

# Discussion on Rural Financial Problems from the Perspective of Theory of Constraint

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**Abstract** Inadequate rural financial services and low service efficiency lead to the situation that a large sum of money flows from rural areas to urban areas through commercial banks. The situation goes against the development of rural production and causes the extreme lack of rural capital, the difficulties in loaning and the prevalence of usurious loan. In view of the problems existed in rural financial system, the rural financial developmental trend, rural gross production, rural financial scale and rural financial efficiency from 1983 to 2008 are empirically analyzed by using the Pagano model in endogenous growth theory. This research assumes that, rural financial scale has positive relation with rural economic output, that is to say, the expansion of rural financial scale can facilitate the development of rural economy; the rural financial efficiency has negative relation with rural economic development. In Chinese rural areas, the economic development still relies on the expansion of rural finance. However, at the same time of increasing the financial scale, the efficiency of rural finance is decreasing gradually. Thus, the support of rural finance on rural economic growth lies at the low level. Therefore, in view of the basic prerequisite of rural economic development, two solutions are adopted and Japanese and Korean experience are used. The measures are as follows. First, conducting organization innovation through promoting new village construction and gathering dispersed farmers to form rural cooperative organization to reduce transaction cost. Second, transforming financial support from exogeneity to endogeneity and market-oriented rural finance to effectively solve the efficiency of rural finance.

**Key words** Rural finance, Pagano model, Theory of constraint, Organization innovation, China

Four state-owned commercial banks have withdrawn their rural branches after commercialization reform. However, due to high risk and disorder development, rural cooperative funds have been clarified and rearranged mandatorily, which lead to the sharp shrink of rural financial services. At present, rural financial services are basically monopolized by rural credit cooperatives, but rural credit cooperatives have many problems in terms of management, system, ownership, handle structure, which lead to the low efficiency of rural financial services. Insufficient rural financial institutions and low efficient rural financial service lead to the outflow of a large sum of rural capital to urban areas through the existing commercial institutions. It is adverse to rural production. Besides, rural capital will be extremely insufficient and it is hard for farmers to get loan and rural private loan will prevail. In view of the problems in rural finance, the econometric model by using historic data is established to analyze, which can provide theoretical support for solving rural financial problems objectively.

## 1 Data source, index selection and research method

**1.1 Data source** *Chinese Statistical Yearbook* 1983–2010, *Greenbook of Chinese Rural Economy* 1993–2008, *Chinese Financial Yearbook* 1983–2008.

**1.2 Index selection** According to Pagano model in the theory of endogenous economic growth, (1) the scale of total vol-

ume of rural financial capital and rural finance regardless of capital depreciation  $FS = M_0 + AD$ ,  $M_0$  is rural money in circulation,  $AD$  is agricultural deposit; (2) deposit conversion rate  $Q = FE = RLB/RDB$ ,  $FE$  is rural financial efficiency,  $RLB$  is rural loan balance,  $RDB$  is rural deposit balance; (3)  $\ln RGDP = \alpha_0 + \alpha_1 \ln FS + \alpha_2 \ln FE + \xi$ ,  $RGDP$  is rural gross domestic production; (4)  $\Delta Y_t = \alpha + \lambda Y_{t-1} + \xi_t$ ; (5)  $\Delta Y_t = \alpha + \eta t + \lambda Y_{t-1} + \xi_t$ ; (6)  $\Delta Y_t = \alpha + \eta t + \lambda Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + \xi_t$ ,  $\alpha$  is a constant factor,  $\eta t$  is trend term,  $\sum_{i=1}^m \alpha_i \Delta Y_{t-i}$  is distributed lag model,  $\xi_t$  is white noise process. In the actual test process, the unit root of suitable time series to be tested should be found. Through the model selected, the  $\tau$  can be obtained, compared the statistics with the threshold limit  $\tau_\alpha$  under the significance level of  $\alpha$ , if  $\tau < \tau_\alpha$ , then the assumption of  $\lambda = 0$  is rejected,  $\lambda$  is regarded as significant. Time series does not follow the above unit root process and time series is stable. Or else,  $\lambda$  is regarded as insignificant and the time series follows the above unit root test process, the time series is unstable.

**1.3 Research method** The relevant data is used to analyze the changing trend of rural gross domestic production (RGDP), rural financial scale level and rural efficiency level; conducting unit root test and cointegration test on time series; cointegration regression of variables; and according to the three dimensional graph of cointegration regression equation to directly describe the relations among rural gross domestic production, rural financial scale and rural financial efficiency.

