An Empirical Study on Migrant Worker's Housing Security Willingness Based on the Logistic Regression Model

------ Take a Case from Foshan

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Abstract. Based on the questionnaire survey data of 1000 migrant workers in Foshan City, Guangdong Province in 2016, logistic regression analysis was carried out on the basic situation, living conditions and housing security willingness of migrant workers. The study found that the gender of migrant workers, the area where the work unit was located, the total monthly income of the family, and the availability of social security and other factors had a significant impact on the choice of housing security methods; age, family members and spouse and other factors has a significant impact on the choice of housing security products. According to the characteristics of the demand for housing security and housing security products, combined with the possibility of supply of public financial resources, the thesis suggests that it aims to establish the information management system of migrant workers' personnel, adopt the methods of integrating households and other methods, and gradually improve the housing security system of migrant workers.

Introduction

With urbanization, industrialization and modernization just keeping pushing on, a mass of migrant workers are swarming into the cities. They make great contribution to these cities' construction and development, and meanwhile have to challenge a series of difficulty. Being the first to bear the brunt is housing issue. The relevant data shows that the migrant workers, as an urban weak group, are limited to low career status, meager income and household registration system that lead to an inferior housing right. Thus it can be seen, how to integrate the migrant workers' housing security into the new urbanization and how to formulate housing support policy aiming at their housing willingness have become the hot issue of the housing security study.

According to the statistical data, Foshan City in the centre of the PRD (Pearl River delta) of Guangdong Province has the largest labor input market in which the migrant workers account for 48% of local population. Hence, it is significantly a representative sample. In this study, we used the logistic regression analysis model to analyze their demand characteristics concerning housing security mode and product in terms of local social and economic developments, proving the empirical support in the establishment of more complete housing security supply system for the migrant workers.

Literature review

The housing issue is a world problem which any country may encounter or experience in its economic development and urbanization. Oversea researchers have carried out practice study extensively and deeply. Todaro's population flow model theory (2000) reveals that regional development gaps such as income difference drive population flow[1]. Rossi (1980) believed family life cycle change is correlative with migration; in other words, life circulation changes family structure, leading to housing demand. However, the most important function of the migration is to satisfy such demand by adjusting housing[2]. Simons (1968) defined three categories in the change of relationship between resident and residential environment from the social point of view: firstly urbanization, i.e. the change in population characteristics and living habits; secondarily economic status, including income, working environment and education background etc; finally socialized isolation between nationalities, between races and between religious faith[3]. Arthur O'sullivan (2003) analyzed the impact of the applicable public housing policy on the urban poverty. He believed the federal housing policy caused housing isolation that increased poverty. He advocated such solution as eliminating urban poverty by reforming housing policy[4].

Chinese scholars also carried out some researches aiming at the migrant workers' housing security. Liu Shuangliang (2010) investigated the migrant workers' residential situation. He found their residential distribution, type and quality tended to be complicated, diversified and poor[5]. Li Bin (2013) pointed out owning a urban affordable housing was one of the most desired helps, also extremely wishful willingness for living and working in peace and contentment[6]. Cui Zhu (2008) classified housing security into three levels, i.e. low-rent housing, money subsidy and unaffordable housing, which are subject to different income groups from low to high[7]. Wu Xianghua, Yu Minmin and Zuo Long (2015) investigated and surveyed the migrant workers' housing security willingness in Nan Jing City to find out that the housing security willingness significantly depended on their gender, age, monthly income, occupation, residential type and future[8]. These studies lay a solid foundation for this research, but also provide rich materials. This paper will focus on the effect factors of the migrant workers' housing security willingness in Foshan City from the view point of social security and on the basis of foresaid studies, providing empirical evidence for relevant policy formulation by the analysis based on logistic regression model.

