

Research on the Efficiency of Financial System Supporting the Development of Real Economy in Anhui based on DEA Model

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Abstract

The GDP of Anhui Province is growing rapidly, but due to changes in the economic situation, the economic development of Anhui Province has slowed down. Economic output is used as the output indicator, and the data from 2015 to 2020 is used as the research sample, and the DEA model is used to empirically analyze the development efficiency of the real economy in the financial system of Anhui Province. The research conclusions and policy recommendations have some reference significance for the Anhui provincial government to make decisions.

Keywords

Financial System; Real Economy; DEA Model.

1. Introduction

Anhui Province strongly supports finance to help the development of the real economy, hoping to increase the growth of Anhui's GDP, and constantly explore effective ways for finance to serve the real economy, and has also achieved certain results in this regard. At present, in order to balance the development of finance and the real economy, all provinces and cities fully support the development of the financial industry, but too much investment in finance will cause spillover effects, and the real economy in some places cannot keep up with the pace of financial development. How to coordinate the development of the two is an issue that all parties need to explore. Today's economic development situation is uncertain, but as long as we develop steadily, apply financial rationally to the development of the real economy, and actively explore new methods of economic development and new models of financial development, our economic development will move towards a better one.

At present, domestic scholars have relatively abundant researches on the efficiency of the financial system in supporting the development of the real economy. For example, domestic scholars Zhao Ningning and others used the relevant data of Tianjin's financial development from 2015 to 2020 to summarize the current development status of financial institutions in Tianjin, and discuss the development of Tianjin's financial institutions. The efficiency of financial support for the development of the real economy [1]. Zhang Jiachen et al. analyzed the operation of China's financial enterprise system and the financing difficulties of the real economy [2]. Liu Yanan used the coefficient of variation method to calculate the efficiency of financial system from 2008 to 2018 in Weinan, and found that the financial system of Weinan City was in a slow growth trend during the inspection years [3]. Zhang Qiang et al. used the DEA-Malmquist index model to conduct an empirical study on the efficiency of financial support

for the real economy in Shaanxi Province from 2007 to 2016, which provided certain insights for the development of the real economy in Shaanxi Province [4].

Through the reading and sorting of relevant literature, we found that the research on the efficiency of finance in Anhui Province to help the development of the real economy is not rich. Therefore, this paper uses the sample data of Anhui Province from 2015 to 2020 to study it, hoping to provide information for future researchers. This paper has certain reference value and enriches the research content in this field.

2. The Current Situation of Financial Support for the Real Economy in Anhui Province

As can be seen from Figure 1, as more and more attention is paid to the development of the financial industry, the scale of social financing in Anhui Province has generally expanded. In 2014, the scale of social financing was 426.22 billion yuan. The scale of financing was 925.12 billion yuan, about 2.17 times the scale of social financing in 2014. In 2016, the scale of social financing increased by 75.8 % year-on-year, and in 2018 it was 538.22 billion yuan, a year-on-year decrease of 23.5 %, indicating that the degree of change in the scale of financing in Anhui Province is relatively large, which is related to the relevant policies formulated by Anhui Province. . It can be seen from the figure that the financial support for the real economy in Anhui Province is on the rise [5].

