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Study on Rural Microfinance System's Defects and Risk Control Based on Operational Mode

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Abstract
An attempting investigation of the present situation of the town and village's micro credit in the rural areas, by modeling the basic operational mode of the rural credit cooperatives and its cash flow process, as well as doing the analysis and assessment of risk and the corresponding problems, concluded that whether the rural credit cooperatives in rural areas of the most common microfinance mode is healthy or not, so as to predicted further the possible development and continue to pay attention to the latest development phenomenon.

Key words: Rural microfinance; Rural credit cooperatives; Cash flow; Risk assessment; Reform trend

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INTRODUCTION
Micro loan known as micro finance is the relevant agencies according to the farmers' economic conditions and the credit degree loan to farmers in the approved amount and period. The loans are usually used for production, with the feature of small amount, short-term, no any guarantee flexible form of guarantee, low market interest rate's level, and member's organization. In rural areas, micro loan is in very important position in the allocation of funds, helping farmer households (hereinafter referred to as farmers) production and occupies. The rural microfinance operation has three basic models as follows: The first is the peasant joint guarantee loan. The establishment of 5~10 households set up joint guarantee to do group loan, the households are guarantor for each other, if there is one household cannot timely repay the loan, the other members in the joint guarantee will have the liability for satisfaction. The 5 households in the next few years will be difficult to get a loan. These loans make full use of the supervision and restriction between farmers and reduce the loan risk, with its relatively large amount; the proportion of the loans amount in the total loans is generally higher. But the loans issued only to long-term fixed residence village. The second is credit loan system. It is controlled by the rural credit cooperatives, assisted by village committee members, select credit village in the township and village and the credit users in the shareholders. The users can obtain larger possibility of credit loans, higher amount. And as time passed, the credit index reflecting on the loan amount will increase. The third is personal mortgage loans. If farmers obtain the loans, they have to provide the real estate property and other certain mortgage or guarantee. The rate of such loans approved is relatively low, the loan amount is less accordingly.

1. THE CONSTRUCTION OF RURAL CREDIT COOPERATIVES CASH FLOW MODEL
In general, the rural credit cooperatives balance held on deposits is less than loan balance, rural credit cooperatives has no other source of funds, so the rural credit

cooperatives need to loan from the central bank; and the farmers will take new debt in old debt to maintain liquidity and turnover. So we believe that farmers will continue to get loan from the rural credit cooperatives. Based on the above analysis, we can get the following model:

If rural credit cooperatives deposits amount is S, the deposit interest rate is r_s, then the refinancing amount is L_z, the refinancing interest rate is r_z, According to the CBRC, rural credit cooperatives capital adequacy ratio should reach r_c, the rural credit cooperatives equity capital (share capital etc.) should be $(S+L_Z)\times\frac{r_c}{1-r_c}$. Therefore, the rural credit cooperatives available capital should be $(S+L_Z)/(1-r_c)$. The CBRC also stipulates that rural credit cooperatives reserve ratio should be Re (Emergency fund's deposit interest income rate in the central bank and its cost is basically the equal, so we will not consider effect of emergency funds in calculation of the profit). So the emergency amount is $S\times r_e$, therefore, the rural credit cooperatives loans amount is $[(S+L_Z)/(1-r_c)-S\times r_e]$, but because the local micro loan demand is more than the rural credit cooperatives provided amount. And the rural credit cooperatives' purpose is profit, so in most cases, rural credit cooperatives will loan to farmers with micro loan. For farmers, if we take all the farmers as an abstract subject: in the rural credit cooperatives the outstanding of deposit is S, the interest rate is r_s, the loans he received is L, it will be $L=(S+L_Z)/(1-r_c)-S\times r_e$, the loan interest rate is r_L; farmers productive income is E.

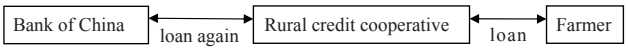

Figure 1
Cash Flow Diagram Form

(1) Rural Credit Cooperative Cash Flow Model

Figure 2
Rural Credit Cooperative Cash Flow Model

Point I: The rural credit cooperatives deposit is S, the cash is $(S+L_Z)\times\frac{r_c}{1-r_c}$.

Point II: The rural credit cooperatives deposit S and Bank of China refinancing L_Z, cash is $(S+L_Z)/(1-r_c)$.

