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THE IMPACT OF DEVELOPMENT OF FARMLAND TRANSFER MARKET AND FARMER STRATUM DIFFERENTIATION ON THE SELECTION OF OLD AGE SECURITY MODE: A HOUSEHOLD SURVEY ANALYSIS IN RURAL CHINA

The development of farmland transfer market is beneficial for the market of land resources, however, because of the dual function of farmland, the development of farmland transfer market and farmer stratum differentiation necessarily affect the mode of old age security. Based on the data of the farm household survey, this paper employs the multinomial probit model to empirically analyze the impact of farmland transfer market development and farmer stratum differentiation on the selection of old age security mode. The quantitative results showed that among the numerous factors affecting the selection of old age security mode, the development of farmland transfer market and farmer stratum differentiation all pass significant test at the levels of 5% and 1% respectively. The more farmers deviate from the pure agricultural employment, the more they are inclined to choose social old age security, and the development level of farmland transfer market advance one unit, the probability of selecting the social old age security will increase 29.6%. Based on the above conclusions, corresponding policy implications are put forward.

Keywords: farmland transfer market; stratum differentiation; old age security; questionnaire survey; rural China.

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ВПЛИВ РОЗВИТКУ РИНКУ ЗЕМЛІ ТА СОЦІАЛЬНОЇ ДИФЕРЕНЦІАЦІЇ НА ВИБІР ТИПУ ПЕНСІЙНОГО СТРАХУВАННЯ: АНАЛІЗ ОПИТУВАННЯ ЖИТЕЛІВ СІЛЬСЬКОЇ МІСЦЕВОСТІ У КНР

У статті показано, що трансформація ринку землі в Китаї позитивно впливає на ефективність використання земель у масштабах всієї країни, але через подвійну функцію землі у КНР та в контексті диференціації класу селян у країні ринок землі суттєво впливає на вибір типу пенсійного забезпечення. На основі даних опитування жителів сільської місцевості побудовано мультиноміальну пробіт-модель для емпіричного аналізу розвитку ринку землі в КНР, процесів диференціації прошарків селян та впливу цих двох трендів на вибір типу пенсійного страхування. Результати моделювання продемонстрували, що обидва параметри суттєво впливають на вибір типу пенсійного страхування. Чим більше селянин віддаляється від традиційних сільськогосподарських видів робіт, тим більше він стає схильним до соціального типу пенсії. Підвищення рівня розвитку ринку землі в окремії місцевості на одну одиницю призводить до підвищення ймовірності вибору соціального типу пенсії на 29,6%. На основі результатів моделювання розроблено рекомендації щодо перегляду пенсійної політики.

Ключові слова: трансформація ринку землі; диференціація прошарків населення; пенсійне страхування; опитування населення; сільські регіони КНР.

Табл. 3. Форм. 2. Літ. 23.

Хенгжоу Ксу, Гонкчун Їнь

ВЛИЯНИЕ РАЗВИТИЯ РЫНКА ЗЕМЛИ И СОЦИАЛЬНОЙ ДИФФЕРЕНЦИАЦИИ НА ВЫБОР ТИПА ПЕНСИОННОГО СТРАХОВАНИЯ: АНАЛИЗ ОПРОСА ЖИТЕЛЕЙ СЕЛЬСКОЙ МЕСТНОСТИ В КНР

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В статье показано, что трансформация рынка земли в Китае благоприятно сказывается на эффективности использования земель в масштабах всей страны, однако из-за двойной функции земли в КНР и в контексте дифференциации класса крестьян в стране рынок земли неизбежно влияет на выбор пенсионного обеспечения. На основе данных опроса жителей сельской местности построена мультиномиальная пробит-модель для эмпирического анализа развития рынка земли в КНР, процессов дифференциации прослойки крестьян и влияния этих двух трендов на выбор типа пенсионного страхования. Результаты моделирования показали, что оба параметра оказывают существенное влияние на выбор типа пенсионного страхования. Чем больше крестьянин отдаляется от исконно сельскохозяйственных видов работ, тем больше он становится склонен к социальной форме пенсии. А повышение уровня развития рынка земли в отдельной взятой местности на одну единицу приводит к повышению вероятности выбора социальной формы пенсии на 29,6%. На основе результатов моделирования разработаны рекомендации по пересмотру пенсионной политики.

