

# Research on the Efficiency and Influencing Factors of Financial Service Entity Economic Growth Based on Generalized Square Method and Quantile Regression Method

Yanqiang Cheng

School of Finance and Trade, Zhuhai College of Jilin University, Zhuhai 519041, China.

**Keywords:** Financial services real economy, Growth efficiency, influencing factors, Generalized square method, Fractional regression method.

**Abstract:** The relationship between financial development and real economic growth has always been a hot topic in economics. The paper analyzes the economic growth efficiency and efficiency of financial services from 1980 to 2018 in Guangdong Province and uses the generalized square method and quantile regression empirical method to analyze the main factors affecting the economic growth of financial service entities. The relationship between financial services and real economic growth. The research results show that during the period from 1980 to 2018, the economic growth efficiency of financial services in Guangdong Province has a significant downward trend, especially in terms of technical efficiency. The reason is that the scale expansion of the financial industry, the restructuring of the system and the overcapacity of the real economy have had a negative impact on the economic growth efficiency of the financial services entity. To this end, the paper proposes a solution. The economic growth efficiency of financial services entities must be improved through financial industry reform, service innovation and optimization of the external environment to completely improve the current situation.

## 1. Introduction

Economists at home and abroad have conducted in-depth discussions on the relationship between financial development and economic growth and have obtained rich results through theoretical analysis and empirical research. In recent years, in order to promote rapid and healthy economic development, many developing countries have regarded financial development as an important engine for economic growth. At present, some stocks and incremental problems in the economic development of financial services have accumulated and gradually deteriorated: structural mismatch of financial resources has intensified, financial "ineffective supply" has been excessive and "effective supply" has been insufficient, overcapacity in the real economy has increased and non-performing loan ratio in the banking industry Issues such as rising, "de-realization" and "idling" of funds have become increasingly prominent. Funds continue to move away from the real economy and participate in virtual trading and speculation [1]. Financial resources "can't", "do not dare" and "do not want to" enter the real economy have increased the pressure on the restructuring and transformation of the real economy under the new normal. The reform is struggling and the financial and effective service of the real economy is facing challenges. Based on this, the paper uses the generalized two-squares method and the quantile regression method to analyze the economic growth efficiency and influencing factors of financial services entities in the past 30 years as the case and improve the economic development of financial services entities under the new normal. Efficiency and promotion of the healthy and stable development of the real economy propose targeted countermeasures.

## 2. Generalized square method and fractional regression analysis

### 2.1. Generalized square method

Since the data we currently have has a short time and a large number of data sections, if the data is

directly subjected to fractional regression, there will often be problems with excessive error terms. For this reason, the data cannot be directly estimated by parameters. In order to solve this kind of problem, the feasible data of the panel data firstly uses the feasible generalized least squares method (FGLS), which is developed on the basis of generalized least squares estimation. It is found that the FGLS regression analysis has strong consistency. And robustness characteristics are suitable for panel data analysis, so consider the following model:

$$y_{it} = X_{it}\beta + \varepsilon_{it} \quad (1)$$

Where  $X_{it}$  represents a variable other than the disturbance term (e.g., a constant term, a time trend term, an individual dummy term and an item that does not change over time) and  $\varepsilon_{it}$  is a disturbance term. The three situations in which the disturbance term  $\varepsilon_{it}$  may exist in the empirical process are as follows:

In the first category, the variance of the disturbance term of the individual  $i$  is recorded as  $\sigma_i^2 = \text{var}(\varepsilon_{it})$  and if  $\sigma_i^2 \neq \sigma_j^2, (i \neq j)$ , the disturbance term  $\varepsilon_{it}$  of the panel data is said to have a cross-sectional heteroscedasticity. In the second category, if  $\text{cov}(\varepsilon_{it}, \varepsilon_{jt}) \neq 0, (s \neq t, \forall i)$  exists between the disturbance items  $\varepsilon_{it}$  between different sections, there is a cross-section autocorrelation between the disturbance items  $\varepsilon_{it}$  of the panel data. In the third category, if there is  $\text{cov}(\varepsilon_{it}, \varepsilon_{jt}) \neq 0, (i \neq j, \forall t)$  between each disturbance term  $\varepsilon_{it}$ , then there is a cross-section autocorrelation between the disturbance terms  $\varepsilon_{it}$ .

