

# Research on Financial Supply Efficiency of Listed Companies in Emerging Industries in Jiangsu Province

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**Abstract:** Emerging industries represent the direction of a new round of scientific and technological revolution and industrial transformation. They are the key areas to cultivate new driving forces for development and obtain future competitive advantages. They are new economic sectors or industries with the birth of scientific research achievements and technologies. During the 13th Five Year Plan period, we should put these industries in a more prominent position in economic and social development, vigorously build a new system of modern industries, and promote sustainable and healthy economic and social development. Because of the characteristics of these industries, they cannot do without a large number of stable capital investment and financial support. High efficiency of financial supply means "delivering carbon in the snow" for these industries. Based on the data of 37 emerging industry listed companies in Jiangsu Province from 2013 to 2017, this paper uses the BCC model of generalized DEA to analyze the financial supply efficiency of emerging industry listed companies in Jiangsu Province, and finds that: the overall efficiency value of emerging industry in Jiangsu Province is not optimal, but shows an upward trend; the financial supply efficiency is between different industries and enterprises There are differences.

## 1. Introduction

Innovation is the first driving force for leading development and the strategic support for building a modern economic system. At present, the previous round of scientific and technological revolution and industrial change are breeding, in-depth evolution, showing the development trend of multi field, interdisciplinary and group breakthrough in the world. Emerging industries represent a new round of scientific and technological revolution and the direction of industrial transformation, and are the key areas to cultivate new driving forces for development and obtain new competitive advantages in the future. Jiangsu Province firmly implements the innovation driven development strategy, deepens supply side structural reform, develops emerging industries, and speeds up industrial transformation and upgrading. However, due to the characteristics of high investment, high risk and long return period of capital, the external financing of emerging industries has encountered some difficulties. In order to get rid of these difficulties, it is necessary to study the problem of financial supply. This paper takes the listed companies of emerging industries in Jiangsu Province as an example to analyze the financial supply efficiency of emerging industries in Jiangsu Province, and uses BCC model for empirical analysis.

## 2. Empirical analysis

### 2.1 Index selection

In this paper, 37 emerging industry listed companies in Jiangsu Province are selected as the research objects. The sample data is from guotai'an database. The time span is from 2013 to 2017. Dea-solver5.0 is used in the software. The asset liability ratio and the proportion of circulating shares are selected as input indicators to represent the indirect financial supply of financial

institutions represented by banks and the direct financial supply represented by the stock market. Take the rate of return on net assets and the growth rate of total operating income as output indicators to represent the profitability and growth ability of emerging industries.

Because DEA measure requires data to be greater than or equal to 0, it is transformed by the following formula:

$$y_i = 0.1 + 0.9 \times \frac{x_{ij} - m_j}{M_j - m_j}, i = 1, 2, \dots, n$$

$$M_j = \max(x_{i1}, x_{i2}, \dots, x_{ij}); m_j = \min(x_{i1}, x_{i2}, \dots, x_{ij}); y \in [0, 1, 1]$$

### 3. Analysis of empirical results

In this paper, through the analysis of input angle and output angle, as well as the comparative analysis between them, finally, from the projection surface analysis and relaxation variable analysis, we get the improvement plan. In this paper, dea-solver5.0 software is used to calculate, and the comprehensive efficiency, pure technical efficiency, scale efficiency and relaxation variable s value of 37 emerging industry listed enterprises in Jiangsu Province in 2013-2017 are obtained.

#### 3.1 Comprehensive efficiency analysis

When using DEA model to measure the effectiveness, if the comprehensive efficiency of the decision-making unit is 1, it means that the decision-making unit is in a relatively effective state, which realizes the output maximization under a certain input state or the input minimization under a certain output state.

It can be seen that among the 37 listed companies, the number of companies whose comprehensive efficiency reaches 1 in 13-17 years is only 3, 4, 4, 3 and 4 respectively, which indicates that the resource allocation efficiency in the development process of emerging industries in Jiangsu Province has not been optimized and needs to be improved. From 2013 to 2017, the overall financial supply efficiency shows an upward trend. Among the 37 enterprises, Hengrui pharmaceutical and Hengli hydraulic have performed well. Whether it is comprehensive efficiency, pure technical efficiency or scale efficiency, their efficiency values are basically kept at 1 in 2013-2017, indicating that the financial supply efficiency of these two companies is relatively effective compared with other companies. From the perspective of change trend, the comprehensive efficiency of emerging industries in Jiangsu Province shows an overall upward trend, reaching 0.64 in 2017.

