The Relationship between Housing Conditions and House Owner's Occupation-A Study Based on The Correspondence Analysis①

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Abstracts

This paper shows detailed study on descriptive statistics and correspondence analysis about indexes combined with householders' occupation as Chinese household housing source, housing construction area index and so on basing on the sixth population census data. The study indicates, from housing construction area perspective, the section leaders which are in the government offices, institutional organization, professional elite and the clerk have larger housing area than other occupation, and from the housing source perspective, in terms of market-oriented housing ratio or self-owned housing ratio, the section leaders which are in the government offices, institutional organization, professional elite and the clerk are also in the leading position. And the same time, householders with these occupations largely occupied economically affordable housing belonging to the housing difficult groups originally.

Keywords: The Occupations of the Householders；Housing Sources；Residential Housing Area；The China Population Census

1. Introduction

In 1998, China welfare housing system was abolished by the China State Council, the real estate entered a new era of commodity housing. As a result, dramatic changes had taken place in the construction scale and living conditions of urban residents. Meanwhile, with the market economy transformation of China, the social differentiation and stratification between different members of society had been exacerbated. What reflected on the housing market is that people from different classes get the housing with varying types based on their different social and economic abilities. Among the varieties of indicators of social stratification, occupational status is the most important one. So the present research seeks to use data form the Sixth Population Census to uncover a view of housing stratification, that is, the relationship between housing condition and householder's occupation.

The independent housing stratification study begun with J. Rex and R. Moore in their 1967 publication of Race Community and Conflict and the conception of "housing class" has been a symbol that represents various social classes and becomes an important point to view

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social stratification. As the crucial indicator of housing stratification, occupation plays a large role in the housing distribution. Liu and Mao (2012) argue that different occupations may incur diverse housing stratification status. Compared with the direct producers, people in the redistribution system especially the senior executive will be in higher position in the housing stratification. Similar research appears in Jiang and Pang's study (2005), they use the 5th China Population Census to analyze the relationship between China's floating population and housing condition. The research shows that the government officials and executives control the best housing resources, and the office clerks that directly offer services to government officials possess the better housing than professionals.

This paper is organized as follow. Section 2 will introduce the variables including the housing area and housing property rights, presents the data source and empirical model. Section 3 estimates the relationship among housing owner's occupation and per-capital floor area and housing property rights in the correspondence analysis model. Section 4 is the summing-up of the paper.

2. Data and Analytical Model

The stratification of housing can be explored from different aspects and using various variables and methods. This study examines stratification of housing across two different dimensions as indicators, housing area, housing sources (housing property rights). Housing area reflects the housing space and housing quality. Under the market economy system, housing has not only the assets for living, but also an exchange value as important family property (Liu Zuyun & Hu Rong, 2010). According to the China Real Estate Statistics Yearbook in 2012, the average housing price per meter had exceeded 35,000RMB in the first-ties cities like Beijing or Shanghai. General families are barely to afford it. So the housing property rights are another dimension vital to measure the housing stratification.

The types of the variables in this study are classified variables. The introductions are shown as follow.

Occupations

First, we focus on the explained variable, that is, the classification of occupations. We divide it as seven part, "directors (short for the section leaders in the government offices, institutional organization), "professionals", "clerks (short for handle affairs personnel and concerned personnel), "commercial(short for commercial service people)", "agricultural (short for agricultural workers)", "industrial (short for industrial workers)", "others(short for workers with inconvenience classification)". In this article, the directors are labeled as the managerial elite class and labeled the professionals as professional elite class. Other occupations are labeled as no-elite class. Generally speaking, the elite classes control more social resources than the no-elite classes no matter under the market economy system or the redistribution system.

Housing Area

Then, we will introduce the explanatory variables. The variable housing area refers to per capital floor space and is divided into 7 parts. First part is "blow 13"(short for "blow 13 ㎡ per person") , followed by "13-29", "30-39", "40-49", "50-59", "60-69", "above 70". Usually the lager the numbers are, the better the housing condition will be. In China, the government calls the first group as the low-income group with housing problems.

