© 2017 Institute of Thermomechanics CAS, v.v.i.

Housing consumption and empirical research of newly employed graduate-based on the investigation in xi'an city

LIU Xiaojun[2], XU Jiazhuo[2]

Abstract. The survey results show thatthe newly employed college graduates have poor housing conditions and big housing pressure at this stage. 47.08% of the new employment college students do not have housing provident fund and 48.63% rely on rent to solve the housing problem. Through calculating the affordability of newly employed college students, 47.08% of them have difficulties in renting houses and 78.07% lack of purchasing ability. Therefore, we must first improve the housing security system for new-employed university students as soon as possible. Second, we should promote the healthy development of the housing rental market. Finally, we should raise the income level of new-employed university students and guide the consumption concept of cascade housing. Many kinds of measures should be taken to solve simultaneously the housing problems of newly employed college students.

Key words. Newly employed graduate, housing consumption, housing affordability, housing security.

Introduction

With the gradual expansion of the group of graduates, housing demandis also growing. Therefore, how to protect the housing of newly employed college students are also more and more attention by the government. This paper, taking Xi'an as an example, conducts a questionnaire survey on newly employed college students (within five years of graduation), makes an empirical analysis of the affordability of new-employed college students and attempts to make some contributions to the newly-employed college students' housing consumption problems through empirical research data. This time a total of 342 valid questionnaires were returned and the survey results are as follows.

Housing Status Survey Result of Newly Employed College Students

The Basic Situation.

The results showed that men accounted for 47.37% and women accounted for 52.63%, of which the local (Xi'an) account for 30.70%, 58.48% of households is in Shaanxi Province and only 10.82% of the household is outside the province. In terms of marital status, 21.93% are married, 35.38% are unmarried but have boyfriend and girlfriend, and 42.69% are unmarried and single. According to the distribution of academic qualifications, 63.74% are undergraduate, 22.81% are specialist, 12.87% are masters and only 0.58% are doctors. From the graduation time, within a year accounted for 24.27%, 1-3 years accounted for 47.66% and 3-5 years accounted for 28.07%.

Analysis of Housing Status

Table 1. Cross-analysis of housing status and monthly income

Monthly Income (Yuan)	Buying Commodity House	Living with Parents	Dormitory	Lease Village	Rent (Share)
Below 2500	5	12	15	13	11
2501-3500	11	15	12	27	23
3501-5000	20	16	22	26	13
5001-8000	18	9	12	6	6
Above 8000	11	2	1	0	2
proportion	19.01%	15.79%	18.13%	21.05%	16.08%

The result shows that nearly half of them rent houses to solve the housing problem. Compared with the average disposable income of 30032 yuan (2503 yuan) per inhabitant in Xi'an in 2016, nearly 20% person did not reach the per capita disposable income of Xi'an residents.
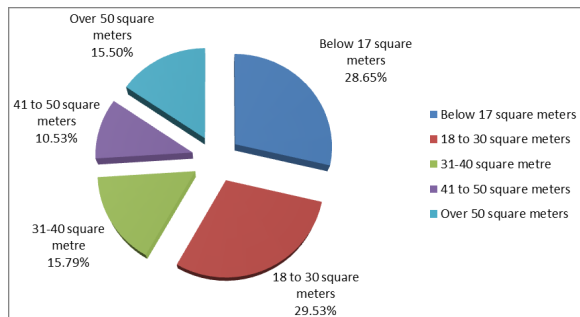

Fig. 1. Housing living area statistics

The results show that over 50% of the newly employed college students still have less than the average per-capita housing area in urban areas and living conditions are crowded compared with $31\,\mathrm{m}^2$ in 2016 in urban areas of Shaanxi Province.

Empirical Analysis on Housing Affordability of Newly Employed Col-

lege Students

According to the Statistical Yearbook of Xi'an, the per capita consumption expenditure of urban residents accounts for about 70% of the disposable income, while the living expenses account for about 18% of the total consumption expenditure and about 12% of the disposable income, showing a rising trend. According to the survey data, the proportion of housing expenses of newly employed students in Xi'an as a percentage of their income is only 44.15% below 20%. Therefore, the new employment of college students in housing expenditure as a share of income far higher than the average level, which shows that the phenomenon of housing difficulties is still serious.

