

# Statistical Measurement Analysis on Financial Resource Allocation Effectiveness

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**Abstract:** Based on the definition of financial resource allocation effectiveness, this paper studies the effectiveness of financial resource allocation in China during 1998-2018. First of all, a framework for measuring the effectiveness of financial resource allocation is constructed from the perspective of "capital flow" of institutional departments, taking into account both allocation efficiency and coordination degree of allocation structure in the process of financial resource allocation. Then, on the basis of theoretical research, the index system of financial resource allocation efficiency and coordination degree of financial resource allocation structure is established, and then the effectiveness index of financial resource allocation is constructed. Finally, the evolution characteristics and influencing factors of the effectiveness index of financial resource allocation are analyzed.

## 1. Introduction

Finance is the core of economy, and financial security is closely linked with economic security [1]. In modern society, if a part of the financial system or even a financial institution cannot effectively prevent financial risks, it is likely to produce a chain reaction and Domino Effect, thus leading to a national or even international financial crisis and undermining financial and economic security [2].

After the protection period for China's entry into WTO, China's financial industry faces opportunities and challenges to fully integrate into the development of international finance. The process of financial internationalization and integration is accelerating in the new era. The development of China's financial industry will bear a greater impact from the wave of financial internationalization. Looking around the world, to improve the theoretical level and practical ability to prevent financial risks and resolve financial crises as soon as possible, to seize opportunities and meet challenges promptly, to steadily increase asset returns, to avoid financial risks, to effectively implement financial supervision, and to safeguard financial and economic security are major issues facing China's financial industry and economic development.

The nature of financial resources determines that the study of the allocation of financial resources must start with the effectiveness of allocation [3]. Since the reform of the economic system, the development of the financial industry has brought about increasingly fierce competition. Banks, securities, insurance and other financial industries are booming in a relaxed environment. China's credit market, money market and capital market are also gradually on the right track. The stone of the financial industry also determines that finance shoulders the responsibility of building bridges between capital supply and demanders in the market. Finance can affect the development of the real economy by changing the allocation of financial resources. Finance is a kind of special resource that integrates the attributes of natural resources and social resources and has strategic significance to the development of real economy [4]. Since finance is a kind of resource, it is as scarce as all other resources, and there are problems about how to allocate and how to ensure the effective allocation of resources. Although the allocation of financial resources in China has improved in recent years, with the expansion of economic scale and the rapid expansion of financial resources in various regions of China, the allocation of financial resources has increasingly become a complex systematic project. Therefore, in-depth study of the allocation of financial resources must examine the effectiveness of the allocation of financial resources.

For a long time, the research on the allocation of financial resources has focused on the

calculation of efficiency, which makes the issue of effectiveness in the allocation of financial resources not paid enough attention. The efficiency of financial resources allocation is measured from the perspective of input and output, but it ignores the duality of financial resources allocation and allocation of other economic resources. Based on this, considering the dual attributes of financial resources, it is of great significance to measure the effectiveness of financial resources allocation.

## 2. Measuring Model of Financial Resources Allocation Efficiency

The allocation efficiency of financial resources is a dynamic process that changes with the investment, quantity, limit and proportion of financial resources. Different investment of financial resources in various institutions will also affect the allocation efficiency of financial resources. This paper intends to select the input and output indicators of financial resource allocation of four institutions and departments from the fund flow table under the national economic accounting system, and use DEA index decomposition method to measure the efficiency of financial resource allocation.

By selecting the input and output indicators of financial resource allocation from the fund flow table, and taking each institution as a decision unit (DMU), the DEA index decomposition method can be used to directly calculate the financial resource allocation efficiency of each institution and each year by calculating the distance between the financial resource allocation efficiency of each institution and the common frontier flour. At the same time, the financial resource allocation efficiency of each institution and each year can be decomposed into technical efficiency and scale efficiency, so as to further analyze the internal causes of the changes in the financial resource allocation efficiency, which is the objective to be studied in this paper. The specific construction flow is shown in Fig. 1.

