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THE IMPACT OF RURAL LAND TRANSFER ON FARMERS' INCOME FROM THE PERSPECTIVE OF FARMER DIFFERENTIATION: AN EMPIRICAL STUDY BASED ON HOUSEHOLD QUESTIONNAIRE SURVEY IN TIANJIN CITY, PRC [*]

Using the household survey data conducted in Tianjin in 2013 and applying logistics regression, this paper empirically analyzes the impact of rural land transfer on farmers' income. The results show that: 1) employment outside farming as share of overall family labor and home insurance have significant impact on households' income of purely agricultural type farm; 2) age, education level, household income per capita, contracted land area, home insurance, price of agricultural land transfer, extent of agricultural land transfer market have significant impact on households' income of large-scale purely agricultural farms; 3) age, outside employment and home insurance have significant impact on households' income of agricultural and industry type farms; 4) education level, support coefficient, outside employment home insurance, volume of agricultural land transfer market have significant impact on households' income for non-agricultural farms.
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ВПЛИВ ПЕРЕДАЧІ ЗЕМЕЛЬ НА ЗАРОБІТКІ ФЕРМЕРІВ З ПОЗИЦІЇ ЇХ ДИФЕРЕНЦІАЦІЇ: ЕМПІРИЧНЕ ДОСЛІДЖЕННЯ ЗА ДАНИМИ ОПИТУВАННЯ В ОКРУЗІ ТЯНЬЦЗІНЬ, КНР

У статті використано дані опитування домогосподарств, проведеного в окрузі Тяньцзінь у 2013 р., до яких застосовано логістичну регресію для емпіричного аналізу впливу передачі сільських наділів на заробітки фермерів. Результати аналізу дозволили дійти таких висновків: 1) позафермерське працевлаштування та наявність страхування мають суттєвий вплив на прибутки домогосподарств виключно фермерської спрямованості; 2) вік, рівень освіти, душовий дохід, розмір земельного наділу за контрактом, наявність страховки, вартість передачі земельного наділу та загальний обсяг ринку передачі земель сільгосппризначення мають суттєвий вплив на прибутки великих домогосподарств суто фермерської спрямованості; 3) вік, позафермерське працевлаштування та наявність страховки мають суттєвий вплив на заробітки сільських домогосподарств змішаних видів зайнятості; 4) рівень освіти, коефіцієнт державної підтримки, позафермерське працевлаштування, наявність страховки та загальний обсяг ринку трансферу сільгоспземель мають суттєвий вплив на заробітки сільських домогосподарств з позафермерськими видами діяльності.
Ключові слова: диференціація фермерів; передача земельних наділів; прибуток сільських домогосподарств.
Форм. 2. Табл. 2. Літ. 17.

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ВЛИЯНИЕ ПЕРЕДАЧИ ЗЕМЕЛЬ НА ЗАРАБОТКИ ФЕРМЕРОВ С ПОЗИЦИЙ ИХ ДИФФЕРЕНЦИАЦИИ: ЭМПИРИЧЕСКОЕ ИССЛЕДОВАНИЕ ПО ДАННЫМ ОПРОСА В ОКРУГЕ ТЯНЬЦЗИНЬ, КНР

В статье использованы данные опроса домохозяйств, проведённого в округе Тяньцзинь в 2013 г., к которым применена логистическая регрессия для эмпирического анализа влияния передачи сельских наделов на заработки фермеров. Результаты анализа позволили сформулировать слудующие выводы: 1) внефермерское трудоустройство и наличие страховки имеют значительное влияние на прибыли домохозяйств исключительно фермерской направленности; 2) возраст, уровень образования, подушевой доход, размер земельного надела по контракту, наличие страховки, стоимость передачи земельного надела и общий объём рынка передачи земель сельхозназначения имеют значительное влияние на прибыли крупных домохозяйств сугубо фермерской направленности; 3) возраст, внефермерское трудоустройство и наличие страховки имеют значительное влияние на заработки сельских домохозяйств смешанных видов занятости; 4) уровень образования, коэффициент государственной поддержки, внефермерское трудоустройство, наличие страховки и общий объём рынка трансфера сельхозземель имеют значительное влияние на заработки сельских домохозяйств с внефермерскими видами деятельности.