Measure the Ability of Renting.

Rental capacity can be calculated using the residual income method. According to income groups and family types, the monthly residual income is the disposable income of the family after deducting the expenses necessary for normal living. The monthly consumption is the remaining monthly surplus income deducting the monthly rent balance and the calculation formula is: monthly consumption Surplus = monthly residual income - monthly rental expenses. Consumption surplus per month is greater than 0, indicating that someone has the rent ability. According to the data from China Index Research Institute, the average monthly rental price of the leasing market in Xi'an is 24 yuan / m2. Assuming that the study object is a single group, renting houses for one bedroom, housing area is 50 m2 and the remaining data sources for the questionnaire data. Monthly disposable income is the median income of questionnaire and uses non-housing normal consumer spending accounted for 70% of disposable income to calculate the remaining income.

Table 2. Measure the ability to rent one-bedroom

Monthly income (yuan)	Below 2500	2501-3500	3501-5000	5001-8000	Above 8000
Proportion (%)	19.59	27.49	30.99	16.67	5.26
Monthly disposable income	2000	3000	4250	6500	10000
Monthly surplus income	600	900	1275	1950	3000
Average monthly rental price	1200	1200	1200	1200	1200
Monthly consumption remaining	-600	-300	75	750	1800

The results show that the monthly income below 3,500 yuan (47.08%) monthly consumption surplus is less than 0, which means that they have difficulties for renting.

Measure the Ability of Purchase.

By paying the down payment and then mortgage loans to buy housing, the monthly consumer surplus is the monthly residual income deducting monthly balance of the loan amount and the formula is as follows. monthly consumer surplus =

monthly residual income - monthly repayment amount. Consumption for the month remaining is greater than 0, indicating that buyers have the ability to purchase.

According to the date of Xi'an Housing Security and Housing Authority and China Index Research Institute, the transaction price of commercial housing in Xi'an was 7531 yuan / m2. And in 2017 the housing policy of Xi'an required that the down payment of home purchase should not be less than 30%. The interest rate of commercial loans(more than five years) is 4.90% and the interest rate of provident fund loan is 3.25%. Reference to affordable housing standards, single family can purchase affordable housing area of 60 m2, and has adopted the commercial loan interest rates and provident fund loan interest rates into the calculation. Among them, the loan life is calculated in accordance with the maximum length of 30 years mortgage loans and monthly repayment is calculated by the amount of principal and interest method.

Suppose only one person to purchase the first house and down payment has been advanced.

Table 3. Measure the purchase ability for single family

Monthly income (yuan)	Below 2500	2501-3500	3501-5000	5001-8000
Proportion (%)	19.59	27.49	30.99	16.67
Area (m2)	60	60	60	60
Total price	451860	451860	451860	451860
loan amount	316302	316302	316302	316302
Monthly disposable income	2000	3000	4250	6500
Monthly surplus income	600	900	1275	1950
Commercial loan monthly repayment amount	1679	1679	1679	1679
Provident fund loans monthly repayments	1377	1377	1377	1377
Monthly consumer surplus except for commercial loans	-1079	-779	-404	271
consumption remaining except for provident fund	-777	-477	-102	537

The results showed that individuals with monthly income below 5,000 yuan (78.07%) lacked the ability to pay 60m2.

Measure Housing Pressure

Establish a binary logistic model. P is the probability of occurrence of the event and 1-P is the probability of the event does not occur, then

$$P = \frac{e^{f(x)}}{1 + e^{f(x)}}$$

$$f(x) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_m x_m$$

$\beta_0$is a constant term unrelated to the various factors. $\beta_1, \beta_2, \cdots \beta_m$are regression coefficient, whichrepresents the contribution of various factors to P.