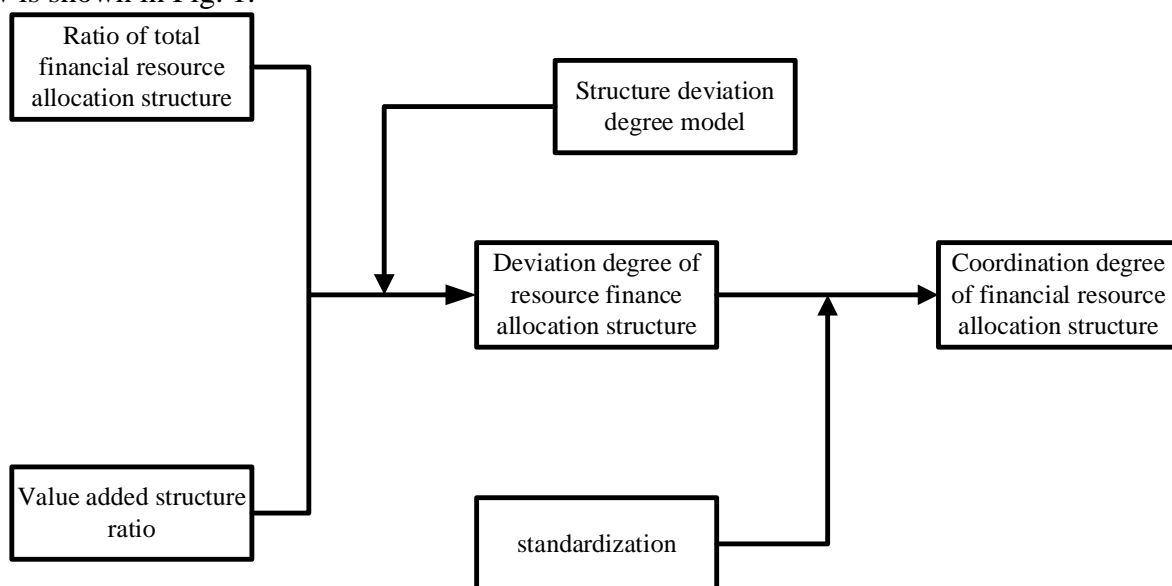


Fig.1 Financial Resource Allocation Efficiency Measurement Process

## 3. Calculation Model of Financial Resource Allocation Structure Coordination Degree

According to the method of measuring the efficiency of financial resource allocation, the efficiency of financial resource allocation only describes the effectiveness of financial resource allocation from the perspective of "quantity". However, with the deepening of economic reform, the main structure of various institutions and departments has undergone profound changes [5]. If we only examine the efficiency of financial resource allocation from the perspective of the main body of various institutions and departments, there will be a big deviation from the actual situation. At this time, it is urgent to include the investigation of the coordination degree of financial resource

allocation structure.

According to the previous discussion on the coordination degree theory of financial resource allocation structure, the coordination schedule of financial resource allocation structure is now in two aspects, namely, the coordination between the main bodies of various institutions and departments and the coordination between the resource allocation capabilities of various institutions and departments and the growth level of the real economy. In order to study the coordination degree of financial resource allocation structure, we must start with the resource allocation structure among various institutions and the contribution structure of various institutions to the growth of the real economy, and measure the coordination degree index of allocation by constructing a structural coordination degree model.

A larger proportion of the structure means that this department controls too many financial resources and there is an uncoordinated phenomenon, which will adversely affect the smooth operation of the economy as a whole. Therefore, it is a necessary condition for stable economic development to keep the total structure of financial resources allocated by various institutions and departments stable. The calculation of the proportion of structure can be obtained only by measuring the proportion of financial resources allocated by various institutions and departments to the total financial resources of the whole society. The second is the structure of financial resources allocated by various institutions and departments and their contribution to the growth of the economy. No matter in any case, the financial resources allocated by various agencies and departments should follow the principle of consistent rights and responsibilities. If we want to ensure the stable growth of economic development, as the main body of the economy, all institutions and departments should, while mastering the financial resource allocation capabilities, also contribute to the corresponding economic growth level within their scope. No matter which department or department, it should not contribute less economic growth capacity on the premise of occupying a large amount of financial resources, which requires coordination between the structure of allocation of financial resources and the ability to contribute to economic growth.