According to the above-mentioned specific different situations, the hypothesis is firstly made, then the OLS estimation of the panel data is performed on the above formula according to the hypothesis and the square of the estimated residual  $e_{it}$  is used as the dependent variable for the regression estimation:  $e_{it}^2 = \delta_1 + \delta_2 x_{i2} + \dots + \delta_k x_{ik} + \text{error}$ , thereby obtaining the estimated value of  $\sigma_i^2$ .  $\hat{\sigma}_i^2$ , the covariance matrix of  $\varepsilon_{it}$  and then use  $1/\hat{\sigma}_i^2$  as the weight to select the corresponding FGLS estimation method according to the above three cases and then perform FGLS estimation and perform multiple iterations until the estimated result converges [2]. The estimated result is

$$\hat{\beta}_{itFGLS} = \left( X'_{it} \hat{V}_{it}^{-1} X_{it} \right)^{-1} X'_{it} \hat{V}_{it} y \quad (2)$$

Where  $V_{it}$  is the positive definite matrix of the parameter and  $\hat{V}_{it}$  is the consistent estimate of  $V_{it}$ . Through multiple FGLS estimation, the effectiveness and robustness of panel data estimation can be gradually enhanced, and the accuracy and interpretation of parameter estimation can be improved. For the above three cases, the above cases were tested by Wald's heteroscedasticity test, cross-section autocorrelation test and Friedman test respectively.

## 2.2. Quantile regression method

The ideal fractional regression model should be able to describe the conditional distribution of the dependent variable under a given independent variable, so that a comprehensive understanding of the dependent variable's dependence on the independent variable can be obtained. The fractional regression method is considered to be an important breakthrough in the field of statistical research. Assuming that the dependent variable is  $Y$ ,  $p$  explanatory variable is  $X_1, X_2, \dots, X_p$ , the following linear quantile regression model is satisfied:

$$Y = \beta_0(\tau) + \beta_1(\tau)X_1 + \beta_2(\tau)X_2 + L + \beta_p(\tau)X_p + \varepsilon \quad (3)$$

The condition  $\tau$  of the error term  $\varepsilon$  is equal to 0, that is,  $P(\varepsilon < 0, X_1, X_2, L, X_p) = \tau, 0 < \tau < 1$ . The parameter  $\beta(\tau) = [\beta_0(\tau), \beta_1(\tau), L, \beta_p(\tau)]$  depends on the parameter  $\tau$ , indicating that the

parameter can vary with the quantile of the investigation. If there is  $X = (X_1, X_2, L, X_p)$ , sample  $(Y_i, X_i), i = 1, 2, L, n$ , then  $\beta(\tau)$  is the solution to the following minimization problem.

$$\min_{\beta(\tau)} \left[ \sum_{i: Y_i \geq X_i' \beta(\tau)} \tau |Y_i - X_i' \beta(\tau)| + \sum_{i: Y_i < X_i' \beta(\tau)} (1 - \tau) |Y_i - X_i' \beta(\tau)| \right] \quad (4)$$

When  $\tau = 1/2$ , there is a "median regression", also known as the "minimum absolute dispersion estimator" (LAD). Obviously, it is less susceptible to extreme values than Mean Regression (OLS) and is therefore more robust.

### 3. Relevant indicators of economic growth of financial services entities

In the empirical research literature on economic growth, production functions are often used as the basic estimation framework. It is also used here to analyze the empirical research on the economic growth relationship of financial services entities. It assumes the form of the total production function (t period), abstracts the total output as a function of the level of financial development and the control variables and the control variables are in addition to financial development. Other major factors other than the level can be represented by a function:

$$Y_t = f(\text{fiance}_t, \text{control}_t) \quad (5)$$

Among them,  $Y_t$  is the total output, generally expressed in GDP,  $\text{fiance}_t$  represents the level of financial development and  $\text{control}_t$  represents the control variable. (1) Investing in physical capital, using the ratio of fixed assets investment to GDP to reflect the level of input of physical capital, expressed in INFIXP. (2) Human capital investment, generally using the primary and secondary school graduation rate or the government's fiscal expenditure in education expenditures to reflect the level of human capital in each region. Taking into account the close relationship between finance and finance, the ratio of total government fiscal expenditure to GDP is set here to reflect the level of human capital and the close relationship between finance and finance, which is expressed by LGEXPP. (3) The degree of economic openness, taking into account the close relationship between foreign direct investment and finance, the ratio of total foreign direct investment (or actual use of foreign capital) to GDP is comprehensively reflected in the degree of economic openness, as well as foreign direct investment and finance. Close contact expressed in FDIAUP. Then there are expressions as follows:

$$\text{LnGDP} = \beta_0 + \beta_1 \text{LnFIR} + \beta_2 \text{LnINFIXP} + \beta_3 \text{LnLGEXPP} + \beta_4 \text{LnFDIAUP} + \mu \quad (6)$$