Empirical analysis

Selection of sample

The samples in this paper are derived from the step sampling (PPS) of the migrant workers at middle-low income levels in 5 districts of Foshan City, which was carried out by the research team of the Real Estate Institute of the Guangzhou University in July, 2016. This team issued 1000 copies of the questionnaire concerning the migrant workers' housing security demand, among which 380 copies (38%) went to Chan Cheng district, 350 copies (35%) to Nan Hai district, 110 copies (11%) to Shun De district, 80 copies (8%) to Gao Ming district and 80 copies (8%) to San Shui district. At result, there were 816 questionnaires returning to the team. However, 718 of them were valid with a response rate of 71.8%.

Based on available research findings, this paper will focus on two aspects to discuss the migrant workers' housing security willingness. One aspect is housing security mode; another is housing security product. Thoroughly investigating the influence of the migrant workers' basic information, working situation and housing condition on their housing security willingness will help the researchers understand their demands at all levels, providing the government with the basis for

housing security policy.

Indicator selection

In terms of the statistics based on the questionnaire results, we select main factors impacting the migrant workers' housing security willingness,including 14 factors such as gender, age, registered residence, family size, education background, technical title, marriage status, employment area, unit's nature, years of working in the area, availability of social security ,family monthly earning,current residential situation and current housing area.

Research hypothesis

Based on available research findings, there are five hypotheses concerning the migrant workers' housing security willingness to be put forward in this paper:

H1:Migrant workers' family monthly earning significantly influences the choice of their housing security mode.

H2:Migrant workers' education significantly influences the choice of their housing security mode.

H3：Migrant workers' employment district significantly influences the choice of their housing security mode.

H4：Migrant workers' age significantly influences the choice of their affordable housing product.

H5： Migrant workers' marriage (having spouse or not) significantly influences the choice of their affordable housing product.

Construction of the Logistic model

In this paper, SPSS19.0 software is used to analyze the data statistically, in which the cross-tabs analysis is applied to figure out those factors having significant impact on housing security willingness and to weed out the insignificant factors. In terms of two dependent variables, i.e. choices of housing security mode and affordable housing product, the multiple logistic (model 1) and dual logistics (model 2) regression analysis and inspection method are adopted to further analyze each factor's impact on the housing security willingness and to summarize the results. :

Variable assignment

It is primary to explore the influence of the migrant workers' basic information, working status and current housing situation on their choice of housing security mode. Such housing security mode is a variable being explained, including rental subsidies, public rental housing provided by the government and purchase-type affordable housing.

It is secondary to study the influence of the migrant workers' basic information, working status and current housing situation on their choice of affordable housing product. Such affordable housing product is a variable being explained, including dormitory and family residence.

The explained variables are mainly categorized as: migrant worker's basic information and working status; migrant workers' housing situation.

First category includes 12 factors such as gender, age, household register, family size, education background, technical title, marriage status, employment area, unit's nature, years of working in the area, availability of social security and family monthly earning. The migrant workers are permanent residents, so being a part of the city. We believe that their basic information and working status influence housing security willingness.

Secondary category includes 2 factors such as current residential situation and housing area. We believe that their current residential situations influence housing security willingness.

Cross-tabs Analysis

Such analysis aims at correlation among multiple variables. It aims at the influence of migrant workers' various factors on their housing security mode. The cross-tabs analysis is used to analyze 14 explaining variables. However, 12 variables(employment area,gender,family size,age,education background,technical title,marriage status,unit's nature,years of working in Foshan,availability of social security in Foshan,current residential situation,family monthly earning) are successfully tested by Pearson square.

According to the analysis, 12 variables above mentioned are successfully tested by Pearson Square (Sig < 0.05). This means these factors are strongly correlative with the choice of housing security mode. At this point, these 12 variables will be integrated into a multi-categorical logistic regression model.

It aims at the influence of migrant workers' various factors on their choice of affordable housing product. The cross-tabs analysis is used to analyze 14 explaining variables. However, following 6 variables are successfully tested by Pearson square.

According to the analysis, 6 variables above mentioned are successfully tested by Pearson Square (Sig < 0.05). This means these factors are strongly correlative with the type of housing security product. At this point, these 6 variables will be integrated into a binary logistic regression model.