## 2 Results and analysis

**2.1 Rural financial development trend** The relevant data show that from the year 1983 to 2008, the changing trend of ru-

ral gross domestic production is in parallel with that of the financial scale, with the trend of annual growth and shows high relativity. There are possible positive relation among them; the financial efficiency assumes annual descending trend, which is opposite to the changing trend of rural gross domestic production.

**2.2 Time series and cointegration analysis** In order to avoid the problem of spurious regression, the stability of time series should be tested. By using the indexes(4), (5) and (6) and Eviews 6.0 software, the unit root test on LNRGDP, LNFS and LNFE, the logatithms of *RGDP*, *FS* and *FE* is conducted respectively( Table 1 ).

It can be seen from Table 1 that, under the 5% credit level, the three variable series are all one order single integration sequence, so the cointegration relations might exist. The cointegration test should be conducted to analyze the long-term and stable relations among variables. If the linear connections of them are not the radom trend, then, they have intergration re-

**Table 1 Unit root test results of variables**

Variable	Test type	ADF test	Threshold value//5%	Lagging order	Is the sequence stable or not
LNRGDP	Intercept	-1.421 048	-2.986 225	5	No
LNFS	Trend and intercept	-2.397 522	-3.644 963	5	No
LNFE	Trend and intercept	-3.331 092	-3.603 202	5	No
$\Delta$ LNRGDP	Intercept	-3.336 200	-2.991 878	5	Yes
$\Delta$ LNFS	Trend and intercept	-5.372 254	-3.612 199	5	Yes
$\Delta$ LNFE	Trend and intercept	-4.286 041	-3.248 592	5	Yes

**Table 2 Co-integration test results of variables**

The assumed number of varibels of cointegration relations	The maximum egien value	Trace statistics	The threshold value under 5% level
None *	0.831 564	54.507 81	29.797 07
At most 1 *	0.376 91	11.759 03	15.494 71
At most 2	0.016 753	0.405 476	3.841 466

The results show that the one order single cointegration series, LNRGDP, LNFE and LNF, assume cointegration relations.

**2.3 Regression analysis** According to the above analysis and the relevant statistics, the cointegration regression results of index (3) can be obtained.

$$\ln RGDP = 5.293 + 0.504 \ln(M_0 + AD) - 2.232 \ln(RLB + RDB) + \xi$$

$$t: (11.674 49) \quad (8.430 661) \quad (-5.414 895)$$

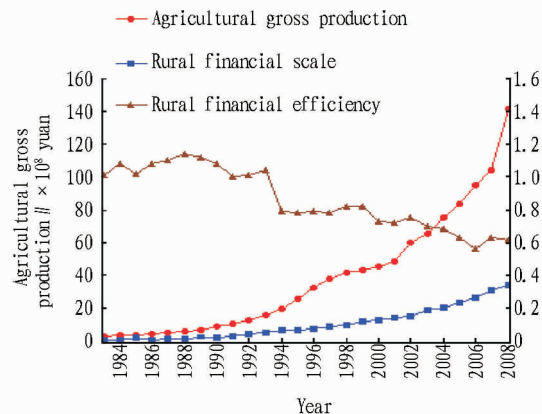
$$R^2 = 0.966 419 \quad DW = 1.715 537$$

$R^2$  is 0.966 419, indicating that the model fit is good,  $DW$  is 1.755 39, bigger than threshold value, indicating that the self-relevants do not exist. The three dimension graph ( Fig. 2 ) is used to describe the relations among rural gross production, rural financial scale, rural financial efficiency.

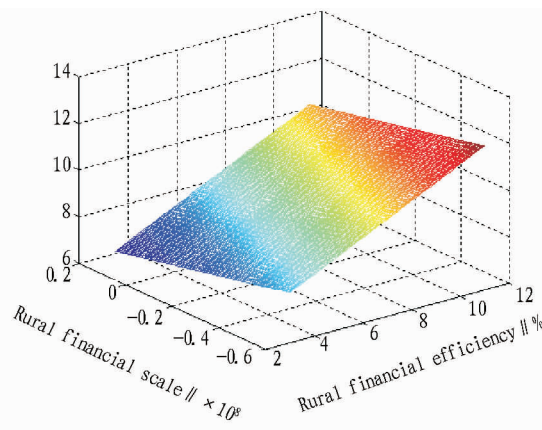
### 3 Conclusions and suggestions

**3.1 Conclusions** Cointegration regression results assume that three are certain positive relations among rural financial scale and rural economic output, that is to say, the expansion of rural financial scale facilitates the development rural economy. Rural financial efficiency has negative relations with rural

lations. By adopting the Johansen method, the cointegration test on LNRGDP, LNFS and LNFE is conducted( Table 2 ).