According to the above two points, this paper constructs the financial resource allocation structure coordination degree calculation process framework as shown in Figure 2:

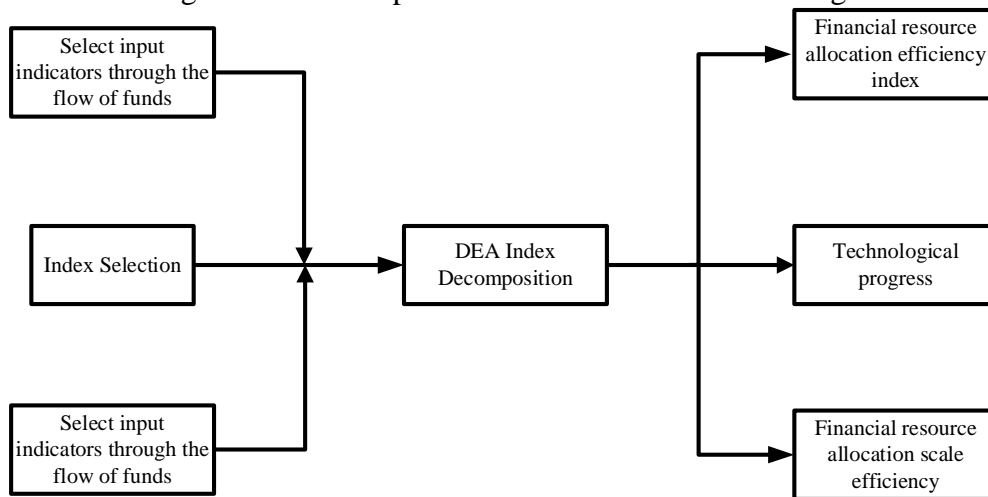


Fig.2 Calculation Process of Coordination Degree of Financial Resource Allocation Structure

#### 4. Index Measurement Model of Financial Resource Allocation Effectiveness

According to the discussion of the theory of measuring the effectiveness of financial resource allocation, the effectiveness index of financial resource allocation consists of the efficiency of financial resource allocation and the coordination degree of financial resource allocation structure. This paper intends to use objective weighting method to synthesize the required financial resource allocation efficiency and coordination degree of financial resource allocation structure to achieve the ultimate goal of measuring the effectiveness index of financial resource allocation. The composition flow chart of the financial resource allocation effectiveness index is as follows:

