Research on the Development of Inclusive Finance in Rural China from the Perspective of Supply and Demand

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Abstract. This paper reviews the development of inclusive finance in China, and theoretically analyzes the factors that lead to the imbalance of rural financial supply and demand. Rural financial supply will be affected by financial repression. In addition, effective market regulation will promote the increase in rural financial demand. However, the development of inclusive finance in rural areas of China faces many constraints such as insufficient rural financial supply, rural financial repression, uncertainty and asymmetry in agricultural risks and returns, and excessive government intervention. These factors will constrain the development of rural inclusive finance. Therefore, the author puts forward some policy recommendations to promote rural financial development.

Introduction

The inclusive financial system aims to provide services to all social strata and groups effectively and comprehensively to solve the issue of financial exclusion. It is a revision and improvement of the original financial system. Both developing and developed countries agree that the concept of inclusive finance is not country-specific and that all countries around the world face the same problems of understanding, developing and rebuilding inclusive financial systems, only in developing countries. The demand for inclusive finance is stronger, and financial exclusion is more acute, especially in rural areas of developing countries, and has become an important constraint on rural economic development. As the largest developing country, China should take into account its national conditions and conditions when addressing the issue of financial exclusion. Take the initiative and be a responsible country. In 2012, At China's top leaders at the G20 summit, the concept of "inclusive finance system" was fully interpreted and held in November 2013. At the meeting, the new concept of "developing inclusive finance" was put forward, and the development of inclusive finance system was regarded as financial deepening reform is an important part of it. In October 2015, the fifth plenary session of the 18th central committee of the communist party of China (CPC) stated again that it should be strengthened. Small and micro businesses and low-income people to provide financial services to implement the "innovation, coordination, green, open, and the concept of "share", the development of inclusive finance. During the 13th five-year plan period, the country will build a inclusive financial system, so as to we will raise the development strategy of inclusive finance. The response to financial development is also a summary and reflection on the practice of inclusive finance in China. Financial exclusion occurs mainly in rural areas, and the core of establishing inclusive financial system is also in rural areas. Whether economic subjects can get equal banking services as other economic subjects directly determines the development level of inclusive finance in a country. In recent years, the degree of financial marketization in China has increased rapidly, and the marketization and commercialization of China's banking industry has been constantly improving. However, in the process, the financing difficulties faced by rural low-income people and small and medium-sized enterprises have not been effectively solved, but have intensified. Rural financial exclusion is increasing. As domestic scientific research institutions and relevant scholars have gradually deepened their research on the "inclusive financial system", China has drawn on the beneficial experience of foreign inclusive financial development and formally brought the development of inclusive finance to the strategic level. The target of inclusive financial services will
be focused on vulnerable groups such as small and micro enterprises, farmers, urban low-income
groups, and poor people. The construction and improvement of the rural inclusive financial system
is the focus of the perfection of the Chinese financial system. Therefore, it is of great theoretical and
practical significance to study the development of rural finance and take inclusive finance as an
important symbol of the development and perfection of rural finance.

Chinese Rural Finance Supply and Demand Game Model and Inclusive Financial Constraint

Game Model Analysis of Rural Financial Supplier in China

In China, financial services are provided not only to formal financial institutions such as
commercial banks, but also to informal financial institutions such as rural cooperative foundations,
pawnshops and private loans. At present, China's rural financial system is being improved and the
capacity for inclusive financial services continues to improve. In China, rural credit cooperatives,
village banks and other new rural financial institutions together constitute the main body of the
Chinese financial system. The survey found that by the end of 2016, there were more than 80, 000
agricultural institutions in China, of which more than 4, 000 were rural credit cooperatives, and the
relative number of rural cooperative banks and village and township banks was relatively small.
The increase in the number of financial institutions has effectively increased the supply level of
inclusive finance. Rural financial institutions include commercial banks, Postal savings, rural credit
cooperatives and other new types of financial institutions such as village and township banks. As a
service provider of inclusive finance, the development of financial institutions directly affects the
realization of inclusive finance.