**Fig. 1 Changing trend of FE, FS and RGDP**



**Fig. 2 Three-dimensional graph of interaction**

economic growth. It is indicated that since 1983, the expansion of rural financial scale has promoted rural development to a certain degree. The existing rural financial system leads to the descending trend of Chinese rural financial efficiency. Rural financial efficiency can not well promote rural development, therefore, the development of Chinese rural finance is still in the stage of facilitating economic development by the increase of financial scale volume. At the same time of increasing the number of financial scale, the efficiency assumes the descending trend and the efficiency has not displayed its role in promoting rural economic development; the expansion of rural financial scale has promoted rural economic development( Fig. 2 ). Driven by the expansion of rural financial scale, in the descending process of rural financial efficiency, rural economic output still

have improvement space to a certain degree. It is similar to the results obtained by the former regression cointegration conclusion, but the low rural financial efficiency has restricted the promoting role paid by the expansion of rural financial scale to rural economic development. Thus, the support of rural finance on rural economic development is conducted at lower level. According to theory of constraint, "the system is often restricted by some critical factors. The critical factors that lead to the appearance of the problems can be found out by analyzing the problems with the logical causality relations. The improvement on critical factors can effectively optimize the whole system"<sup>[1]</sup>. In the whole rural financial system, the above empirical analysis assumes that rural financial efficiency is the restriction factors that affect rural financial development.

### 3.2 Suggestions

**3.2.1** The basic prerequisite and solving thought pattern of rural economic development. In the process of rural economic development, there are two basic prerequisites, the first one is the relative low rural productive level, and lower profit rate than cities and towns; the second one is the small scale agriculture and high dispersed land, small amount and high dispersed loan; besides due to large friction and high trade costs, the governmental support can benefit every farmer. In view of the two prerequisites, there are two solving thought patterns. The first one is to increase the supply of external capital. The theory basis of it is the loanable-funds theory of interest and financial control system, paying attention to the expansion of loanable capital of financial institutions and increasing the capital supply of rural financial institution. In the second place, increasing the external supply of rural financial organization. The theory basis of it is the financial intermediary theory, that is intensifying the rural financial institutions, breaking through the original monopoly and accelerating the reform of rural credit cooperatives. However, the two solutions still have defects. The mandatory external capital supply is easy to lead to the problems of structure deviation of capital flow and fake agricultural trade. The interference of capital use leads to the low efficiency of capital. The functions and structures of rural financial organizations promoted from the top to bottom, can not be determined by market demand, then the problems of rural financial organization supervision, rural credit cooperative system and relevant system design may appear.

The above two solutions show that exogenous capital growth or financial organization can not improve the efficiency of rural finance and can not solve the restriction factors in rural financial system, therefore, the measures are limited in improving the whole system. From the perspective of theory of constraint, the key of optimized system lays in improving the restriction factors. But in Chinese rural financial system, the problem of rural financial efficiency is prominent, which has become the restriction of the whole rural financial system. So, when studying rural financial problems, the restriction factors of the system—the problem of rural financial efficiency should be further discussed. In view of the problem, the experiences of Japan and Korea and some other east Asian countries can be

mirrored.

**3.2.2** Mirroring the merits of Japan and Korea. Japan, Korea and some other countries in east Asian area, in which the small agriculture is the main body, adopted the form of comprehensive agricultural association to provide routes for solving the above mentioned problems. No government can trade directly with dispersed farmers, the extremely high costs of governmental subsidies on farmers can not really serve for farmers, so the agricultural supporting policies can not be fully implemented. In Japan, Korea and some other east Asian countries, the governments open the profitable fields concerning agriculture, including supply of production materials, storage and transportation of agro-products, processing and marketing, rural financial insurance *et al.* Besides, the governments provide preferential support to farmers to encourage the entrance of comprehensive rural cooperative organization to make up the losses of interest decline in agriculture by using the external scale of agriculture. Through the enhancement of agricultural associations, the government promote the agricultural industrialization. The development of Japanese and Korean rural finance has the common features: relying on agricultural associations, improving rural profit rate level, reducing trade costs. In specific operation, around developing agriculture and rural community welfare, Korea launched a series of economic activities including inventory financing, purchasing production elements, package, storage, transportation, processing, marketing, insurance of agro-products, and some other activities. Korea also put forward a new measure for developing agriculture: the integration of production, studying, management, research, that is to say, through the joint efforts of farmers, governments, scientific institutions, the maximum competition of Korean agriculture can be improved, to transform agriculture into an independent, self-reliance and sustainable economic department. Japanese agricultural associations played a great role in connecting rural households and integrating resources, The economic associations help the seemingly dispersed Japanese small farmer operation to go to the industrialized road and realized agricultural modernization. Japan promotes agricultural industrialization operation in; vigorously develops rural cooperatives services and guides service organizations; enhances the organization degree of farmers. Japan creates brand in each village to foster the local characteristic and forms distinctive industrial cluster to improve agricultural comprehensive competitive strength.