While, $\text{In}\left(\frac{P}{1-p}\right) = \text{In}\left[e^{f(x)}\right] = f(x) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_m x_m$is the logarithm of odds ratio $= \frac{P}{1-P} = e^{f(x)}$. Therefore, the meaning of β_i is the natural logarithmic change of dominance ratio for each factor $x_i$change by one unit of measure.

To determine the main influencing factors of housing pressure and its relative size, we first define housing pressure as 1 and no pressure as 0.Secondly, encode each possible influencing factor according to the size or degree of its value.Then use SPSS 20. The software will put all sample data into the model at a time for binary logistic regression analysis and the corresponding estimates of the respective variables are obtained as follows.

Table 4. Omnibus Tests of Model Coefficients

	Chi-Square	df	Sig.
step	20.734	3	.000
piece	20.734	3	.000
model	20.734	3	.000

Table 5. Model Summary

-2Loglikelihood	Cox&Snell R Square	Nagelkerke R Square
41.640^a	0.408	0.761

Table 6. HosmerandLemeshowtes

Chi-Square	df	Sig.
5.953	8	.652

As can be seen from the comprehensive test of model coefficients, the chi-squared value is 20.734 and the probability value is 0.00, which is significantly less than the significance level of 0.05.The statistical significance of regression equation is very significant. In the model summary, Cox & Snell R Square value reached 0.408 and Nagelkerke R Square value reached 0.761, indicating that the model can be better fitted. In the Hosmer and Lemeshow test, Hosmer Lemeshow test value is equal to 5.953 and P = 0.652> 0.05, reached a significant level, indicating that the overall regression model is fitted well. In addition, the accuracy of Classification Table is 90.3%, indicating that the model is more stable.

Table 7. Variables in the equation

	B	S.E,	Wals	df	Sig.	Exp(B)
Gender	-1.340	0.439	9.316	1	0.002	0.262
Edu	-0.385	0.360	2.144	1	0.025	0.470
Housing provident fund	-0.484	0.456	2.125	1	0.028	0.046
Monthly income	1.055	0.438	5.806	1	0.016	2.872
living pattern	0.986	0.285	11.967	1	0.001	2.680
Housingarea	0.326	0.440	2.550	1	0.045	1.122
Housingcost	1.076	0.222	23.501	1	0.000	2.934
Living facilities	-0.954	0.414	5.309	1	0.021	0.385
Constant	-1.87	0.129	2.032	1	0.044	0.354

Under the condition of significant level of 0.05, gender, educational background, housing provident fund, monthly income, living pattern, housing area, housing cost and living facilities are significant.

Monthly income, living pattern, housing area and housing costs OR value is greater than 1, indicating that it is a risk factor. The higher incomeis,the higher demand for housing. And housing options to buy results in an increase in housing costs and housing pressure.

Gender, education, housing provident fund and living facilities OR value is less than 1, indicating that it is a protection factor.That is to say, when the gender is female and education is getting higher and higherwith the housing provident fund and lower life supporting requirements, the housing pressure tends to decrease.

Housing Problems of Newly Employed College Students

Poor Housing Conditions.

Housing conditions of newly employed college students can not be optimistic. There are still more than one-fifth of them to rental housing in the village. And nearly one-third of the housing area is less than 17 square meters.

Big Housing Pressure.

After proportion calculation of monthly income and monthly housing expenditure, 23.68% of them monthly housing expenditures accounted for more than 30% of the total income. And in the sample of purchase housing, 47.69% of them housing expenses is over 30% of income, 29.23% or even more than 50% of monthly income. Other housing, 81.95% of housing costs less than 30% of monthly income. It can be found that to purchase house will significantly increase the proportion of monthly housing expenses accounted for the monthly income. The pressure is often caused by buying a house. When the income has not reached the pre-purchasable level, the premature purchase of a house will cause the housing expenses to be overly high, which will bring over-heavy economic burden and affect the quality of life.

Measures to Solve the Housing Problems of Newly Employed College Students

Improve the Housing Security System for Newly Employed College

Students.

