

## LETTER TO THE EDITOR

# Pre-Measurement Model of Rural Eco-financial Risk in Underdeveloped Areas

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This paper evaluates the level of rural financial ecology in 88 counties (cities and districts) by factor analysis, distinguishes and fits the four components of the financial ecology, including economic environment, social credit, market environment, and financial services. According to the evaluation results, it is found that the current rural financial ecology in underdeveloped areas has three characteristics: economic environment is the main factor determining the depth of rural financial services; social credit is the first step to improve rural financial ecology; and rural financial ecology has Matthew effect.)

Underdeveloped Areas; Rural Ecology; Financial Risk; Factor Analysis

### 1 Introduction

Dr. Zhou Xiaochuan, who has systematically explained the financial ecology, believes that the financial ecology is the micro-level financial environment, including law, social credit system, accounting and auditing standards, intermediary service system, the progress of enterprise reform and the relationship between banks and enterprises. Thereafter, Suning elaborated the specific content and interaction of financial ecological environment from five aspects: stable economic environment, perfect legal environment, good credit environment, coordinated market environment and standardized institutional environment. Zhou Xiao chuan and Su ning's definition of financial ecology mainly focuses on the external environment of financial ecology, which is a narrow financial ecology. In a broad sense, financial ecology includes not only the external environmental factors such as politics, economy, law and credit which interact with financial industry, but also the internal factors of financial system, such as financial market, financial institutions, financial instruments and financial products. Dr. Xu Nuojin believes that the financial ecology includes various financial organizations. In order to survive and develop, in the process of long-term close contact and interaction between the living environment and the internal financial organization, the divisions of labor and cooperation have certain structural characteristics and perform a dynamic balance of certain functions. While summarizing the relationship between financial ecology, it also regards financial internal organization and financial external environment as a common component of financial ecology. In the relevant financial ecology research reports, Li Yang and others also study the dynamic relationship of interdependence and mutual influence in the financial ecosystem from the financial subjects and the financial ecology environment on which they live and develop.

Yuqing Shen, Can Chen, Jianqiang Gu published an article in the Journal of Ekoloji 2019 Issue 107 entitled "Research on the Design of Supply Chain Financial Ecology Model and Risk Management", this article studied

the formation of supply chain finance model, introduced the ecological model of supply chain finance, risk and risk prevention and control measures. The financial model mentioned is helpful to the research in this paper.

The monitoring of rural financial eco-environmental indicators in literature can play an early warning role in rural financial risk (Bai and Wen 2011). The indicator system established in this paper evaluates the degree of rural economic development and economic stability, the degree of rural financial development and the impact of local government on rural finance. On this basis, the early warning model of rural financial risk is constructed by rough set method, which has limitations (Pretorius, 2018). Therefore, this paper puts forward the research on the pre-measurement model of rural eco-financial risk in underdeveloped areas, taking the financial mode in the article of "Research on the Design of Supply Chain Financial Ecology Model and Risk Management" as a reference, and carries out the research in this paper.

## 2 Idea Description

### 2.1 Low level of economic development and small coverage of financial institutions

Rural financial ecology is a subsystem of regional financial ecology, which is affected by rural regional environment, economic development level and production organization mode. Compared with the urban financial ecology, although the level of development is relatively low, it also forms a self-contained system of operation.

In 2007, the per capita net income of farmers was 2373.9 yuan, accounting for 22.23% of the per capita disposable income of urban residents, 57.3% of the national average, and 19.95% of the total consumption and retail sales in the areas below county level (Elbanna and Fadol 2016). It is precisely because of the limited scale of rural economic development, in order to ensure an effective level of profitability, the distribution structure of financial institutions in rural areas is mainly concentrated in the areas above the county, while the areas below the county are relatively scattered. According to statistics, 41.21% of rural credit cooperatives, 33.4% of postal savings institutions and more than 80% of state-owned commercial banks are located above county level.

### 2.2 The construction of credit reporting system is lagging behind, and credit constraints are mainly social relations.

