The Impact of Rural Finance on Rural Economic Development from the Perspective of Efficiency of Discrete Differential Algorithm

Mingxu Peng, M.Sc
Jiawen Huang, M.Sc

Mingxu Peng, Lecturer, Business School, Taizhou University, 318000, Taizhou, Zhejiang, China. Jiawen Huang, Lecturer, Jiangxi Normal University, 330022, Nanchang, Jiangxi, China
Correspondence Lec Peng; rdmzeu@163.com

Objectives: Finance is the core of the national economy. The development of modern rural economy is inseparable from financial support. The relationship between finance and economic growth has always been one of the hot topics in theoretical research and empirical analysis. **Methods:** Under the background of the development of Internet e-commerce, the maximum flow algorithm was based on the empirical research on the relationship between China's financial development and economic growth. **Results:** Based on this, the two-element discrete choice model of Probit and Logistic for economic growth was constructed. Discrete particle swarm optimization (PSO) algorithm was used to estimate the parameters of the model. The significant degree of the influence factors was calculated. **Conclusion:** Finally, it was calculated that concurrent business was the decisive factor of economic growth.

Key words: rural areas; economic development; economic development
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China is a country with large gap between urban and rural areas. Compared with the city, the population of the countryside is large, the development level is low, and the development speed is slow. This greatly restricts the development of the entire national economy. In October 2005, the Fifth Plenary Session of the Sixteenth Central Committee of the Communist Party of China proposed to push forward the building of a new socialist countryside and transform the backward countryside [1]. With the transformation of the mode of economic development and the adjustment of the economic structure, it has become the key to the sustainable development of China's economy to drive agriculture by industry and drive the countryside in cities. Promoting urbanization and new rural construction, balancing urban and rural development, and vigorously developing the rural economy are related to the overall development of the party and the state. It is of great significance for building a well-off society in an all-round way [2]. Both the Party Central Committee and local governments have reached a consensus on increasing agricultural support and capital investment and promoting better and faster development in rural areas. After years of reform and opening up, China's total economic output now ranks second in the world. However, the economic structure is irrational and the development disparity between regions is large. In particular, the development of rural economy is still lagging behind, which is an important factor

restricting China's future development towards an economic power. Therefore, how to develop and expand the rural economy is of great significance for China to build a harmonious society and a new socialist countryside. As a complex system engineering, rural economic growth needs to be matched by many factors. Among them, rural financial development is one of the most important supporting factors [3]. In the process of building a new socialist countryside, the problem to be solved is the shortage of funds for rural economic development [4].

The internal mechanism and realization path of economic growth is the core issue of economic theory [5]. From mercantilism to classical economists, increasing national wealth is the fundamental goal of economic research [6]. Economics, in the wealth of nations, systematically explored the founder of the mode of economic growth. He believed that "the greatest increase in productivity, and the application of labor in the production of labor embodied the point of skill or anywhere, the most proficient judgment seems to be the result of the division of labor" [7]. He believed that division of labor and specialization of labor division could promote technological innovation and technological progress, thereby enhancing labor productivity. Increasing production efficiency could increase the speed of economic growth. He also systematically demonstrated the role of free market economy in economic growth. Through the empirical analysis of the correlation between financial development and economic growth and the proportion of the total assets of Goldsmith's financial intermediaries, it was found that the economic growth stage of the 35 countries usually had the characteristics of the unusual level of financial development. Therefore, scholars believed that financial development and economic growth had obvious synchronicity [8]. Based on the in-depth research and development of Goldsmith, scholars studied the sample data of 80 countries from 1960 to 1989. Under the premise of economic growth, other factors should be controlled and analyze the impact of financial development on economic growth. The results show that there is a positive correlation between the degree of financial deepening, the degree of capital accumulation and the growth of productivity, but there is no negative correlation between the economic growth and the index of financial growth.

METHODS

Pagaro and AID Model Algorithm for the Interaction Mechanism Between Financial Development and Economic Growth

Rural financial needs provide adequate financial support for the development of rural economy, so as to drive the increase of farmers' income and the development of rural economy. Therefore, how to tap the potential of rural finance to better serve the development of rural economy is a major issue that needs to be solved. For many years, the nature of monopoly management and the long running habits have caused many difficult problems in the rural finance and the whole financial industry in China, such as low efficiency and poor quality of operation, which have become serious obstacles to the development of rural finance. In the third Plenary Session of the 17th CPC Central Committee, the party clearly proposed to establish a modern rural financial system, to increase the support for rural finance, and to set up a rural financial service system to adapt to it. Therefore, in the view of efficiency of discrete differential algorithm, the influence of rural finance and rural economic development is studied. In addition to the need to understand the situation of rural financial development and rural economic growth, it is necessary to understand the possible interaction mechanism between them before establishing models and selecting explanatory variables and explanatory variables. Then, combined with the specific circumstances of our financial system, which can help us conduct a deeper analysis of the model and establish a scientific econometric model.