Point III: The rural credit cooperatives loan to farmers, cash is $S\times r_e$.

Point IV: The loan and interest the rural credit cooperatives recovered, the cash is $(S+L_Z)\times(1+r_c)+[(S+L_Z)\times(1+r_c)-S\times r_e]\times r_L$

Point V: Rural credit cooperatives pay back the refinancing and interest, at same time pay back the farmers' deposit and interest. The cash is $(S+L_Z)\times\frac{r_c}{1-r_c}+[(S+L_Z)/(1-r_c)-S\times r]\times r_L-S\times r_s-L_Z\times r_Z$

(2) The Farmer's Cash Flow Model

Figure 3
Farmer's Cash Flow

Point I: Farmer's surplus capital last production cycle is S.

Point II: Farmers will surplus capital S save in rural credit cooperatives, at same time got the rural credit cooperatives loan L.

Point III: Farmers got the production income E, the cash is L+E.

Point IV: farmers pay back rural credit cooperatives loan and interest, got the deposit and interest the rural credit cooperatives paid, the cash is $E+S\times(1+r_s)-L\times r_L$.

In order to discuss w the rural credit cooperatives and the microfinance model with farmers as main body is healthy, the normal rural credit cooperatives operate regularly, the operating conditions of rural credit cooperatives and farmers should be considered.

(1) Rural Credit Cooperatives

Cost: $C=S\times r_s+L_Z\times r_z$; (Formula 1)

Income: $E=[(S+L_Z)/(1-r_c)-S\times r_e]\times r_L$ (Formula 2)

So the rural credit cooperatives profit will be $R=[(S+L_Z)/(1-r_c)-S\times r_e]\times r_L-S\times r_s-L_Z\times r_z=S\times[(\frac{r_c}{1-r_c}-r_e)\times r_L-r_S]+L_Z\times[\frac{r_L}{1-r_C}-r_z]$ (Formula 3)

(2) Farmer

Cost:$C'\ L\times r_L=[(S+L_Z)/(1-r_c)-S\times r_e]\times r_{L;}$ (Formula 4)

Income:$E'=S\times r_s+E$. (Formula 5)

So the farmer's profit will be$R'=S\times r_S+E-L\times r_L=E+S\times[r_S-(\frac{1}{1-r_c}-r_e)\times r_L]-L_Z\times\frac{r_L}{1-r_c}$ (Formula 6)

After calculation, we found that: the rural credit cooperatives and farmers' profits both are from the farmers' production operating income E. So that if farmers can regularly operate, have more or less income directly affects the regular operation of the rural credit cooperatives; In addition, if poor management will cause the bad and doubtful debts of rural credit cooperatives, which will bring considerable blow to rural credit cooperatives.

Therefore, when the farmer's profit is less than 0, which means farmers are at loss, farmers can not repay the loans from rural credit cooperatives; So in the regular operation, the farmers' profits must be more than or equal to 0. In fact, the fact is the farmers with new debt in old debt can not obtain big profits every year, which is to say farmers profit is equal to 0. So the ability of farmers to resist risk is very small. When farmers manage badly or encounter unexpected events (disease, natural disasters) they have no ability to repay the loan. The farmers' profit is $R'=S\times r_s+E-L\times r_L=0$ (according to the Formula 6), rural credit cooperatives' profits is $R=[(S+L_Z)/(1-r_c)-S\times r_e]\times r_L-S\times r_S-LZ\times rZ=E-L_Z\times r_Z$ (according to the Formula 3). Therefore, the rural credit cooperatives' profit is very small and all depends entirely on farmers' production and operation.

2. THE INFLUENCE OF MACROECONOMIC VARIABLES FOR RURAL CREDIT COOPERATIVES OPERATING RISK

From the above analysis we can see that if farmers operating condition is not good, the rural credit cooperative will not be able to stay in business, the mode of micro loan operation will collapse. Therefore, this operation mode as the only financial institutions with the rural credit cooperatives is fragile; anti risk ability is too small. The macroeconomic indicators change will influence farmers and the rural credit cooperatives cash flow and income, in the impact of the change of the macro economic indicators the rural credit cooperatives is likely to collapse.

