

## Research on Economic Growth Efficiency and Influencing Factors of Financial Service Entities Based on Nonlinear Model

Yanqiang Cheng

School of Finance and Trade, Zhuhai College of Jilin University, Guangdong Zhuhai 519041

**Keywords:** Financialization, Real economy, Nonlinear effect, Economic growth efficiency

**Abstract:** For a long time, the correlation between financial development and economic growth has been one of the most important issues in economic theory and empirical research. Based on the panel data of several provinces from 2014 to 2018 and taking financialization index as the threshold variable, a panel threshold model is constructed to test the nonlinear effect and phase characteristics of financialization on real economic growth. The results show that the total factor productivity of China's financial services real economic growth shows a downward trend on the whole, which is mainly caused by the combined effect of efficiency changes and the synchronous decline of technological progress, and is dominated by the decline of technological efficiency. Financialization has a positive external effect on real economic growth within a reasonable threshold. Beyond the reasonable threshold, there is negative externality. In addition, the non-linear effect of financialization on real economic growth presents distinct phased characteristics, and there is a "threshold effect" between the two in the boom period and the recession period. Therefore, to improve the efficiency of real economic growth in financial services, we must focus on the development of financial industry, innovation of financial services, reform of financial system and optimization of external environment.

### 1. Introduction

The interdependence and circular promotion of finance and real economy are the fundamental driving force for the sustainable development of the entire national economy [1]. Financialization is a dynamic process, which manifests itself in different forms and degrees in different stages of capitalist development and has different impacts on economic and social development. Among them, the primary form of financialization shows that financial capital begins to affect the development process of social economy. This form of financialization can undoubtedly promote the development of productive forces and social progress, which can also be called moderate financialization. Financialization is a dynamic process, which manifests itself in different forms and degrees in different stages of capitalist development and has different impacts on economic and social development [2]. Among them, the primary form of financialization shows that financial capital begins to affect the development process of social economy. This form of financialization can undoubtedly promote the development of productive forces and social progress, which can also be called moderate financialization. A large amount of capital idling in the financial sector also leads to the high leverage ratio of non-financial sectors and government agencies and the decline of corporate profit margins, affecting China's economic growth [3]. Therefore, a comprehensive evaluation of the efficiency of financial support to real economic growth in China's provinces and cities and an accurate identification of its main influencing factors will help to provide a reference basis for solving the financial weakness dilemma and adjusting the real economic structure, thus having great practical significance.

### 2. The Necessity of Promoting the Efficiency of Financial Services in Real Economy

Since the reform and opening up to the outside world, one of the national focuses is to maintain stable and sustained economic growth. However, the focus of the financial industry is how to serve

economic growth. At the beginning of the new century, in order to pursue the stability and growth of GDP, special attention was paid to the demand side [4]. The debate on the bank-led financial structure and the financial market-led financial structure is actually a discussion on the overall advantages and disadvantages of financial functions at the macro level. Due to the limitations of empirical analysis, it is difficult to reach a consistent conclusion so far. However, finance, as an effective resource allocation platform, its tool attributes and risk characteristics are natural. Based on the principle of "risk is proportional to income", the rapid development of the financial industry today will inevitably lead to the break-up and regular production of the crisis and the social prosperity. It is the equivalent circulation of value and profit after the integration of resources [5]. To sum up, it is the allocation of funds in different stages and industries. Its essence is the circulation of value. The impact of this form of financialization on economic development depends on the position and strength of different forms of capital in social production, often between moderate financialization and excessive financialization. The degree of central government credit intervention and the degree of financial marketization are conducive to improving the efficiency of financial allocation and financial innovation at the same time. Dual economic structure will reduce the efficiency of financial allocation, and government credit intervention will offset the role of financial marketization in promoting financial efficiency [6]; The relationship between finance and real economy is just like that between water and cement. Only when the two are properly proportioned can high-strength concrete be prepared and the rapid economic development be promoted.