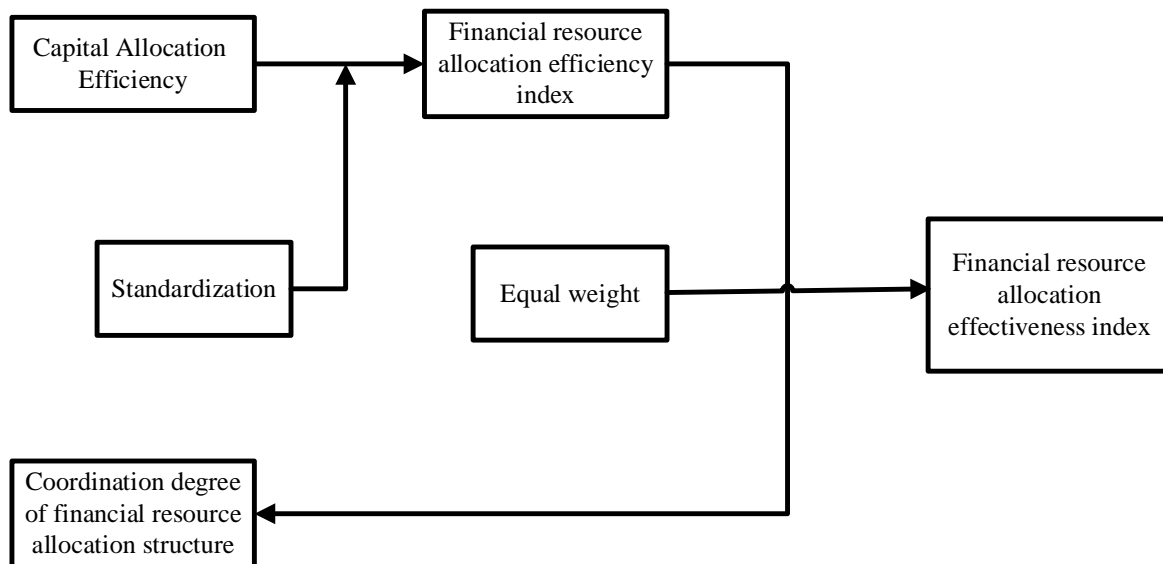


Fig.3 Financial Resource Allocation Effectiveness Index Measurement Process

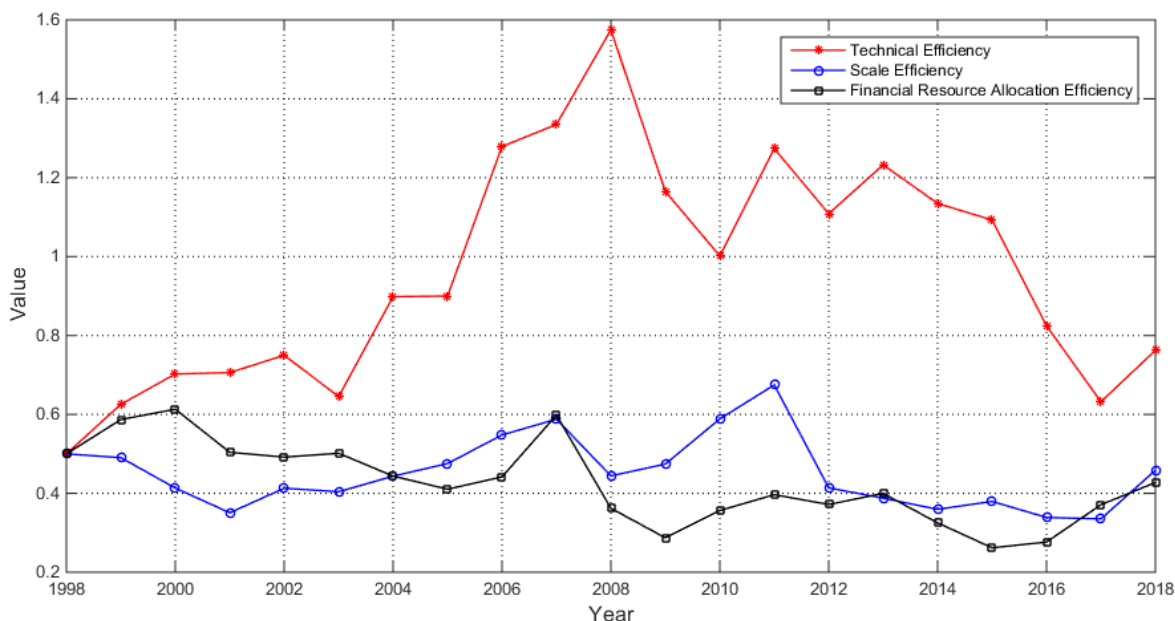


Fig.4 The Changing Trend of China's Financial Resources Allocation Efficiency during 1998-2018