2.1 Deposit's Base Rate r_s Alteration

Although the deposit base rate has been relatively stable, but taking into account of the economic situation, especially the problems of inflation, the potential risk of the deposit base rate for microfinance operation still can not be ignored. If the deposit benchmark deposit rate r_s increases, it is obvious to impact on the rural credit cooperatives. From $C=S\times r_S+L_Z\times r_Z$ (Formula 1), $R=S\times[(\frac{1}{1-r_C}-r_e)\times r_L-r_S]+L_Z\times[\frac{r_L}{1-r_C}-r_z]$ (Formula 3), we can see the rural credit cooperatives 's operating costs increase, the profit will further reduce; the original rural credit cooperatives profits is very small, in the small increase of deposit interest rate, it may cause the loss of rural credit cooperatives, or even bankrupt.

If the deposit benchmark deposit rate r_S is reducing, on the surface it seems it will reduce the cost of peasant credit cooperatives, increase profits of rural credit cooperatives, there are certain benefits to the rural credit cooperatives operating; but in fact, on the other hand, the deposit benchmark rate is reducing, for the farmers that the profit in the whole production cycle is very small, almost 0 in terms, it is relatively large impact. $R'=S\times r_S+E-L\times r_L$ (Formula 6), while the income of the farmers will be further reduced, it will cause the farmers' loss and bankrupt.

2.2 Benchmark Loan Rate r_L's Alteration

By$R=[S(S+L_Z)/(1-r_C)-S\times r_e]\times r_L-S\times r_S-L_Z\times r_Z$ (Formula 3), if the benchmark loan rate decreases, the rural credit cooperatives' interest income of loaning to farmers will decrease obviously, it will be devastating blow to the rural credit cooperatives. If the benchmark loan rate increases, from the $R'=S\times r_S+E-L\times r_L$ (Formula 6), acting on the farmers, farmers' production gains each year may not be able to pay the loan interest, so the farmers are likely to give up its microloan, resulting in the whole operation mode collapse in disorder.

2.3 Refinancing Rate r_Z, Refinancing Total L_Z's Alteration

From $C=S\times r_L+L_Z\times r_Z$ (Formula 1) we can see, in the large loansL_Z, and the increase of refinancing interest rates r_Z will have great impact on the cost of the rural credit cooperatives, decrease a lot profit of the rural credit cooperatives. Although in the current national policy, the central bank should not raise loan rate; but considering the inflation rate continues to rise, we should pay more attention to the potential risk of re loan rates to the rural credit cooperatives. In fact, in the present situation, the refinancing interest rate is relatively less, that is $[\frac{r_L}{1-r_C}-r_Z]>0$, it is positive correlation between the rural credit cooperatives profits and refinancing total L_Z. From $R=S\times(\frac{1}{1-r_C}-r_e)\times r_L-r_S]+L_Z\times[\frac{r_L}{1-r_C}-r_z]$ (Formula 3), if the central bank reduces the refinancing amount L_Z, it will reduce the peasant cooperatives' profits. Moreover, when the rural credit cooperatives can not meet the local loan demand of current situation, Refinancing amount reducing will bring difficulties to the rural credit cooperatives.

2.4 Capital Adequacy Ratio r_C's Alteration

Only from the rural credit cooperative profit formula $R=[(S+L_Z)/(4-r_C)-s\times r_e]\times r_L-S\times r_S-L_Z\times r_Z$ (Formula 3), we can conclude that capital adequacy ratio r_C increasing will lead to improve the profit of rural credit cooperatives. But in fact, rural credit cooperatives financing is difficult, the total equity capital is less. Therefore, the discussion of capital adequacy ratio should be considered as follows:

Rural Credit Cooperatives capital (i.e. equity capital) is constant (E), total assets will be E/r_C; The deposit and relending will be $S+L_Z=\frac{E}{r_C}\times(1-r_C)=E\times(\frac{1}{r_C}-1)$. So the capital adequacy ratio increase will lead to the upper limit of the total decline in the rural credit cooperatives, thereby reduce the agricultural credit cooperatives loans amount, reduce the income of peasant cooperatives.

2.5 Reserve Rate r_e's Alteration

From the rural credit cooperatives profit calculation formula $R=[(S+L_Z)/(1-r_C)-S\times r_e]\times r_L-S\times r_S-L_Z\times r_Z$ (Formula3), we can see clearly, if CBRC stated rural credit cooperative's reserve ratio increase, it will reduce the rural credit cooperatives' available total loan, reduce the income and profit of rural credit cooperatives.

