

A study on residents' willingness to buy house based on Logistic regression model—A case study of Shaanxi Province in China

He Xiayan

College of Humanities and Social Development, Northwest A&F University, Yangling, China
hxy717@nwfau.edu.cn

Abstract: Based on the survey data of young people in A, B, C, D and E in Shaanxi Province, this study uses Logistic model to make an empirical analysis of the factors affecting the intention of residents in Shaanxi Province to buy houses. The data analysis shows that the willingness of Shaanxi residents to buy houses in the past three years is significantly related to their education level, family income, current living area, housing property rights, and satisfaction with their current houses. In general, residents with higher education level, higher family income, smaller current living area, no independent property rights, and lower satisfaction with the current housing are more willing to buy a house in the past three years.

Keywords: Residents of Shaanxi Province; Logistic model; Purchase intention; Influencing factors

1. Introduction

According to different socio-economic conditions in different periods, residents have different levels of demand for housing, and demand is the subjective will to support purchasing power. Mankiw and Weil's research shows that people in their 30s have the most demand for housing, and after they reach their 40s, their demand for housing shrinks^[1]; Gao Xiaolu found in his research that there is a significant correlation between the current family living area and the family population, which together form an important factor affecting the housing demand^[2]; Wang Yan believes that there is a positive correlation between income growth and housing demand, and the rapid growth of residents' income stimulates the housing market demand, while the slowdown of housing price increase has a great impact on alleviating the inhibitory effect of housing price rise on housing demand^[3]; Yang Xia, Xu Dengyao and other scholars divide housing demand into two categories: rigid demand and improvement demand^[4]; Zhang Chong believed that there is a significant positive correlation between the child dependency ratio and the housing demand in the total family population. With the increase of the child dependency ratio, the housing demand will recover^[5]; Wei Guanglan, Deng Xiaoying and others proposed that housing price, residents' income, credit and purchase expectation are the most direct factors affecting residents' rigid demand^[6]. In short, residents' housing demand is affected by a variety of factors.

The goal of housing policy is to make use of planning, housing security, taxation and other means to effectively regulate the supply and demand of residents for housing, so as to meet the legitimate housing needs of residents. Only by understanding the influencing factors of residents' purchase intention can we have the basis for formulating housing policies and related standards. Education level, employment status, household income, current living area, housing property rights, and satisfaction with current housing have an impact on residents' family structure, housing purchasing ability and consumption tendency, and then affect the purchase intention. In this paper, the Logistic regression model is used to analyze the variables. Under the background of "house purchase fever", it is of great significance for the formulation of urban housing policies and related standards to find out what the house purchase intention of these urban residents is and what the mechanism of the main decisive factors affecting their house purchase intention is. This paper will start from the relevant survey data released on CGSS and refer to the analysis model of scholar Zhu Jianchun^{[7][8][9]}. Taking A, B, C, D and E of Xi'an as an example, this paper investigates the residents' willingness to buy houses and its influencing factors.

2. Data Sources, Main Variables and Analysis Methods

2.1. Data Sources

The data used in this study come from the survey data on the house purchase intention of residents in five cities of Shaanxi Province, A, B, C, D and E, released on the China General Social Survey of CGSS. The total number of data in this study is 2993, and the valid data is 2880.

2.2. Specification of Primary Variables

The purchase intention of urban residents refers to the intention of urban residents to purchase a new property in the near future, the next three years. In the questionnaire, do you plan to buy a new property in the next three years? If the answer is yes, the resident is considered to have a strong willingness to buy a house, and it is coded as 1. Through data analysis, there are 719 residents with a clear intention to buy a house, accounting for 25%, and 2161 residents without a clear intention to buy a house, accounting for 75%.

According to the existing literature and the personal judgment of the researchers, the factors that may affect the residents' willingness to buy a house are divided into six aspects: first, the level of education; Second, employment status; Third, household income; Fourth, the current living area; Fifth, housing property rights; The sixth is the degree of satisfaction with the current housing.

2.3. Analysis Methods

In this study, the dependent variable of house purchase intention is a dichotomous variable, so the Logistic model is mainly used to analyze the influence of the rural migrant elderly on the urban settlement intention. The mathematical model is as follows:

$$P = \frac{\exp(\beta_0 + \beta_1 X_1 + \dots + \beta_m X_m)}{1 + \exp(\beta_0 + \beta_1 X_1 + \dots + \beta_m X_m)} \quad (1)$$

Where P is the probability of urban residents buying real estate, β_m is the regression coefficient of the factor, and β_0 is the regression intercept; X_m is the independent variable.