Ключевые слова: дифференциация фермеров; передача земельных наделов; прибыль сельских домохозяйств.

Introduction. Farmer's income has been one of the core issues in Chinese agriculture, and the way to increase of their income has been the key to solving most of rural issues. The decisions put forward during the Third Plenary Session of the 18th Communist Party of China in 2013 clearly indicated the need to effectively increase the property income of farmers, making income a new growth point, so that to support effectively the continued growth of farmers' income, also gradually narrowing the income gap between urban and rural residents. This not only defines the importance of rural work, but also brings clear goals and objectives for the realization of policies related to farming. The land, as the main property of rural residents, should bring property income for them, this can be achieved through land-related equity transfer. Because land transfer not only enables farmers obtain direct interest in land transfer income, but is also able to improve the efficiency of land resources, of land management and also to release the countryside surplus labor force so that to indirectly increase farmers' property income (Chen, 2014).

This study focuses on exploring the effect of rural land transfer on farmers' income from the perspective of farmers' differentiation. The remainder of this paper is structured as follows. Section 1 reviews literature related to this subject. Section 2 describes the study region, method and data used. In section 3, econometric estimation results and discussion on empirical study are presented. Section 4 concludes by putting our results into the context and drawing out policy implications.

Literature review. Theoretically, the land rental market can enhance allocative efficiency and agricultural productivity by equalizing the marginal product of land among households with different land-labour endowments and by facilitating transfers of land from less productive households to more productive ones (Carter and Yao, 2002; Deininger and Zegarra, 2003; Deininger and Jin, 2005; Yao, 2007). However,

in present-day China land rental arrangements are generally informal, short-term, and are usually between the households in the same village. Plots rented from other households are therefore subject to tenure insecurity (Feng, 2008), which may discourage long-term land investments and reduce agricultural productivity.

With the development of China's society and economy, the objective requirements to land transfer have been put forward constantly, since their effects on farmers' income has become increasingly evident. Accordingly, many scholars have discussed the relationship between agricultural land transfer and farmers' income from various angles. For example, some scholars believe that the problems currently existing in China's agricultural and rural development is the difficulties in increasing farmers' income, and one of the reasons lies in the labor force overload on limited lands. Thus, land transfer can effectively increase farmers' income (Chen and Wu, 2010). However, under the existing land income distribution, increasing farmers' income needs premise and conditions. Under current irregular agricultural land market conditions, if the government gets involved in rural land transfer, the transactions cost can be saved, and farmers' income thus increases (Liu, 2010; Shu and Shu, 2012; Murua et al., 2013). C. Wang (2011) studied two channels of farmers' income growth (wage income and household operating income) to analyze the relationship between land transfer and household income, revealing that land market development, to a large extent, can promote higher farmers' income, and development of land markets property as well as assets at credit markets can actively promote the income of farmers but at the same time, if not properly controlled, it will also have some negative impacts on continued growth of farmers' income, bringing more uncertainty to the sector. In this regard, D. Xie (2014) shows that incomplete land transfer rights have significant effect on labor migration and rural-urban income gap, while improvement of land transfer rights can be helpful in promoting labor permanent migration and shorten rural-urban income gap. With the method of propensity S. Matching et al. (2015) matched transfer farmers and non-transfer farmers and found that farmland rent and farmland lease increased farmers' income. Overall, farmland transfer increases farmers' income inequality to some extent through contrasting farmers' income inequality before and after transfer. Y. Lin and S. Yao (2014) found that the direct effect of the Sloping Land Conversion Program (SLCP) on household income is positive but very small and insignificant, suggesting that retiring cropland has, at least, not reduced income from farming. Moreover, SLCP had much higher and even increasing indirect impact on household income through promoting labor transfer and relaxing liquidity constraints.