Further discussion: because actually the total loans L_Z obtained from the central bank is much more than total deposits of farmers S, (such as deposit ratio is up to 400%-500% sometimes), so from the formula $R=[(S+L_Z)/(1-r_C)-S\times r_e]\times r_L-S\times r_S-L_Z\times r_Z$, we concluded: influence of refinancing interest rate r_Z's change in rural credit cooperatives' cost and profit is the much larger than the influence of the deposit. Benchmark interest rate change. Therefore the current inflation rate going up actually will bring great pressure to the central bank, then the refinancing interest rate is likely to rise, which will bring irresistible impulse to the rural credit cooperatives.

In addition, the central bank intends to gradually reduce the total refinancing, which make the rural credit cooperatives on the road to provide for themselves. But in fact, rural credit cooperatives financing is difficulty, loan demand is a lot, loan and deposit ratio is very large. In view of the current situation, if the central bank reduces the loan amount, it will lead to sharp decline of the rural credit cooperatives loans amount and revenue, which will lead to the bankruptcy of the rural credit cooperatives.

As the required reserve base is S, total deposits or reserves $=S\times r_e$, consider that the deposit S in the total assets ratio is smaller, so the change of the reserve ratio can make little effect to available total loans in the rural credit cooperatives. But the capital adequacy ratio r_C is different, it requires the equity capital deposit and refinancing sum ratio ($S+L_Z$) reaches $r_C/(1-r_C)$. In fact, compared to large total deposits and loans, the rural credit cooperatives' equity capital is not up to the standard, so farmers' loan from buying shares in the actual operation, even so, rural credit cooperatives capital adequacy rate attained is still very difficult.

3. THE INSTITUTIONAL RISK FACED BY RURAL MICROFINANCE

3.1 The Financial Risk

Because the rural credit cooperative can not achieve commercialization truly, and get independent, healthy and effective operation itself, its whole cash flow has a strongly dependent on the outside word so as to bring the great financial risk. Seen from the macro point of view, we analyze such risk as the following viewpoints. (a) If the benchmark interest rate rises, of course, the deposit interest rate goes up, too. On the one hand, it will increase the operational costs of the rural credit cooperative and affect the management. (b) If we keep other interest rates be unchanged and the benchmark interest rate of ordinary loan be rising generally, then the loan interest rate will increase exponentially. Because of the low anti-risk capability and the affordable limited scope of interest rate about the farmers, it is possible that the sharp fluctuations of the interest rate have a strong impact on loan demand so as to make the source of profit about the rural credit cooperative be reduced. On the other hand, it may increase the possibility of bad debts, because the farmers can not afford the interest. (c) In the situation of macro economy fluctuation, the lending rate will be improved on a certain pressure (such as inflation). Under the condition of the loan interest rate about the rural credit cooperative being unchanged, the huge operating costs may lead to nearly having no profits, even having a loss.

3.2 The Risk of Operating Model

From the viewpoint of rural credit cooperative itself, there is still a considerable risk for this operating model. So far, the profitability indicators and loan indicators, which the credit union gives to the township and country rural credit cooperatives, have been increasing constantly. Considering its own interests, the workers of the subordinate rural credit cooperative may increase the amount of the loan in order to reach the total issued indicators. If this extent of borrowings exceeds the productivity gains which the local farmers can achieve, the new loans are likely to become bad debts. In addition, the loan-deposit ratio is basically higher than 200%. And the capital adequacy ratio is seriously low. If massive natural disasters occur, the farmers can not afford the payment. And the rural credit cooperative has no ability to go on run because of the hundreds and thousands of bed debts last year. These own risk still needs to rely on the support of the national capitals to avoid. Such a small village or town rural credit cooperative cannot be digested by itself.