Economic growth is defined in economics as "economic growth" refers to the continuous increase in the production of physical products and services within a country or region. It means the expansion of economic scale and the enhancement of production capacity. It can reflect the growth of the economic strength of the country or region. In China's economic circles,

indicators of economic growth usually have GDP.GNP calculated at variable prices, or their per capita value or growth rate. Financial development refers to short-term and long-term changes in financial structure. It is not only a comparative change of financial structure at different time points, but also a change in the flow of financial transactions in different periods. The financial structure refers to the form and scale of all financial institutions and financial instruments in the financial market. That is to say, financial development refers to the continuous evolution of financial institutions and financial instruments. Specifically, it represents the expansion of financial scale and the improvement of financial deepening level respectively. Since the launching of the theory of financial development, many economists have studied the contribution of finance to the economy. Among them, Pagaro used the endogenous growth model as the most classic and was praised by many economists later. He used the simplest endogenous growth model to reveal the promotion of financial system to economic growth perfectly. The following is a brief introduction to Pagaro's model and its related conclusions: the total output is assumed to be a linear function of the total capital stock: The A model assumes that the two sectors are economic and the size of the population is unchanged. Only one kind of commodity is produced in this area. The goods can only be used for investment or consumption. If used for investment, the old rate is fixed by δ. The conversion rate of savings and investment is X. The total investment is:

$$It = K(t+1) - (1-\delta)Kt \quad (1)$$

When $S_t = L_t$, the market is balanced and stable. At this time, the equilibrium growth rate can be got: (S is the amount of savings translated into investment):

$$g = AS / Y - \delta(\cdot) \quad (2)$$

Vector Autoregressive Model Algorithm

The VAR model is introduced by Simms into econometrics. Its main function is to predict and analyze the dynamic impact of random disturbance on the system and its size, positive and negative, and duration. The modeling method of vector autoregressive model overcomes the drawbacks of the traditional simultaneous equations modeling method in econometrics. For example, there is no obvious distinction between endogenous and exogenous variables in modeling, and the model is not disturbed by the interference of the endogenous variables in the model, which causes the model to be complicated or not strong identifiability, and the dynamic connection between the variables cannot be reacted. The VAR model has been widely recognized and applied in the early years of its introduction to econometrics. Descriptive statistics and the test results of unit root test and Grainger causality test have been analyzed. Considering the influence of economic growth, the scale of financial institutions and the level of financial deepening and the four economic variables of government financial expenditure, it cannot accurately determine which variable is the exogenous variable of the model. Therefore, the advantage of the variable autoregressive model is utilized, and the VAR model is selected as the basis of empirical research. In the following article, the operational econometric significance and calculation results of each step will be listed in detail. Before establishing the VAR (P) model, the lag time P of the model must first be established. Using AIC, SC information, criterion and maximum likelihood ratio method, the lag time P of VAR model is determined synthetically. The results of using Eviews5.0 are as follows:

Table 1
Lag Test Results

P	AIC	SC	LnL (P)
1	-12.93737	-11.94264	149.3737
2	-16.000641	-14.21119	177.0062
3	-14.002246	-12.44027	162.2021

Under the restriction of the sample size, the maximum lag period of this model is 3. Otherwise, there will be a large deviation in parameter estimation due to the lack of sample capacity, resulting in erroneous conclusions. According to the operation results, when the lag number of the model is selected to be 2, the minimum information of AIC and SC statistics is obtained. At the same time, the LR value is tested to the maximum. Conclusion: when the lag period is P=2, it is most suitable for this sample, so VAR (2) model is selected. The model of VAR (2) based on Eviews5. 0 is as follows: (the result of the operation is appendix), in which LNPRGDP is chosen as the dependent variable.

$$LNPRGDP = 0.06565456851 * LNFIN(-1) \div 0.48877859072 * LNFIN(-2) \quad (3)$$

Vector Error Correction Model Algorithm

In the previous cointegration test, the four endogenous variables in the VAR C2 model have long cointegration relationship, and the optimal equation of likelihood ratio test is selected to list the cointegration equation. Compared with the unconstrained VAR model, the VEC model has good predictability. The equation estimated by the VEC model is consistent with the selected likelihood ratio than the selected equation.

$$vecm = LBPRGDP(-1) - 1.098551 * LNFIN(-1) - 0.537613 * LNFIR(-1) \quad (4)$$

According to the result of Eviews5.0 operation, the matrix model of VEC model's parameter estimation can be obtained.