Ключевые слова: трансформация рынка земли; дифференциация слоёв населения; пенсионное страхование; опрос населения; сельские регионы КНР.

1. Introduction

The third Plenary Session of the 17th Communist Party of China Central Committee have made the following decisions: according to the principles of legitimacy, willingness and compensation, allow farmers to transfer the contractual operation right of land by means of subcontract, lease, interchange, transference and stock cooperation to develop diversified forms of appropriate scale of operation. This indicates that the transference of farmland into a new stage. Besides the basic function of agricultural production, farmland has some functions of social old age security for farmers; however, the extension of farmland transference certainly has an important effect on the old age security function of land. Marketization of farmland transference not only changed the combination mode of two production factors (rural labor and land), but also altered the income structure of farmers and their risks, consequently bring some effects to the mode of "family support + land security" in rural areas. At the same time, with the rapid industrialization and urbanization, large numbers of farmers continually move to cities and non-agricultural industries, and this brings about gradual differentiation for farmers occupation. Some farmers cease to be traditional peasants which work from dawn to dusk. Their incomes now are not coming from agriculture; sensation and value of this kind of work have changed, and this affects the cognition of farmers on farmland security function and the difference in selecting the old age security mode. Therefore, it has certain theoretical and practical significance to discuss the inherent logical relationship between development of farmland transfer market, farmer stratum differentiation and selection of old age security mode under this background.

Until now, the study on farmland transference marketization has been mainly focused on several aspects as follows: firstly, the impact of farmland transference market on the efficiency of land allocation (Carter, Yao, 2006; Deininger, Jin, 2005; Jin, Deininger, 2009). Their study results show that land rental market can enhance the allocative efficiency and agricultural productivity by equalizing the marginal product of land across households with different land-labor endowments and by facilitating transfers of land from less productive households to the more productive ones.

Secondly, the study on the relationship between farmland transference and non-agricultural employment (Yao, 2000; Kung, 2002; Feng, 2009; Alessandro, Weersink, 2009; Feng, Heerink, 2010). Thirdly, some studies concern the impact of land transference market on household behavior of land use (Fang, Huang, 2003; Du, Huang, 2010). On the aspects of the relationship between farmer stratum differentiation, farmland transfer and old age security there is a small volume of literature, same with the cognition of land value (Chen, Zhao, 2012; Zhan, Zhang, 2012). Far less attention has been paid to investigate the inherent mechanism of farmland transfer market development, farmer stratum differentiation and old age security selection.

To our knowledge no studies have analyzed until now the joint impact of farmland transfer market development and farmer stratum differentiation on the selection of old age security mode in rural China. The objective of this paper is, therefore, to examine the impact of farmland transfer market development and farmer stratum differentiation on the selection of old age security mode. To reach this objective, with the data on farm households and the village survey we employ the ordered probit model to empirically analyze the effect of farmland transfer market development and farmer stratum differentiation on the selection of old age security mode.

The remainder of this paper is structured as follows. Section 2 presents the theoretical framework of our analysis and the hypotheses. Section 3 describes the method and the data used. In section 4, econometric estimation results and discussion on the empirical study are presented. Section 5 concludes by putting results into context and drawing implications for further policy development.

2. Theoretical analysis and hypotheses

With the rapid development of industrialization and urbanization, rural labor in developed areas is gradually shifting from agriculture to non-agricultural industries. This phenomenon advances the ratio of non-agricultural employment and weakens the reliance of farmers for rural lands. At the same time, land management with moderate scale was accelerated by the adjustment of agricultural structure, these all facilitate the rural lands transfer. Moreover, farmland is a very important possession for many household (Yao, 2012). For a long time, rural land is the groundwork for farmers, especially the functioning land for old age security, it is irreplaceable for most rural households. In rural areas where the formal social security system is absent, all security functions for farmers are undertaken by land. However, more recent data suggest that, with the rapid development of industrialization, urbanization, and the emergence of off-farm labor markets, land rental has become more active (Kung, 2002). At the same time, there is evidence that better functioning of land rental markets could help the economy to realize considerable gains in productivity and farmers' income diversification (Benjamin, Brandt, 2010). Especially in eastern rural areas where economy is developed, rural households' participation in off-farm activities supplements and diversifies their incomes, increases their welfare, and reduces the dependence on rural lands. Increased labor supply to off-farm activities may reflect an ex post response to a realized shock (Kochar, 1999) or an ex ante decision based on the need for alternative sources of income in a risky environment (Barrett, Reardon, 2012; Rose, 2001). Diversification of income and off-farm employment enhance the ability of economic payment of farmers, consequently, this broadens the selection range of rural households' old age security to some extent.