3. Analysis of the Factors Influencing the Housing Purchase Intention of Urban Residents

3.1. Logistic Regressive Model Analysis

According to the data, this paper explores the influence of education level, employment status, household income, current living area, housing property rights, satisfaction with current housing and other factors on the purchase intention of residents in Shaanxi Province. Independent variables: (1) Education level, dummy variable, the value of 1 represents junior high school or below, 2 represents senior high school (technical secondary school), 3 represents university (technical secondary school or undergraduate), 4 represents graduate student or above; (2) Employment status, dummy variable, the value of which is 1 for administrative institutions, 2 for state-owned enterprises, 3 for private enterprises, 4 for colleges and universities and scientific research units, 5 for unemployment and 6 for others; (3) Household income, continuous variable; (4) Current house area, continuous variable; (5) Housing property rights, dummy variable, 1 represents no property rights, 2 represents partial property rights, 31 represents second-hand housing, 32 represents affordable housing, 33 represents multi-storey commercial housing, 34 represents high-rise commercial housing, 35 represents villa, 36 represents others; (6) The degree of satisfaction with the current housing, dummy variable, 1 represents satisfaction, 2 represents dissatisfaction. Dependent variable: residents' purchase intention, dummy variable, with the value of 1 representing "yes" (having purchase intention in the last three years) and the value of 2 representing "no" (having no purchase intention in the last three years).

As can be seen from the results of Table 1, the missing cases in this study are not serious, only 3.8% of the total cases.

Table 1: Case Summary

Undergraduate Degree Gender ^a		N	Percent
Valid	Included in Analysis	2880	96.2
	Missing Cases	113	3.8
	Total	2993	100.0
Unselected cases		0	.0
Total		2993	100.0

a. If the weight is effective status, see the classification table for the total number of cases.

3.1.1. Intercept Model

Table 2: Classification Table A, B

	Observed		Predicted		
			In the Next Three Years		Percentage Correct
			No	yes	
Step 0	In the Next Three Years	No	2161	0	100.0
		yes	719	0	.0
	Overall Percentage				75.0

a. Constant is included in the model.

b. The cut value is .500

In the case of this study, the mode value of the dependent variable (residents' purchase intention) is "do not buy," so the intercept model simply predicts that residents have "no" intention to buy real estate in the past three years. It can be seen from the "correct percentage" in the last column of Table 2 that in this way, the proportion of residents who are correctly predicted to have the intention to buy a house in the past three years is 0, while the proportion of college students who are correctly predicted to have the intention to buy a house in the past three years is 100%.

3.1.2. Model Overall Test

Table 3: Omnibus Test of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	230.077	6	.000
	Block	230.077	6	.000
	Model	230.077	6	.000

According to the results of model test in "Model" in Table 3, it can be seen that the chi-square value is 230.077 and the degree of freedom is df63, indicating that the model has 6 independent variables, sig.=0.000, indicating that the added independent variables have a significant effect, that is, the overall model has a significant improvement.

3.1.3. Model Evaluation

Table 4: Model Summary

Model	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	3006.774 ^a	.077	.114

a. Because the change in parameter estimates is not enough.001, the estimates are terminated at the 5th iteration.

The results in Table 4 show that the Cox-Sneel R square is 0.077, and the Negorko R square is 0.114. If the latter is used, it can be approximated that the independent variables in the model, such as educational level, employment status, family income, current living area, housing property rights, and satisfaction with the current housing, can explain about 11.4% of the difference in the dependent variable.

3.1.4. Research Model Prediction Classification Table

Table 5: Classification Table ^A

	Observed		Predicted		
			In the Next Three Years		Percentage Correct
			No	yes	
Step 1	In the Next Three Years	No	2132	29	98.7
		yes	685	34	4.7
	Overall Percentage				75.2

a. The cut value is .500

By comparing Table 5 with Table 2, it can be seen that when the model with independent variables is

used to predict the housing purchase intention of Shaanxi residents, the proportion of correctly predicting "yes" (willing to buy) increases from 0 to 4.7%, while the price is that the proportion of correctly predicting "no" (not willing to buy) decreases from 100% to 98.7%. The overall accuracy rate has increased from 75% to 75.2%, and the accuracy rate of prediction has increased, which also means that the added independent variables have improved the explanatory power of the model.