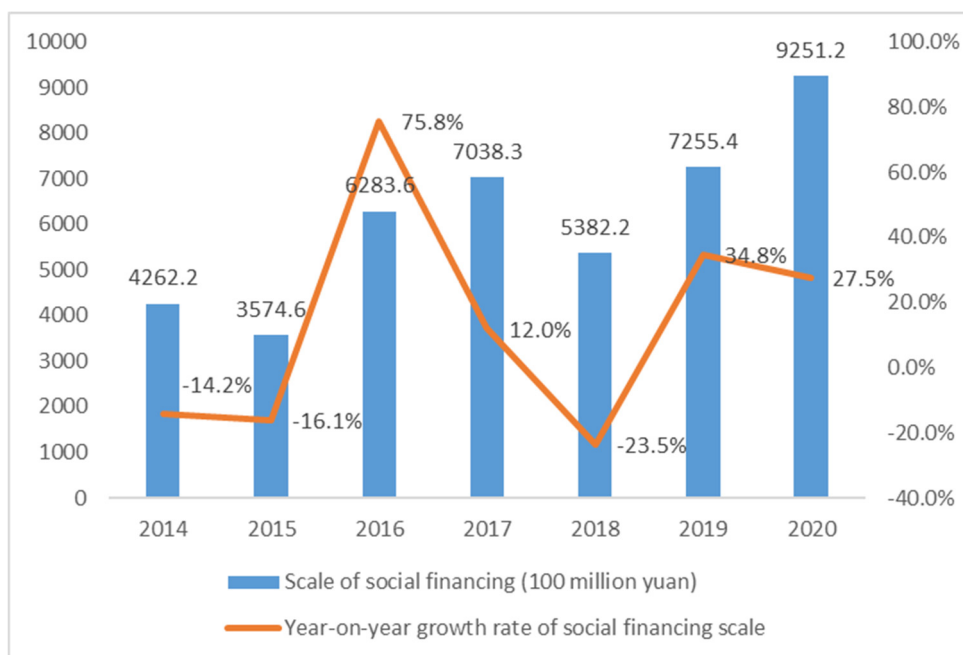


Figure 1. The scale and year-on-year growth rate of social financing in Anhui Province from 2014 to 2020

We compare and analyze the year-on-year growth rate of social financing in Anhui Province and the growth rate of real economic output, as shown in Figure 2. It can be seen that the real economic output of Anhui Province continued to grow from 2014 to 2020, of which the growth rate reached 21.7 % in 2018. In the same year, the scale of social financing in Anhui Province decreased by 23.5 % year-on-year. In 2017, the growth rate of social financing scale and the growth rate of real economy output were not much different, 12 %, 11.2 %. From the above analysis results, we can see that the current development of finance and real economy in Anhui Province is in an unbalanced state.

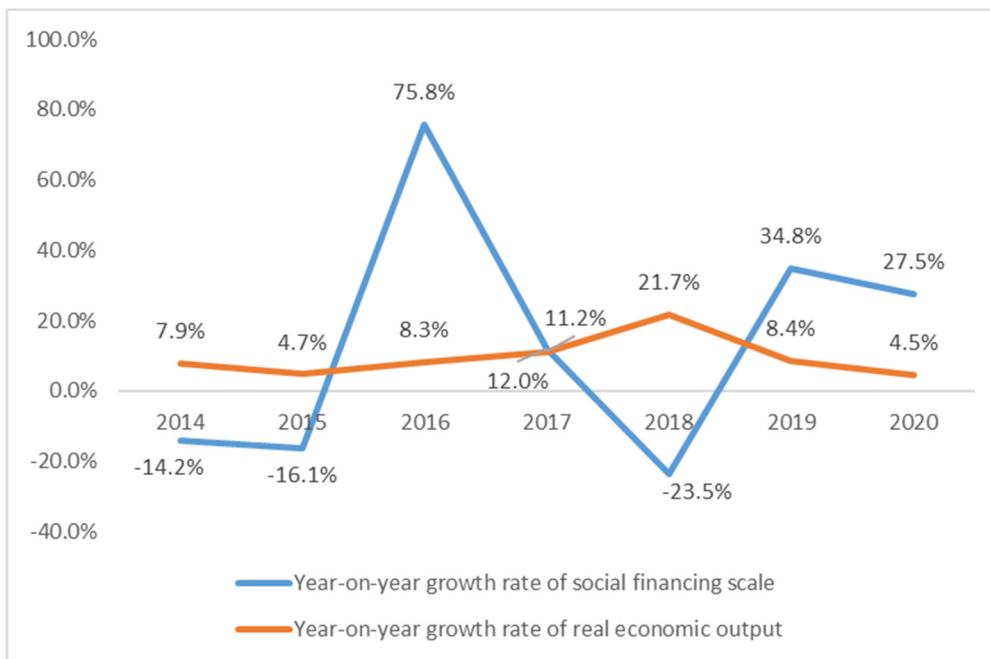


Figure 2. The growth rate of social financing scale and real economic output growth in Anhui Province from 2014 to 2020

3. Empirical Analysis of the Efficiency of Financial Support for the Development of the Real Economy

3.1. Research Methods

DEA model method, also known as data envelopment analysis method, is currently widely used in the analysis of agricultural input-output efficiency, enterprise performance efficiency, etc. It can be divided into B CC model and C CR model according to whether the scale return is variable [6]. This paper selects the DEA-BCC model to analyze the efficiency of Anhui Province's financial support for the development of the real economy.