As the special case of social stratification, farmer differentiation also has two important characteristics: specificity of function and diversity of position. It also has two basic forms: one is the heterogeneity of farmers increasing income; another is changes of farmers' social inequality (Liu, 2009). Differentiation in vocation and income between farmers has lead to differences between farmers in resources endowment, skill structure and economic income levels. According to the theory of labor division and specialization, a household will make the decision on resources allocation based on resources endowment and the target of family production. This will not only realize the maximization of production efficiency by reasonable utilization of resources, but also realize the specialization of production by rational division

between family members, which further improves production efficiency (Tang and Shi, 2014). While social stratum enhance farmers' advantages of specialization and competition to some extent, this favorably improves the efficiency of farmland utilization for the farmers who are skilled in agriculture and thus enhance their income.

To the best of our knowledge, only a few literature studies have analyzed the impact of rural land transfer on income from the perspective of sociological stratum. And the studies above all take farmers as a unified whole, neither involving the type of farmers, nor considering the impact of different agricultural land transfer forms on their income. So, the objective of this paper is, therefore, to examine the impact of rural land transfers on households' incomes. To reach this objective, with the data of farm household and village survey we construct the multiple regression model to empirically test the effects of agricultural land transfer on different types of households' income.

Data sources and research methods.

1. Data sources. The data used in this paper were collected from the peasant household survey in Xiqing District, Jinghai County. We selected questionnaire and participatory rural appraisal (PRA) for data collection, PRA method was selected because farmers have been differentiated into different strata, their social and cognitive resources vary due to different status and positions, however, traditional survey methods usually overlook the effect of stratum differentiation on their willingness of rural land transmission. In addition, since 2012 the Ministry of Agriculture established 33 pilot areas nationwide for standardization management of transfer' of rural land contracted. Jinghai County in Tianjin was elected, and one of reason we chose this county is a big number of large-scale agricultural households in this area.

In this survey we got 436 questionnaires, then the questionnaires with omitted or false information were eliminated, and 387 ones were found to be effective, so that the effectiveness rate was 88.76%. The survey mainly includes personal characteristics, family endowment characteristics, methods and market environment of rural land transference, and other needed information.

2. Model specification. Farmers' income is affected by many factors, but the relationship between the variables and farmers' income is uncertain. In a quantitative research on a number of factors affecting farmers' income, the multiple linear regression model has strong applicability. Based on this and other relevant research methods we use multiple linear regression model for our analysis. Multiple linear regression model can be generally expressed as:

$$Y = \alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \cdots + \alpha_n x_n + \varepsilon, \tag{1}$$

where Y is the dependent variable; x_i represents the vector of explanatory variables ($i = 1, 2, ..., n$); α_i is the vector of parameters to be estimated; ε is the vector of residuals.

3. Variable enactment. Based on the existing research results and practical results of our questionnaire investigation, combined with key variable of this article, the independent variable is set by individual farmers and endowment characteristic of family resources, market environment and transfer methods of rural land. More specifically:

1) individual farmers and family characteristics variables, including age, gender, marital status, education, proportion of migrant workers, family supporting coefficient, contracted land per capita, household insurance situation;

2) rural land transfer price, namely, land transfer fee, unit: yuan / mu (per annum);

3) land market variables, mainly refer to the degree of farmland transfer market development.

Marketization degree analysis of farmland transfer is the use of market operation mechanism to set the market degree and decide it comprehensively by investigating the weights of various forms of market operation. The main forms at the current farmland transfer market are transfer, lease, subcontract, admission, replacement, etc., and due to the limitations of survey data, the calculating methods should refer to the way the experts like F. Qu (2004) used to measure the marketization degree of urban land:

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

where RLM is marketization degree; RLT_i and W_i — specific forms of transfer area and the corresponding weights, respectively. Weights are determined by the Delphi method. During the survey, the main rural land transfer forms included transfer, lease, contract and admission;

4) rural land transfer variables. In order to distinguish the effect of various forms of transfer on farmer's pension security selection, we set dummy variables for transfer ways: leases as "1", subcontracting as "2", shares way as "3", and transfer as "4".

Variables description and descriptive statistics results are shown in Table 1.