3.1.5. Model Coefficients and Tests

Table 6: Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	
Step 1 ^a	Education Level	.284	.063	20.122	1	.000	1.328
	Employment Status	-.040	.031	1.682	1	.195	.961
	Family Income	.000	.000	36.713	1	.000	1.000
	Current Living Area	-.007	.002	10.912	1	.001	.993
	Housing Property	-.012	.003	16.587	1	.000	.988
	Housing Satisfaction	.918	.110	70.189	1	.000	2.505
	Constant	-2.804	.297	89.306	1	.000	.061

a. Input variables in step 1: education level, employment status, family income, current living area, housing property, and housing satisfaction.

Table 6 is the Logistic model of the factors affecting the purchase intention of Shaanxi Province residents. It can be seen from the above table that among the six variables included in the model that may affect the purchase intention of Shaanxi Province residents, five have passed the significance test, which are the educational level, family income, current living area, housing property rights, and satisfaction with the current housing.

The results in Table 6 show that the sig. of the independent variable of employment status in this study is greater than 0.01, and it can be considered that the independent variable of employment status in the model has no significant influence, while the Sig of the five independent variables of education level, family income, current living area, housing property rights, and satisfaction with the current housing. It can be considered that these five independent variables in the model (education level, family income, current living area, housing property rights, and satisfaction with the current housing) have statistically significant effects.

In Table 6, according to Exp(B), the results are as follows: 1. Exp(B) of educational level is 1.328, indicating that for every increase in educational level, the occurrence ratio of purchase intention in the next three years will be 1.328 times of the original; 2. Exp(B) of employment status is 0.961, and B is negative, indicating that the willingness of buying a house with a fixed job is 0.961 times that of buying a house with unemployment; 3. Exp(B) of household income is 1, indicating that for every unit increase in household income, the probability of purchasing a house in the next three years will be doubled; 4. Exp(B) of the current housing area is 0.993, and B is negative, indicating that for every unit reduction in the current housing area, the occurrence ratio of purchase intention in the next three years will be 0.993 times of the original; 5. Exp(B) of housing property rights is 0.988, and B is negative, indicating that residents with no property rights or only partial property rights, residents living in second-hand houses, residents living in affordable houses, residents living in multi-storey commercial houses, residents living in high-rise commercial houses and residents living in villas have 0.988 times the purchase intention of the latter in turn. 6. Exp(B) of housing satisfaction is 2.505, indicating that the probability that residents who are dissatisfied with their current housing have the intention to buy a house is 2.505 times higher than that of residents who are satisfied with their current housing. The results are analyzed as follows:

(1) Among the demographic economic and social factors that affect residents' house purchase intention, the household income status has a statistically significant effect on the residents' house purchase intention in Shaanxi Province. Residents with higher income have a stronger intention to settle down in the city, and the higher the income, the higher the probability of purchasing new real estate in the past three years. The reason may be that people with higher income have higher requirements on housing quality, geographical location, surrounding environment and other factors, and value diversified factors in housing selection, so they have a higher demand to change houses and buy houses. On the other hand, because high-income people have fewer economic factors to worry about, there is no great pressure when they want to buy a house.

(2) Among the factors related to the current housing status, the current living area, housing property rights and housing satisfaction have passed the significance test for residents' purchase intention. The probability of purchasing a house in the next three years will be 1.328 times higher than that of the previous one for each unit reduction in the current housing area. This shows that the residents with a

smaller house area have a stronger willingness to buy a new house, while the residents with a larger house area do not have the willingness to change houses brought by the problem of insufficient living space. In terms of the variable of housing property rights, the willingness of residents without property rights or with only partial property rights, residents living in second-hand houses, residents living in affordable houses, residents living in multi-storey commercial houses, residents living in high-rise commercial houses and residents living in villas is 0.988 times that of the latter in turn. It shows that the residents without housing property rights have stronger purchase intention than those with housing property rights. They want to own a house legally and completely, and have a sense of belonging and security in psychology. The residents with higher housing standards have a weaker willingness to buy houses than those with lower housing standards. The degree of satisfaction with the current housing also has a significant impact on residents' purchase intention, and the higher the degree of satisfaction with the current housing, the lower the purchase intention of the residents in the past three years.