### 3. Theoretical Mechanism of Financialization Affecting Real Economic Growth

From the perspective of financial function, moderate financialization can enhance the financial sector's ability to centralize and accumulate capital through innovative monetary and non-monetary financial instruments, so that the capital accumulated in the financial field can rapidly expand in other fields, balance supply and demand, and improve the efficiency of resource allocation [7]. Financial development is a change of financial structure. He put forward the concept of financial correlation ratio, which is an indicator to measure the development degree of national financial industry. It means the ratio of a country's total financial assets to its national wealth at a certain point in time. The efficiency of the financial system can be divided into bank efficiency and financial market efficiency. These theories did not include the real economy and split the relationship between finance and the real economy. Under certain conditions, capital is accumulated and converted in different forms, thus stimulating the growth of the real economy through wealth effect [8]. Financial innovation with financial derivatives as the main medium is still the main driving force for the next economic rise. However, at the micro level, the banking system and the financial market system have their own advantages and disadvantages in specific financial functions. Different stages of economic development or different fields of economy and society have different focuses on the demand for financial functions, and when formulating financial development policies, they can be based on the key changes in the demand for financial functions or the weak links of financial functions.

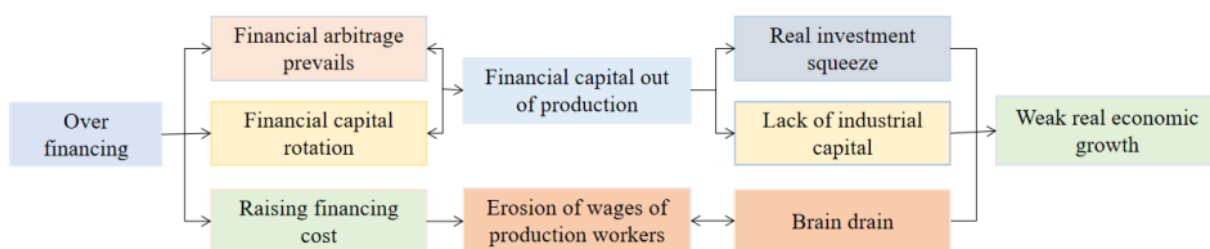


Fig. 1 The mechanism of excessive financialization on real economic growth

However, excessive financialization will impact the smooth operation of the real economy through the following three paths (Figure 1). From the perspective of "financial capital-financial capital" accumulation mode, excessive financialization has squeezed out investments that support the development of the real economy. It can refer to the growth of the total output of a country or region

in a period of time compared with the previous period. The economic growth rate of a country is generally measured by the economic growth rate. Economic growth can generally reflect the overall capacity of a country [9]. Financial efficiency can be measured by the total factor productivity of "economic output" of "financial input". Solow residual method was mainly used in the early measurement of total factor productivity, but the production functions and assumptions required by this method were too inaccurate. Risk can be controlled through credit rationing and post-supervision for enterprises. However, the financial market has a weak incentive mechanism in terms of prior information collection and post-supervision, which makes it difficult to effectively overcome various information asymmetry problems in financial transactions. When the financial industry continues to expand and gradually replace the pillar position of the real industry in the national economic operation, and financialization gradually evolves into the main means of capital accumulation, some large multinational financial groups often no longer need to directly participate in investment and productive activities, but only need to use huge capital to carry out transnational financial arbitrage to reap huge profits [10]. The function of the theory of financial structure is that, firstly, it gives the index to measure the financial development for the first time, which enables scholars to do quantitative research. The second is that it chooses the measurement method and gives a certain explanation to the relation of relevant influences.