3.2. Indicator Selection and Data Sources

3.2.1. Indicator Selection

We select the scale of social financing (100 million yuan), the balance of various loans of financial institutions (100 million yuan), and the premium income (100 million yuan) as input indicators. Output (100 million yuan) is the output indicator, of which the real economic output is calculated by using GDP-real estate output-financial industry output value.

Table 1. The financial input-output system of Anhui Province

Category	Specific indicators	Mean	Standard deviation
Input indicator	Scale of social financing (100 million yuan)	6464.217	1911.862
	Balance of various loans of financial institutions (100 million yuan)	38099.878	9492.698
	Premium income (100 million yuan)	1107.347	274.49
Output indicator	Real economic output (100 million yuan)	26533.963	5485.017

3.2.2. Data Sources

In order to ensure the reliability of the data, the data in this article come from the Hefei Sub-branch of the People's Bank of China and the Statistical Yearbook of Anhui Province.

3.3. Empirical Analysis Results

3.3.1. Input-output Efficiency Analysis

Using Deap2.1 software , the financial input -output efficiency of Anhui Province from 2015 to 2020 was obtained. The results are shown in Table 2.

Table 2. 2015-2020 Anhui Province Financial Support Real Economy Development Efficiency Calculation Results

Years	Overall efficiency	Pure technical efficiency	Scale efficiency	Types of returns to scale
2015	1.000	1.000	1.000	constant size
2016	0.920	0.927	0.993	Decreasing size
2017	0.896	0.910	0.984	Decreasing size
2018	0.973	1.000	0.973	Decreasing size
2019	0.925	1.000	0.925	Decreasing size
2020	0.833	1.000	0.833	Decreasing size

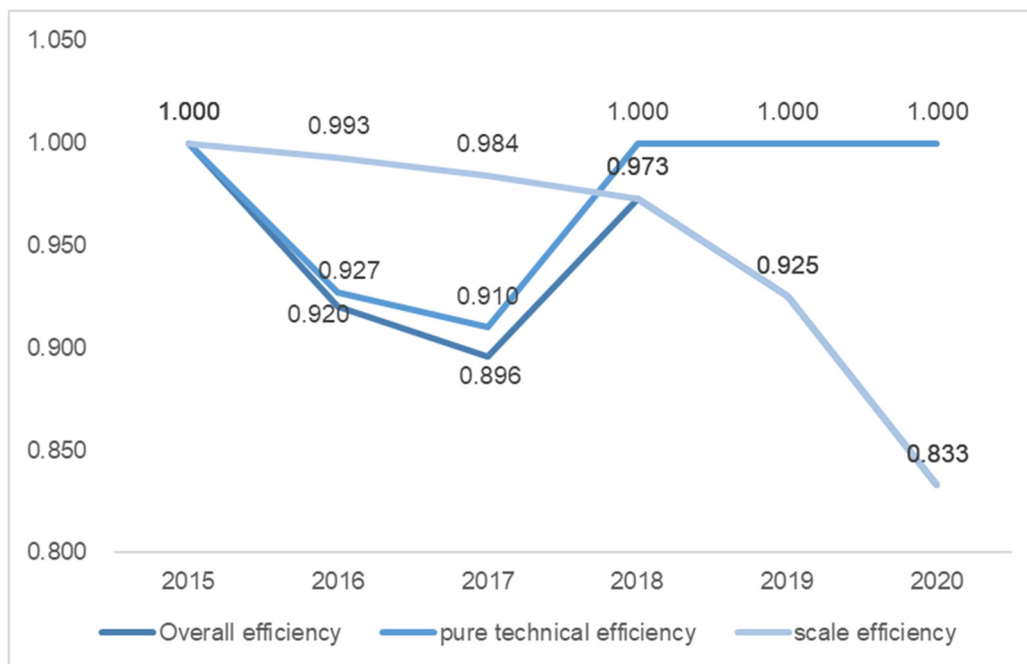


Figure 3. Calculation results of the efficiency of financial support for the development of the real economy in Anhui Province from 2015 to 2020

