

# Descriptive Statistical Analysis of the Financial Condition of Listed Companies in China's Manufacturing Industry: Based on 2012-2022 Financial Data

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**Abstract:** After years of revolution and innovation, China's manufacturing industry has formed a relatively mature industrial system and a considerable scale, laying the foundation for the economic prosperity of China, creating the conditions of social stability and realizing the improvement of people's living situations. This paper collects the financial data of China's manufacturing companies which are selected from public market from 2012 to 2022, and analyzes the profitability, operating ability, solvency and growth ability of listed manufacturing companies. Conclusions are drawn: first, the profitability of public-market manufacturing companies is polarized. Second, public-market manufacturing companies from China have strong cost and expense control ability, and have realized the transformation from rough development to refined production. Third, public-market manufacturing companies from China are generally averse to debt leverage. Fourth, the willingness of production reinvestment of public-market manufacturing companies from China in China's manufacturing industry is decreasing, and their profitability is gradually declining with the rise of operating costs.

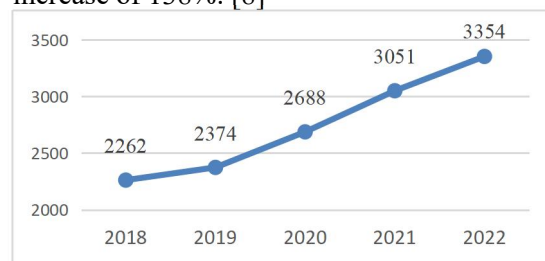
**Keywords:** Manufacturing; Financial Analysis; Descriptive Statistics

## 1. Introduction

Data from China's National Bureau of Statistics (NBS) shows, China's GDP grew at a rate of 4.9% in the third quarter of 2023, and it is expected that China's annual GDP growth rate will hardly exceed 5.5%. As one of the important drivers of China's GDP growth, more attention should be devoted to the

manufacturing sector in the context of the overall economic slowdown. [1-7]

The manufacturing industry is pivotal in China and plays an extremely significant role in China's entire economy. Since 2018, the number of public-market manufacturing companies from China has increased from 2,262 to 3,354, (See **Figure 1**) public-market manufacturing companies from China account for 66% of the number of listed companies in China. From the change of market capitalization distribution, since 2018, the market capitalization of public-market manufacturing companies from China has increased from 19 trillion to 45 trillion, an increase of 138%. [8]



**Figure 1. Number of listed manufacturing companies in China from 2018 to 2022**

The manufacturing industry is the ballast of stable employment. 2022 The annual payment of employee compensation by listed companies totaled 6.24 trillion yuan, of which public-market manufacturing companies from China paid a total of 2.33 trillion yuan, ranking first among all categories of industries. [4]

Since April 2005, the Chinese government has released the Purchasing Managers' Index (PMI), which together with the GDP constitutes China's macroeconomic indicator system. A PMI of 50% or higher reflects an overall economic expansion, while a PMI of less than 50% usually reflects an overall economic recession. [9][10]

## 2. Current Situation of Listed Companies in China's Manufacturing Industry

Data from CSRC Guidelines on Industry Classification of Listed Companies (revised in 2012) shows, public-market manufacturing companies from China have a wide range of categories, up to 31 categories of Agricultural and sideline Food Processing

Industry, Food Manufacturing Industry and Wine, beverage and refined Tea Manufacturing Industry, which are basic industries. There are also high-tech industries such as Computers, Communications and Other Electronic Equipment Manufacturing and Automobile Manufacturing. See Table 1:

