

The Model of the Exploratory Factor Analysis about Residents' will of Rural Land Transfer

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Abstract

In order to improve the living conditions of the residents and improve the satisfaction of rural land transfer, by constructing the structural equation model of government policies, re-employment and residents' will of rural land transfer, this paper analyzes the promoting effect of the government policies and re-employment work. The results show: There is a significant correlation among residents' will of rural land transfer, government policies and re-employment work. The government should improve management institution of rural land transfer to supervise each link of the rural land transfer, especially for the signing and implementation of the contract. To deal with the conflict appeared in the rural land transfer; the grass-roots government should set reasonable management systems and refine the implementation of these systems. Grass-roots government takes systematically training of cadres in rotation to improve the management capacity of grass-roots cadres.

Keywords: residents' will of rural land transfer, structural equation model, AMOS software

1. Introduction

Land issue is related to agricultural development and social stability. It also has a very important impact on agricultural modernization and China's urbanization process. But such phenomena as the slow growth speed of the traditional agricultural production and low income of rural residents appears, then the negative impact of fragmentation of arable land on agriculture and social production has been revealed. Therefore, at present, rural land transfer has been advocated [1-3]. It means that arable land will be concentrated and managed with moderate scale by putting the property right of land into market. It will become the developing direction of the arable land in the future.

During the process of rural land transfer, it inevitably involves the interests of residents, businesses and the Government, *etc.* One of the most difficult is the residents' awareness and recognition of the policy of rural land transfer [4-6]. Only after solving such problems as employment, social security and income can the residents benefit from rural land transfer. Then it will guide them to approve the policy. Therefore, study of the residents' will of rural land transfer and their main concerns during the process have not only the theoretical value but also the practical significance.

The system of rural land transfer is an objective requirement for promoting the

development of rural productivity, and it is a product of innovation and change of the rural land property right system. It is also an inevitable result of gradual marketization of the rural economy [7-9]. Since China's reform and opening up, reform process of rural land system is the process of continuous evolution and improvement from "collective ownership of rural land and the collective management system" to "collective ownership of rural land and the household contract responsibility system"[10].

From 2004 to 2014, the CPC Central Committee and the State Council has deployed on rural reform and agricultural development in the form of No. 1 document of the Central Committee for 11 consecutive years, which shows China's policy makers have paid high attention to "three rural issues"[11]. It also shows "three rural issues" has become a top priority of urgent problems in the work of the government. It has been showed clearly in the 3rd Plenary Session of 18th," encouraging right to contract for management to transfer to professional investors, family farms, farmer's cooperatives and agricultural enterprises; developing various forms of scale operation".

The implementation of China's rural land transfer system in the new era changes the traditional mode of agricultural production to improve the market competitiveness of agriculture; optimizes the allocation of rural land resources and changes the state of the small-scale peasant economy to realize benefits of land scale operation; realizes optimal combination of production factors such as land, capital, technology, labor [12].

Xu Hengzhou, Guo Zhongxing (2011) carried on the empirical analysis of the relationship between farmers' vocational division, land property preference and rural land transfer by using Logistic model. They put forward such policy proposals as establishing and perfecting rural social security system gradually and so on [13]. Jin Lifu, Ran Shuangquan (2012) studied adjustment of rural industrial structure in the process of rural land transfer and how to establish a sound social security system in rural areas effectively on the basis of rural land transfer system [14]. Fan Xingli (2012) presented that we should perfect rural land transfer from the aspects of changing farmers' awareness, promoting the transference of rural surplus labor and perfecting the service system of rural land transfer, etc, in order to realize the healthy development of rural land transfer [15]. Based on case studies, Nie Jianliang and Zhong Zhangbao (2013) presented that different social relationships between both sides of rural land transfer formed emotional, economical and power-oriented rural land transfer policy. They thought resources integration is an effective choice for promoting rural land transfer. Though the study of the research literature related to the overseas rural land trading and domestic rural land transfer [16], Liu Lijun (2013) pointed out that further empirical research on economic performance, social performance and comprehensive performance of the rural land transfer will become an important direction in the research of theory and practice in the future [17].

