Acta Technica *62* (2017), No. 7A, 1125–1138

Dynamic analysis and comprehensive evaluation for rural finance influenced by regional economic difference based on DEA model

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Abstract. The Thesis firstly researched related theories about financial resources, and definition of the Thesis about rural financial resources was proposed pertinently. Then current state for Chinese rural financial resource allocation was analyzed, respectively including analysis for agriculture-related loans, financial support in agriculture, financial institutions, financial products and financial system. Then efficiency evaluation index system of the Thesis was established, and empirical analysis for efficiency was conducted by utilizing DEA model on this basis. Then efficiency result was provided with static statistics analysis. It is shown in research result that overall allocation efficiency for Chinese rural financial resources is low, and rural financial efficiency input represents rule for decreasing returns to scale. Environment for rural financial development and lagging for system factors are the main factors to cause lower efficiency in rural financial resource allocation; management level for rural financial institutions shall be improved and support for rural economy shall be more emphasized.

Key words. DEA model, Regional economic difference, Financial dynamic analysis, Comprehensive evaluation.

1. Introduction

Our country is a great agricultural country, and rural development has always been concerned by the country. After founding of the country, rural economy got a certain recovery, and capital circulating in market gradually increased. Thus rural finance came into being. But rural capital remaining in circulation was not enough to meet demands for expanded production in rural areas, and rural development was constrained. Under this kind of background, usury occurred in large amount.

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Although usury could solve capital in development in a short time, but it brought about many instabilities to rural economic development. In order to restrain usury expansion, and strengthen management of rural financial market, Chinese government proposed route of strengthening rural financial service and developing rural credit cooperation on national rural financial working conference in 1951. Rural finance developed vigorously later, and banks set branches in counties and villages one after another. Even some branches had been set in town, and rural credit cooperation institutions developed very rapidly. But about 20 years after that, due to various reasons, development in rural finance tends to stagnate.

After the Third Plenary Session of the Eleventh Central Committee in 1978, Chinese rural finance begun to recover, and rural financial system reform subject to agricultural banks and Rural Credit Cooperatives as the subjects had been continuously promoted at the same time. Through stage reform and policy adjustment for several times, rural financial system dominated by financial organization, subject to rural credit cooperatives as subject and other rural financial institutions as supplement had been formed. In recent years, Chinese agricultural industrialization has developed gradually, and capital demand has been more vigorous and various. In contrast of leap development of urban financial system, Chinese rural financial and economic development presents more and more incongruous. Contradiction for relatively lagging financial development and increasingly financial demands in rural areas has been strengthened, and it is urgently needed to break though original mode of rural finance. From Third Plenary Session of the Eleventh Central Committee, reform innovation for rural financial development has been concentrated, but it turns out that development is not so smooth. Although scale operation has been continuously promoted, problem of difficulty in loan and financing is not effectively solved. Due to lacking capital, abandoned family farms still occur occasionally. Faced with a series of difficult problems for rural development, in order to further develop rural economy, China proposed new thinking for new rural construction after 1903, that is to let city lead village and industry re-feed agriculture to promote urban and rural harmonious development for urban-rural integration. The 18th National Congress of the Communist Party of China has focused on "promoting urban-rural integration development". A series of new thinking for rural development was proposed clearly. Quickening rural financial system innovation, strengthening responsibilities for financial institutions servicing three agricultural problems, and incorporating issuing of agriculture-related loan into assessment system were clearly proposed in *Several Opinions about Comprehensively Deepening Rural Reform and Quickening Promoting Agricultural Modernization* this year. New rural financial institutions shall be positively developed, and development for rural bank, small-amount loan company and rural foundation shall be promoted. These measures are leaping for rural financial system development, greatly breaking through fence of old rural financial system. Economic society development is jointly promoted by many resource factors, and traditional opinion is to take labor, capital and land as three core elements of economic development. But with the economic development, significance of technology and knowledge is increasingly protruded. It is proven in economic development practices that promotion function of finance in economic development can not be neglected,