**Table 1. Category of Listed Companies in China's Manufacturing Industry**

IDX	CATEGORY	NUMBER	RATE
1	Agricultural and sideline Food Processing Industry	68	1.90%
2	Food Manufacturing Industry	78	2.18%
3	Wine, beverage and refined Tea Manufacturing Industry	46	1.28%
4	Tobacco Industry	0	0.00%
5	Textile Industry	53	1.48%
6	Textile and Garment Industry	40	1.12%
7	Leather, fur, feathers and their products and footwear Industry	10	0.28%
8	Wood processing and wood, bamboo, rattan, brown and grass products	9	0.25%
9	Furniture Manufacturing	31	0.86%
10	Paper and paper product	42	1.17%
11	Printing and recording media reproduction industry	14	0.39%
12	Cultural, Educational, Industrial, sports and entertainment products Manufacturing	23	0.64%
13	Petroleum Processing, Coking and Nuclear fuel Processing Industry	18	0.50%
14	Chemical raw materials and chemical products Manufacturing	356	9.93%
15	Pharmaceutical Manufacturing	324	9.04%
16	Chemical Fiber Manufacturing	32	0.89%
17	Rubber and plastic products Manufacturing	128	3.57%
18	Rubber and plastic products Manufacturing	120	3.35%
19	Ferrous metal refining and rolling Industry	36	1.00%
20	Non-ferrous metal Smelting and rolling industry	90	2.51%
21	Metal products	102	2.84%
22	General Equipment Manufacturing Industry	215	6.00%
23	Special Equipment Manufacturing	393	10.96%
24	Automobile Manufacturing	186	5.19%
25	Railway, Ship, Aerospace and Other Transportation Equipment Manufacturing	84	2.34%
26	Mass Electrical Machinery and Equipment Manufacturing	344	9.59%
27	Computers, Communications and Other Electronic Equipment Manufacturing	610	17.01%
28	Instrumentation Manufacturing	98	2.73%
29	Other Manufacturing	21	0.59%
30	Comprehensive Utilization of Waste Resources Manufacturing	15	0.42%
31	Metal products, machinery and equipment repair	0	0.00%
TOTAL		3586	100.00%

**Source: Authors' own organization based on CSMAR database**

Data released recently by the Ministry of Industry and Information Technology showed that in 2022, China's manufacturing value added accounted for nearly 30% of the global share, and the scale of the manufacturing

industry ranked first in the world for 13 consecutive years. Currently, regionally, manufacturing industries are actively developed everywhere. Eastern region to accelerate the transformation and upgrading,

take the lead in cultivating a number of new industries, Guangdong, Jiangsu, Shandong, Zhejiang and other advantages of the status of the province continues to consolidate, played a "pillar" role. Central region and part of the western region is rapidly rising. Sichuan, Anhui, Jiangxi and other manufacturing industries in the country's proportion continues to rise, become a successor to industrial growth, which are known as "rising star". [2] Regionally, the Pearl River Delta, the Yangtze River Delta and a number of economic growth poles are being formed, becoming an important growth pole to pull the development of the manufacturing industry.

However, from the above table, it is not difficult to realize that although public-market manufacturing industry from China are large and complete, the uneven distribution of the industry is obvious.

In this paper, we selected 3, 586 non-ST manufacturing companies in China's A-share market from 2012 to 2022, and among the 31 manufacturing categories, Computers, Communications and Other Electronic Equipment Manufacturing, Mass Electrical Machinery and Equipment Manufacturing and Pharmaceutical Manufacturing ranked the top five. And these five categories accounted for more than 50% of the A-share manufacturing industry, the other 26 categories of manufacturing companies accounted for less than 50%. This shows that China's listed manufacturing companies are clearly bifurcated.

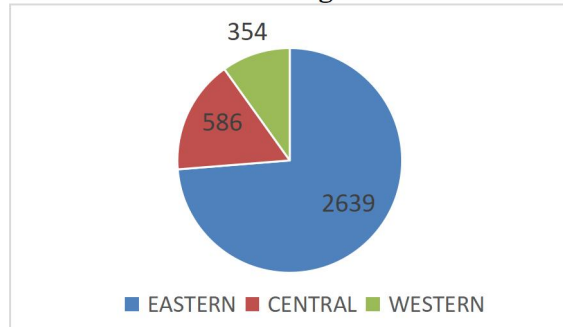
On the other hand, the benefits of regional distribution clustering of listed manufacturing companies in China are highlighted. 10 regions have more than 100 listed manufacturing companies. See **Table 2**.

