue is greater than 1, 4 common factors can be extracted from the financial data of 33 companies in the semiconductor industry by 2020. From this, it can be seen that the sum of rotation

squares is shown in Table 2. In 2019, the common load of the first factor is 29.709%, the rotational load of the second factor is 24.270%, and the common total rotational load of the third factor is 19.722%; the fourth common factor is the total square rotational load (contribution rate) of 14.557%, the cumulative contribution rate of the total square rotation load

is 88259%, which meets the requirements of the general election. Therefore, we extracted 4 common factors that can explain the basic information contained in the 12 financial indicators, with an additional level of 88.259%. In 2020, the total rotational load (contribution rate) of the first common factor is 33842%, the total rotational load (contribution rate) of the second common factor is 21.648%, and the total rotational load of the third common factor. The coefficient is 21.648%. The rate is 19.103%, the total squared rotational load of the fourth factor is 16.450%, and the cumulative total squared rotational load reached 91.043%, which met the requirements for replacement. Therefore, extracting 4

common factors can explain the basic information contained in 12 financial indicators, and the additional level is 91.043%.

A rubble diagram is a rubble argument to demonstrate the importance of each factor: the horizontal axis is the number of factors, and the vertical axis is the size of the true root. The front slope corresponds to a wider root scar, and the effect is obvious: the positive root on this platform is smaller and the force is weaker. Factors can be extracted from the annual financial data of 33 semiconductor companies in 2020. As can be seen from Figure 1, 4 common factors can be extracted from the annual financial data of 33 listed companies in the semiconductor industry in 2020.

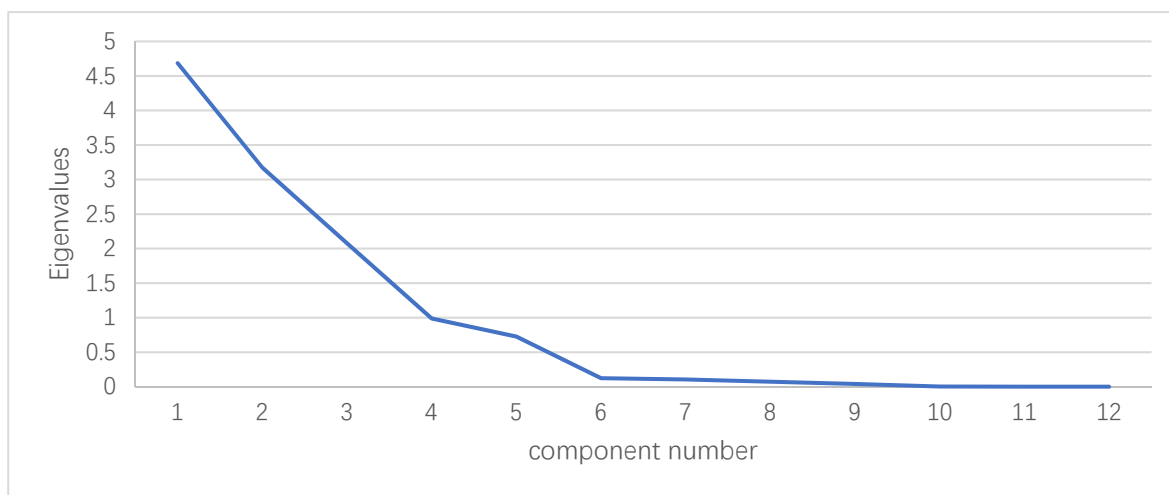


Figure 1. Factor Analysis Gravel Chart

4.3. Common Factor Naming and Economic Explanation

From Table 3, the first factor is the public burden of the total net interest rate of assets, return on equity and net sales interest rate, which reflects the profit of the audited company, which can be called profitability (F1). The second common factor, which has a larger weight in quick accounting, current accounting and cash accounting, reflects the solution of the auditing company and can be called performance capability

(F2). The third factor has a heavier burden on the N-year operating profit growth rate and N-year total growth rate, reflecting the auditing company's profit growth and development capabilities, which can be called development capabilities (F3). The fourth common factor in inventory turnover (times) and today's business turnover (times) has a large weight (time), it reflects the efficiency of investment asset review companies, and can be called ability to pay (F4).