## 4. Research Design

### 4.1 Model building

In order to explore the non-linear relationship between financialization and real economic growth, this paper uses Levine (1997) for reference to build a panel threshold model, taking financialization index as a threshold variable, to build a panel threshold model of financialization index and real economic growth rate. The details are as follows:

$$eggdp_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 f_{it} I(q_{it} \leq \gamma) + \beta_2 f_{it} I(q_{it} > \gamma) + e_{it} \quad (1)$$

Among them,  $eggdp_{it}$  represents the growth rate of the real economy in province  $t$  in year  $t$ ,  $f$  represents the financialization index,  $q_{it}$  represents the threshold variable, and  $\gamma$  is the threshold value. The control variable  $X_{it}$  mainly includes the urbanization rate of each province, human capital, openness, and Fiscal policy,  $e_{it}$  is a random error term.

Financial development does not have a consistent and positive effect on economic growth. Financial development has different effects on economic growth at different stages of income level. The mechanism of financial development on economic growth is assumed to be a "black box" of "financial input" and "economic output". Control financial input indicators, use mathematical planning and statistical data to determine the efficiency frontier, and evaluate their efficiency by comparing the degree of deviation of decision-making units from the production frontier, so as to accurately quantify the financial efficiency of each province. Considering the final consumption rate, labor growth rate and other variables will also affect economic growth.

The function value depends on the magnitude relationship between the threshold variable  $q_{it}$  and the threshold  $\gamma$ . The function value is 1 when the expression  $q_{it} \leq \gamma$  in the parentheses holds, otherwise it is treated as 0. Its efficiency change index and technology change index are both transferable. The global Malmquist index measurement does not need to be replaced by the geometric mean of the two periods, and it can effectively avoid the problem of unsolved linear programming that may exist in the same period Malmquist index. Among them, the input of capital, labor force and technological progress are the main factors that affect economic growth, and the collinearity among the factors has little effect on the production function. It is to search among all the threshold values and finally obtain the threshold estimation value. The traditional method is to arrange the threshold values according to the order of increasing in sequence, then take 70% of the observed value as the quasi threshold value, then make the least square estimation to the equation according to the threshold variable value, and then obtain the residual sum of squares of the equation. Therefore, the whole

sample can be divided into two regimes by indicator function: low financial level ( $QIT \leq \gamma$ ) and high gold melting level ( $QIT > \gamma$ ). The corresponding coefficients of each regime are  $\beta_2$  and  $\beta_2'$ , respectively.

#### 4.2 Variable description

As the financial attribute of the real estate industry has become increasingly prominent in recent years, the residual value after excluding the sum of the financial industry and the real estate industry from the total output value of the national economy is approximately substituted for the output value of the real economy, drawing on the mainstream view of defining the category of the real economy. The gross output value of the real economy is measured by the gross output value of other industries after deducting the added value of the financial industry and the added value of the real estate industry from the GDP of each region and used as the output index. Labor input (l) is replaced by the number of people employed in the real economy, and is obtained by subtracting the number of people employed in the financial industry and the number of people employed in the real estate industry from the total number of people employed in the whole society. The level of financial development is measured by the proportion of RMB deposits and loans in GDP of each province in that year. Because there are many factors that affect the real economic growth in the region, in order to avoid the multicollinearity between variables, this paper selects urbanization rate, human capital, openness to the outside world and fiscal policy as the control variables. The specific definitions of each variable are shown in Table 1. The proportion of fiscal expenditure to GDP is measured by selecting the proportion of provincial local fiscal general budget expenditure to GDP. The initial level of economic growth is measured by the logarithmic value of the average GDP of each province in the previous 5 years. Labor force growth rate is measured by the percentage change rate of the number of employed people in each province.