$Y_t = (LNPRGDP\ LNFIN\ LNFIN\ LNGOV)'$.

$$Y_{t-1} = -\begin{pmatrix} -0.034777 \\ 0.078194 \\ 0.119161 \\ 0.112126 \end{pmatrix} * vecm \quad (5)$$

From the VECM equation, it can be seen that from the long-term relationship, the trend of economic growth and financial development indicators show a trend of the same change. Eviews5.0 is used for modeling, testing and forecasting. When testing the stationarity of time series, the method of ADF in unit root test is adopted. The maximum lag order is selected to be 4. The following are the results of the test, such as table 2:

Table 2
Unit Test Results

variable	t statistic	P value	1% threshold	5% threshold	10% threshold
LNPRGDP	3.070981	0.9996	-3.930360	-3.066686	-3.673469
D (LNPRGDP)	-4.336076	0.9991	-3.930360	-3.066686	-3.673469
LNFIN	-4.336076	0.9993	-3.930360	-3.066686	-3.673469
D (NFIN)	-4.336077	0.9993	-3.930360	-3.066686	-3.673469
LNFIR	-4.336078	0.9994	-3.930360	-3.066686	-3.673469
LNGOV	-4.336079	0.9996	-3.930360	-3.066686	-3.673469
D (LNGOV)	-4.336080	0.9996	-3.930360	-3.066686	-3.673469

RESULTS

According to the established model, the data of each variable are set as the initial population in the algorithm. The optimal solution is included in the initial population. Then the discrete particle swarm optimization algorithm is used to estimate the parameters. The specified frequency variable PIN=1 is chosen to convert the inverse function of the cumulative normal distribution function (Figure 1), and the value, expectation, residual and probability of each independent variable are calculated. The goodness of fit and parameter estimation of Probit equation is obtained. In the Pearson goodness of fit test, the chi square value, the degree of freedom and the P value of the model were 96.988, 119 and 0.999 respectively. This shows that the goodness of fit of the model is good (Table 1).

Figure 1
The Total Amount of Exhaust Emissions Under the Comparison of Two Cases

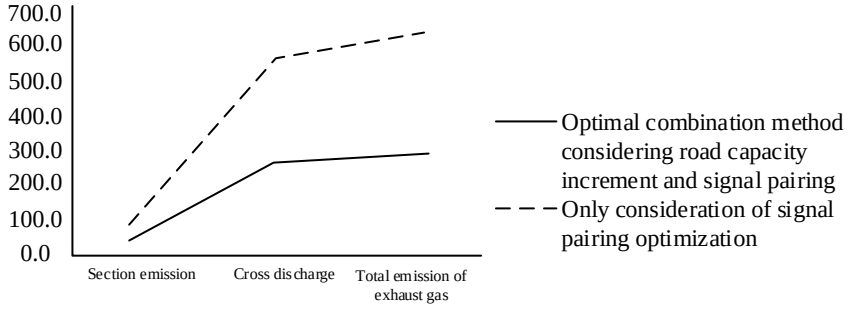


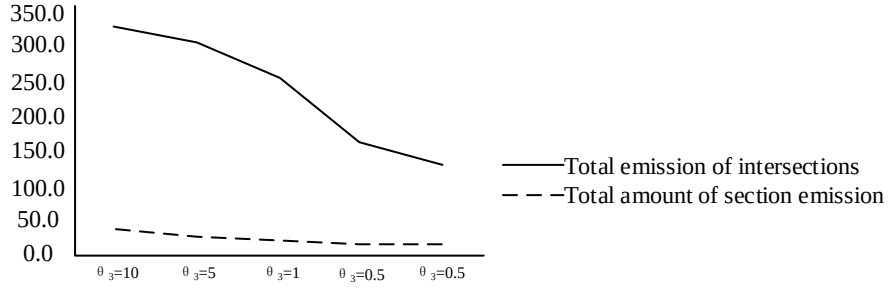
Table 3 is the optimal parameter estimation after 20 iterations and obtains the parameters of two-yuan Probit discrete choice model.

Table 3
Regression Coefficient and Standard Deviation Estimation of Probit model

	Regression Coeff.	Standard Error	Coeff. /S.E.
Intercept	1.299	0.916	1.692
X1	1.914	0.666	2.690
X2	0.061	0.191	0.339
X3	0.361	0.396	0.996
X4	0.139	0.426	0.326
X5	-0.039	0.606	-0.066
X6	0.260	0.642	0.399
X7	0.366	0.669	0.632
X8	-0.296	0.296	-1.009
X9	0.666	0.416	1.396
X10	0.661	0.364	1.696

Because the prior information of a parameter reflects the subjective judgement of the researcher, and the same thing cannot guarantee that the researchers have the same subjective understanding. Therefore, how to choose the prior distribution of parameters is a controversial issue. It is obvious that for the same model, the prior distribution of different parameters may give a completely different parameter estimation result. Therefore, the parameters were fitted and calculated, and the fitting curves of the parameters were as follows (Fig. 2). It is proved that the parameters of the model are highly fitted and the parameters are set well, and the algorithm performance is also good.