Fundamentally, the development of farmland transfer market and the instability of rural land security function was induced by the development of market economy and change of policy environment. Under the market effects, the significance of farmland economic utility for households is gradually strengthening, and the significance of farmland security for households is gradually weakening. This change engenders the impact on the intrinsic rural security system, and then, various patterns of rural old age security are formed, for instance, family support for the aged, self-support and social support.

On the other hand, the theories on old age security participation and rural land transfer summarized above treat rural farmers as one entirety (Rowena, Patricia, 2002; Vranken, Swinnen, 2006; Rahman, 2011). The factors driving the participation in old age security system and land transfer market, however, are likely to vary between different strata of farmers. For example, more educated and skilled rural labour tend to avoid family old age security and prefer self-supporting or commercial security. Due to the difference in career, education and income sources, farmers have different cognition of the value of farmlands, and this affects the selection of an old age security mode.

Based on the above theoretical analysis, we put forward the hypotheses as follows:

H1. The higher the development level of farmland transfer market is, the more farmers are inclined to choose the old age security mode, and there is a positive correlation between the development of farmland transfer market and the selection of old age security mode.

H2. Due to the difference in strata, there are also differences in the selection of old age security mode by farmers of different strata. The farmers with non-farm skills are more likely to choose the old age security of market-oriented from.

3. Methodology and data description

3.1. Model specification. The model used for the regressions analyses explains the mode selection of old age security by the characteristics of an individual, available resources of households to which an individual belongs, and farmlands transfer. To examine whether individual characteristics, household resources and farmland transfer perform the same across different types of old age security, we will estimate the model for the effect of development of the farmland transfer market and farmer stratum differentiation by the types of old age security as distinguished in the survey.

We use a multinomial probit model to examine the old age security mode selection of different farmer stratum. The multinomial probit model is theoretically more appealing than the multinomial logit model applied in previous studies on off-farm employment choices in China (Xia, Simmons, 2004; Shi, Heerink, 2009), as it is free from the "independence of irrelevant alternatives" property of the multinomial logit model. The multinomial probit model is computationally burdensome, but recent developments in computer hardware and software made it possible to apply this method to our data set. The model is specified as:

$$Y_i = C_i + C_{1i}X_1 + C_{2i}X_2 + C_{3i}X_3 + C_{4i}X_4 + \varepsilon_i \quad (1)$$

where:

Y_i = polychotomous variable representing the selection of an individual for the old age security mode i ;

X_1 = characteristics of an individual and a household;

X_2 = (column vector of) characteristics of farmer stratum;

X_3 = (column vector of) recognition for social old age security;

X_4 = (column vector of) variables of farmland transfer market;

$C_{1i}, C_{2i}, C_{3i}, C_{4i}$ = (row vectors of) the coefficients to be estimated;

ε_i = the error term with standard properties.

The dependent variable is a polychotomous variable which equals 0 if a farmer chooses the mode of family support, 1 for self-support, and 2 for social support. Table 1 gives an overview of the definitions of the variables used in the regressions.