Table 3. Rotated composition matrix

Financial indicator		Element			
Name	variable	1	2	3	4
Return on Equity ROE (weighted) (%)	X1	0.091	0.956	0.154	0.099
ROA(%)	X2	0.131	0.963	0.031	0.069
Sales margin(%)	X3	0.405	0.649	-0.077	-0.415
Inventory turnover rate (times)	X4	0.085	-0.180	0.063	0.810
Total asset turnover rate (times)	X5	-0.209	0.449	0.170	0.776
Current asset turnover rate (times)	X6	-0.415	0.130	0.521	0.683
Current ratio (%)	X7	0.980	0.114	0.064	-0.066
Cash ratio (%)	X8	0.982	0.067	0.099	-0.100
Quick ratio (%)	X9	0.987	0.084	0.063	-0.066
Operating profit N-year growth rate (%)	X10	0.181	0.048	0.961	0.142
Total profit N annual growth rate (%)	X11	0.219	0.073	0.954	0.143
Total assets N-year growth rate (%)	X12	0.818	0.230	0.326	-0.036

Extraction method: principal component analysis.

4.4. Calculate Factor Scores and Compare Rankings

The factor analysis function module of SPSS can

automatically calculate the SPSS scores of four common factors, but each common factor reflects different aspects of the economic performance of listed companies, so it is

difficult to use one common factor for comprehensive estimation. Therefore, by taking the contribution rate corresponding to each factor as a common weight, calculating the comprehensive financial performance scores of the 33 sample companies in 2019 and 2020 can better illustrate the contribution of common factors to financial performance. The SPSS program corresponds to the composite factor score calculation and has the following:

$$\text{Factor total score} = 0.3717\text{FAC1}_1 + 0.2378\text{FAC2}_1 + 0.2098\text{FAC3}_1 + 0.1807\text{FAC4}_1$$

After the comprehensive score is calculated, the year is ranked according to the comprehensive score, and the results are shown in Table 4. Then, construct 2020 based on the composite scores in Table 4.

Table 4. Financial performance ranking of listed semiconductor companies

Securities name	Factor total score	2019 ranking	Securities name	Factor total score	2020 ranking
Nanda Optoelectronics	1021.1767	1	Changdian Technology	3969.0543	1
ZhuoShengwei	485.3580	2	Thrive	3489.4310	2
Awinic Electronics	459.2430	3	Puran shares	1878.3351	3
Weir Shares	457.6467	4	Weir Shares	1603.2055	4
Shanghai Belling	388.5321	5	ZhuoShengwei	693.5754	5
China Micro Corporation	172.4426	6	China Micro Corporation	677.7569	6
Broadcom integration	153.0641	7	Anji Technology	345.9742	7
New Clean Energy	150.1229	8	Chippen Micro	260.8884	8
Leon Micro	140.8198	9	Crystal Technology	255.4150	9
Anji Technology	129.7476	10	Awinic Electronics	215.4707	10
Jiejie Microelectronics	124.1032	11	Shanghai Belling	209.9065	11
Chippen Micro	123.7132	12	New Clean Energy	198.8524	12
Zhongjing Technology	103.7621	13	Nanda Optoelectronics	180.3988	13
Crystal Technology	100.8932	14	Broadcom integration	165.6391	14
Zhongying Electronics	81.2538	15	Jiangfeng Electronics	163.8755	15
Changdian Technology	81.1977	16	Zhongjing Technology	141.9583	16
Austron Electronics	54.7864	17	Leon Micro	133.5918	17
Kangqiang Electronics	50.7673	18	Jiejie Microelectronics	126.3332	18
Zhengyuan Wisdom	48.4908	19	Tongfu Microelectronics	111.3000	19
Thrive	47.4225	20	Zhongying Electronics	70.5637	20
Fullhan Micro	43.5013	21	Dagang Shares	62.6441	21
Jiangfeng Electronics	37.9739	22	Austron Electronics	58.1141	22
Shanghai Silicon Industry	34.9609	23	Yangjie Technology	53.7064	23
Yangjie Technology	26.2777	24	Galaxy Microelectronics	39.1351	24
Galaxy Microelectronics	26.1680	25	Shanghai Silicon Industry	36.2862	25
Puran shares	22.2100	26	Fullhan Micro	22.4419	26
Suzhou solid technetium	22.0112	27	Kangqiang Electronics	12.8172	27
Fudan Microelectronics	-5.6212	28	Zhengyuan Wisdom	12.7094	28
Runxin Technology	-23.7416	29	Fudan Microelectronics	-1.5593	29
Tongfu Microelectronics	-54.8364	30	Suzhou solid technetium	-2.1684	30
Tony Electronics	-151.4543	31	RunxinTechnology	-3.0062	31
Silan Micro	-337.7105	32	Tony Electronics	-8.2766	32
Dagang Shares	-755.8000	33	Silan Micro	-56.5527	33