Table 1 Selection of indicators for each variable

Variable	Variable selection	Variable interpretation
Growth	Economic growth rate	The GDP growth rate of each province based on 2014 is selected to measure
FD	Financial development level	The proportion of RMB deposits and loans in GDP of each provincial financial institution in that year is selected to measure
Consume	Final consumption rate	Select the proportion of final consumption of each province in GDP of the expenditure method to measure
Fiscal	Proportion of fiscal expenditure to GDP	The proportion of general budget expenditure of provincial local finance in GDP is selected to measure
Initial	Initial level of economic growth	The comparative value of the average GDP of each province in the first 5 years is selected to measure it
Labor	Labor force growth rate	Select the percentage change rate of the number of employed people in each province to measure
k	Technical level	Select the number of patent rights in each province and take logarithm to measure

#### 4.3 Section headings

Based on the availability and completeness of the data, this paper takes 31 provinces in China as the research objects, and makes an empirical analysis by using the provincial panel data from 2014 to 2018. The main input index of financial resources takes into account the human capital, material capital and support to the real economy of the financial industry, and selects the number of employees in financial institutions, the balance of deposits and loans in financial institutions and the scale of social financing respectively. The ratio of provincial loans to deposits is used as a measure of the degree of credit intervention by the central government. This is based on two considerations: for a long time in China, bank loans are often tied to policy objectives. Adjustments made with

deposits can eliminate the heterogeneous effects caused by differences in the development of financial systems between provinces. For some missing data, this paper uses the moving weighted average method to supplement, and carries on the GDP index reduction processing to the related price data. Descriptive statistics of relevant variables are shown in Table 2.

Table 2 Descriptive statistics of variables

Variable	Mean value	Standard deviation	Minimum value	Maximum value	Median
Growth	0.13	0.06	-0.18	0.32	0.12
FD	0.12	0.26	0.32	0.16	0.04
Consume	0.09	0.94	0.15	0.30	0.17
Fiscal	0.24	0.14	0.33	0.54	0.37
Initial	0.51	0.33	-0.17	0.88	0.32
Labor	1.88	0.59	0.06	0.96	-0.85
k	2.71	0.11	0.28	1.53	0.01

The ratio of loans from financial institutions to GDP is chosen as a substitute variable for financial development. The financial structure is represented by the total turnover in the stock market accounting for the bank's credit balance with the private sector. Using SPSS18 software, the correlation coefficients of input-output indicators of 31 provinces and cities from 2014 to 2018 are calculated, and the results are shown in Table 2. The correlation test results show that there is a significant positive correlation between the real economy's financing volume, labor input, fixed asset investment and the real economy's total output value, which meets the basic requirements of the model and is consistent with the actual situation. At the same time, Kao test and Pedroni test are used to conduct panel cointegration test on each variable. The results show that there is a long-term stable equilibrium relationship between each explanatory variable and the explained variable. In order to ensure the robustness and rationality of the regression results, this paper tests the weak externality of financialization index.

## 5. Empirical Analysis of Non-linear Effect of Financialization on Real Economic Growth

According to the results of Ir test and Hausman test, the fixed effect model is applicable in this paper. Further, the threshold effect test results between financialization and real economic growth according to Bootstrap method are shown in Table 3. Due to the different levels of economic development and financial development in different regions, the growth of insurance demand has a non-linear impact on economic growth. In fact, from the analysis of the industry environment, the developed financial system in the region has a positive impact on the efficiency of capital allocation in the industry and strengthens the economic growth effect of industry development. From Table 3, it can be seen that the single threshold and the double threshold are significant at the statistical level of 1% and 10%, respectively. Therefore, there is a double threshold effect between financialization and real economic growth. At the significance level of 10%, the original hypothesis holds, which shows that there is no double and multiple threshold effect. In summary, we have every reason to judge that there is a single threshold  $\gamma$ . Assuming a truncated normal distribution with a constant mean value, considering the factors that affect the efficiency volatility, the model does not impose any constraints. Thresholds  $\gamma_1$  and  $\gamma_2$  are -0.256 and 0.126, respectively, that is, there is a threshold for the downward deviation and upward deviation of financialization.