Figure 2
Comparison of Exhaust Emission and Road Emission From Intersections Under θ_3 Changes



In the above two-yuan Probit discrete choice model, the calculated constant term is 1.298. It shows that economic development has an initial driving force without any other variables. Among the variables, the coefficient of concurrent busine ss is the largest (1.841), and the coefficient of economic subsidy policy is the second. The two variable Probit discrete choice model can get the observed values, expected values, residuals and probabilities of each independent variable at different levels. However, because the number of covariates is greater than 1, the 95% confidence

interval cannot be reached. At the same time, taking into account the concurrent industry, age, economic direct subsidy and other preferential policies and so on, it is necessary to introduce dummy variable (Dummy Variable). Therefore, Logistic regression is combined to conduct an impact analysis.

Table 4
Parameter Estimation of Logistic Regression Equation (1)

	B	S.E.	Wald
Intercept	-1.414	1.161	1.609
X1	6.333	1.611	10.949
X2	-1.190	1.076	1.419
X3	0.991	0.796	1.199
X4	-0.347	0.941	0.171
X5	-0.901	1.366	0.436
X6	1.133	1.070	1.111
X7	0.169	1.111	0.013
X8	-0.906	0.606	1.131
X9	1.637	0.916	3.474
X10	0.766	0.663	1.944

The results of the analysis of the various impressions are shown in Table 2. First, the facultative degree is the decisive factor. According to the China Economic Statistics Yearbook, the average income of people in some provinces (4504 yuan, 2011 is 6232 yuan, the former is considered as the standard of the income grade division). And according to the proportion of economic income earned by the respondents in the total income, it can be divided into part-time industries. The model showed that the concurrent variables were tested at a significant level of 1%. Their Wald and OR ratios were 10.948 and 207.086 respectively. It shows that other industry facultative activities outside the industry have great impact on their income. Single development of traditional industrial production is no longer the main way to achieve regional economic growth.

The impact of human capital is not significant. From the model output data, it is clear that the Sig. value of the employment skills, educational level and age variables are 0.509, 0.679 and 0.268, respectively. The original hypothesis is rejected, which is related to the type of occupation and the classification of independent variables. From the present point of view, a certain industry facultative in the region is mainly concentrated in the labor-intensive industries in the Yangtze River Delta and the Pearl River Delta region (such as heavy chemical industry, toys, shoes making, textile, diet, construction and related industries, etc.). Their job demands for literacy and employment skills are not very high.

In general, the impact of rural financial development on rural economic growth is reflected in the positive and negative two aspects: on the one hand, rural financial development has a positive role in promoting rural economic growth. For example, the emergence of credit promotes the financing of funds, and the operation and operation of financial institutions achieve the rational allocation of resources in the whole society. On the other hand, rural financial development may also have a negative impact on rural economic growth under certain circumstances. For example, in the process of developing rural industrialization, due to the implementation of the expansionary financial policy, excessive financial liberalization has led to

the rapid development of the virtual economy and the accumulation of risk. A large outbreak of systemic risk has destroyed the fundamentals of the economy. Scholars have done a lot of research on how to grasp the process of financial development and how to guard against financial risks. The role of rural finance in rural economy is manifested in four aspects: first, it promotes the circulation of commodities through the intermediary role of money and promotes the financing of funds through credit. Second, provide capital input for economic development by promoting savings to investment, including quantity and quality. Third, through the operation and operation of financial institutions, reasonable allocation of resources in the whole society can be achieved. Fourth, contribute directly to rural economic growth through the growth of rural financial industry itself.

DISCUSSION

In recent years, with the attention of the central government to the "three rural issues" and the deepening of the reform of the rural financial system, the investment in rural credit funds has increased. However, compared with the rapid development of urban finance, the development of rural finance in China is still not satisfactory. Under this background, the influence of Rural Finance on rural economic development has been studied in the view of efficiency of discrete differential algorithm. The relationship between rural financial development and rural economic growth was empirically analyzed. Rural economic growth Probit and Logistic two-yuan discrete choice model was constructed. Discrete particle swarm optimization (PSO) was applied to estimate the model parameters and calculate the order of influence factors. Based on the angle of prediction, a number of mining rules were made, and the internal mechanism of economic growth was revealed. It is necessary to promote the economic growth and the improvement of the people's living standard. The result of empirical analysis shows that concurrent business is the decisive factor of economic growth. The impact of human capital on economic growth is not significant. Based on this, suggestions for promoting rural economic growth have been put forward: first, actively adjust the industry. The former single primary industry will be transformed into multi industries combined with common development, adjusting the land system to improve the allocation efficiency of land resources.

Human Subjects Approval Statement

This paper did not include human subjects.

Conflict of Interest Disclosure Statement

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