### 4. Analysis of the economic growth efficiency of financial services in Guangdong Province

Table.1. Median regression of conditions between financial development and real economic growth in Guangdong Province from 1980 to 2018

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.863238	0.287272	41.95754	0.0000
LNFIR	0.265909	0.062973	4.812969	0.0000
LNINFIXP	0.973872	0.077952	14.18673	0.0000
LNLGEXPP	-2.09052	0.082773	-13.3348	0.0000
LNFDIAUP	0.067682	0.026827	3.640463	0.0003
Pseudo R- squared	0.28097	Mean dependent var	8.932267	
Adjusted R- squared	0.276907	S.D dependent var	0.513204	
S.E. of regression	0.392762	Objective	84.63337	
Quantile dependent	8.9065	Objective (const. only)	117.7034	
Sparsity	0.900077	Quasi- LR statistic	293.9339	
Prob (Quasi- LR stat)	0.00000			
Dependent Variable: LNGDPP				
Method: Quantile Regression (Median)				
Sample: 1980 2018 IF DIDAI=3				
Included observations:574				
Bootstrap method: XY- pair, reps=200, rng=kn				

In order to compare the results of the study, the following is a quantitative analysis using conditional median regression and their results are shown in Table 1.

In order to further explore the differences in the impact of financial development and other control variables on economic growth at different levels of economic growth, a quantile regression estimate of multiple quantile levels of economic growth is followed.

Table.2. Quantile Regression Estimation between Financial Development and Real Economic Growth in Guangdong Province from 1980 to 2018

	Quantile	Coefficient	Std. Error	t-Statistic	Prob.
C	0.2000	0.1460	1.8462	0.0681	0.8366
	0.4000	0.5882	1.5663	0.3682	0.6065
LOG(FIR)	0.2000	3.0516	1.0310	2.8588	0.0063
	0.4000	3.8328	0.6666	5.8121	0.0000
LOG(INFIXP)	0.2000	2.3601	1.1231	2.4042	0.0233
	0.4000	1.4383	0.5882	2.4162	0.0226
LOG(LGEXPP)	0.2000	-3.6458	0.6884	-5.2125	0.0000
	0.4000	-3.0280	0.5105	-5.8336	0.0000
LOG(FDIAUP)	0.2000	-0.1042	0.1166	-0.8830	0.3686
	0.4000	-0.0146	0.0686	-0.1846	0.8548

## 5. Analysis of the efficiency and causes of financial service entity economic growth

### 5.1. Showing negative growth

The regression coefficient of the financial system structure is significantly negative in most models and not significant in a few models. In theory, the greater the proportion of stock market capitalization and premium income to total financial assets, the more rational the financial system structure and the higher the efficiency of financial services entity economic growth. The empirical results are contrary to the theory [4]. The reason for this situation may be that China's real economic growth depends to a certain extent on the development of direct finance, but the lag and violent fluctuations in direct financial development, especially the development of the stock market, have produced huge growth in the real economy. The negative impact, so the greater the proportion of stock market capitalization and premium income, the lower the efficiency of financial services entity economic growth.

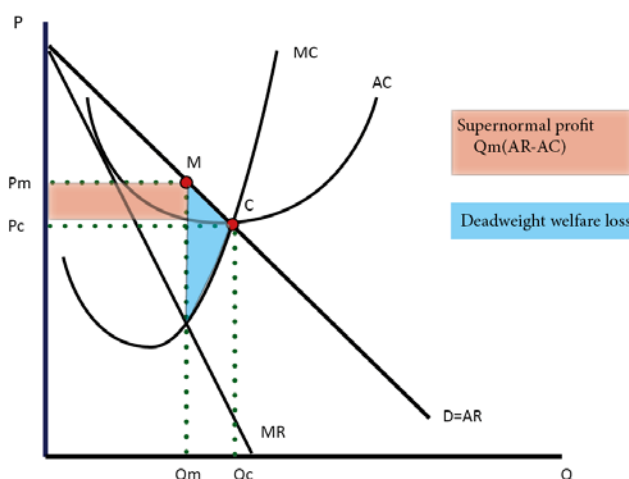


Fig. 1 The real economy experiences negative growth in the case of increased investment in financial services

### 5.2. Financial industry is turbulent and market chaos

As the economic growth rate continues to decline, the phenomenon of "de-reality" and "currency idling" in the financial sector is gradually increasing. The specific performance is as follows: the currency or capital supply deviates from the real economy, the expansion of virtual financial assets

and the rapid growth of financial inter-bank business. Funds participate in the "money making money" lending business, multiple constraints and other potential interest temptations hinder financial resources "don't want" to serve the real economy. These lending businesses and "financial innovations" have not only failed to solve the problem of financing difficulties and financing in the real economy, but also contributed to the fact that funds have "decoupled from reality" and disguised "currency idling". High interest rates not only attracted More funds are added to the usury industry and it is very easy to cause fund-raising fraud and "Ponzi financing". The expansion of the total amount of financial assets transactions and the rapid increase in the growth rate of transactions have helped the development and formation of asset price bubbles. The rapid changes in asset prices in the short term have changed people's expectations of prices and virtual wealth, further accelerating the funds. In the short term, the imbalance between the development of finance and the real economy has been aggravated, distorting the objective requirements of financial services to serve the real economy.