As for China, when promoting new village construction, the organization should be innovated. The dispersed farmers should be integrated to form rural cooperative organization. The financial support of government to rural areas can be directly used in rural cooperative organizations, rather than rural households and governmental departments or their subenterprises. The comprehensive rural cooperative organization in Japan become the main body of accepting governmental preferential policies. With the external scale economy concerning agriculture and relevant governmental preferential policies, agricultural profits may reach the social average profit level, thus, the problems of low profit level are possibly to be solved. The financial

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for no reason or do not attend the meeting of discussing official business five times within one year, their membership of meeting of discussing official business will be canceled. In the process of discussing village affairs, the villagers are to supervise the performance of duties of members of meeting of discussing official business.

How to ensure the coordinated and orderly operation of all the subjects of "three committees" is still to be explored. How can the system work most effectively? How to deal with the relationship between village party branch and "three committees"? These are basically clear in the system setting, but in practice, these will deviate due to various factors. Setting of system must not be changed as the leaders change, and must not be changed as the views and attention of leaders change. Therefore, we should focus on the work of system and supervision. In addition, we should need to strengthen education, so that the established system and supervision are internalized as the cultural factors of the cadres, the party members and the masses. But this needs "cultural soil", incessant optimization of the grass-roots democracy and political environment and increasing enthusiasm of villagers to participate in politics. However, it is a long, arduous, and complicated process.

## 4 Conclusion

In the light of the history of birth of the first villagers' committee, the villagers' self-governing originating from the grass root is from the inner rural society, a kind of residents' self-integration, with the characteristics of social spontaneity and self-organization. However, the villagers' self-governing rises from social spontaneity to national system, and is universally promoted and popularized across the country, which is the result of the national drive. The state, as this kind of governance body smacking of democratic colour, is to reconstruct the rural order, a process of "democracy to the countryside", and a process of using the way of democracy to re-integrate the rural society and the state empowering the people<sup>[4]</sup>. In this context, the villagers' self-governing system emerges, whose development is bound to be impacted by the national policy, inseparable from the modern national administrative drive. It is noteworthy that the national administrative drive is also a "double-edged sword". On the one hand, it plays the positive role in promoting the development of the villagers' self-governing. But on the other hand, using administration to promote the villagers'

self-governing, is likely to cause that the development of the villagers' self-governing is under the administrative pressure, and in the predicament of development. After all, the footing of using administration to promote the villagers' self-governing, is still a kind of external integration of villages. As an external "embedded" institutional arrangement, the growth of the villagers' self-governing also needs a kind of democratic theory based on the rural society, so as to maintain and consolidate this rural democratic citadel. If the rural community lacks effective internal organization mechanism, once the external integration mechanism changes, it easily falls back into "governance vacuum". The new model of "rule by three committees" mentioned in this paper, also expects the improvement of the internal operation of the villagers' self-governing. By further refinement on the procedures, and further coordination on the system, it can provide organization guarantee for improving the villagers' self-governing system, thus combining the top-down national integration and the bottom-up social growth.

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support of government and the serving subjects of financial organizations are the comprehensive rural cooperative organization. The financial service relations among rural cooperative organization and rural households have decreased the transaction costs and solved the problem of excessive high transaction costs. After solving the two restriction factors, the profit level of rural areas is improved and the credit trade costs have decreased. Besides, the external capital will flow to rural areas spontaneously. Thus, the low efficiency and deviated

structure caused by externality of capital and financial organization can be solved. Transforming the financial support from externality to internality and marketizing rural financial market can effectively solve the efficiency of rural finance.

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