**Table 2. Regional Distribution of Listed Companies in China's Manufacturing Industry**

ID	PROVINVE/AUTONOMOUS REGION/MUNICIPALITY DIRECTLY UNDER THE CENTRAL GOVERNMENT	REGION	NUMB ER
1	Beijing	EASTERN	177
2	Tianjin	EASTERN	45
3	Hebei Province	EASTERN	62
4	Shanxi Province	CENTRAL	24
5	Inner Mongolia Autonomous Region	CENTRAL	19
6	Liaoning	EASTERN	62
7	Jilin Province	CENTRAL	32
8	Heilongjiang Province	CENTRAL	26
9	Shanghai	EASTERN	242
10	Jiangsu Province	EASTERN	529
11	Zhejiang Province	EASTERN	534
12	Anhui Province	CENTRAL	126
13	Fujian Province	EASTERN	103
14	Jiangxi Province	CENTRAL	67
15	Shandong Province	EASTERN	238
16	Henan Province	CENTRAL	88
17	Hubei Province	CENTRAL	105
18	Hunan Province	CENTRAL	99
19	Guangdong Province	EASTERN	611
20	Guangxi Zhuang Autonomous Region	EASTERN	22
21	Hainan Province	EASTERN	14
22	Chongqing	WESTERN	45
23	Sichuan Province	WESTERN	118
24	Guizhou Province	WESTERN	25
25	Yunnan Province	WESTERN	26
26	Tibet Autonomous Region	WESTERN	12
27	Shaanxi Province	WESTERN	57
28	Gansu Province	WESTERN	23
29	Qinghai Province	WESTERN	8

30	Ningxia Hui Autonomous Region	WESTERN	12
31	Xinjiang Uygur Autonomous Region	WESTERN	28

Source: Authors' own organization based on CSMAR database



**Figure 2. Regional Distribution of public-market manufacturing companies from China, 2012-2022**

Discounting the companies listed repeatedly in different public markets, among the 3, 579 manufacturing listed companies, there are 2, 639 China's manufacturing companies from public market in the eastern region, accounting for 73.74%. In the central region, there are 586 public-market manufacturing companies from China, accounting for 16.37%. the total number of manufacturing listed companies in the western region is 354, accounting for 9.89%. See Figure 2.

### 3. Descriptive Statistics

#### 3.1 Research Sample and Research Tool

In this paper, China's manufacturing companies from public market are selected from the CSMAR database from 2012 to 2022, excluding 81 ST companies, with a total sample size of 3, 586. A comprehensive financial analysis of Chinese listed manufacturing companies is conducted in five

dimensions: profitability, operating ability, solvency, development ability, and cash management ability. Considering that there are 31 subcategories of public-market manufacturing companies from China, 31 major industries are involved. In order to minimize the industry variability as much as possible. In this paper, the raw data are processed with outliers: 1. blank values are eliminated; 2. Eliminate outliers among the factors, including some large and small values. The descriptive statistics of this paper are completed by IBM SPSS Statistics 23 software.

#### 3.2 Profitability Analysis

The analysis of profitability, the overall level of profitability is analyzed. This paper selects gross operating profit margin, net operating profit margin, return on net assets, return on invested capital, return on assets, net profit margin on total assets, net profit margin on fixed assets, EBITDA, financial expense ratio, cost and expense margin for analysis. Among them, gross operating profit margin and net operating profit margin are indicators of great concern to manufacturing enterprises, and return on net assets is a profitability indicator of great concern to investors. Return on invested capital does not take into account the financing structure of the enterprise, and focuses only on the profitability that the owner's inputs and liabilities can create for the enterprise, which can also reflect the profitability of the enterprise's core business (Table 3). [1]

**Table 3. Summary statistics of Profitability**

Summary statistics		Accounts Receivable Turnover	Inventory Turnover	Accounts Payable Turnover	Working capital turnover	Current assets turnover	Fixed assets turnover	Total assets turnover
Number of cases	Valid	71186	71083	67925	62574	71222	71183	71222
	Missing	37	140	3298	8649	1	40	1
Mean		5.4440	3.5392	4.9808	2.8263	.7488	4.2397	.3936
Median		2.5879	2.2205	3.0928	1.2110	.5971	2.1081	.3197
Standard Deviation		10.06421	5.27262	6.82669	6.27361	.57476	7.74700	.27758
Minimum value		.08	.00	.00	.03	.03	.10	.01
Maximum value		100.91	99.70	100.59	98.71	22.15	100.84	5.04

As can be seen from the above table, the average value of gross operating profit margin of China's manufacturing companies from

public market is 29.49%, and the median is 26.23%; the average value of net operating profit margin is 11.3%, and the median is 9%.

It reflects the strong cost control ability of listed companies in China's manufacturing industry. the financial expense ratio is 1%, and the cost and expense margin is higher, reflecting the lower financing leverage of China's manufacturing companies from public market. On the whole, the overall profitability of listed manufacturing companies sub 2012-2022 is stronger. But from the point of view of EBITDA indicators, the profitability of China's listed manufacturing companies shows a polarization trend.