Based on many scholars' research of rural land transfer and the comprehensive analysis of re-employment, rural land transfer policy, Social security and so on, this paper establishes the scientific evaluation system by using the structural equation model. By using the established index system, the paper analyzes the impacts of three different aspects on residents' will of rural land transfer in detail and their interrelationship.

The main innovative points of the paper are:

1. Based on the structural equation model, the paper studies residents' will of rural land transfer. In the process of building, this paper makes full use of its advantage of statistical analysis towards unmeasured variables. Through the analysis of the index system in the questionnaires, this paper establishes the latent variable corresponding to residents' will of rural land transfer. Then the paper analyzes and mines the residents' will of rural land transfer. Determining residents' will of rural land transfer through mining the latent variable in a structural equation model can not only get close to the respondent's actual but also greatly improve the effect of analysis of this paper.

2. Through the establishment of structural equation model, this paper carries on the comprehensive analysis of the relationship between the will of rural land transfer, re-

employment and social security. Structural equation model is able to analyze multiple independent variables and dependent variables at the same time. It can also analyze unobservable latent variable as well. The paper uses the structural equation model to evaluate the will of rural land transfer, re-employment and social security separately. The paper also studies the interactions of the three aspects.

3. The selection of research area is of certain particularity and typicality. This paper studies the researches in rural land transfer in Suzhou city over the years. The survey data all come from the National Social Sciences Fund Project. The title of the project is "Research on Improving the Rural land transfer System--- studies on citizenization risks of landless residents and countermeasures in big agricultural provinces in middle part of china" (09BJY061). The data investigation of this project lasted for several years. The questionnaire design took into account the overall characteristics and regional differences of the rural land transfer in China. By summarizing experiences and lessons learned in the development process, this article mainly discusses the residents' will of rural land transfer.

2. Establishment of the Index System and Its Data Processing

2.1. Establishment of the Index System

In order to further study the impact of re-employment, rural land transfer policy and social security on residents' will of rural land transfer, this paper establishes the index systems of residents' will during the process of rural land transfer, the re-employment of the residents and social security after the rural land transfer. Traditional research on rural land transfer is to obtain the statistical data of residents' will of rural land transfer directly from the questionnaires. But during the process of actual survey, a lot of filtered survey questions are found to be answered randomly.

In addition, based on data mining technology, according to the survey index designed at the end part of the questionnaire, it is also found that the respondents' will of rural land transfer are different from their actual answers to the same question. Therefore, in order to solve this basic and fundamental question, this paper assumes that the residents' will of rural land transfer can not be accurately observed and measured [18]. Then by using structural equation model, latent variables about rural land transfer are designed to obtain the relevant data of the index about residents' will of rural land transfer.

2.2. Screening and Recording of Data

In order to ensure the accuracy of the data, this paper screens for the correctness and completeness of the data and completes the data processing. In the process of data entry of questionnaires, because of the carelessness of the inputting workers, it is common to find that the input data values are not within the range of scale values, data values are overlapped or omission of some data, and so on.

For the first two cases, setting the scope of the data on the corresponding variable column is a good way to find out the cells which are not within the range. Retaining only one number is a way to deal with overlapping data [19]. Try to directly delete the values which are out of range and regard them as missing values.

2.3. Deleting and Processing of Missing Data

In the process of questionnaire survey there is a certain number of missing data. In order to better analyze the data, this paper uses methods based on Bayes estimation to interpolate the missing data. The basic idea of Bayesian method is to assume that the model parameters to be estimated are random variables of certain distributions [20]. Based on prior experience, a priori of parameters to be estimated is given. The information about the prior distribution is known as priori information. According to the

priori information, combined with sample information, the paper tries to calculate the posterior distributions of parameter to be estimated by applying Bayes' theorem. Then with application of the loss function, the paper draws some eigen values of the posterior distribution and uses them as estimator of parameter to be estimated.