The construction of rural social credit system is lagging behind, and the effective punishment mechanism for dishonest behavior has not yet been established. The credit rating of rural households carried out by rural credit cooperatives is still in its infancy. The construction of credit villages and credit townships is far from complete. In addition, the legal consciousness of some local governments in rural areas is weak, which further condones and encourages the occurrence of malicious debt evasion and debt relief (Zou 2015; Huang and Gao 2017). At present, besides the legal system and household credit archives, the credit screening and restraint mechanisms commonly existing in rural areas are mainly as follows: most peasant households have simple credit consciousness, attach great importance to their credit among their relatives and friends, and consciously maintain it; local financial institutions can better utilize the advantages of being close to the community, and rely on various social network relationships to have a better understanding of the credit status of local residents; depending on mortgage guarantees and credit guarantees provided by various cooperative organizations, credit constraints are imposed on borrowers.

### 2.3 Higher transaction costs in the market

The rural production is based on the natural economy, the production and life style are scattered and not large-scale; the local farmers' demand for loans is more characterized by "a wide range, many points, small quota"; the rural market mechanism is not complete, and the related service function is lacking. These have further increased the transaction costs of financial markets. Because of this, in order to compensate for higher cost expenditure and risk loss, the interest rate of rural credit cooperatives, which mainly serve rural areas, is higher

than that of other commercial banks as a whole. In 2007, 93.9% of the loans of rural credit cooperatives carried out floating interest rates, while only 13.2% of the loans of state-owned commercial banks.

2.4 The service of financial market is single, and credit is still the main financial demand.

The rural market is small, and the service function of rural financial market is relatively single. The service of banking financial institutions is still mainly deposit and loan business, and some intermediary business is also mainly traditional exchange payment and agency business. Rural financial institutions almost do not provide commercial bills of exchange, collection and acceptance, personal finance and online banking and other financial services. Correspondingly, farmers' demand for financial services is mainly based on borrowing and remittance funds (Linetal 2017; Liuetal 2018). Because of the limited income level of farmers themselves and the small scale of the rural market, there are fewer cases where farmers have demand for other financial services and are not satisfied. According to a survey, only 21.79%, 9.64% and 28.93% of the respondents in rural areas indicated that the demand for bank cards, exchange and credit card consumption was not met.

From the above analysis, we can see that although the rural financial ecosystem has a lower level, it maintains the relative balance within the ecosystem through its own unique operation mechanism which is different from the urban financial ecosystem.(Henry et al., 2017) The relationship between interdependence and support in the financial ecosystem indicates that we cannot simply seek the improvement of the financial ecosystem by emphasizing a certain link. Only based on the operation mode and development law of rural financial ecology itself, and under the same social and economic development background, by comparing the differences and characteristics of the development of financial ecology in different rural areas, can the analysis conclusions be convincing and helpful to find a feasible policy path.

### **3 Results**

#### **3.1 Factor analysis of rural financial ecology**

With regard to the selection of financial ecological assessment indicators, the relevant domestic literatures mainly put forward the principles of scientificity, comparability and operability from the perspective of statistics. In addition to these principles, this paper argues that in order to obtain as accurate statistical results as possible, highlight the systematic nature of financial ecology and the characteristics of rural economic and financial development, the selection of financial ecology indicators should focus on three principles (Chenand Hao 2018).

##### *3.1.1 Representation*

As the connotation of financial ecology shows, the evaluation of financial ecology must be a systematic project. The evaluation indicator system should cover all the relevant fields involved in financial ecology as far as possible, so as to ensure the comprehensive and accurate assessment results.

##### *3.1.2 Relevance*

The connotation of financial ecology is rich, and the indicators describing financial ecology are very extensive. Considering that some indicators are mutually inclusive and similar, as well as the leading factors with strong correlation in the development of rural financial ecology, the selected indicators are not required to be comprehensive, but should be sufficiently representative.

##### *3.1.3 Effectiveness*

The description of financial ecology can be reflected not only from the composition of ecology, such as the number of intermediaries, but also from the role and effect of financial ecology, such as the level of transaction costs. This paper holds that although the composition of financial ecosystem basically determines its possible effect, in order to truly reflect the level of financial ecosystem, the evaluation indicator should be based on the effectiveness

indicator.

### 3.2 Selection of financial ecology assessment indicators

According to the requirement of systematic principle, under the framework of economy, law, credit, market environment and financial level, according to the principle of representativeness and validity, taking counties (cities, districts) as units, the selection of indicators is considered as follows.