### 3.3 Analysis of Operating Capacity

The operation of any business revolves around the turnover of funds. Through the turnover, the enterprise makes the capital get value-added, so as to achieve the effect of expanding the balance sheet of the enterprise, and create

wealth for the enterprise. Manufacturing enterprises to obtain funds, through the procurement of raw materials, auxiliary materials, and then into the production process, the production of products, after the completion of the finished product or inventory, and then into the sales process, accounts receivable, and finally through the recovery of goods again into monetary funds back to the enterprise, to complete a round of capital turnover. [3]

In measuring the turnover ratio of an enterprise, the seven commonly used indicators are accounts receivable turnover, accounts payable turnover, inventory turnover, current assets turnover, fixed assets turnover, total assets turnover, and working capital turnover (Table 4).

**Table 4. Summary statistics of Operating capacity**

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Based on the above table, it is easy to see that the mean value of accounts receivable turnover, inventory turnover, accounts payable turnover, working capital turnover, current asset turnover, fixed asset turnover indicators is significantly larger than the median, with a right-skewed distribution, indicating that there is a very large value of the data. It reflects the obvious polarization of the operational aspects of China's listed manufacturing companies. On the one hand, it is related to the specific industry in which the enterprise is located. On the other hand, it is related to the operating ability of the enterprises.

Overall: China's manufacturing industry listed companies have strong cost and expense

control ability, and have realized the transition from rough development to refined production.

### 3.4 Solvency Analysis

Solvency refers to the ability of an enterprise to repay debts (including principal and interest) as they fall due. the ability to repay maturing debts in a timely manner is an important symbol reflecting the good or bad financial position of an enterprise. Through the analysis of solvency, you can examine the ability of the enterprise to continue to operate and risk, and help to predict the future earnings of the enterprise. Enterprise solvency includes short-term solvency and long-term solvency (Table 5). [6]

**Table 5. Summary statistics of Solvency**

Summary statistics							
	Quick Ratio	Working Capital to liabilities	Interest cover multiplier	Net cash flows from operating activities/current	Asset-to-liability	Equity multiplier	EBITDA/total liabilities

				liabilities	ratio		
Number of cases	Valid	91287	91287	91287	91287	91287	91287
	Missing	0	0	0	0	0	0
Mean		1.2570	2.8467	15.5026	.0551	.4469	1.9913
Median		1.0744	.9412	5.1549	.0336	.4405	1.7873
Standard Deviation		.76941	7.44644	35.74185	.17853	.15298	.71812
Minimum value		.08	-2.86	-26.32	-.54	.14	1.16
Maximum value		10.23	101.24	419.68	.87	.83	5.80

Generally speaking, quick ratio was considered be maintained at 1:1. Then it indicates that every \$1 of current liabilities of the enterprise can be covered by that of current assets. Thus the short-term solvency is reliably guaranteed. In the above table, the mean and median of the quick-fix ratio basically overlap, slightly to the right, indicating that the general solvency of China's manufacturing industry listed companies. The working capital to borrowing ratio is left-skewed, reflecting that most of the manufacturing companies have little debt pressure. On the other hand, the gearing ratio of about 44% further reflects the aversion to debt of China's listed manufacturing companies. EBITDA is the difference between the net cash flow from operating activities and the net cash flow from investing activities of an enterprise. It can reflect the level of net profit remaining after a company deducts all operating costs and expenses. If a company's EBITDA continues to grow, then it indicates that the company's operating efficiency is improving and profitability is increasing. Conversely, if EBITDA continues to decline, then it may indicate that the company's cost control is weak and profitability is declining. It is very

suitable for evaluating industries that have huge upfront capital expenditures and need to amortize the upfront investment over a long period of time, such as asset-heavy enterprises. Manufacturing industry, due to the entire production and processing process is more complex and long, to maintain a high EBITDA is the manufacturing industry listed companies need to pay attention to the indicators.

### 3.5 Growth Analysis

The growth capacity of an enterprise is inextricably linked to its revenue capacity, resource allocation, and operational capacity. This paper selects nine indicators to be analyzed. [5].

As can be seen from the above table, the median of fixed asset growth rate, return on net assets growth rate, net profit growth rate, and operating profit growth rate are all negative, which indicates that more than half of the listed companies in China's manufacturing industry have reduced their investment in fixed assets in the past 11 years, as well as that their revenue capacity and profitability are declining continuously. The decline in their profitability, as presented in the data, is related to the rise in operating costs (Table 6).