Data has been made into a numeric variable. So for missing data of each variable, AMOS software provides method of Bayes estimation to interpolate the missing data. This paper uses the index of the land-deprived residents' satisfaction level towards compensation standard for requisition as an example. In normal index system, one represents "fulfill", two for "partially fulfill", three for "fail to fulfill", four represents "do not know". Based on the idea of regression analysis, the paper uses method of the Bayes estimation to interpolate the index. Among them, the tenth interpolation of data No. 362 is one with good testing results.

3. Structural Equation Model

3.1. Structural Equation Model

Structural equation model, SEM for short, is also called the covariance structure model. It is a statistical method to analyze the relationships among variables based on the covariance matrix of the variables. Structural equation model is different from the general statistical model used for the study of the variables' relationship, the main characteristic of which is to establish the internal relationship between latent variables [21].

Latent variable means variables cannot be measured directly and accurately in many research fields, such as economic, regulatory, social and psychological areas. Such variables as quality of service, policy efficiency, intelligence, study motivation, social and economic status, can be defined as latent variables. Latent variable cannot be measured directly, while they can be indirectly measured through some measurable variables. For example, parents' education level, occupation and income can be used as measurement index for the social and economic status of a student's family.

Traditional statistical analysis methods can not properly deal with these latent variables. By using structural equation model, the relationships between the latent variables and index of measurable variables can be simultaneously processed. Structural equation model is divided into the latent variables and the measurable variables, so a structural equation model is composed of measurement equation and the structural equation. Measurement equation describes the relationship between latent variables and index, while structural equation reflects the relationship between latent variables.

(1)The Measurement Model

$$y = \Lambda_y \cdot \eta + \varepsilon \quad (1)$$

$$x = \Lambda_x \cdot \xi + \delta \quad (2)$$

(2)The Structure Model

$$\eta_2 = B\eta_1 + \Gamma\xi_1 + \zeta \quad (3)$$

3.2. Path Map

Path graph is the main tool for path analysis, in which a line with an arrow is used to represent pre-determined relationship between variables. The arrow indicates that the relationship between the variables is linear, and the direction of the arrow shows direction of causality [22]. Both ends of lines with arrows connect two variables, exogenous or endogenous variable. Exogenous variables are indicated by a rectangle and endogenous variables are in the oval. Path coefficient can be used to show the size of the linear relationship between variables. The specific path map is shown in Figure 1.

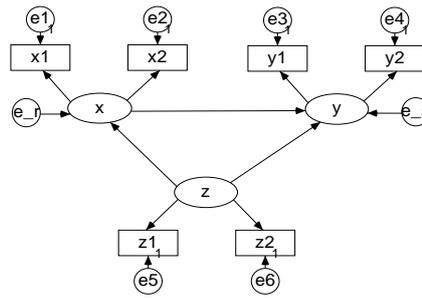


Figure 1. Basic Composition of Path Graph

In Figure 1, a_1 、 a_2 、 \dots 、 c_1 、 c_2 、 p 、 q 、 r are the path coefficients, x_1 、 x_2 、 \dots 、 y_3 、 y_4 are the external variables and F_1 、 F_2 、 T are the endogenous variables. According to the path graph, the path analysis model can be obtained.

$$y_1 = a_1 F_1 + e_1 \quad (4)$$

$$y_2 = a_2 F_2 + e_2 \quad (5)$$

...

$$x_1 = c_1 T + e_5 \quad (6)$$

$$x_2 = c_2 T + e_6 \quad (7)$$

$$F_1 = rT + e_{-r} \quad (8)$$

$$F_2 = qT + pF_1 + e_{-s} \quad (9)$$

It is the path analysis if least squares estimate (LSE) is a method used in estimating path coefficient of the above model. It is a structural equation model if maximum-likelihood method (MLM) is used.

4. Exploratory Factor Analysis of Residents' Satisfaction about Living Conditions in the Process of Rural land transfer

4.1. Model Building Based on Data Analysis

Because there are various influence factors, great randomness and uncertainty exist in the direct data investigation about residents' will of rural land transfer, rural land transfer policy of the government and residents' re-employment in the actual rural land transfer process.