3.3 The Payment Risk

Because of the singleness of the rural credit cooperative business object, on the one hand, the cash flow cycle is almost consistent with the production cycle of the farmers. After granting the credit in the period of spring plowing, reserve fund of the rural credit cooperative is usually seriously insufficient. And it often regains a normal state after it has recovered the loan at the end of the year. Sometimes, the rural credit cooperative should delay the payments when the farmers' deposit needs to be cashed. Therefore, the credibility of the rural credit cooperative is not very high in the eyes of farmers so as to lead to many people who don't need loans more willing to choose the state-owned commercial bank deposits. Such reputation and image in farmers' heart can affect the source of the rural credit cooperative and the long-term development. On the other hand, owing to the limitation of the production about farming and animal husbandry, it has a strong dependency upon the natural conditions. The anti-risk capability for the rain-dependent farmer is very low. Then, a part of risk is transferred to the rural credit cooperative by means of petty loan. Moreover, because of the bad debts of many people, the natural disaster of an area may lead to the difficulty of the rural credit cooperative on-going operation.

3.4 The Credit Rating Risk

Although the rural credit cooperative has obtained a certain achievement by the small credit rating, it is still hard to get the true, fair and effective results by the system of credit rating. First of all, the annual income depends on how well the natural situation in this year gets because the local farmers are always rain-dependent. When the rural credit cooperative issues the loan, it can not estimate the annual income of the lender accurately. And as far as the local farmers are concerned there is nearly no assets used for mortgage. The rural credit cooperative can hardly establish a comparatively perfect information file in this

respect. The current evaluation method of the rural credit cooperative greatly depends on human factors, especially, the personal subjective judgment of the village cadres. It is difficult for the loan officers to know the situation of the villages truly, so the village cadres play a decisive role in the process of the user's evaluation. Moreover, it is hard to avoid corrupt practices, such as bribery and so on, from which the village cadres reap the profits easily. And these loan farmers may can not repay the loan and interest to lead to the great increasing of the loan risk.

4. THE DIVERSIFICATION COUNTERMEASURES OF SUSTAINABLE DEVELOPMENT OF RURAL CREDIT COOPERATIVE

4.1 The Innovation of Operational Mechanism About the Rural Credit Cooperative

On the one hand, we can optimize the structure of reserve assets. The rural credit cooperative can determine the mutual ratio of the various assets. When we accelerate the velocity of loans and match up the length of maturity reasonably, it also can strengthen the property diversification; focus on efficiently using the stock, and compress non-performing loans. On the other hand, we make great efforts to grasp the credit information of the high quality customer, the research of product marketing and the industrial prospects survey by using scientific methods and means. And we should classify the prospective borrower scientifically in the context of increasing our own management benefit and customer affordability. In addition, we need to change the mode of operation and adjust the business strategy. In the process of adhering to the "agriculture, rural areas and farmers" service, the rural credit cooperative needs to combine with the actual and achieve the three transformations on operating management as soon as possible. Firstly we should pay attention the transformation from supporting quantitative mode to supporting scale efficiency. Secondly we should change the simple structure of assets and liabilities to diversification. Thirdly we should shift the decentralized funds and extensive management to centralized funds and intensive farming.

4.2 Establishing the Effective Risk Pre-warning Mechanism

Focusing on strengthening the risk management, preventing and controlling the credit risk at the core, we should build the comprehensive risk management pre-warning mechanism accelerated, which includes the operating risk recognition and identification system, operational risk monitoring system, operational risk disposal system and so on, to scientifically and effectively strengthen the risk management. Such as the regular business analysis, risk assessment, regular physical count, all kinds of vouchers, account books, account checking, post-supervision of the business. Once it discovers that the risk reaches the warning line, it can send out the early warning timely, thus it brings the liquidity risk management into the orbit of science, normalization, programming, and gradually forms the liquidity risk management. Otherwise, we should build the emergency response plan of liquidity risk in order to start the plan timely for the possibly occurred liquidity risk, and try our best to control the risk in the smallest range.

4.3 Renovating the Rural Credit Environment and Strengthening the Loan Credit Guarantee

It is the responsibility of government to enhance the construction of the rural credit environment, cultivate the farmers credit consciousness, improve the farmers' credit concept and change the farmers' negative opinions for rural credit cooperative. On the one hand, we should make full use of the credit management of the new development of the people's bank for reference, input the credit information of the farmers to credit reference system, introduce various rules and regulations, establish and improve the reward and punishment mechanism. On the other hand, in order to root the concept of repaying loans honestly in the heart of people deeply, we need to actively carry out the publicity and education of the policy, which requires the financial department, legal department, government departments to work together, and train the farmers' credit consciousness step by step.

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