and financial resource attribute is becoming more and more obvious. It is shown in researches of history that finance can play about two percent role. At the time of financing promoting economic development, it is also going through the process from quantitative change to qualitative change. But financial qualitative change is the key of financial development. Problem of researching financial development lies in researching how to effectively allocate financial resources. Finance is also the deployed resource, and it can also deploy other resources at the same time. Modern economic growth needs first deployment of capital, and it is needed that financial system plays deployment role to guide others such as deployment for personnel and material. In financial economic age, it is not possible to talk about economy without finance, and financial economic age provokes problem of financial resource allocation and efficiency research. Reasonably conducting effective allocation for financial resources is the only road to realize financial sustainable development.

Finance is the core of modern economy, and is also the important factor of rural economic development, playing a key role in solving three agricultural problems. At current stage, it is hard for Chinese rural finance to play this kind of role, and the reason is that Chinese rural finance stays in non-balance state in structure and capital allocation. Although market mechanism can effectively conduct allocation of financial resources. Due to retreating of commercial finance and defects existing in rural credit cooperatives, market mechanism in rural areas is very limited, and financial resource allocation efficiency is low and faces serious capital outflow. Under this circumstance, letting rural finance develop freely, allocation for rural financial resources can not be effectively realized, and function of finance supporting three agricultural problems can not be realized. Therefore, researching how to effectively allocate rural financial resources is very important.

2. Construction for efficiency evaluation index system of rural financial resource allocation

2.1. Relation between rural financial resource allocation and rural economic development

According to definition in the Thesis and subject to research result of Professor Bai Qinxian for reference, contained range of financial resources is relatively wide, and it can be said that it comprehensively generalizes all aspects of financial development system (financial institution system, financial supervision system, financial market system, and financial environmental body), or financial ecological system [57]. Without regard to regulations, under economic condition of market, relation between rural financial resource allocation and rural economic development is shown in Fig.1 and Fig.2: abscissa axis represents financial rural development state in one area (in direct proportion to rural financial development degree and rural financial resource input), and vertical axis represents rural economic development state (in direct proportion to the total rural economy). U Curve represents utility level, and it is allocation utility or allocation efficiency of rural financial resources. Slash is budget constrain line for rural financial resource allocation, representing input of

rural financial resources, hereinafter referred to as budget line. Simplified model is subject to financial development state as input, and subject to financial development as output. When other conditions are unchanged, under this ideal state, economic level and financial development will reach some relative balanced state.

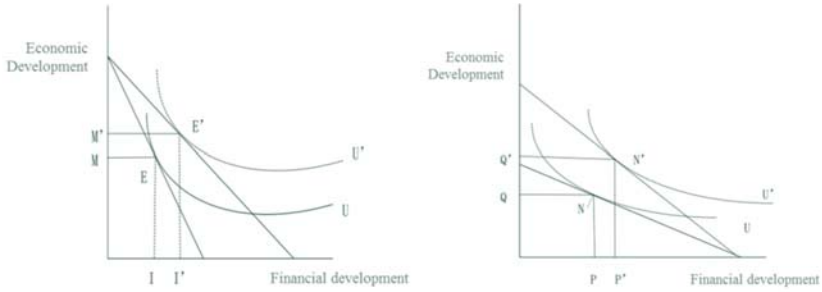

Fig. 1. Relation between rural financial resource allocation state and rural economic development