Table 3 Threshold effect test results

Model	Threshold test		
	F statistics	P value	Threshold value
Single threshold	338.46	0.02	-0.16
Double threshold	51.56	0.07	-0.24
Triple threshold	23.96	0.23	0.13

The likelihood ratio function shown in Figure 2 has a construction process using more detailed and intuitive analysis of threshold estimates and confidence intervals. Observe whether the threshold value is consistent with the real value by using likelihood ratio. When the level of science and technology crosses a threshold value, its financial development changes from a blocking effect to an encouraging effect on economic growth. From the analysis of dynamic threshold regression results, it is found that excessive financial development hinders economic growth when the level of science and technology is weak.

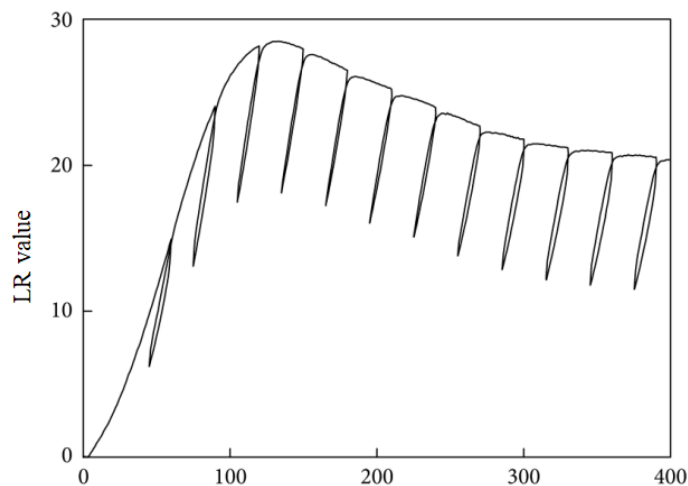


Fig. 2 Threshold estimation and confidence interval

The above threshold test results show that the impact of China's financial development on economic growth has a threshold value of 0.126, which indicates that the correlation between the two is likely to be non-linear. The ratio of private credit to GDP, which reflects the financial development index, is positive and significant at a level of 1%, indicating that the increase in China's financial development has not improved the efficiency of financial services to the real economy, and the quality of financial development still needs to be improved. The main reason is that only when the degree of economic financialization has accumulated to a certain stage can the financial system with the function of financing better guide the entity departments to effectively allocate resources among different economic entities, different regions and different periods. The financial development index is constructed by using the proportion of the total local and foreign currency loans of banks and other financial institutions to GDP, which reflects the total amount of funds provided to the real economy through the financial sector in the financing activities of the whole year. It is used to measure the financial scale of a region. It is generally believed that the larger the index, the higher the financial development level of the region. In order to contrast with the non-linear model, the dynamic panel linear model I is used to investigate the relationship between financialization and real economic growth without considering the threshold effect. Then, according to the calculated threshold value, the panel threshold model II with fixed effect is constructed to investigate the non-linear relationship between the two. The regression results of the two models are shown in Table 4.

According to the threshold of scientific and technological level, we can divide our provinces into two regions: those with low scientific and technological level and weak productivity, and those with high scientific and technological level and strong productivity. In areas with high scientific and technological level, their economic development is relatively high. The results of this study show that too much deviation from the positive level of financialization is also not conducive to real economic growth. This is mainly because excessive financialization has strengthened the financial sector's control over the real sector with relatively excess production capacity and stagnant development, forcing more capital and income dedicated to the real industry to flow into the financial sector, leaving the real industry out of reality and lacking in capital accumulation. This

shows that the development of China's stock market has not brought about an improvement in the efficiency of the financial system, which may be due to the unsound design of the stock market system and frequent and drastic fluctuations in stock prices, which have adversely affected the real economy. In particular, compared with the inhibitory effect of excessive financialization level on real economic growth, the inhibitory effect of too low financialization level on real economic growth is more significant. In regions with low level of science and technology, their economic development is relatively low, and the productivity and efficiency of various sectors and industries in the national economy are low. Financial development and excessive financial expansion will virtualize and foam the economy, and the real economy will not be fully developed, thus creating a "financial repression effect", further triggering economic contraction, and financial development will hinder economic growth.