Assumptions and their interpretation

Assume that rural credit providers are individual. The supply of credit funds is the same as that
of rural credit supply. The sum of the credit funds provided by each person in a specific area to the
rural financial market is the overall financial supply of the rural financial market.

The following assumptions are made for rational individuals:

Assumption1: The average price of productive consumer goods is $P_x$. Productive consumption
expenditure is $X_i$ units.

Assumption2: Rural credit fund supply is $S_i$ unit, Provide the opportunity cost of fund of every
unit rural credit to supply for $P_c$.

Assumption3: The expected revenue of the company is $M_i$.

Assumption4: the utility of consumption $x_i$ units of productive consumer goods and of the
supply of rural credit funds of $s_i$ units is recorded as $U_i = U_i(x_i, S)$ And this utility $U$ is
decreasing with respect to the marginal utility and marginal substitution rate of $x_i$ and $S$, that is:

$$
\begin{align*}
\frac{\partial U_i}{\partial x_i} &< 0 \\
\frac{\partial U_i}{\partial S} &> 0
\end{align*}
$$

$$
MRS_{x_i} = \frac{\partial U_i / \partial S}{\partial U_i / \partial x_i}
$$

MRSs, is a subtractive function of $S$.

Construction and Solution of Game Model

Under the above assumptions, n rational individuals provide rural credit funds in specific areas.
The optimization problem of total $S$ can be reduced to a complete information static game model:

$$
MAX U_i = U_i(x_i, S)
$$

among, And $M_i = p_x \cdot x_i + p_c \cdot s_i$
Each rational behavior individual $i$ pursues the maximization of its own interests in the same environment, and will select the optimal strategy $(X_i, S)$ to maximize the following Lagrangian functions:

$$L_i = U_i(x_i, S) + \lambda(M_i - p_x \cdot x_i - p_c \cdot s)$$

among $S = \sum_{i=1}^{n} S_i \ i = 1, 2, ..., n$

A Lagrangian coefficient in Formula.

In order to maximize utility, the first order condition for optimization is:

$$\begin{align*}
\frac{\partial U_i}{\partial x_i} - \lambda \cdot p_x &= 0 \\
\frac{\partial U_i}{\partial S} - \lambda \cdot p_c &= 0 \\
MRS_{S_{x_i}} &= \frac{\partial U_i/\partial S}{\partial U_i/\partial x_i} = \frac{p_c}{p_x}
\end{align*}$$

The above expression shows that, as a rural credit organization, $n$ rational behavior individuals, in the supply of rural credit funds, if each rational behavior individual proceeds from its own interests, it will get a Nash equilibrium. The total supply of credit funds is: $(s_1^l, s_2^l, ..., s_n^l)$ And the total amount of credit is: $S^l = \sum_{i=1}^{n} s_i^l$ Nash equilibrium $(s_1^l, s_2^l, ..., s_n^l)$

Nash equilibrium, satisfying the above identity relation, that is:

$$MRS_{S_{x_i}}(S^{-1}) = \frac{\partial U_i/\partial S^l}{\partial U_i/\partial x_i} = \frac{p_c}{p_x}$$

$i=1, 2, 3... n$

Suppose in a specific rural areas, engaged in the business of rural credit funds of financial institutions as an individual has not independent, they in the rural areas of a particular influence each other when the rural credit supply, namely they through consultation, to unite in a particular area of rural credit supply, this constitutes an alliance of interests, or, as a whole, these financial institutions can be formed between herding effect: is their behavior of some financial institutions can imitate by groups of other financial institutions. At this time, for the whole specific area of rural credit supply situation should be considered from the overall supply of capital optimization problem. At this time, the pareto optimization problem can be reduced to the following model:

$$MAXU = \sum_{i=1}^{n} \omega_i \cdot U_i(x_i, S)$$

among , $U = \sum_{i=1}^{n} U_i \ M = \sum_{i=1}^{n} M_i \ M_i = p_x \cdot \sum_{i=1}^{n} x_i + p_c \cdot S$