2.2. Establishment for evaluation index system of financial resource allocation

Allocation for rural financial resource shall be subject to principle of benefit and equity combination. Allocation function of market mechanism on financial resource shall be fully exerted to guide financial resources for fund and capital to flow to fields with higher investment income and promote economic development, and balance of regional economic development shall be considered at the same time. Financial support shall be infused into areas with bad resource endowment to support and set up financial market development in these areas, promote rural industry upgrade and economic development in disadvantaged areas, positively guide them to set up ecological environment with sound finance and economic development to prevent a series of problems brought about by too large economical difference and promote benign development of regional economy. It is thought in the Thesis that the objective of rural financial resource allocation is to promote realization for the maximum of rural economic output effect through acting on other rural input elements under some financial resource input. It is assumed in the research that: in case rural financial resources are provided with effective deployment, economic development level in rural areas will be improved due to this. On the contrary, in case allocation efficiency for rural financial resource is low, it means that flow direction for financial resource is not beneficial to improving regional economic development level and promoting improvement in living standard for residents. It is represented as a waste of financial resources, so rural economic development is restricted.

As shown in the following Table 3-2, rural economic input-output index shall be established, then corresponding change shall be made according to research purpose in the Thesis. Other social environmental influence factors are not considered in the Table.

Table 1. Rural economic input-output index

	Code symbol	Element name
Input index	X	Financial resource X
	V	Human resource V1
		Production material capital V2
Output index	Y	Economic development level Y1
		Living standard of residents Y2

As shown in Table 3-2, rural economic input element is financial resource X, human resource is $V1$, and production material resource is $V2$. Input beyond financial resources shall be marked as others (or called unexpected) input $V = V1+V2$. According to output demand of the Thesis, economic development level shall be supposed as $Y1$, living level for residents as $Y2$, and output index shall be supposed as $Y = Y1 + Y2$. Output Y = input X+input V, and addition here is not just simple arithmetic sum but represents one kind of positive function relation. Or it can be said that Y=$\{Y1, Y2\}$, V=$\{V1, V2\}$ and Y=$\{X, V\}$, and "+" in the Thesis can be taken as one kind of simplified expression mode.

Combining with the analysis in the above, input-output system index based on the research purpose in the Thesis shall be given. Other economic social environment factors shall be analyzed later. Specific index system is shown in the Table 2.

Table 2. Input-output index system of efficiency evaluation

	Symbol	Element name	Specific index			
Input index	X	Financial resource X	Agriculture-related loan X1	Financial support in agriculture X2	The number of small financial institution in rural areas X3	Financial practitioner X4
	-V	Human resource V1	Rural residents V1			
		Production material capital V2	Investment in agricultural fixed assetsV21		Land V22	
Output index	Y	Economic development level Y1	Agricultural GDP Y1			
		Living l evel of resident Y2	Rural per capita net income Y21		Y22 Engel's coefficient Y22	

Financial resource X was analyzed in the Thesis subject to 29 provinces as desicion-making unit DMU in 2012, including $X1$ agricultural-related resource, $X2$ capital of financial support in agriculture, $X3$ the number of small financial institution in rural areas and $X4$ practitioner in small rural financial institution. Output

V includes $V1$ human resource and $V2$ production material capital, of which $V1$ includes rural resident quantity, $V2$ includes investment in rural fixed-assets $V21$, and agricultural land area $V22$, and output Y includes $Y1$ rural economic development condition and living condition of resident $Y2$. $Y1$ is the total amount of agricultural GDP specifically, and $Y2$ is per capita pure income $Y21$ for rural residents and Engel's coefficient $Y22$. For the number sum of input output of DEA model is about $1/3$ to $1/2$ of DMU under empirical condition, there are not many input-output indexes in the Thesis.

3. Method for data envelopment analysis (DEA)

Data envelopment analysis (data envelopment analysis, DEA) was proposed by famous operational research experts Charnes, Cooper and Rhodes in 1978. It was subject to relative efficiency concept as the basis, subject to convex analysis and linear planning as tools to calculate and compare relative efficiency between decision making unit (Decision making unit, DMU) with the same type , and evaluate evaluation object based on this. DEA was favored by many scholars for its unique advantages once it appeared, and it is now applied in performance evaluation in all fields. Before introducing principle of DEA method, several basic concepts shall be introduced firstly:

3.1. Decision making unit

One economic system or one production process can be deemed as an activity producing some quantity of "products" through inputting production element of some quantities by one unit (or one department) within some possible scope. Although specific contents of this kind of activity differ, its purpose is to make this activity obtain the maximum "benefit" as much as possible. For it can be realized from "input" to "output" through a series of decision making, or it can be said that "output" is the decision result. Therefore, such unit (department) is called decision making unit (DMU). Therefore, it can be thought that every DMU (the i DMU is recorded as DMU_i) represents some economic meaning, and its basic characteristic is that it has some input and output. Own decision making objective is realized with efforts during the process of transferring input to output.