Therefore, in order to improve the quality of research, this paper regards the above three variables as latent variables. Latent variables of residents' will of rural land transfer correspond to five observed variables. Firstly, the influence of your own ideas and opinions on the government's rural land transfer policy; Secondly, your attitude to the loss of land; Thirdly, whether the government issued land compensation to you or not when your land has been expropriated or purchased; Fourthly, whether you are clear about the payment of compensation for rural land transfer or not; Fifthly, whether the non-cash compensation is all achieved or not. The options of the observed variable of compensation are "Yes" and "no". The rest of the observed variables are designed in accordance with the four-level table about the degree of satisfaction and cognition [23].

Based on the above index system, two pieces of data analysis models are established:

1. The Analysis Model for principal factor

$$x_i = \alpha_i \cdot y + e_i \quad (10)$$

In the formula, α_i is factor loading, e_i is residual variance, y is common factor.

2. The Analysis Model for regression

$$y = \alpha_1 \cdot x_1 + \alpha_2 \cdot x_2 + \alpha_3 \cdot x_3 + \alpha_4 \cdot x_4 + \alpha_5 \cdot x_5 \quad (11)$$

4.2. Empirical Analysis on Residents' Will and Government's Policy of Rural land Transfer

Latent variables of rural land transfer policy correspond to five observed variables. Firstly, satisfaction degree of allowance standards for the rural land transfer; Secondly, comparison of difficulties before and after the land loss; Thirdly, evaluation on the work done by cadres during the process of rural land transfer; Fourthly, whether there are dispute between the government and farmers or not; Fifthly, farmers' attitudes towards the town construction by using the rural land [24]. The options of the observed variable of issue are "Yes" and "no". The rest of the observed variables are designed in accordance with the four-level table about the degree of satisfaction and cognition.

In order to analyze the relationship between the residents' will and government's policy in the process of rural land transfer, the paper uses AMOS18.0 to establish the path graph of factor analysis of two index systems and the path map of covariance of two principal factors. The results of path coefficient estimation are shown in Figure 2.

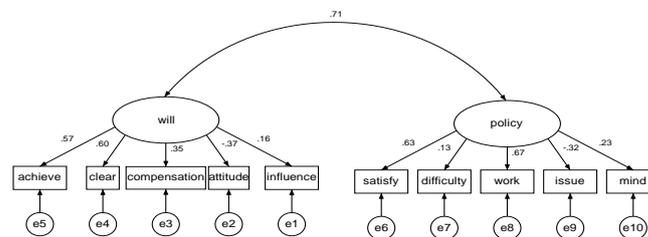


Figure 2. Path Graph of the Relationship between the Residents' Will of Rural Land Transfer and Government's Policy

The structural equation model obtained from the path graph (path coefficients are figures from the standardization of the model, the same hereinafter) is:

$$influence = 0.16 \cdot will + e_1 \quad (12)$$

$$attitude = -0.37 \cdot will + e_2 \quad (13)$$

...

$$achieve = 0.57 \cdot policy + e_1 \quad (14)$$

$$clear = 0.60 \cdot policy + e_2 \quad (15)$$

Covariance of *policy* and *will* is 0.71, which indicates that there is significant correlation between the residents' will of rural land transfer and government's policy. But the intensity of the correlation is not very high.

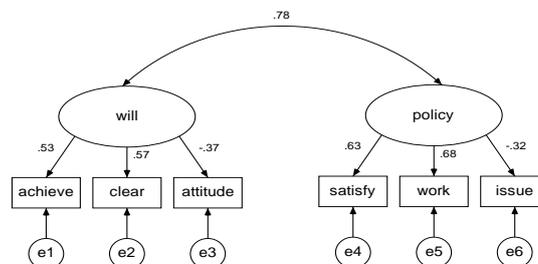


Figure 3. Path Graph of the Significant Correlated Variables between the Residents' will of Land Circulation and Government's Policy

Through the comparison of Figure 2 and Figure 3, it can be seen clearly that the correlation coefficient of policy and will shows a trend of rising ($0.78 > 0.71$). By removing variables which are apparently not related to principal factor, the correlation between policy and will can be increased.