Housing Property Rights

The variable housing property rights includes eight parts, they are, "lower-renting housing (No.1)", "renting other housing (No.2)", "self-building housing (No.3)", "purchasing commodity housing (No.4)", "purchasing second-hand housing (No.5)", "purchasing

affordable housing (N0.6)", "purchasing used-to-be public housing (N0.7)", "Other housing (No.8)". Among all these eight kinds of housing, the rate of buying commodity housing can somehow reflect the marketization degree of the housing market. The owning-rate of low-renting housing and affordable housing can meet the housing demand of the low-income housing groups.

This study employs Correspondence Analysis Model as its method of analysis. This model was firstly proposed by French statistician Beozecri in 1970 and used to reveal the relationships among variables according to analyze the interactive summary sheet made up of qualitative variables. This method is able to reveal the differences between different classes of the same variable or the different classes of different variables.

Supposed the raw data matrix is shown below:

$$X = \begin{pmatrix} X_{11} & X_{12} & \dots & X_{1P} \\ X_{21} & X_{22} & \dots & X_{2P} \\ \dots & \dots & \dots & \dots \\ X_{N1} & X_{N2} & \dots & X_{NP} \end{pmatrix} \qquad (1)$$

The letter N stands for number of the samples and in this study we regard it as the number of occupation types. While letter P is the number of the indicators. X_{ij} is the observed value which both belongs to sample i and indicator j.

Then sum all the elements in the matrix X, the result is shown blow.

$$T = \sum_{i=1}^{N}\sum_{j=1}^{P} X_{ij} \qquad (2)$$

After that, make correspondence transformation to the raw data matrix, we gill get a new matrix $\mathrm{Z} = \left[Z_{ij} \right]$ (3)

$$Z_{ij} = \frac{X_{ij} - X_{i\cdot} \cdot X_{\cdot j} / T}{\sqrt{X_{i\cdot} \cdot X_{\cdot j}}}, (i = 1, 2, ..., N; j = 1, 2, .., P)$$

At last, we calculate the R and Q factor analysis rotated component matrix. Here we define that $\mathrm{A}=Z'Z$ and $\mathrm{B}=ZZ'$. A is the covariance matrix of the variation point and B is the covariance matrix of the sampling point. Then calculate the eigenvalues and eigenvectors of A and B. Assume that $\lambda_1 \geq \lambda_2 \geq ... \geq \lambda_m, 0 < m \leq \min(p, n)$ is the eigenvalues of A and B. $\mu_1, \mu_2 \cdots,$ μ_{m} is the eigenvectors of A. Now we get the R factor analysis rotated component matrix F.

$$F = \begin{pmatrix} \mathrm{u}_{11}\sqrt{\lambda_1} & \mathrm{u}_{12}\sqrt{\lambda_2} & \dots & \mathrm{u}_{2m}\sqrt{\lambda_m} \\ \mathrm{u}_{21}\sqrt{\lambda_1} & \mathrm{u}_{21}\sqrt{\lambda_2} & \dots & \mathrm{u}_{2m}\sqrt{\lambda_m} \\ \dots & \dots & \dots & \dots \\ \mathrm{u}_{p1}\sqrt{\lambda_1} & \mathrm{u}_{p2}\sqrt{\lambda_{\mathrm{p}}} & \dots & \mathrm{u}_{pm}\sqrt{\lambda_m} \end{pmatrix} \qquad (4)$$

As $\mathrm{B}=ZZ'$, so V_i the eigenvectors of B $ZU_i = V_i$. So we get the Q factor analysis rotated component matrix G.