(3) Among the factors related to individuals, education level has a significant correlation with purchase intention; The probability of purchasing a house in the next three years will be 1.328 times higher than that in the previous three years for each level of education level, indicating that with the improvement of education level, the purchasing power of the residents is gradually strengthened, and the purchasing intention also shows an upward trend. The reason for this conclusion may be that the residents with higher education level have stronger social competitiveness, and can get better employment opportunities and more wages than the residents with lower education level, so that they can bear the economic pressure brought by house purchase. At the same time, residents with higher education have higher requirements for the living environment and geographical location of the house, so they are more likely to constantly change their willingness to buy houses. Among the factors related to individuals, education level has a significant correlation with purchase intention; The probability of purchasing a house in the next three years will be 1.328 times higher than that in the previous three years for each level of education level, indicating that with the improvement of education level, the purchasing power of the residents is gradually strengthened, and the purchasing intention also shows an upward trend. The reason for this conclusion may be that the residents with higher education level have stronger social competitiveness, and can get better employment opportunities and more wages than the residents with lower education level, so that they can bear the economic pressure brought by house purchase. At the same time, residents with higher education have higher requirements for the living environment and geographical location of the house, so they are more likely to constantly change their willingness to buy houses.

4. Conclusions

Based on the survey data on the house purchase intention of residents in Shaanxi Province released by CGSS, this study conducted Logistic analysis on the data, and found that the residents with higher education level, higher family income, smaller living area, no independent house property rights, and lower satisfaction with the current house have stronger house purchase intention in the past three years. The following conclusions are drawn:

(1) The research data show that the five factors of education level, household income, current living area, housing property rights and satisfaction with current housing have a significant impact on the residents' willingness to buy a house; Moreover, household income, current living area, housing property rights, and satisfaction with current housing have the most significant impact on residents' purchase intention.

(2) The increase of education level, the increase of household income, the feeling that the current living area is crowded, the desire for independent housing property rights, and the low satisfaction with the current housing will lead to the increase of residents' willingness to buy a house.

(3) Residents' willingness to buy a house is influenced by both subjective and objective conditions, and to a greater extent by many subjective dissatisfaction with various aspects of the current housing.

As a pillar industry of a country, the government should actively stabilize the housing market and meet the housing needs of residents. The following suggestions are hereby made:

(1) In view of the fact that the lower the housing satisfaction is, the higher the residents' willingness to buy houses will be. The government should expand kindergartens and hospitals to meet the needs of residents, enhance the environmental rectification and cultural facilities in residential areas, and pay special attention to the rectification of aging communities. At the same time, the government should

gradually expand the urban transportation network and improve the traffic accessibility of communities.

(2) Most families need to face the problems of fertility and elderly care, and the government should also take its own responsibilities and introduce corresponding supporting measures to encourage residents to have children and support the elderly, the first is housing measures. At present, the government provides affordable housing and public property housing for some residents with low economic level, but the area is too small to meet the housing needs of residents who have a second child and residents who live together to support the elderly. Therefore, the government should provide some large area of affordable housing for residents to choose.

(3) In order to meet the housing needs of residents, financial institutions are essential. Although some residents have the intention to buy houses, they are limited by their own economic conditions. Financial institutions should improve the credit mechanism and establish a resident credit scoring system, so that residents with good credit can obtain more funds for house purchase with lower loan interest rate, and then improve their housing conditions.

References

- [1] G Alperovich. *The baby boom, the baby bust and the housing market: a further look at the debate*[J]. *The Annals of Regional Science*, 1995, 29(01):235-258.
- [2] Gao Xiaolu. *Analysis on the structure of residential housing demand in Beijing*[J]. *Acta Geographica Sinica*, 2008(10):1033-1044.
- [3] Wang Yan. *Research on the change of urban housing demand in China based on the perspective of population transition*[D]. Chengdu: Southwestern University of Finance and Economics, 2009.
- [4] Yang Xia, XU Dengyao. *Research on the change of population structure and housing demand in urban development*[J]. *Development Research*, 2011(02):84-87.
- [5] Zhang Chong. *The Impact of population structure on housing demand in China*[D]. Chengdu: Southwestern University of Finance and Economics, 2014.
- [6] Wei Guanglan, Deng Xiaoying. *Research on the Factors influencing the Rigid Demand of Urban Housing*[J]. *Cryogenic Building Technology*, 2016(01):148-150.
- [7] Jing Xiaofen and Zhu Jianchun. *Study on the urban settlement intention of the rural migrant elderly*[J]. *Journal of Sichuan Agricultural University*, 2015(03):113-118.
- [8] Zhu J C. *Research on resource utilization of agricultural waste in Shaanxi*[D]. Xianyang: Northwest A&F University, 2015.
- [9] Xing Fan, Zhu Jianchun. *Construction and Application of competency index system for poverty alleviation cadres: Based on sample analysis in southern Shaanxi Province*[J]. *Journal of Yunnan Agricultural University (Social Sciences)*, 2022(04):52-59.