### **5.3. Overcapacity in the real economy leads to financial failure to serve**

The slowdown in the growth of the real economy and the overcapacity have led to a large backlog of corporate products and the problem of corporate debt has become more prominent. Zombie companies are on the verge of "dying struggle". At the same time, the balance of non-performing loans in the banking industry has increased substantially and the possibility of systemic financial risks has increased, resulting in a large amount of funds "not dare" to enter the real economy to serve the real economy [5].

## **6. Suggestions on the improvement of economic growth efficiency of financial services entities**

### **6.1. Accelerate the improvement of the financial system market and weaken the government intervention mechanism**

Accelerate the improvement of the financial market system, build regional financial centers, improve the resource allocation function of financial markets and improve the efficiency of financial resources utilization. At the same time, increase financial support for strategic technology industries, improve the integration of technology and finance and accelerate technology. Coordinated development with finance. It is necessary to base on the new economic normality and supply-side reform, strengthen the top-level design, clarify the government's financial decentralization reform path, further define the government and market, central and local financial resource rights division mechanism, improve the government's vertical and horizontal decentralization of finance and promote The reform of financial decentralization between the central and local governments, the government and the market will increase the depth of the local real economy of financial services in various regions. Promote the allocation of financial resources mainly from the central distribution to the direction of local distribution, the explicit increase of provincial-level local government financial resource allocation rights and the realization of the allocation of financial resources from "hidden centralization" to "dominant decentralization" [6].

### **6.2. Expand the scale of bond stock financing and increase the proportion of direct financing**

To improve the financial supply structure, we must change the financial structure led by bank intermediaries, gradually promote the construction of multi-level capital markets, increase the proportion of corporate bond financing in direct financing and improve the construction of bond-based systems and steadily promote the expansion of the scale of real economy bond financing. De-leverage and transformation and upgrading of overcapacity industries provide high-quality corporate bond financing for strategic emerging and high-tech industrial enterprise transformation and upgrading and enhance the ability and efficiency of the enterprise bond finance market to serve the real economy development.

## 7. Conclusion

This paper examines the status quo of financial services real economy development from the economic growth data of Guangdong Province from 1980 to 2018. Using the generalized square method and fractional regression method to measure the economic development efficiency of financial services entities, and based on the analysis of the factors affecting the economic development efficiency of financial services entities in Guangdong Province, the purpose is to improve the economic development efficiency of financial services entities under the new normal. And propose targeted countermeasures to promote the healthy and stable development of the real economy. In view of the limited sources of research data, there are still many shortcomings in this study. In the future, further research will be conducted on data analysis and statistics.

## References

- [1] Cai Zexiang, Wu Xueqiang. Research on the Development Efficiency of Financial Services Real Economy under the New Normal——Based on Empirical Analysis of Provincial Panel Data. *Economic Issues*, Vol. 10 (2017) No.17, p. 20-31.
- [2] Zhai Fang, Zhang Hongwei. Research on the Uncoordinated Development of China's Financial and Real Economy——Based on the Perspective of Financial Alienation. *Modern Economic Research*, Vol. 5 (2016) No.19, p. 34-38.
- [3] Qiu Zhaoxiang, Wang Shuyun. Research on the Coordinated Development of Financial and Real Economy Relations. *Theoretical Exploration*, Vol. 4 (2017) No.25, p. 28-34.
- [4] Lu Yifeng, Yang Liang. Research on the Relationship between Internet Finance and Real Economy and Driving Ideas. *Journal of Tianjin University of Commerce*, Vol. 1 (2016) No.36, p. 3-7.
- [5] Xu Guihua, Peng Junhua, Dai Wei. Price Fluctuation, Extrusion Effect and Financial Support for Real Economic Efficiency——Based on Panel Analysis of Interprovincial Space. *Journal of Finance and Economics*, Vol. 8 (2017) No.28, p. 29-43.
- [6] Opening up the Channel of Financial Capital to Connect with the Real Economy——Exploration of Jingmen City's Implementation of "Re-asset Investment". Vol. 2 (2017) No.12, p. 51-53.