From Figure 3, in terms of the comprehensive efficiency of financial support for the development of the real economy in Anhui Province, the years 2015-2017 and 2018-2020 were in a downward trend, and only the comprehensive efficiency in 2015 reached 1, indicating that in 2015 Year DEA is strong and effective; from the perspective of pure technical efficiency, the pure technical efficiency in 2015 and 2018-2020 reached 1, indicating that the technical elements in these years were used reasonably, while in 2016 and 2017 The pure technical efficiency is less than 1, indicating that the technical elements in the past two years have not been used reasonably, and the reason should be found ; from the perspective of scale efficiency, there is a downward trend from 2015 to 2020; from the perspective of scale returns, the returns to scale in 2015 remain unchanged, and the returns to scale from 2016 to 2020 decrease, so only the returns to scale in 2015 remain unchanged and reach the optimal state.

3.3.2. DEA Invalid Cell Input Redundancy Analysis

From Table 2 that the pure technical efficiency in 2016 and 2017 was less than 1, so there was input redundancy in these two years.

Table 3. Summary table of input redundancy and target value of DEA ineffective technical units

Index	Years	Original value/100 million yuan	Target value/100 million yuan	Improvement rate
Scale of social financing (100 million yuan)	2016	6283.600	3897.180	- 37.98 %
	2017	7038.300	4368.846	- 37.94 %
Balance of various loans of Financial institutions (100 million yuan)	2016	30774.510	28519.332	- 7.32 %
	2017	35162.030	31991.948	- 9.02 %
Premium income (100 million yuan)	2016	876.097	790.076	- 9.82 %
	2017	1107.160	923.364	- 16.60%

It can be seen from Table 3 that in 2016 and 2017, the investment redundancy of social financing scale in Anhui Province was relatively large, and the improvement rates reached 37.98 % and 37.94% respectively; the investment redundancy of various loan balances of financial institutions respectively reached 7.32% and 9.02%, which is not much difference; in 2017, the improvement rate of premium income reached 16.60%. It can be seen that in order to better enable finance to support the development of the real economy, it is necessary to rationally expand the scale of social financing.

4. Conclusions and Recommendations

4.1. Conclusion

From 2015 to 2020, the comprehensive efficiency of financial input and output in Anhui Province showed a trend of first decreasing, then increasing and then decreasing. The comprehensive efficiency in 2015 reached 1, that is, DEA was strong and effective in 2015, and the return to scale in 2015 remained unchanged, and the return to scale from 2016 to 2020 decreased, so only the return to scale in 2015 remained unchanged, reaching the optimal state. In 2016 and 2017, there was a spillover phenomenon in Anhui Province's investment in the financial industry. At present, the scale of social financing in Anhui Province has expanded too quickly, and its expansion speed should be appropriately reduced.

4.2. Recommendations

4.2.1. Strengthen Policy Support

The government should introduce relevant policies to provide assistance to financial institutions that are struggling under the epidemic so that they can tide over the difficulties. To implement the policies of "exemption, reduction, delay, return, and subsidy", the government must do what it says and take concrete actions to improve the government's credibility and make the economy run more effectively. The support of policies, for financial practitioners, will increase the confidence of financial practitioners and enhance their motivation. For brick-and-mortar businesses, their survival rate will be higher. For the people, with the support of the government, they will stick to their posts and do their best work. As the beneficiaries of the policy, it is necessary to actively support the development of the real economy in Anhui Province, and enterprises can also help each other to tide over the difficulties together and welcome the arrival of "spring". Well-developed enterprises can invest in the construction of

projects formulated by the government and cooperate with the government to complete the development plan.