#### 3.2 Pure technical efficiency and scale efficiency analysis

The comprehensive efficiency is affected by the pure technical efficiency and scale. If the pure technical efficiency and scale efficiency are invalid, the comprehensive efficiency will also be affected. Pure technical efficiency represents the system and management level, and the use of management and skills and other factors of enterprises has an impact on production efficiency, which indicates the efficiency of using its input resources at the current technical level. The change trend of pure technical efficiency and comprehensive efficiency of each enterprise is basically the same. Specifically, the enterprises with high pure technical efficiency are Tianrui instruments, Hengli hydraulic, Yuyue medical, etc. From the perspective of the changing trend, the overall pure technical efficiency is an upward trend, only a few enterprises are declining, and these enterprises belong to the energy conservation and environmental protection industry and the new generation of information technology industry.

Scale efficiency refers to the difference between the existing scale and the most significant scale on the premise of certain system and management level. According to table 2, except for a small number of enterprises whose scale efficiency is less than 0.9 in 2013, the scale effect in other years is basically greater than 0.9, indicating that these enterprises have achieved the scale effect. From

the perspective of the changing trend, the scale of a few enterprises, such as little swan, Yaxing bus, Hengtong electro-optic, shows a downward trend,

From the average calculation of the three efficiency indicators of 37 listed companies, we can get the overall change trend of comprehensive efficiency, pure technical efficiency and scale efficiency in 2013-2017.

### 3.3 E comparative analysis of input angle and output angle

The change of scale income refers to the change of production factors to the output of an enterprise when other conditions remain unchanged. According to the relationship between the change value of production factors and the change value of production, it can be divided into scale increasing, scale invariable and scale decreasing.

It can be seen that most of the listed companies in the sample are in the stage of increasing scale in 14 years, accounting for 38%, but combined with table 2 before, the comprehensive benefits of the companies with increasing scale returns are very low, which shows that the expansion of scale has been hindered by financial supply and lack of funds. Therefore, increasing the capital investment in these companies and making their scale expand can increase the income of enterprises, and the corresponding financial supply efficiency will also improve.

### 3.4 Projection analysis

According to the projection analysis of DEA model and the relaxation variable  $s$  value of input-output index, we can analyze the input redundancy and output deficiency of financial supply, and then put forward the improvement scheme of financial supply efficiency.

Table 1: Summary table of slack variables of input indicators

	Max	Mean	0	Max	Mean	0
2013	0.23	0.033	17	0.058	0.003	36
2014	0.14	0.012	31	0	0	37
2015	0.009	0.00026	36	0	0	37
2016	0	0	37	0	0	37
2017	0	0	37	0	0	37

As shown in Table 1, except for 2013, input indicators 1 (asset liability ratio) and 2 (current share ratio) are basically close to 0, with a maximum of 0.23, indicating that the phenomenon of investment redundancy is not obvious; compared with S1 and S2, the number of indicators 1 is 0 is less than that of indicator 2, indicating that the phenomenon of indirect investment redundancy is relatively obvious compared with direct investment; from the point of view of average and maximum value, S1 is still larger than S2. In combination, the redundancy of indirect investment is more obvious. However, in 16 and 17 years, the data of indicator 1 and indicator 2 are all 0, indicating that the redundancy of investment has been improved.

Table 2: Summary table of slack variables of output indicators

	Max	Mean	0	Max	Mean	0
2013	0.31	0.064	17	0.44	0.067	23
2014	0.11	0.01	28	1.84	0.19	18
2015	0.75	0.268	6	0	0	37
2016	0.46	0.19	8	0.24	0.02	32
2017	0.53	0.08	7	0.53	0.03	33

From the perspective of Table 2, the average value of the two indicators shows a declining state, indicating that the output shortage is improving. However, compared with the two indicators, the data of indicator 1 (growth rate of operating revenue) is significantly greater than that of indicator 2 (return on net assets), most of the data of indicator 1 are not 0, while most of the data of indicator 2

are 0, indicating the profitability of Listed Companies in emerging industries in Jiangsu Province. The ability to grow is not enough. Based on the above analysis, we can conclude that the inefficiency of financial supply is mainly caused by the lack of direct investment and the lack of growth capacity.

#### **4. Conclusion**

1) In 2013 and 2014, the financial supply efficiency of Listed Companies in emerging industries in Jiangsu Province was generally low, among which the low pure technical efficiency was the main reason for the low comprehensive efficiency.

2) Compared with 2013 and 2014, the comprehensive efficiency of Listed Companies in emerging industries in Jiangsu Province is steadily increasing in 15-17 years, which shows that the investment structure, investment scale and management level of Listed Companies in emerging industries in Jiangsu Province have been greatly improved.

3) The input redundancy has been basically improved, and the growth capacity in the output index is becoming increasingly prominent, while the profitability is improving. Through the analysis of the S-value of slack face, it is found that: on the one hand, the phenomenon of input redundancy has been basically improved. With the government guiding the rational inflow of social funds and the more rational allocation of funds by financial institutions, emerging industries are faced with the phenomenon of capital redundancy. On the other hand, the lack of output is also improving. Although the growth ability of enterprises is declining, the profitability of enterprises is improving.

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