Under many circumstances, we are more interested in many DMUs of the same type. So called DMU of the same type refers to DMU set having the following three characteristics: having the same objective and task; having the same external environment; having the same input and output index.

3.2. Production possibility set

Suppose that there m input in some economic (production) activities in some DMU, it can be written into vector form $x = (x_1, \cdots, x_m)^T$; there are s output, and it can be written into vector form $y = (y_1, \cdots, y_s)^T$. Therefore, we can use (x, y) to express the whole production activity of the DMU.

Definition1. Set is called production possibility set composed of all possible production activities.

At the time of using DEA, it is generally supposed that production possibility set T meets the following four axioms.

Axiom 1(ordinary axiom): $(x_j\ ,\ y_j)\ \in T\ ,\ j=1\ ,\ 2\ ,\ \cdots\ ,\ n$

Axiom 2 (convexity axiom) : set T is convex set. In case $(x_j\ ,\ y_j)\ \in T\ ,\ j=1\ ,\ 2\ ,\ \cdots\ ,\ n$, and there is $\lambda_j \geq 0$ meeting $\sum_{j=1}^{n} \lambda_j = 1$, that is $(\sum_{j=1}^{n} \lambda_j x_j,\ \sum_{j=1}^{n} \lambda_j y_j) \in T$.

Axiom 3 (ineffectiveness axiom): in case $(x,y) \in T\ ,\ \hat{x} \geq x\ ,\ \hat{y} \leq y,\ (\hat{x}\ ,\ \hat{y})\ \in T$

Axiom 4 (cone axiom): set T is cone. In case $(x,y) \in T$, $(kx,ky) \in T$ for any $k>0$.

In case production possibility set T is the smallest one meeting Axiom 1, 2, 3 and 4, T has the following only expression form.

$$T=\left\{(x,y)\,|\sum_{j=1}^{n} x_j\lambda_j \leq x\ ,\ \sum_{j=1}^{n} y_j\lambda_j \geq y\ ,\ \lambda_j \geq 0\ ,\ j=1\ ,\ 2\ ,\ \cdots\ ,\ n\right\}.$$

(1) Technical efficiency: for any $(x,y) \in T$, in case there is no $y' > y$ and $(x,y') \in T(x,y) \in T$ can be called production activity of technical efficiency.

(2) Scale benefit: relative variation ratio $k = \frac{y}{y}/\frac{x}{x}$ of output and input in the same period is called scale benefit. In case $k>1$, it shows that scale benefit increase, and increasing input can be considered at the same time; in case $k<1$, it shows that scale benefit decrease, and input can be considered to be decreased; in case $k=1$, it shows that scale benefit is not changed, and it is called scale benefit.

3.3. DEA method principle and CCR model

Basic principle of DEA method: supposing there are n decision making units $DMU_j(j=1,2,\cdots,n)$, their input and output vectors are respectively: $X_j = (x_{1j},x_{2j},\cdots,x_{mj})^T > 0$, and $Y_j = (y_{1j},y_{2j},\cdots,y_{sj})^T > 0, j=1,\cdots,n$. For status and function of all kinds of input and output differ during the process of production, its input and output shall be "combined" in case of evaluating DMU that is to deem them as one production process having one input totality and output totality. Thus every input and output shall be endowed with proper weight. Supposing that weight vector for input and output are respectively $v=(v_1,v_2,\cdots,v_m)^T$ and $u=(u_1,u_2,\cdots,u_s)^T$, the following definitions can be obtained.