Where the objective function is the weight coefficient, and $\omega_i \geq 0$. $\sum_{i=1}^{n} \omega_i = 1$. If $n$ behavioral individuals are equal in their status in the group, the interaction between them is also equal.
If the influence degree between them is not the same, that is some individuals to other individuals in the group's influence is big, some individuals to other individuals in the group's influence is small, so each individual to the group's overall credit supply utility is different, the influence of lead to utility weight in the objective function is different, so to satisfy the pareto first-order conditions can be turned into:

\[
\begin{align*}
\omega_i \frac{\partial U_i}{\partial x_i} - \lambda \cdot p_x &= 0 \\
\frac{\partial U_i}{\partial S} - \lambda \cdot p_c &= 0
\end{align*}
\]

By the above formula, we can get Pareto optimal solution \( S^2 \)

\[
\frac{\partial U_i / \partial S}{\partial U_i / \partial x_i} = \frac{p_c}{p_x}
\]

The upper form can also be written as:

\[
\frac{p_c}{p_x} - \sum_{j \neq i}^{n} \frac{\partial U_i / \partial S}{\partial U_i / \partial x_i} = \sum_{i=1}^{n} \frac{\partial U_i / \partial S}{\partial U_i / \partial x_i}
\]

Because:

\[
\frac{p_c}{p_x} - \sum_{j \neq i}^{n} \frac{\partial U_i / \partial S}{\partial U_i / \partial x_i} < \frac{p_c}{p_x}
\]

Therefore, we can obtain:

\[
MRS_{S^1_{x_i}} (S^1) > MRS_{S^2_{x_i}} (S^2)
\]

It can be seen from the above analysis that the supply of rural credit in pareto optimization is larger than that in Nash equilibrium due to function decline. This shows that for rational financial institutions, rural financial market can only provide sufficient rural credit if it is voluntary, which will also lead to insufficient credit funds for farmers. Therefore, financial institutions should be encouraged to provide farmers with adequate financial resources to ensure that farmers meet their financial needs. There are subjective reasons of financial institutions as well as objective reasons of the environment. The marketization of farmers' loan interest rate can effectively encourage financial institutions to increase credit to farmers. Only by participating in rural credit funds can we obtain expected benefits from financial institutions and truly realize the continuous operation of farmers' credit funds.

**Analysis of rural financial demand side game model**

**Assumptions and their interpretation**

Under the condition of completely free competition, farmers are not interfered with by any outside world or the supervision of rural households by financial supervision department is
seriously inadequate. The individual consumer of rural credit funds is that the farmers' demand for rural credit is \( q_i \) and the following assumptions are made:

Assumption 1: in complete market competition, the average cost of obtaining credit funds for consumers \( C(Q) \):

Assumption 2: the average income that consumers can get from using rural credit funds is \( \pi(Q) \):

Assumption 3: \( \pi(Q) \) is a minus function of the total credit demand \( Q \). \( C(Q) \) is an increasing function of the total amount of credit demand \( Q \). There are the following inequalities:

\[
\begin{align*}
C'(Q) &\geq 0 \quad (\pi'(Q) \geq 0) \\
C''(Q) &\geq 0 \quad (\pi''(Q) \geq 0)
\end{align*}
\]

Record that \( P_i \) is the profit of the rural credit fund of the peasant household \( i \) consumption \( Q \) unit, the following are:

\[ P_i = q_i[\pi(Q) - C(Q)] \]

**Construction and Solution of Game Model**

Individual farmers are considered to be rational, so \( N \) individual farmers consumption of rural credit funds optimization problem. Can be transformed into a static game model of individual complete information:

\[ \max P_i = q_i[\pi(Q) - C(Q)] \]

In style \( Q = \sum_{i=1}^{n} q_i \) \((i = 1, 2, ..., n)\).