4. Classification of farmer differentiation. Since the reform, the trend of stratum differentiation in the rural society is increasingly apparent. As early as 1990, rural community was considered to be differentiated into 8 stratums. After the tax reform, strata began to variy differently due to different classification criteria (He, 2013). Based on the existing results, starting from the relationship between farmers and agriculture (including farming and aquaculture) and the degree of peasant household specialized operation, this paper divides current farmers into 4 social classes: namely, general purely agricultural, large-scale agricultural (family farms), partly-farming and off-farm peasant households.

Empirical analysis and results. According to the method mentioned above, this paper employs statistical software "Eviews 6.0" for logistic model estimation, and the specific results are shown in Table 2.

The results of statistical analysis point out that the regression model has a good coherence and strong explanatory power, regression results are credible.

According to the model estimation, the estimated coefficients of age significantly affect large-scale agriculture and partly-farming households' income, also passing the significance test at the 10% level. This suggests that for young large-scale and partly-farming peasant households who are in the prime of their life, being able to withstand high levels of agricultural work, having enough enthusiasm for career development, the scale cultivation through land transfer will undoubtedly bring them higher revenues and significantly affect their income increase.

Table 1. **Variables definitions and the results of descriptive statistical analysis,**
authors'

Variable	Description	Mean	Sta. Err.
1. Individual characters			
Age	Actual age	42.516	6.341
Gender	Male = 1; female = 0	0.697	0.402
Marital status	Married = 1; single = 0	0.935	0.246
Education	College degree or above = 5; high school, polytechnic school = 4; middle school = 3; primary school = 2; illiterate = 1	3.824	0.613
2. Family endowment characteristics variables			
Supporting coefficient	Proportion of non-labor force	1.603	0.416
Proportion of migrant workers	Proportion of migrant workers in family labor	0.428	0.376
Contracted land scale per capita	Contracted land scale per capita (mu)	1.453	0.447
Household insurance situation	Total number of families participating in rural social pension and urban pension security programs	3.512	0.369
3. Farmland transfer environment variables			
Land transfer price	Land transfer fee, unit: yuan / mu (per annum)	350.65	143.76
Degree of farmland transfer market development	Actual measured values	0.507	0.424
Types of farmland transfer	Lease = 1; subcontract = 2; admission = 3; transfer = 4	2.063	0.862
4. Dependent variable			
Net income per capita of peasant household	Actual survey data (yuan)	12650.72	3428.64

The variable of education is found to have significant effect on general purely agricultural, large-scale agricultural households, passing the significance test at 10% level. From the function level perspective, however, the variable has different influence on 3 types of peasant households.

In terms of large-scale farmers, better educational background enables them adopt advanced agricultural technologies and knowledge in plowing, and thus strengthen the effect of large-scale operations on revenue growth. Supporting coefficient has significant effect on general purely agricultural and off-farming households, passing the significance test at 10% whereas the effect on large-scale and partly-farming households is not significant. This suggests that the proportion of non-labor force, like elderly or children, has significant effect on the revenue of general purely agricultural and off-farming households. The share of migrant workers in family labor significantly affects the revenue of general purely agricultural, partly-farming and off-farming households, passing the significance test at 10%, 5% and 1% levels, respectively. This indicates that for general purely agricultural households, off-farm employment has a remarkable effect on revenues and for partly-farming and off-farming households, since part of or even all of their income comes form off-farm employment so the increase of it significantly influences household income.

Table 2. **Results of parameter estimation,** *authors'*

Independent variable	General purely agricultural		Large-scale agricultural		Partly-farming		Off-farm	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Age	-0.843	0.605	-0.493*	0.526	-0.574*	0.605	-0.526	0.428
Gender	1.241	1.018	0.741	0.492	0.382	0.574	0.423	0.567
Marital status	0.726	0.418	0.808	0.652	0.673	0.461	0.506	0.479
Education	0.675	0.376	1.028*	0.403	0.527*	0.403	0.465*	0.632
Supporting coefficient	-0.582*	0.583	-0.628	0.472	0.664	0.392	-0.529*	0.439
Proportion of migrant workers	0.836*	0.674	0.637	0.503	0.575**	0.482	0.636**	0.517
Contracted land scale per capita	0.628	0.463	0.732**	0.628	0.763	0.734	0.526	0.702
Household insurance situation	0.736*	0.605	0.592*	0.473	0.546*	0.372	0.738*	0.627
Land transfer price	-0.584	0.472	-0.678**	0.315	-0.627	0.483	-0.451	0.402
Degree of farmland transfer market development	0.627	0.492	0.516**	0.538	0.825	0.830	0.642*	0.705
Farmland transfer methods	0.458	0.537	0.725	0.491	0.630	0.605	0.536	0.418
Constant	4.243	0.547	3.715	0.482	4.537	0.563	2.836	0.323
-2 log likelihood	89.284		86.260		83.715		86.535	
Cox & Snell R^2	0.276		0.461		0.358		0.307	
Nagelkerke R^2	0.379		0.416		0.392		0.382	
Sig.	0.000		0.000		0.000		0.000	