Definition 2. $\theta_j = \frac{u^T Y_j}{v^T X_j} = \frac{\sum_{r=1}^{s} u_r y_{rj}}{\sum_{i=1}^{m} v_i x_{ij}}$, $(j=1,2,\cdots n)$ is called efficiency evaluation index of the j decision making DMU_j.

It can be known from definition that we can select proper weight vector to make $\theta_j \leq 1$. In case you want to know some decision making unit, supposing that DMU_o $(o \in \{1,2,\ldots,n\})$ is not the "optimal" relatively in these decision making units, the maximum can be investigated when u and v change as much as possible? In order to measure value of θ_o, Charnes et al. proposed the following model in

1987:

$$\begin{aligned} Maximize \quad & \frac{\sum_{r=1}^{s} u_r y_{ro}}{\sum_{i=1}^{m} v_i x_{io}} = \theta_o \\ subject\ to \quad & \frac{\sum_{r=1}^{s} u_r y_{rj}}{\sum_{i=1}^{m} v_i x_{ij}} \le 1, j = 1, 2, \cdots, n, \\ & u_r \ge 0, v_i \ge 0, \ \forall r, i. \end{aligned} \tag{1}$$

Utilize Charnes-Cooper conversion of fractional programming proposed by Charnes and Cooper (1962): $t = 1/\sum_{i=1}^{m} v_i x_{io}$, $\mu_r = tu_r, (r = 1, \ldots, s)$ and $\omega_i = tv_i, (i = 1, \ldots, m)$ we can obtain the following linear planning model after conversion:

$$\begin{aligned} & Maximize \ \sum_{r=1}^{s} \mu_r y_{ro} = \theta_o, \\ & \text{subject to } \sum_{i=1}^{m} \omega_i x_{io} = 1, \\ & \sum_{r=1}^{s} \mu_r y_{rj} - \sum_{i=1}^{m} \omega_i x_{ij} \le 0, \ j = 1, \ldots, n, \\ & \mu_r, \omega_i \ge 0, r = 1, \ldots, s; \quad i = 1, \ldots, m. \end{aligned} \tag{2}$$

According to related basic theories of linear programming, expression form for dual problem of model (2) can be known:

$$\begin{aligned} Minimize \quad & \theta_o \\ subject\ to \quad & \sum_{j=1}^{n} x_{ij} \lambda_j \le \theta_o x_{io}, \ i = 1, 2, \ldots, m, \\ & \sum_{j=1}^{n} y_{rj} \lambda_j \ge y_{ro}, r = 1, 2, \ldots, s, \\ & \lambda_j \ge 0, \ j = 1, \ 2, \ \ldots, \ n. \end{aligned} \tag{3}$$

The above model is based on the "optimal" decision making unit in all decision making units for reference object to obtain the relative efficiency of which is less than or equal to 1. Model (2) or (3) will be solved for n times, and relative efficiency of per decision making unit can be obtained per time. Economic definition of model (3) is: in order to evaluate performance of DMU_o ($o \in \{1, 2, \ldots, n\}$), one set of combination decision making unit can be used to compare with it. Right hand members of the first and the second constraint condition in Model (3) are input and output of this combination decision making unit. Therefore, model (3) means that

in case the optimal value of efficiency obtained is less than 1, and it shows that such one imaginary decision making unit can be found out, and it can be subject to input less than evaluated decision making unit to obtain output more than this unit, which shows that evaluated decision making unit is non DEX effective. When efficiency value is 1, decision making unit is DEA effective. Related DEA effective are zero according to slack variable can be divided into two kinds of weak DEA effective and DEA effective that is to judge according to investigating value $s_i^-(i = 1, \ldots m)$ and $s_r^+(r = 1, \ldots, s)$ of in the following model.