**Table 6. Summary statistics of Growth**

Summary statistics										
		Capital Preservation and Appreciation Rate	Capital Accumulation Rate	Fixed Assets Growth Rate	Total Assets Growth Rate	Return on Net Assets Growth Rate	Net Profit Growth Rate	Operating Profit Growth Rate	Operating Revenue Growth Rate	Total Operating Costs Growth Rate
Number of cases	Valid	26504	26504	26501	26504	25947	26115	26109	26147	26605
	Missing	322	322	325	322	879	711	717	679	221
Mean		1.0852	.0852	.0570	.0904	.0307	.0586	.0482	.0477	.1846
Median		1.0358	.0358	-.0035	.0501	-.0705	-.0434	-.0454	.0326	.1416
Standard Deviation		.17589	.17589	.15755	.13845	.069964	.069617	.067316	.025887	.024943
Minimum value		.91	-.09	-.12	-.10	-3.17	-1.92	-1.32	-.57	-.32
Maximum value		5.48	4.48	1.02	3.07	5.99	3.69	2.40	.96	1.24

#### 4. Conclusion

Although the PMI index still remains above 50, summarizing the analysis, China's manufacturing industry is facing the problem of how to further develop in the future. With the drastic changes in the international and domestic political and economic environment, China's manufacturing industry is facing a very big dilemma.

First, the manufacturing industry no longer has the advantage of labor. Firstly, as the price of labor in China rises, compared with Southeast Asian countries, our labor price no longer has an advantage. Second, compared with the labor force in Europe and the United States, we in labor efficiency is not high.

Secondly, the short-term solvency is weak. Epidemic to every manufacturing enterprise has brought a huge rush in, for the capital chain is tight enterprise is a fatal blow. Therefore, in the future, China's manufacturing enterprises should be cash flow management as a top priority.

Third, the manufacturing industry competition is intensifying. China's manufacturing industry wants to develop, first of all to break through the European and American countries in the high-end manufacturing industry suppression, especially to solve the technical neck problem. Secondly, to enhance the efficiency of the manufacturing enterprises. Realize the green development of low energy consumption and high efficiency.

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#### References

[1] Dou, Qianqian, and Xinwei Gao. "The double-edged role of the digital economy

in firm green innovation: Micro-evidence from Chinese manufacturing industry. " Environmental Science and Pollution Research 29.45(2022):67856-67874.

- [2] Zeng SX, Xie XM, Tam CM (2010) Relationship between cooperation networks and innovation performance of SMEs. *Technovation* 30:181–194.
- [3] Economic daily. (2023, March 31). China's manufacturing sector has been the world's largest for 13 consecutive years. [https://www.news.cn/fortune/2023-03/31/c\\_1129481817.htm](https://www.news.cn/fortune/2023-03/31/c_1129481817.htm)
- [4] He, Jiabo, Jin Zhang, and Xinjian Gu. "Research on sharing manufacturing in Chinese manufacturing industry. " the *International Journal of Advanced Manufacturing Technology* 104(2019):463-476.
- [5] Huang, Qunhui. "Intelligent manufacturing. " *Understanding China's Manufacturing Industry*. Singapore: Springer Nature Singapore. 2022.111-127. from Chinese manufacturing industry. "
- [6] Li, Ling. "China's manufacturing locus in 2025: With a comparison of "Made-in-China 2025" and "Industry 4.0". " *Technological forecasting and social change* 135(2018):66-74.
- [7] Taj, S. and Morosan, C. (2011), "The impact of lean operations on the Chinese manufacturing performance", *Journal of Manufacturing Technology Management*, Vol. 22 No. 2, pp. 223-240.
- [8] Wang, Shuhong, Xiaoqing Wang, and Suisui Chen. "Global value chains and carbon emission reduction in developing countries: does industrial upgrading matter. " *Environmental Impact Assessment Review* 97(2022):106895.
- [9] Xu Guoxin etc., M. (2022). *Annual Statistical Report On the Development of Chinese Listed Companies*. China Listed Companies Association.
- [10] Yang, Haochang, Lianshui Li, and Yaobin Liu. "The effect of manufacturing intelligence on green innovation performance in China. " *Technological Forecasting and Social Change* 178(2022):121569.