4.5. Evaluation of Factor Analysis Results

It can be seen that most of the listed companies in the semiconductor industry have a higher composite score of financial performance in 2020 than in 2019. This shows that, affected by the new crown pneumonia epidemic and the Sino-US trade war, most listed companies in the semiconductor industry have accelerated their development due to internal and external pressures, resulting in better financial performance in 2020 than in 2019. It can be seen that, as the semiconductor industry on the supply side, in the face of internal and external pressures, if it can adjust production in time to produce the supply required by the demand side, its financial performance will be improved compared to the

entire industry. On the contrary, its financial performance will be improved. Relative to the entire industry will be balanced or even decline.

From Table 5, the number of companies with a comprehensive score, profitability score, payment ability score, development score, and operational capability score greater than 100 in 2020 has increased compared with 2019, indicating that the entire semiconductor industry in 2020 The financial performance of listed companies is good in 2019. The number of companies with a composite score, profitability and solvency scores greater than 0 in 2020 has increased compared to 2019; the number of companies with a development capability score greater than 0 is the same as in 2019 and 2020; this shows that, compared to 2019, 2020 The

payment ability and operating ability of listed companies in the entire semiconductor industry have not changed significantly. But companies with a development capability of less than 0 also gained 1 point. This shows that due to the impact of the epidemic, in 2020 compared with 2019, the

development capabilities of listed companies in the entire semiconductor industry have declined slightly, but the profitability, operating capabilities and payment capabilities of listed companies have improved.

Table 5. Factor scores and comprehensive score statistics

Project	F1 (Profitability)		F2 (Performance Capability)		F3 (Development Capability)		F4 (Ability to pay)		Total Score	
	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
Score > 100 (pieces)	4	21	17	13	19	22	0	7	14	20
0<score<100(pieces)	24	11	10	9	7	3	12	18	13	8
Score<0(pieces)	5	1	5	1	7	8	21	8	6	5
Average score	35.7075	437.542	158.419	154.40	206.517	1110.37	-18.11	142.665	98.7419	458.1157
Maximum score	276.3445	3951.835	832.9416	1171.088	3446.813	12052.46	12.7528	1799.928	1021.177	3969.054
Minimum score	226.788	3.6099	502.314	1.2123	2398.96	230.633	138.82	37.4545	755.8	56.5528

5. Realistic Bottleneck

5.1. Lack of Special Funds

Since the semiconductor industry is characterized by high investment, high risk and high output, the development path of the industry is highly related to policy and financial support. The well-developed areas of China's semiconductor industry are closely related to the introduction of policies, the attention of enterprises, the introduction of talents, and the implementation of special funds.