$$\begin{aligned} &Minimize\ \theta_{\mathrm{o}} - \varepsilon(\sum_{i=1}^{m} s_i^- + \sum_{r=1}^{s} s_r^+) \\ &subject\ to\ \sum_{j=1}^{n} x_{ij}\lambda_j + s_i^- = \theta_o x_{io},\ i = 1, \ldots, m \\ &\sum_{j=1}^{n} y_{rj}\lambda_j - s_r^+ = y_{ro},\ r = 1, \ldots, s \\ &\lambda_j, s_i^-, s_r^+ \geq 0,\ \forall i, j, r. \end{aligned} \tag{4}$$

Of which ε is Non-Archimedean infinitesimal.

Effectiveness definition of evaluated decision making unit DMU_o $(o \in \{1, 2, \ldots, n\})$ is given according to the above model:

Definition 3. In case the optimal solution of model (4) meets $\theta_o^* = 1$, DMU_o can be called weak DEA efficiency.

Definition 4. In case the optimal solution of the model (4) meets $\theta_o^* = 1$, and $s_i^- = 0$ and $s_r^+ = 0$ is workable, DMU_o can be called DEA efficiency.

Definition 5. In case the optimal solution of model (4) meets $\theta_o^* < 1$, DMU_o can be called non-DEA efficiency.

In case of decision making unit of non-DEA efficiency, there are three kinds of modes to improve decision making unit to efficient decision making unit: maintain output unchanged, and decrease input; maintain input unchanged and increase output; decrease input and increase input at the same time. DMU decrease and input increase are allowed at the same time in CCR model. In case of CCR model, it can be projected to efficiency frontier through the following projection mode, and point input-output combination obtained through projection is DEA efficiency.

$$\begin{aligned} &\hat{x}_{io} = \theta_o^* x_{io} - s_i^{-*} = x_{io} - (1 - \theta_o^*)x_{io} - s_i^{-*} \leq x_{io}, i = 1, \ldots, m \\ &\hat{y}_{ro} = y_{ro} + s_r^{+*} \geq y_{ro}, r = 1, \ldots, s. \end{aligned}$$

Difference between the value obtained through the above projection and original input-output value is evaluated as numerical value that shall be improved reaching efficiency of evaluated decision making unit, supposing input variation is x_{io}, and output variation is y_{ro}:

$$\begin{aligned} &x_{io} = x_{io} - \hat{x}_{io} = x_{io} - (\theta_o^* x_{io} - s_i^{-*}),\ \ i = 1, \ldots, m \\ &y_{ro} = \hat{y}_{ro} - y_{ro} = (y_{ro} + s_r^{+*}) - y_{ro},\quad r = 1, \ldots, s. \end{aligned}$$

3.4. Geometric mean efficiency model

In order to distinguish difficulty in order of efficient decision making unit, Wang et al. (2007) proposed pessimistic efficiency model, combined it with optimistic efficiency model, and proposed double-frontier data envelopment analysis method. Data envelopment analysis model based on pessimistic frontier is:

$$\begin{aligned} &Minimize \quad \phi = \sum_{r=1}^{s} \mu_r y_{ro}, \\ &subject\ to \quad \sum_{i=1}^{m} \nu_i x_{io} = 1, \\ &\qquad \sum_{r=1}^{s} \mu_r y_{rj} - \sum_{i=1}^{m} \nu_i x_{ij} \geq 0,\ j = 1,\ 2,\ \ldots,\ n, \\ &\qquad \mu_r, \nu_i \geq 0,\ r = 1,\ 2,\ \ldots,\ s;\ i = 1,\ 2,\ \ldots,\ m, \end{aligned} \tag{5}$$

Of which μ_r and v_i are non-negative weights. Difference of model (12) and model (2) lies in: efficiency obtained through model (12) calculation is more than or equal to 1, but efficiency value obtained through model (2) is less than and equal to 1. Double-frontier data envelopment analysis method is to integrate efficiency obtained in model (12) and model (2) through geometric mean mode, that is:

$$\varphi_o^* = \sqrt{\phi_o^* \cdot \theta_o^*}\,. \tag{6}$$

Of which φ_o^* is efficiency value DMU_o ($o \in \{1, 2, \ldots, n\}$) of after integration, but θ_o^* and ϕ_o^* respectively correspond to the optimal efficiency value of decision making unit under model (2) and model (12). The following is one diagram of efficient frontier and inefficient frontier.