4.2.2. Strengthen the Introduction of Financial Talents

The development of the financial industry is inseparable from financial talents, and the government should increase the construction of talents. The government should broaden the channels for talent introduction, provide certain financial support for the construction of financial disciplines in colleges and universities, vigorously cultivate compound financial talents, improve the level of financial services in Anhui Province, and optimize the structure of financial talents. For high school students, simple education of financial knowledge can be given to them, so as to improve their interest in finance, and to tap potential talents for key training [7]. For the people of Anhui Province, we can carry out financial knowledge publicity work. If everyone has a certain understanding of finance, I believe that the government can efficiently introduce financial talents. For the introduced talents, establish reasonable and efficient evaluation indicators, and if they do not meet the standards after evaluation, they should be replaced immediately, and the work will be carried out in an orderly manner. All departments should do that, recruit people not blindly, replace people with basis, not talk about feelings, only talk about performance, and efficiently promote the introduction of financial talents.

4.2.3. Drive Innovation in Financial Services

Launch innovative financial products to stimulate new vitality of the real economy in financial services. The banking industry has improved the construction of the credit evaluation system, strengthened the research and development of innovative credit products, and vigorously promoted them. The government should incentivize some financial institutions or banks with financial innovation to stimulate their innovative power. By setting up a suggestion mailbox, the government absorbs the innovative ideas of the public, collects feasible methods and puts them in place, adopts an incentive method, and gives certain rewards to those who propose innovative ideas that are adopted. Powerful financial institutions can train an innovation team to carry out financial-related innovation and R&D, improve innovation efficiency and quality, and at the same time give these R&D personnel generous rewards and remuneration to stimulate their work potential.

4.2.4. Improve the Supervision and Management System

At present, the relevant departments of Anhui Province should formulate a reasonable system for financial supervision. Banks must conduct strict credit evaluations on companies that need financing. For companies with lower credit ratings, financial institutions should be cautious when financing, control their own risks, and ensure optimal capital allocation. The government must prevent the phenomenon of the economy from "developing from reality to virtual reality". Once there is such a trend, it should immediately take relevant measures to improve it. When financial institutions are innovating, they should always pay attention to their own risks, set a risk limit, do a good job in risk prevention, and establish a good innovation environment. Regularly evaluate the supervision system, and immediately improve the unreasonable supervision system to avoid or prevent the phenomenon of improper supervision. No shelter, no favoritism.

4.2.5. Digital Economy Empowers Finance

On January 12, 2022, the State Council issued the "14th Five-Year Plan for the Development of Digital Economy". It can be seen that the financial industry must be integrated with the digital economy and develop in harmony with the digital economy. The digital economy promotes the digital transformation of finance. However, financial digitization will bring certain risks, such as information leakage, which requires improving risk prevention and control capabilities in the process of digital transformation. Getting rid of the original model and making substantial changes is not only a test of the original financial model, but also a test of financial practitioners.

How we use our own actions to help transform the financial industry is something we need to consider. Digital transformation is the development trend of various industries. Digitalization brings us many benefits, making work more efficient, making life more convenient, and enabling education to be carried out more flexibly. Promoting the digital transformation of finance is the general trend and the need for the development of Anhui Province.

4.2.6. Build a Digital Information Platform

Banks do not have a comprehensive understanding of government or enterprise information. They can promote the construction of a digital information sharing platform, recruit specialized technical personnel to collect information, and help banks obtain information in a timely manner. Only by quickly obtaining the government's newly released plans can banks effectively improve relevant policies and accurately solve the pain points of enterprises and the key issues that the government is concerned about. Capturing this information through big data, the Internet, etc., can reduce the cost of the banking industry, thereby providing effective financial support to enterprises with financing difficulties, and at the same time helping the implementation of some entrepreneurial projects. In the construction of digitalization, there will be many problems. All departments should organize and manage effectively, and solve the problems one by one, so that the construction of digital information platform can be effectively promoted. Not only the banking industry, but other industries can also build their own digital information sharing platforms, so that access to information is no longer a problem, and enterprises can be closer to each other.

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