To maximize the profits of farmers in the upper class, there are

\[ \frac{\partial P_i}{\partial q_i} = 0 \]

This is also the condition that the rational farmer individual must satisfy the best consumption of the rural credit fund, which can be expressed by the following equation.

\[ q_i^{\ast} = \pi(Q) - C(Q) + q_i \cdot [Q^2] = 0 \]

**Add** up the best demand for each individual, and the following relational formula can be obtained:

\[
\begin{align*}
Q^1 &= \sum_{i=1}^{n} q_i \\
n[\pi(Q^1) - C(Q^1)] + Q^1[\pi'(Q^1) - C'(Q^1)] &= 0
\end{align*}
\]

Further available:

\[
\begin{align*}
P^1 &= \sum_{i=1}^{n} P_i^{\ast} = Q^1[\pi(Q^1) - C(Q^1)] \\
\pi(Q^1) - C(Q^1) + \frac{Q^1}{n}[\pi'(Q^1) - C'(Q^1)] &= 0
\end{align*}
\]
Now relax the original assumptions, introduce the regulator, that is to say, the individual of the individual farmers of credit funds for regulatory allocation. Considering the interests of the farmers as a whole, the Pareto optimization problem for all farmers should maximize the profit $P$, and its first order derivative condition should satisfy the following equation:

The optimal profit is:

$$\max P = Q[\pi(Q) - C(Q)]$$

If profit $P$ is maximized, its first derivative condition should satisfy the following equation:

$$\pi(Q^2) - C(Q^2) + Q^2 \cdot [\pi(Q^2) - C(Q^2)] = 0$$

The optimal profit is:

$$P^2 = Q^2[\pi(Q^2) - C(Q^2)]$$

and because,

$$\pi'(Q) - C'(Q) \leq 0$$
$$\pi''(Q) - C''(Q) \leq 0$$

neither of them is constant equal to zero. It is therefore possible to:

$$Q^1 > Q^2 \quad P^1 < P^2$$

The above analysis shows that in the allocation of rural credit funds, if farmers' financing behavior is not subject to the constraints and adjustments of financial supervision, then the pareto optimal balance of rural credit allocation will not be achieved, because rational farmers will also pursue their own interests to the maximum. In this way, a rational individual farmer will be unable to find the Nash equilibrium of rural credit distribution, which will lead to the low allocation or efficiency of rural credit funds and affect the healthy development of rural economy.

**Constraints on Inclusive Finance Development in Rural China**

**Delayed constraints on rural economic development**

In general, the higher the level of economic development, the faster the economic growth, the more rational the industrial structure, the higher the employment rate, the income level and the level of investment in a region, the more fiscal revenue the better the financial situation, the greater the rural financial demand and the higher the level of financial development. Conversely, the lower the level of financial development. Since McKinnon and Shaw regard financial liberalization as the core theory of financial and economic development coordination from the system level, the theory of rural finance and rural economy is more complementary. The scale of rural financial transactions is an important symbol of local economic development. When economic development reaches a certain level, financial transactions will be realized, resulting in corresponding financial needs. According to the survey data of "global financial inclusion index", there are huge international differences in income level and gender among the main users of financial services. On average, developed countries have more than twice as many bank accounts as developing countries. The data also show that the service density and ATM point distribution density of Banks are significantly different at the national level. The higher the level of economic development, financial concentration and financial level, the higher the level of inclusive finance development. Conversely, the development level of inclusive finance is lower.

From China's situation, after the reform and opening up today compared with the beginning of the reform, rural inclusive finance has a fundamental sex changes, cannot deny, this and level of our country economy development advance by leaps and bounds, dweller can pay income to rise apparently to wait having the most direct concern.
In the central and western regions, especially in the western region, although having good financial resources, but its financial resources outflow phenomenon is very serious, because of its rural areas without good social and economic conditions, unable to realize the effective expansion of capital, cause the outflow of rural capital unceasingly, the rural financial development scale cannot satisfy the economy development condition, rural lack effective financial demand, weak infrastructure and rural finance, rural financial institutions in the node distribution density is low, the rural credit shortage and further inhibit the rural economic development, thus forming a vicious cycle of rural finance and rural economy, the lower the universality of the rural finance.

**Restraining constraints of rural finance**

In the rural financial market of developing countries, the barriers for farmers and vulnerable groups to enter the financial credit market are too high and that caused widespread financial repression.

First, the total supply of funds in the formal financial system is insufficient, and the informal financial system has not gained its due status.