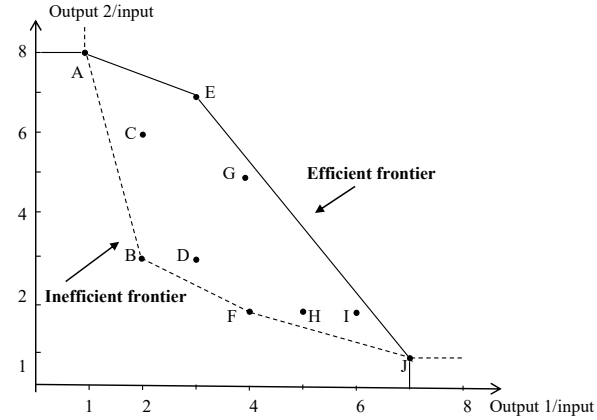

Fig. 2. Efficient and inefficient frontier of decision making unit

4. Empirical analysis

4.1. Relation between rural financial resource allocation efficiency and regional economic development level

In order to further explore relation between rural financial resource allocation efficiency level and economic development degree, subject to GDP as division standard, 29 provinces shall be respectively divided into 10 provinces with higher GDP, and 10 provinces with intermediate GDP and relatively low GDP. It can be seen from the following Table 3 that there is no obvious difference between rural financial resource allocation efficiency and regional GDP, and there is no correlation between rural financial resource allocation level and economic development degree. Therefore, there is no scientific basis for thinking that rural financial resource allocation efficiency in economic developed areas is relatively high or rural finance can be improved through inputting rural financial resource in areas with financial difficulties.

Table 3. Statistic of efficiency value under different GDP distribution

Group	Observed reading	Sum	Average	Variance
GDP high	10	7.896514	0.789651	0.053665
GDP intermediate	10	7.569614	0.756961	0.0963
GDP low	9	7.164949	0.796105	0.193313

Projection analysis for production frontier is aimed at provinces and cities with inefficient combined efficiency. Through projecting its production frontier, use condition of its element input can not only be understood, analyze reason for its inefficiency can also be analyzed and degree that needs to be improved of its attribute value and ideal value of input-output can be confirmed.

4.2. Input redundancy analysis

(1) Redundancy of rural financial input was analyzed based on input perspective in the Thesis, supposing that input redundancy rate is the ratio of redundancy and practical input amount, and redundancy rates for rural financial resource input in provinces with inefficient relative efficiency are listed in the following table 4.

It can be seen from Table 4 that the average redundancy rate of agriculture-related loan is 0.39, and the average redundancy rate of financial support in agriculture is 0.22. Redundancy rate of standard small and medium-sized financial institutions in rural areas is 0.42, and the highest redundancy rate of practitioner in small and medium-sized financial institutions is 0.53. It is shown that increase of rural financial institution and practitioner will not promote improvement in rural financial resource allocation efficiency under current technical level. Input redundancy of related provinces shall not be listed in the Thesis.