## 5. Measurement Results of Financial Resource Allocation Effectiveness Index

Based on the aforementioned research, Fig.4 presented the changing trend of allocation efficiency of financial resources during 1998 and 2018 in China. It is obvious from the figure that the scale efficiency curve is relatively stable except for relatively large fluctuations from 2004 to 2014, which indicates that the change in scale efficiency is not the biggest factor affecting the allocation efficiency of financial resources. On the other hand, the technical efficiency has fluctuated continuously from 2000 onwards [6], and the fluctuation trend of the allocation efficiency of financial resources is similar to the technical efficiency, which indicates that the allocation efficiency of financial resources is greatly influenced by the technical efficiency. The fluctuation range of the allocation efficiency of financial resources depends on the technical efficiency and the scale efficiency, but the fluctuation is influenced by the latter two. The allocation efficiency of financial resources was in a low position in 2003, and the reason for its low position was due to the decline of technical efficiency. In 2003, China was in the initial stage of economic restructuring. The initial stage of economic restructuring will inevitably affect the technical efficiency of resource allocation. The subsequent technical efficiency increased year by year,

reflecting the promotion effect of economic system reform on technical efficiency. Then the change trend of financial resource allocation efficiency is basically the same as the change of technical efficiency, especially the sharp rise in 2008 and the sharp drop in 2009 are mainly due to the change of technical efficiency. The transmission of the US subprime mortgage crisis in 2008 to the international community had a great impact on the efficiency of China's financial resource allocation in 2009. The growth rate of China's institutions and departments all dropped significantly in 2009, while the total amount of financial resource allocation reached a record high. Therefore, the efficiency of financial resource allocation dropped significantly. However, the subsequent relatively stable operation of the economy gradually got rid of the impact of the US subprime mortgage crisis. The efficiency of financial resource allocation rose in 2010 and 2011, only falling back in 2012.

It is a descriptive statistical analysis of a series of index values measured by DEA index decomposition [7]. The average values of technical efficiency, scale efficiency and financial resource allocation efficiency are 0.974, 0.708 and 0.697 respectively, indicating that financial resource allocation efficiency shows a downward trend on average, and the downward trend is caused by the decline of technical efficiency. The standard deviations of technical efficiency, scale efficiency and financial resource allocation efficiency are 0.255, 0.315 and 0.538 respectively, indicating that the fluctuation degree of technical efficiency and scale efficiency is higher than that of financial resource allocation efficiency. The coefficient of kurtosis and skewness coefficients of technical efficiency are 1.576 and 0.238 respectively, which indicates that its distribution pattern is close to normal distribution, but presents a peak and a left bias. The coefficient of kurtosis and skewness coefficients of scale efficiency are 0.426 and 0.785, indicating that its distribution pattern is close to normal distribution, but shows flat peak and left bias. The coefficient of kurtosis and skewness coefficients of financial resource allocation efficiency are 1.241 and 0.976, indicating that the distribution pattern has obvious peaks and right skewness, and the data concentration is far away from the other two indexes. It can also be seen from the maximum and minimum indexes that the range of technical efficiency and scale efficiency is much greater than financial resource allocation efficiency, indicating that its volatility is still higher than financial resource allocation efficiency.

## 6. Conclusion

On the basis of the concept of financial resource allocation effectiveness, this paper divides the measurement of financial resource allocation effectiveness into two aspects: the measurement of financial resource allocation efficiency and the measurement of the coordination degree of financial resource allocation structure, which respectively correspond to the effectiveness of the financial resource allocation process and the effectiveness of the results, and constructs a measurement framework to comprehensively measure the effectiveness of financial resource allocation through the combination of "quality" and "quantity". Then, we select the relevant indicators of financial resource allocation of various institutions and departments in China from 1998 to 2018, measure the efficiency of financial resource allocation and the coordination degree of financial resource allocation structure respectively, and synthesize the effectiveness index of financial resource allocation through equal weight weighting method. Finally, the changing trend of china's financial resources allocation efficiency during 1998-2018 is presented based on which it is concluded that the resource allocation efficiency and the coordination degree of financial resource allocation structure have the same change trend in most periods, but there was a huge contrast in 2008. The coordination degree of financial resource allocation structure has a relatively consistent fluctuation trend when the economic operation is relatively stable. However, if it coincides with the abnormal period of deepening economic system reform and abrupt changes in economic forms at home and abroad, the fluctuation between the two tends will be greatly different, indicating that the trend changes of the two are related.

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