In order to prevent and control financial risks, the formal financial system, as the supplier of rural credit funds, will require the supplier of funds to provide many materials to prove repayment ability and credit level. However, these materials are usually made according to the indicators related to large enterprises in cities, such as business scale, credit status, liabilities, asset quality and borrowers' education level, making it difficult for most people to meet the prescribed credit qualification standards. In fact, due to the characteristics of rural credit region, industry and farmers themselves and the relative dispersion and high risk of agricultural activities, some excellent township enterprises cannot get credit funds. Farmers are often in a weak position in the lending market and it is difficult for them to obtain sufficient borrowing funds from the formal financial sector.

At the same time, informal credit is widespread but has not gained the status it deserves. Those in urgent need of funds.

When it is hopeless to obtain funds from formal financial institutions, it seeks usury financing through private channels. Normal private lending can make up for the lack of services provided by formal financial institutions. However, the interest rate of loans in the informal financial sector is far higher than the upper limit of formal lending rates, which will inevitably increase the financing costs of farmers and township enterprises and make it impossible to provide more financial products and services to all those who need them.

Secondly, the existing rural credit environment is poor. Due to lack of corresponding guarantee measures and low marketization level,

Result in poor quality of rural financial assets, high risk, poor credit. Farmers have little access to credit from the rural financial sector and few mortgages are available due to the lack of transferability of rural land. In particular, under the premise of collective ownership of rural land, the government has not formulated relevant laws and regulations on land transfer, which leads to the fact that land, the core production factor of agricultural production, cannot be transferred together with other production factors. The market of rural and urban integration is artificially divided, and the rural area is actually in the state of semi-marketization. In addition, the production cycle of agriculture is long, greatly affected by natural conditions, and small-scale agricultural production has a weak ability to bear risks. All these are not conducive to the establishment of a good rural credit environment. Then, rural financial institutions have little consideration for the actual needs of farmers, and financial products cannot meet the special needs of farmers and vulnerable groups. Rural financial institutions usually design a large number of financial products aimed at large customers and high-quality customers for their own operating principles, while the financial varieties provided for farmers are few. In terms of deposits, there are more general savings varieties, and there are fewer current accounts, long-distance deposits and deposits, credit CARDS and other businesses that can be transferred for settlement. In terms of loans, they are mainly productive loans, less consumer loans, more short-term current assets loans and less long-term fixed assets loans.
Asymmetric Constraints Between Agricultural Risks and Returns

The spatial particularity of rural economic environment, industrial relevance and seasonal production determine that rural finance is different.

The same as the attributes of urban finance, coupled with some inherent attributes of the rural financial market reduced the efficiency. Agricultural production activities are obviously seasonal and susceptible to natural factors such as weather. Price and output risk are highly correlated, which greatly increases the credit cost and operational risk of rural financial institutions.

First, China's rural financial system risk is serious, one is the growth of agricultural products in the process of vulnerable

The impact of natural disasters and bad weather makes farmers vulnerable to losses. Secondly, the growth cycle of agricultural products is long, which generally takes a long time from sowing to selling. Moreover, the operation of rural capital is very slow, and the whole process of investment, production, circulation and distribution often takes half a year to a year. The price of agricultural products often changes greatly during this period. The risk management of rural finance tends to be complicated due to the highly related operational risks of rural households in the same region.

Second, rural borrowers are geographically dispersed, with small production scale and low correlation between rural financial markets, resulting in relatively weak financial and accounting system construction, low information transparency and credibility in rural credit markets

The phenomenon of interest asymmetry is more serious. The high liability management characteristic of the rural financial institutions leads to the aggravation of their inherent vulnerability, coupled with poor management, easy to cause the breeding of internal management and other risks.

Third, farmers, small and micro enterprises are congenital lack of credit, leading to financial institutions easy to ignore the "three rural" credit demand.

At present, farmers in rural areas can use some collective land use rights and their own contracted land

With the right as collateral for mortgage loans, many other property belonging to farmers can not be used as collateral. For example, farmers' houses, housing sites and productive materials cannot be used as collateral, so farmers are not only short of high-quality loan collateral, but also subject to harsh mortgage financing channels. In addition, due to the lack of guarantee mechanism for repayment of loans from financial institutions, once unexpected losses occur to peasant households, it is often difficult for them to repay loans, leading to credit risks.