Table 4. Input redundancy rate in inefficient provinces

Inefficient provinces	Redundancy rate of agricultural-related loan	Redundancy rate of financial support in agriculture	Redundancy rate of financial institutions	Redundancy rate of financial practitioner
Hebei Province	0	0	0.082505	0.117139
Shandong Province	0.200871	0	0.156683	0.18278
Liaoning Province	0.190321	0	0.062721	0.338214
Heilongjiang Province	0.016251	0	0.222408	0.424652
Guangxi	0.166332	0	0.238923	0.404239
Jilin Province	0.12693	0.018886	0.335998	0.585774
Xinjiang	0.455603	0.288587	0.041483	0.317025
Anhui Province	0.32281	0.010708	0.309953	0.565623
Jiangsu Province	0.740672	0.120137	0.269348	0.404561
Sichuan Province	0.360729	0.052468	0.573579	0.668659
Yunnan Province	0.49397	0.40966	0.422279	0.412656
Guangdong Province	0.371893	0.21525	0.532274	0.629989
Shaanxi Province	0.316252	0.301126	0.613339	0.612898
Inner Mongolia	0.411893	0.379412	0.456783	0.663629
Jiangxi Province	0.468414	0.287721	0.579202	0.649394
Chongqing City	0.535905	0.375224	0.717926	0.646568
Gansu Province	0.522721	0.486892	0.657438	0.670998
Zhejiang Province	0.729636	0.318441	0.670083	0.71397
Guizhou Province	0.55386	0.546499	0.669425	0.678532
Shanxi Province	0.77352	0.518801	0.774981	0.845582
Average	0.387929	0.216491	0.419367	0.526644

(2) Mean values for input redundancy according to regions are listed in the following Table 5:

Table 5. Different regional distributions for mean value of input redundancy rate

	Redundancy rate of agriculture-related loan	Redundancy rate of financial support in agriculture	Redundancy rate of the number of financial institutions	Redundancy rate of financial practitioner
Northeast	0.111167	0.006295	0.207043	0.449547
East	0.335786	0.254694	0.264116	0.358616
West	0.347364	0.25817	0.440064	0.491199
Middle part	0.263778	0.181381	0.277356	0.343433

It can be obtained from Table 4-5-a that input redundancy degree of agriculture-related loan, the west $>$ the east $>$ the middle $>$ the northeast: input redundancy degree of financial support in agriculture, the west $>$ the east $>$ the middle $>$ the

northeast: redundancy degree of financial institution, the west > the middle > the east> the northeast; input redundancy degree of financial practitioner, the west > the northeast> the east > the west. It can be seen that input redundancy in all aspects in western parts is the largest, and the country greatly supports the Western Development and continuously increases financial input, which does not bring about financial development but presents input redundancy. Mode and method improvement for financial resource allocation shall be emphasized for rural financial development in western areas.

5. Conclusion

Rural financial development is the important link related to rural economic development, and efficiency for rural financial resource allocation is the core problem of rural financial development research. Rural financial resource includes elements for rural financial institution, financial products, capital and financial legal system etc., and these elements jointly act on rural economy, guide allocation of rural production resource, and deeply affect rural economic development. Allocation efficiency of provincial rural financial resources in China was researched in the Thesis. The Thesis firstly researched related theories about financial resources, and the word of financial resource firstly occurred in the western countries. But there were not many researches about it, and there were more researches of Chinese scholars about financial resources. At the time of scholars at home and aboard researching financial resources, due to different research perspectives, its definition can not be unified. It is thought in the Thesis that rural financial resource is the financial system serving rural areas with agriculture-support characteristics, including financial capital, financial system, financial environment, tool personnel and environment etc.. All these compose rural financial ecological system. Current state of Chinese rural resource allocation was analyzed then, including analysis for agriculture-related loan, financial support in agriculture, financial institution, financial product and financial system. Issuing of agriculture-related loan has very large regional difference, and regional difference of financial support in agriculture has little difference. Rural financial institutions mainly include formal finance, and informal fiance, and new rural financial institutions for rural bank, small-loan company and mutual fund cooperatives etc. receive national support. They are mainly distributed in the western areas, and informal financial institutions are suppressed by the state. Rural financial reform system in China has gone through reform of more than 30 years, and gone through three stages of ups and downs. It is now embracing new development opportunity. Correlation between rural finance and rural economy was analyzed. Rural finance and rural economic development are inseparable, and they can promote each other. Therefore, developing rural finance is very necessary to rural economy development.

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Received May 7, 2017