*, **, *** denotes significance at the 10%, 5% and 1% levels respectively.

Therefore, in order to accelerate rural land transfer and improve farmers' income, off-farm employment has to be widened to promote off-farm employment for vast agricultural population. Contracted land scale per capita only has effect on the income of large-scale agricultural household, suggesting that the large scale of agricultural operations positivity effects revenue increases and provides support for accelerated rural land transfer large-scale agricultural operations. Family insurance situation significantly enhances family income for 4 types of peasant households. This shows that insurance situation serves as an alternative to agricultural land safeguard function, significantly affecting farmers 'production intentions and behavior in rural areas, thereby affecting farmers' income.

Judging from the estimation results of market environment and methods of rural land transfer, the development level of farmland transfer market has no significant effect on general purely agricultural and partly-farming households. A possible reason for that is that in traditional farming community, rural land transfer not only mostly relies on information from friends and relatives, but also lies on the trust. For this type of peasant households, the regional scope of farmland transfer is limited to collective economic organizations. Meanwhile, this variable significantly affects the income of large-scale agricultural and off-farming households, also passing the significance test at 10% and 5% levels, respectively. This indicates that under policy demands of promoting rural lands flow and increasing scale of operations, the system of farmland transfer market and other supporting constructions should be actively improved. Land transfer price has a significant effect on the revenues of large-scale agricultural households, passing the significance test at the 5% level. While the effect on general purely agricultural, partly-farming and off-farm households were not significant. Generally speaking, land transfer price is the key factor that directly affects the scale of rural land transfer and farmers' net income. The higher is the price, the more difficult would be land transfer. Possible explanation here for the price to have no significant effect on general purely agricultural, partly-farming and off-farming households might be that these 3 types of farm households mostly rely on relatives and friends for land transfer, some even farming for free. Types of rural land transfer have no significant effect on farmers' revenue.

Conclusions and policy implications. On the basis of the survey data of Tianjin farmers in 2013, this paper from the perspective of farmers differentiation, empirically analyze the effect of farmland transfer on different types of households income. The results show that: 1) the supporting coefficient, proportion of migrant workers and household insurance situation have significant effect on the revenue of general purely agricultural households; 2) age, education level, contracted land scale per capita, household insurance situation and market development level have significant effect on the revenue of large-scale agricultural household; 3) age, education level, share of migrant workers and household insurance situation have significant effect on partly-farming households' income; 4) education, supporting coefficient, share of migrant workers, household insurance situation and market development level have significant effect on the revenues of off-farming peasant households.

Based on the above conclusions, the corresponding policy implications are as follows. Initially, dependence of different peasant households on rural land varies due to farmers differentiation. Government can take measures to encourage off-farming

or partly-farming peasant households to sold out rural land, and thus, provide space for the development of land management and new agricultural operations entities. Secondly, to actively cultivate rural factor market development, to gradually improve intermediary organizations at rural land transfer market, to decrease the costs of rural land transfer. Lastly, to combine the actual needs of farmers after differentiation to develop differentiated institutional arrangements for different households' types. Providing export system for the farmers who have the ability for off-farming employment, to protect their land and property rights, and to promote the urbanization of peasant. As for the farmers who have the ability and willingness for agricultural operations, it is vital to improve their management capacity, and lead them gradually to new types of agricultural operations.

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