It shows that residents' satisfaction of rural land transfer can be improved by increasing the subsidies and allowances of the expropriated or purchased land, improving the service level of grass-roots staff and solving the disputes appeared in the process of rural land transfer promptly and impartially. In order to further study the relation between the residents' will of rural land transfer and government's policy, the following two regression models show the path graph in Figure 5 by using software AMOS17.0.

The regression model obtained from the empirical analysis is:

$$will = 0.1 \cdot mind + 0.01 \cdot issue + 0.28 \cdot work + 0.12 \cdot difficulty + 0.39 \cdot satisfy \quad (16)$$

The regression equation shows that all indications of rural land transfer policy are the main factors that affect residents' will of rural land transfer. "satisfaction degree of allowance standard for the rural land transfer", "evaluation on the work done by cadres during the process of rural land transfer", "comparison of difficulties before and after the land loss" and

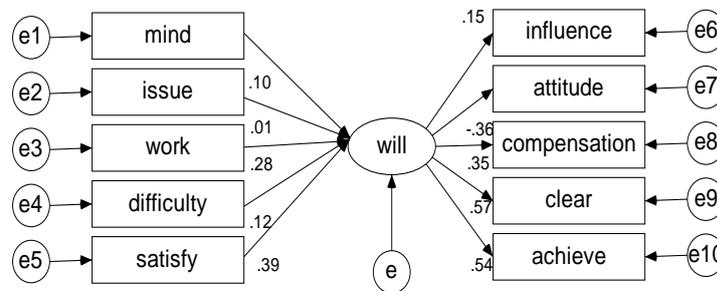


Figure 4. Path Graph of the Influence Factors of Government's Policy on Residents' Will of Rural Land Transfer

"Farmers" attitudes towards the town construction by using the rural land" produce more significant negative effects on residents' will of rural land transfer. So the government should be more careful on the choice of the rural land transfer policy and make more positive policy guidance.

4.3. The Empirical Analysis on Residents' will of Rural Land Transfer and Re-employment

Re-employment corresponds to five observed variables. Firstly, comparison of the income before and after the land loss; Secondly, whether the farmers feel satisfaction about the current job or not; thirdly, the expectation of employment; fourthly, whether there is discrimination against landless residents from the employer. Fifthly, whether the local government formulates the preferential policy of employment for landless residents, the options of discriminant are "Yes" and "no". The rest of the observed variables are designed in accordance with the four-level table about the degree of satisfaction and cognition [25].

In order to analyze the relationship between the residents' will of rural land transfer and re-employment, the paper uses AMOS17.0 to establish the path graph of factor analysis of two index systems and the path graph of covariance of two principal factor. The results of path coefficient estimation are shown in Figure 5.

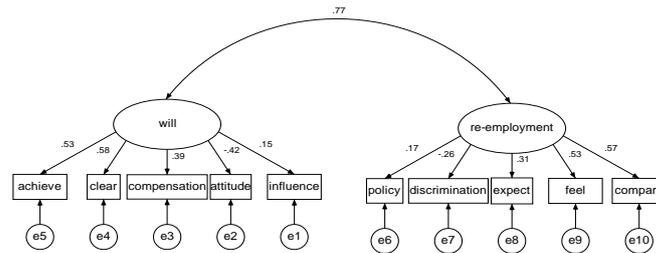


Figure 5. Path Graph of the Relationship between the Residents' will of rural land transfer and Re-employment

The structural equation model obtained from the path graph (path coefficients are figures from the standardization of the model, the same hereinafter) is:

The structural equation model obtained from the path graph (path coefficients are figures from the standardization of the model, the same hereinafter) is:

$$achieve = 0.53 \cdot will + e_6 \quad (17)$$

$$difficulty = 0.13 \cdot will + e_7 \quad (18)$$

...

$$achieve = 0.57 \cdot policy + e_1 \quad (19)$$

$$clear = 0.60 \cdot policy + e_2 \quad (20)$$

...