Table 1. Description of variables, compiled by the authors

Set	Independent variables	Variable description
X ₁	Age	Age
	Marital status	Married = 1; single = 0
	Education	Number of schooling years
	Whether or not have son	Have = 1; no = 0
	Farmland	Contracted farmland area
	Whether or not have skills of off-farm employment	Have = 1; no = 0
X ₂	Stratum category	agricultural labors = 1; peasant workers = 2; employees = 3; peasant intellectual = 4; individual workers and individual business = 5; private entrepreneurs = 6; township enterprisers = 7; executives of rural affairs = 8
X ₃	Recognition for social old age security	Incomprehension = 1; comprehension = 2; familiar = 3
X ₄	Level of farmland transfer market	Value calculated
	Mode of farmland transfer	Lease = 1; subcontract = 2; land share = 3; transfer = 4

In this paper, we are calculating the development level of farmland transfer market by using the previous study results (Qu, 2011) as a reference. The model is specified as:

$$RLM = \frac{\sum RLT_i \times W_i}{\sum RLT_i}, \quad (2)$$

where RLM represents the development level of farmland transfer market, RLT_i and W_i denote the area of farmland transfer and the corresponding weight, respectively. The subscript i stands for the type of farmland transfer, mainly transfer, lease, subcontract and land share. In this model, the Delphi method is used to define the weight.

3.2. Area selection and data description. The data used in this paper were collected in a farm household survey in Xiqing District, Jinghai County, Linqing City and Guanxian County. The former two are located in Tianjin City, bordering with Beijing City, the two final areas are located on the west of Shandong Province. Selecting the study areas, the following two aspects were considered: firstly there are more opportunities for off-farm employment and farmland transfer; secondly there are various

modes of old age security for farmers to select. Based on this, we selected 3 towns from each county, and 3 administrative villages from every town, the 12 towns selected are Yangliuqing, Xinkou and Zhongbei in Xiqing District, Tangguantun, Liangwangzhuang and Taitou in Jianghai County, Wanshan, Lanwo and Donggucheng in Guanxian County, Daxinzhuang, Kangzhuang and Bachalu in Linqing City.

The detailed data collection on off-farm employment, household and individual characteristics, farmland transfer, old age security and other relevant variables for the calendar year 2010 was carried out in administrative villages in July-August 2010. In this survey, we got 485 questionnaires, the questionnaires with omitted and false information were eliminated, and 439 ones were in effect, the effective rate is 90.52%. Table 2 presents the statistical description of the independent variables.

Table 2. Statistical description of the independent variables

Independent variables	Min.	Max.	Mean	SD
Age	22	68	36.1753	7.9430
Marital status	0	1	0.7849	0.3219
Education	0	13	6.8247	1.2536
Whether or not have a son	0	1	0.8725	0.6326
Farmland	1.8	10.5	4.8217	0.6528
Whether or not have off-farm skills	0	1	0.6843	0.3755
Stratum category	1	8	5.5726	0.7125
Recognition of social old age security	1	3	2.0826	0.4725
Level of farmland transfer market	0.2840	0.8615	0.4535	0.3152
Mode of farmland transfer	1	4	2.5826	0.4657

Source: Farm household survey.

4. Estimation results and analysis

Table 3 shows the estimation results of the multinomial probit analysis. The estimated equations perform satisfactory in terms of goodness of fit.

Table 3. The results of parameter estimation, compiled by the authors

Independent variables	Coef.	Std. Dev.	Wald value	Sig.	Power Exp.
Age	-1.326*	0.825	2.413	0.076	0.754
Marital status	-1.453**	2.386	1.467	0.046	0.818
Education	0.825**	0.475	3.728	0.027	1.426
Whether or not have a son	-1.645*	1.518	2.363	0.068	0.762
Farmland	-1.527	0.812	4.384	0.227	0.863
Whether or not have off-farm skills	0.843**	0.768	3.437	0.036	1.435
Stratum category	2.372***	2.654	5.628	0.008	1.631
Recognition of social old age security	0.942	1.523	1.785	0.157	1.108
Level of farmland transfer market	1.583**	1.657	3.682	0.027	1.296
Mode of farmland transfer	0.672*	0.836	4.526	0.068	1.250
constant	1.275	0.754	2.683	0.128	1.484
-2 log likelihood			89.615		
Cox & Snell R ²			0.342		
Nagelkerke R ²			0.317		
Sig.			0.000		