Logistic regression analysis

A multi-categorical logistic regression analysis is subject to dependent variables based on multifactor, mainly aiming at probability prediction of multifactor impacted events. Therefore, Model 1 adopts multi-categorical logistic regression model to quantitatively analyze how migrant workers select housing security mode.

Assuming the explained variable π is a tri-categorical variable, let's take it as Value 1, 2, 3, so explaining variable is X1, X2, Xi; choose $\pi=1$ as reference, thus multi-categorical logistic regression model is as follows:

$$\text{logit} \quad \frac{p_2}{p_1} = a_2 + b_{11} X_1 + b_{12} X_2 + \ldots + b_{1m} X_m \qquad （1）$$

$$\text{logit} \quad \frac{p_3}{p_1} = a_3 + b_{21} X_1 + b_{22} X_2 + \ldots + b_{2m} X_m \qquad （2）$$

$$P(\pi = 1 \mid X) = \frac{\text{EXP}(a + b_1 X_1 + \ldots + B_m X_m)}{1 + \text{EXP}(a + b_1 X_1 + \ldots + B_m X_m)} \qquad （3）$$

Supposing migrant workers' choice of housing security mode as dependent variable valuing at 1, 2, 3; where 1 refers to rental subsidy, 2 to public rental housing and 3 to purchase type affordable housing.

In this multi-categorical logistic regression analysis, 12 variables in Table6 are substituted into the multi-categorical logistical regression model, then the variables at Sig > 0.05 are rejected to reestablish regression equation and to do significance test till all variables in the equation are tested as being significant. In terms of backward screening method, "age, education background, technical title, spouse and current residential situation" will be rejected if the Sig values exceed 0.05.

Sig values of "employment area, gender, family size, unit's nature, years of working in Foshan, availability of social security in Foshan and family monthly earning" are less than 0.05. This means these 7 variables above mentioned have significant influence on migrant workers' housing security willingness, so applicable to the model. Subsequently, SPSS19.0 will be used for multi logistic regression analysis.

The chi-square value is 955.929, df is 38, and Sig value is less than 0.05 by likelihood-ratio test. This means that the model is at good fitting degree, so suitable for analysis. See Table1.

Table1.Model Parameter Estimation （（1）=Public rental housing / rental subsidies;（2）=Purchase type affordable housing / rental ）

Housing security willingness		B		Sig		exp（B）	
		（1）	（2）	（1）	（2）	（1）	（2）
Intercept		23.806	4.864	0.993	0.998		
Employment area	Chan Cheng	3.962	3.09	0	0.003	52.553	21.973
	Nan Hai	3.956	2.395	0	0.023	52.261	10.966
	Shun De	2.884	2.198	0.002	0.03	17.894	9.011
	Gao Ming	3.179	2.435	0.001	0.018	24.018	11.412
	San Shui	0[b]	0b	.	.	.	.
Gender	Male	1.916	3.587	0	0	6.794	36.133
	Female	0[b]	0b	.	.	.	.
Availability of social security in Foshan	Yes	-1.591	-2.095	0.032	0.009	0.204	0.123
	No	0[b]	0b	.	.	.	.
Family monthly earning	RMB200 and below	-5.455	-4.226	0	0	0.004	0.015
	RMB 2001-4000	-2.288	-1.263	0.005	0.155	0.101	0.283
	RMB4001-6000	0.545	0.674	0.528	0.473	1.724	1.961
	Above RMB6000	0[b]	0[b]	.	.	.	.

Model 2：

Supposing migrant works' choice of housing security product is a dependent variable, it has two values that are set as 1 and 2, where 1 refers to dormitory and 2 to family residence.

In Model 2, 7 variables in Table8 are substituted into the binary logistical regression model, then the variables at Sig > 0.05 are rejected to reestablish regression equation and to do significance test till all variables in the equation are tested as being significant. Subsequently, SPSS19.0 will be used for multi logistic regression analysis.

The chi-square value is 6.434, df (degree of freedom) is 5, and Sig value is more than 0.05. This means that independent variable is able to predict dependent variable effectively. See Table2 for model parameter estimation.