#### 3.2.1 Selection of economic indicators

Rural areas and their periphery urban areas have close interdependence through various economic exchanges. By synthesizing the determinants of the main rural economic development and selecting the representative and decisive indicators, we should consider not only the agricultural indicators, such as the per capita income of farmers, but also the economic indicators of the periphery environment, such as per capita GDP.

#### 3.2.2 Selection of legal and credit indicators

From the perspective of financial ecology, the level of non-performing loan rate of regional financial institutions is the most concentrated reflection of local law enforcement and credit level. According to the principle of representativeness and validity, the local legal system and credit environment can be directly reflected by the non-performing rate, such as the non-performing rate of agricultural loans.

#### 3.2.3 Selection of market environmental indicators

The market environment mainly reflects the standard level and perfection degree of market institutions, such as whether financial institutions are legal persons with clear property rights and whether the market has perfect professional service institutions. These factors directly affect the management level of financial institutions, and are reflected in the expenditure of operating expenses. Therefore, the level of market environment can be better and more comprehensive reflected by the operating expenses expenditure of financial institutions, such as loan cost rate.

#### 3.2.4 Selection of financial level indicators

Because the structure of rural financial market is single, and the deposit and loan business is the main business, the loan business plays an important role in rural financial services. Therefore, the selection of financial level indicators in this paper is mainly based on loans, such as the per capita scale of agricultural loans.

Taking into account the above considerations, this paper finally selects 11 indicators, such as per capita GDP, per capita income of farmers, per capita operating income of township enterprises, per capita profit of township enterprises, per capita loan, non-performing loan rate, non-performing loan rate, unit loan cost rate, operating income expense rate, balance of agricultural loans and per capita surplus of agricultural loans, as the evaluation indicator of rural financial ecology in counties (cities, districts). Among them, because rural credit cooperatives are the main or only financial institutions in rural areas (especially in the areas below county level), their operation behavior and conditions can better represent the financial level of rural areas, so the indicators of rural finance in this paper are selected from rural credit cooperatives.

## 4 Discussion

### 4.1 Economic and environmental factors have a significant impact on rural financial deepening indicator

By using the calculated variables of financial ecological factors, the paper makes regression analysis on the rural financial deepening indicator. The variables of economic environment factor, social credit factor and financial service factor have significant positive influence on the rural financial deepening indicator. The partial correlation coefficient between economic environment factor and rural financial deepening indicator is 0.44, which shows that the economic environment factor should be the most fundamental factor to determine the depth of rural financial

services. The biggest difference among regions comes from the level of economic development. Although the depth of rural financial services is the result of many factors, because economic development is the basis of other factors, in the long run, leaving the economic development, the improvement of rural financial service level can only be empty talk. Therefore, the most important and fundamental link for the improvement of the depth and quality of rural financial services should be the improvement of the level and quality of economic development.

#### 4.2 Social credit factor is the primary means to improve financial ecological environment

Compared with 2006, in 2007, the correlation coefficients between the changes of comprehensive scores of rural financial ecology and those of economic environment, social credit, market environment and financial service factors were 0.49, 0.85, 0.35 and 0.15, respectively. The change of social credit factors was the most important factor affecting the changes of comprehensive scores of financial ecology. This shows that in the rural economic and social development, relative to the economic environment, market environment and financial services, and with the joint efforts of the government and financial institutions, the improvement of the social credit environment is relatively easy to achieve results in the short term. Although the improvement of rural financial ecological environment depends on the mutual promotion of various factors, for the government, the first measures to promote the improvement of rural financial ecological environment should consider improving the local social credit environment.

### 5 Conclusion

Higher correlation coefficient shows that the lower the level of rural financial ecology, the slower the improvement of rural financial ecology, or even a regression. In 2007, 10 out of 88 counties (districts and cities) scored lower in rural financial ecology than in 2006, of which 8 were in the bottom 25 in the financial ecology ranking in 2006. The Matthew effect of rural financial ecological changes is mainly caused by economic and environmental factors. The correlation coefficient between the change of economic and environmental factors in 2007 and that in 2006 reached 0.79. The higher the score of economic and environmental factors, the greater the change of the score. It can be concluded that although the improvement of rural financial ecology needs the mutual promotion of various factors, due to the Matthew effect, the improvement of financial ecology in especially poor areas also needs the corresponding support from the government in policy and funds. Otherwise, it will be very difficult for these areas to achieve better development of financial ecology.

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