5.2. Lack of Original Innovation

In terms of supply of the current industrial chain, although existing enterprises in the Yangtze River Delta have formed their own production systems and are subdivided into innovative product positions in the industry, many high-end products still rely on a large number of imports and require long-term technical challenges. In terms of intermediate manufacturing, the semiconductor industry in the Yangtze River Delta involves integrated circuits, radio devices and other businesses. Many companies are known as Changjiang Electronics Technology and National Taiwan University Optoelectronics Innovation and Exploration Industry, and the gap with the international market continues to widen. Tightening, but the development of the semiconductor industry in the Yangtze River Delta lacks original innovation and has not yet taken the first step. The industrial chain has low links and thin links.

5.3. The Semiconductor Industry Lacks Cooperation and Linkage

In recent years, although the semiconductor industry in the Yangtze River Delta region has developed rapidly, attracting leading enterprises in the industry such as Changjiang Electronics Technology, NTU Optoelectronics, and Srip Semiconductor, the total number of enterprises is still small. More than half of the existing related enterprises are concentrated in Jiangsu Province. The overall level of the semiconductor industry in the Yangtze River Delta is still relatively weak, and the concentration of the industrial chain is low. The main business of the company is chip design, packaging materials, and power electronic devices. It has not yet formed an industrial cluster, and its radiation driving ability is not strong.

6. Conclusions and Recommendations

Based on the foundation and status quo of the

semiconductor industry in the Yangtze River Delta region, it is necessary to make up for the shortcomings of the semiconductor industry in the development of potential semiconductor complete machines, semiconductor packaging, semiconductor equipment and materials. Focus on industrial chain investment, strengthen investment and institutional financing cooperation, pay attention to the intersection of industry and semiconductor capital, attract investment through enterprises, and arrange financing through education. With finance as the axis, projects are connected in series to form an industrial chain, a large-scale industry, and a new cluster. The explanation of each link can be answered from the gap between domestic and international.

(1) Establish an industrial fund to optimize the industrial ecology. The Yangtze River Delta region is trying to invest in small and medium-sized electronic projects in the semiconductor industry as soon as possible to overcome the temporary bottleneck, and must vigorously raise funds from the public. Stand firm on the banks of the besieged city. In order to encourage local development projects and attract external projects to Tianjin, efforts are made to develop and develop sufficient resources to support and develop semiconductor projects of different scales and industrial subsidies. In the Yangtze River Delta region, optimize the environment required for the development of the local semiconductor industry.

(2) Strengthen talent cultivation and introduce leading enterprises. The Yangtze River Delta should rely on the leading scientific research institutes and projects in the region to establish a semiconductor industry technology research institute, consolidate the comprehensive environment, and target the culture of high-end talents and technical leaders. Which industry is working urgently. The company is a large-scale industrial public utility organization, and it wants to attract young people, attract Chinese scientists and entrepreneurs from all over the world to innovate and start businesses in the Yangtze River Delta, and actively promote key breakthroughs and leapfrog development. On the basis of the existing semiconductor industry, develop and expand local projects, introduce leading industrial enterprises, form industrial clusters, form connections, promote the common development of upstream and downstream, fundamentally strengthen original innovation, and promote cooperation and integration.

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References

- [1] Zhang Jie, Zhao Juan. Financial performance evaluation of listed biopharmaceutical companies [J]. Business Accounting, 2018, (03): 43-45.
- [2] Tang Wanyu, Liu Hongjiu. Financial Performanc Evaluation of Listed Pharmaceutical Companies: A Study Based on Grey Entropy Correlation Analysis [J]. Journal of Jiaxing University, 2020, 32 (04): 137-143.
- [3] Luo Dingti, Zhao Yihan, Liu Zhengjun. Research on Financial Performance Evaluation of Chinese Pharmaceutical Listed Companies —Based on Diagnosis and Analysis of Obstacle Factors [J]. Journal of Luoyang Institute of Technology (Social Science Edition), 2021, 36(01): 26-31.
- [4] Shen Ci. Research on financial performance evaluation of listed pharmaceutical companies [D]. Nanjing University of Technology, 2017.