In order to further construct regression model of the index variables of residents' will of rural land transfer and the government policy, path graph can be obtained by using software AMOS17.0, which is shown in Figure 5.

The regression model obtained from empirical analysis is:

$$will = 0.36 \cdot compare + 0.26 \cdot feel + 0.11 \cdot expect - 0.13 \cdot discrimination + 0.12 \cdot policy \quad (21)$$

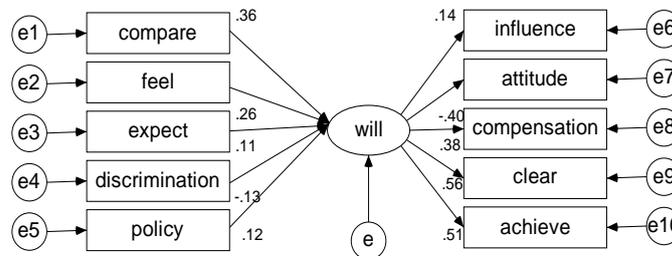


Figure 6. Path Graphs of the Influence Factors of Re-Employment on Residents' Will of Rural Land Transfer

The regression equation shows that all indications except for “whether there is discrimination against landless residents from the employer” are the main factors that affect residents' will of rural land transfer. “comparison of the income before and after the land loss”, “whether the farmers feel satisfaction about the current job or not”, “whether the local government formulates the preferential policy of employment for landless residents” and “the expectation of employment” produce more significant positive effects on residents' will of rural land transfer[26]. So the government should be more careful on the choice of re-employment policy for landless residents in the process of rural land transfer.

5. Conclusion

5.1. According to the principal factor analysis model of variable index of the government and residents' living conditions, and the empirical analysis results of covariance model as well, there is remarkable correlation among the residents' will of rural land transfer, government's policy and re-employment. The indicator related to residents' living conditions, especially for "allowance standard for land purchase" and "preferential employment policies", has the higher correlation.

5.2. In order to protect ownership of collective land and safeguard the interests of residents and property owners, the government should improve management institution of rural land transfer and supervise each link of the rural land transfer, especially for the signing and implementation of the contract.

5.3. In order to deal with the conflict appeared in the process of rural land transfer, the grass-roots government should set a reasonable management system and refine the implementation of the system, properly handle contradictions and problems that occur in the process of rural land transfer. So that a win-win situation can achieve a win-win situation for rural land transfer and agricultural structure adjustment,

5.4. Through the systematical training in rotation from the grass-roots government, the cadres can understand the policy spirit and grasp the laws and regulations. It is advantageous to manage various affairs related to rural land transfer and improve the management capacity of grass-roots cadres. In addition, the grass-roots government should also cultivate professional talents of agriculture.

Based on analysis model of verification factor, using AMOS analysis tools, this paper builds a structural equation model to realize the correlation analysis on residents' will of rural land transfer, government's policy and re-employment in the process of rural land transfer. Through the analysis, this paper presents that the government's policy effect should be strengthened and the re-employment of residents should be improved in order to improve the residents' will to rural land transfer. The analysis results of the article accord with the practice of rural land transfer work, which have scientific and practical significance in the future work of rural land transfer.

Acknowledgements

This Work was Supported by the Open Project of Collaborative Innovation Center of Suzhou Regional Development(2014SZXTKF06), the Scientific Research Platform Open Topic of Laboratory of Intelligent Information Processing (2014YKF39), Natural Science Foundation of Anhui Provincial Education Department(KJ2012A263), Anhui university humanities and social science research base: Research centre of northern Anhui urban-rural integration(SK2014A119), Excellent Academic and Technical Backbone of Suzhou College (2014XJGG03), Key Program for the Excellent Youth Foundation of Higher Education of Anhui Province (2013SQRW078ZD).

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