Survey results show that up to 38.60% said they did not know the public rental policy, 21.35% said they would like to give it a try, 26.90% said less houses for more people and 13.15% think public rental location is remote and they will not select. Therefore, the promotion of public rental policies and the monetary subsidies can reduce the pressure on the government to build public rental housing. Besides, acquisition or leasing of commercial housing for rent in kind can also solve the problem of remote location of public rental housing. And it should be appropriately expanded the coverage of protection groups. Housing provident fund management center should further increase the intensity of administrative law enforcement and expand the provident fund system benefits to let more employees enjoy the housing provident fund loan policy.

Promote the Healthy Development of the Housing Rental Market.

Housing enterprises should gradually change the mode of operation, from a single development of sales to sale and lease model simultaneously. On the one hand, it can be achieved to relieve financial pressure. On the other hand, it can also lock target customers in advance and reserve customers for later development. And the marketing expenses can be saved for repaying long-term customers so as to achieve a virtuous cycle of rental and sale. Cultivate specialized housing leasing companies. Only companies that professional, industrial and large-scale can bring economies of scale and provide better service. The implementation of the housing lease contract registration and filing can protect the legitimate rights and interests of lessor and lessee. The establishment of credit housing leasing market can enable the rental housing gradually enjoy the same rights and interests as property owners.

Improve the Income Level of Newly Employed College Students and Guide the Concept of Cascade Housing Consumption.

Increase the good policy of entrepreneurship for newly employed college students. Integrate all kinds of education and skills training resources and start employment and entrepreneurship skills training to improve income levels and help them go through the difficult period of graduation. Change housing consumption concept, make gradient consumption preparation and reduce the purchase requirements.

References

[1] J. JOHAN: *A Review of Housing Affordability in the City of Kuala Lumpur.* Conference International Graduate Conference on Engineering, Science and Humanities (2014).

[2] N. S. SOHAIMI, A. ABDULLAH,S. SHUID: *Young professionals' housing affordability through housing preferences in Kuala Lumpur and a review on the means-end chain model. 15* (2017), No. 1.

[3] A. Z. Z SADAT, W. N. A. W. A. AZIZ,N. R. HANIF: *Housing Affordability Problems among Young Households.* Journal of Surveying Construction & Property (2016).

[4] M. TOKORO: *Housing Policy and Social Security Reform in Britain(Social Policy and the Right to Housing).* Social Policy & Labor Studies *6* (2014), 54–64.

[5] B. WU, H. SHEN, K. CHEN: *Exploiting Active Sub-areas for Multi-copy Routing in VDTNs.* Proc. of the 24th International Conference on Computer Communications and Networks (ICCCN) (2015).

[6] B. Wu, H. Shen: *Discovering the Densest Subgraph in MapReduce for Assortative Big Natural Graphs*. Proc. of the 24th International Conference on Computer Communications and Networks (ICCCN) Workshop on Big Data and e-Health (BDeHS) (2016).

[7] B. Wu, H. Shen: *A Time-Efficient Connected Densest Subgraph Discovery Algorithm for Big Data*. Proc. of the 10th IEEE International Conference on Networking, Architecture, and Storage (NAS) (2015).

[8] D. Clapham, P. Mackie, S. Orford: *HOUSING OPTIONS AND SOLUTIONS FOR YOUNG PEOPLE IN 2020*. Joseph Rowntree Foundation (2020).

[9] J. Chen: *Housing tenure, residential mobility and adolescents' education achievement: evidence from Sweden*. The Annals of Regional Science *50* (2013), No. 1, 275–294.

[10] K. Kim, S. J. Jeon: *Why do households rent while owning houses? Housing sub-tenure choice in South Korea*. Habitat International *36*, (2012), No. 1, 101–107.

[11] D. J. Krupka, N. Kwamen: *DONALDSON †. WAGES, RENTS, AND HETEROGENEOUS MOVING COSTS*. IJ Economic Inquiry *51* (2013), No. 1, 844–864(21).