Table2.Variables Being in Equation

	B	S.E,	Wals	df	Sig.	Exp (B)
Spouse	0.273	0.138	3.929	1	0.047	1.314
Age	0.701	0.197	12.725	1	0.000	2.016
Family size	0.637	0.185	11.822	1	0.001	1.891
Constant	-1.066	0.312	11.713	1	0.001	0.344

Analysis of results

Model 1:

According to the regression results from Model 1, migrant workers' family monthly earnings significantly influence their choice of housing security mode if the Sig of such earning variable is less than 0.05, which is verified by H1. In a similar way, migrant workers' education backgrounds have insignificant influence on their housing security mode if the Sig of such education variable is more than 0.05, which is unable to support H2. The Sig of their employment area < 0.05 means such area may significantly influence their choice of housing security mode, which is verified by H3.

Model 2：

According to the regression results from Model 2, migrant workers' age and marriage significantly influence their choice of affordable housing product if the Sig of such variable is less than 0.05, which is verified by H4 and H5.

Discussion and suggestion

Discussion

Model 1:

1. Migrant workers' family monthly earnings significantly influence their choice of housing security mode. According to exp (B) < 1 for two classes of the earnings, i.e. RMB2000 and below, and RMB2001-4000, those below RMB4000 tend to rental subsidy mode rather than purchase-type affordable housing. The reason is those with low family monthly earnings spend less on their housing. However, the rental subsidies might cover their rental residence and household, thus they (below RMB4000) are more likely to choose rental subsidy mode.

2. Migrant workers' employment areas significantly influence their choice of housing security mode (Sig< 0.05). This means those working in the two districts are more accessible to the public rental housings provided by the government than in other three districts. By complete analysis, we found that the migrant workers employed in Chan Cheng district and Nan Hai district tend to select public rental housing as their housing security because the government's money subsidies are beyond their rental cost.

3. Migrant workers' genders significantly influence their choice of housing security mode. This means that the male more likely tends to the public rental housing provided by the government and purchase-type affordable housing.

4. Migrant workers' availability of social security significantly influences their choice of housing security mode. This means that the migrant workers with social security in Foshan prefer rental subsidies as the security mode when compared with those without the social security.

Model 2：

1.Migrant workers' marriage significantly influences their choice of affordable housing product. The reason is they have strong family attachment; however, family affordable housing is a feasible solution.

2.Migrant workers' age significantly influences their choice of affordable housing product.

3.Migrant workers' family size significantly influences their choice of affordable housing product.

Suggestion

1. It is foremost to deepen the reform of urban housing system and to perfect housing security system. In virtue of the opportunity of new urbanization development, the government should deepen urban housing system reform and continuously perfect housing security system, gradually building multi-level housing security system, actively promoting the equalization of urban public service facilities and infrastructures, improving people's housing standards, and making all efforts to becoming housing security and supply system into a "moral project".

2. Physical and rental subsidies are offered simultaneously to provide a feasible solution to migrant worker's family housing. However, both measures are available to their housing demand. If possible, they may apply for the public rental housing, or if necessary, for money subsidies. Additionally, the government should provide reasonable rental subsidies to guarantee the feasibility of such security mode.

3. It is necessary to simplify social security procedure. The social security must protect migrant worker's rights and interests to encourage them joining in the system. On the other hand, the employers should offer the social security for their employees as required in the contract laws to support them in application for the affordable housing, moreover to reflect their attributions to Foshan.

4. The government should reasonably design the product aiming at migrant workers' incomes and working areas, striving to adjust it to different conditions. For instance, for the low-income groups in Chang Cheng and Nan Hai districts, the government may offer a public rental housing solution; but nonetheless, in Gao Ming and San Shui district, offer money subsidies.

5. In some cases such as the family with more than 2 members, spouse or being older, the government's product design should be suitable for family affordable housing; in the meanwhile the public service facilities, for instance education and medical service, should also be considered, increasing their sense of belonging.

It's generally applicable although it is based on Foshan's data.

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