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

*** Statistically significant at the 1% level.

With regard to the characteristics of an individual and a household, from the results of estimation, we find that the area of contracted farmland has no significant effect on the selection of old age security mode, however, the symbol of regression coefficient is negative, and this indicated that the more the contracted farmland area is, the less individual is inclined to choose the mode of social old age security. Marital status, education and off-farm skills are all statistically significant at the 5% level, this shows that for choosing social old age security, married farmers are 18.2% lower as compared to single farmers, farmers with higher education are more likely to choose the mode of social old age security, farmers with off-farm employment skills are also inclined to select the social support by 43.5% more than the farmers who don't have off-farm employment skills. The variable of whether a farmer has a son also passes the significance test at the 10% level, and the probability of family support for a household with a son is higher by 76.2% than for a household which has none.

The variable of farm stratum is found to have a significant positive impact on the selection of old age security mode, it also passes the significance test at the 1% level, and the symbol of regression coefficient is positive. This finding is consistent with the hypothesis (H2). These results also show that the more farmers deviate from the pure agricultural employment, the more they are inclined to choose social support. This also indicates that if farmers could obtain the stable off-farm employment, they can reduce the reliance on farmland as much as possible and risk uncertainty for future proceeds to some extent, and this will impel farmers actively choose the mode of social old age security.

With respect to the effect of social support recognition, from the estimation results, the recognition for social support is found to have no significant effect on the selection of old age security mode. However, from the symbol of regression coefficient and power exponent, we can indicate that when the recognition for social support is enhanced by one unit, the probability of choosing social support increases by 10.8%. Therefore, during the implementation of social old age security, it is necessary to promote the knowledge of social support for rural farmers.

The variable of the development level of farmland transfer market is found to have a significant and positive impact on the selection of old age security mode, and it passes the significance test at the 5% level. This finding is consistent with the hypothesis (H1). The result also indicates that when the development level of farmland transfer market is enhanced by one unit, the probability of choosing social support will increase by 29.6% because the improvement of farmland transfer market level may enhance the non-agricultural income of farmers, weaken the reliance on family support and reinforce farmer's economic affordability for self and social support. From the above results we can draw the following implications: in the process of encouraging farmers to take part in various security systems, it is necessary to develop non-agricultural industries, improve rural labor's professional quality and accelerate the development of the farmland transfer market.

The type of farmland transfer is found to have a significant impact on the selection of old age security mode, and the dummy variable passes the significance test at the 10% level. The transfer of farmland means that a farmer obtains stable non-farm employment, and then rescinds the contract relationship between a farmer household and a rural collective organization. Thus farmers with stable non-farm income or

employment are more likely to choose the type of farmland transfer and the mode of social support.

5. Conclusions and policy implications

Development of farmland transfer market and farmer stratum differentiation have important implications for the selection of rural old age security mode. Applying the multinomial probit model for the household survey data, this paper investigates the effects of land transfer market development and farmer stratum differentiation on the selection of rural old age security mode.

The empirical results show that among the numerous factors affecting the selection of old age security mode, the development of farmland transfer market and farmer stratum differentiation all pass the significance test at the levels of 5% and 1% respectively. The more farmers deviate from purely agricultural occupation, the more they are inclined to choose the mode of social old age security, and the development level of farmland transfer market advance by one unit increases the probability of selecting social old age security mode by 29.6%.

Based on the above conclusions, corresponding policy implications are as follows: firstly, according to the regression analysis, it is necessary to improve the evaluation mechanism of farmland transfer price, to actualize the market price guidance of farmland transfer, to enhance the market level of farmland transfer and to increase farmer's transfer procedures. Secondly, farmer stratum differentiation has a significant impact on farmland transfer and old age security selection, so it is vital to enhance the cultural and professional quality of rural labor, to breed the advantage of resource endowment for different farmer strata, thus it can provide technical guarantees for farmers in choosing different employment, and facilitate the transfer of rural labor; thirdly, the integration of urban and rural social security systems must be implemented step by step to reduce farmers' anxiety about lacking old age security. The social security function of farmland should be weakened and improved social security system should be provided by government. Finally, with respect to recognition of social security, it is necessary to promote the policy of social security by a number of different ways, to reinforce the farmer's recognition of social security and improve the participation consciousness about social old age security.

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