Fourth, the rural financial resources are relatively poor, the lack of economic development momentum. Fragmented due to the scattered rural markets, customers, and loans to small size, high operating costs, low profits, and the influence of commercial Banks, joint-stock reform, leading commercial Banks to shrink the branches in rural areas and the business, its service object slowly turned to large and medium-sized cities and large and medium-sized enterprises and other high-end customers, cause severe outflow of rural resources, rural financial services shortage. Under the active guidance of government departments, rural credit cooperatives provide rural areas with micro-credit loans and farmers' mortgage loans, and rural finance still exists. The reason why rural finance appears financial exclusion is that rural funds flow out of rural areas with the financial system.

Fifth, the rural financial infrastructure is backward, the payment and clearing network coverage is small, and the payment and settlement costs are high. With the geographical dispersion of rural population behind rural transportation and communication in rural areas, the radiation of financial service network is weak, leading to the high cost of financial services. It is difficult for traditional farmers to accept some new payment methods, such as mobile payment, bank card payment and other new payment methods.

Excessive government intervention in market constraints

Strong economic policy interventions at the national level will lead to the inefficient operation of rural financial development. Therefore, the government should stop. The government directly
intervened in financial markets through administrative means, especially price intervention. Price intervention is mainly through strict government restrictions on deposit and loan rates. The level of interest rates determines the size of social savings and investment, and real interest rates under financial restraint are usually negative, resulting in low savings rates and insufficient credit for financial institutions. In the case that the interest rate level does not correctly reflect the supply and demand of funds, the interest rate distorts the price of financial markets, resulting in inefficient allocation of social resources, and the power of financial institutions to regulate funds through the market is weakened. The low interest rate policy not only undermines the commercial sustainability of rural financial institutions, but also increases the non-price credit constraints of demand subjects, resulting in inequality in access to financial services, and forms a reversal mechanism for residents to subsidize enterprises and the poor to subsidize affluence. The financial restraint in rural China is relatively serious. The access of rural financial markets is strictly controlled. The development of rural micro-financial institutions is slow. Private financial activities were once banned, and the formal financial organization system is not perfect. Most rural credit cooperatives are in a state of high debt.

**Measures for the Development of Rural Finance in China**

**Promote a diversified supply of rural inclusive financial institutions**

The realization of inclusive finance in rural areas needs to strengthen institutional supply and transform inclusive finance and new financial institutions through traditional financial institutions. Based on inclusive finance, the guarantee mechanism is used to reduce the risk of financial institutions providing inclusive financial services and promote the increase of financial service supply. The diverse demand for rural financial services also requires diversified financial institutions here.

**Increased provision of rural inclusive financial infrastructure**

China's rural inclusive financial infrastructure is seriously undersupplied, such as the imperfect rural credit system, the lack of relevant laws and regulations and policy support for rural inclusive finance, and the poor overall financial and ecological environment. The article believes that the supply of rural inclusive financial infrastructure should be increased to make the rural inclusive financial system socially accessible.

A class of people provides effective financial products and services. Therefore, in developing rural inclusive finance in developing countries, more financial products and services should be provided to all those who need them, and policy support for the rural inclusive financial system should be increased and the institutional environment improved through the establishment and improvement of rural credit systems. Building an inclusive rural inclusive financial system.

**Innovation of rural financial instruments to enhance the availability of inclusive financial products**

The realization of rural inclusive finance needs to provide more financial products and services to all those who need them. The development and innovation of financial products is crucial to the realization of rural inclusive finance. But at present, the financial products in rural areas are still relatively single, and it is necessary to provide financial products that meet the needs of rural areas through financial innovation. Introduce credit products with small, unsecured or mutual insurance for farmers, launch collateral financing for accounts receivable, and vigorously promote the "Internet +" business of rural finance.

**Actively promote the balance between supply and demand in the rural inclusive financial system**

Strengthening the publicity and education of farmers' inclusive financial knowledge. Effective regulation of rural inclusive finance can promote effective rural financial demand, which is of great significance to the balance of agricultural financial markets. At the same time, supervision can promote institutions to effectively provide inclusive financial services, increase inclusive financial supply, and promote a balance between supply and demand.
References