Table 4 Regression result of model

Variable	Model 1	Model 2
Growth	-0.13* (-4.64)	-0.09* (-2.13)
FD	-0.35* (-0.66)	-0.24* (-5.33)
Consume	0.13* (4.81)	0.07 (2.96)
Fiscal	-0.74* (-3.37)	-0.36* (-1.28)
Initial	-2.88* (1.77)	0.55* (4.87)
Labor	-0.86* (0.51)	0.64 (10.18)
k	-	-5.63* (9.92)

Note: The value in brackets is t, \* which indicates that it is significant at 1% statistical level.

## 6. Summary

This paper introduces a threshold model and uses a dynamic panel model to study the impact of China's financial development on economic growth from a non-linear perspective. In the short term, excessive financialization tends to multiply the leverage effect of the financial system on the real economy, triggering financial bubbles, increasing the probability of financial crises, and causing serious impact on the smooth operation of the real economy. The expansion of the scale of financial industry is not conducive to the improvement of the efficiency of economic growth of financial services entities, but rather plays a blocking role. The financial system structure has a significant negative impact on the economic growth efficiency of financial service entities in most regions. In this process, we focus on the analysis of the non-linear economic growth effect of insurance consumption and its change rule under the condition of significant difference between financial scale and financial risks, in combination with the current economic slowdown and unbalanced development of financial development and insurance consumption in various provinces. Therefore, in order to better guide the return of finance to the original service of the real economy, we need to start from two aspects. Based on the "threshold effect" between financialization and real economic growth, the government should improve the financial system according to the needs of economic development and change the abnormal development concept of "promoting growth through financial expansion". In order to maintain the sustainability and stability of China's economic development, we need technological innovation to make science and technology reach a certain level and further promote economic development.

## References

- [1] Dai P V, Delpachitra S, Cottrell S. Real Exchange Rate And Economic Growth In East Asian Countries: The Role Of Financial Integration [J]. *The Singapore Economic Review (SER)*. (2017), p. 62.
- [2] Abid I, Goaid M. A meta-frontier assessment of bank efficiency in Middle East and North Africa countries [J]. *International Journal of Productivity and Performance Management*. Vol. 66 (2017) No. 2, p. 266-296.
- [3] Okazaki K. Banking System Reform in China: The Challenges to Improving Its Efficiency in Serving the Real Economy [J]. *Asian Economic Policy Review*. (2017), p. 12.
- [4] Inekwe J. Financial crises and the extreme bounds of predictors [J]. *Empirical Economics*. (2018), p. 55.
- [5] Uluc A. Stabilising House Prices: the Role of Housing Futures Trading [J]. *The Journal of Real Estate Finance and Economics*. (2018), p. 56.
- [6] Kuusela H, Spence M T, Paul P. How objective and subjective knowledge affect insurance choices [J]. *Journal of Financial Services Marketing*. Vol. 22 (2017) No. 4. p.161-172.
- [7] Kuosmanen P, Vataja J. The return of financial variables in forecasting GDP growth in the G-7[J]. *Economic Change and Restructuring*. Vol. 50 (2017) No. 1, p. 1-19.
- [8] Syed E A, Omar M. Ḥiyal in Islamic finance: recognition of real economic need or circumvention of Ribā? [J]. *Qualitative Research in Financial Markets*. Vol. 9 (2017) No. 1, p. 00-00.
- [9] Xu Pengbo. Financial service real economy has a long way to go [J]. *National circulation economy*. (2017) No. 17, p. 85-89
- [10] An Yixia. Difficulties and Countermeasures to reduce the financing cost of northeast real economy enterprises [J]. *Local finance research*. (2017) No. 2, p. 4-10