$$G = \begin{pmatrix} \mathrm{V}_{11}\sqrt{\lambda_1} & \mathrm{V}_{12}\sqrt{\lambda_2} & \dots & \mathrm{V}_{2m}\sqrt{\lambda_m} \\ \mathrm{V}_{21}\sqrt{\lambda_1} & \mathrm{V}_{21}\sqrt{\lambda_2} & \dots & \mathrm{V}_{2m}\sqrt{\lambda_m} \\ \dots & \dots & \dots & \dots \\ \mathrm{V}_{p1}\sqrt{\lambda_1} & \mathrm{V}_{p2}\sqrt{\lambda_{\mathrm{p}}} & \dots & \mathrm{V}_{pm}\sqrt{\lambda_m} \end{pmatrix} \qquad (5)$$

After we finish all these steps, we draw the sample and indicator scatter diagram on the factor anis.

3. Results

Housing area and occupations of householders

In the first step, we need to examine whether there is relationship between the housing area and the occupations. According to the Chi-square test result, χ^2=9.67E5 and $P^{-} = 0.00$, so we can consider that the association exits.

Next, we place the factor loading points of housing area and occupations on the plane that uses the two common factors axis as the coordinates. Now we get the factor planar point diagrams of housing area and occupations (figure 1).

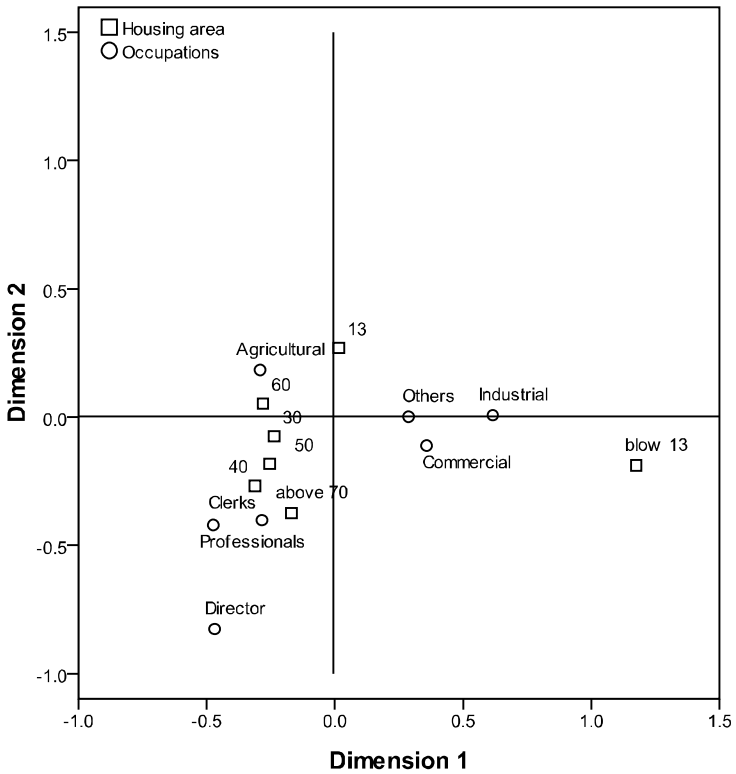

Figure 1 The housing area and occupations

Figure 1 shows that directors, professionals, clerks have advantages in obtaining the housing that are belonging to the group 30-39, 40-49, 50-59, above 70. Furthermore, the directors have closer connections with the group "above 70", while the professionals mainly in the group "30-49". The commercial service people have a large percentage in living in the "blow 13". The industrial workers and people with other occupations tend to live in the housing the area of "13-29". And the agricultural workers have a trend of living in the "60-69".

Housing sources and occupations of householders

Similarly, first we examine whether there is relationship between the housing sources and the occupations. According to the Chi-square test result, χ^2=1.75E6 and $P^{-} = 0.00$, so we can consider that the association exits.

Next, we place the factor loading points of housing sources and occupations on the plane that uses the two common factors axis as the coordinates. Now we get the factor planar point diagrams of housing area and occupations (figure 2).

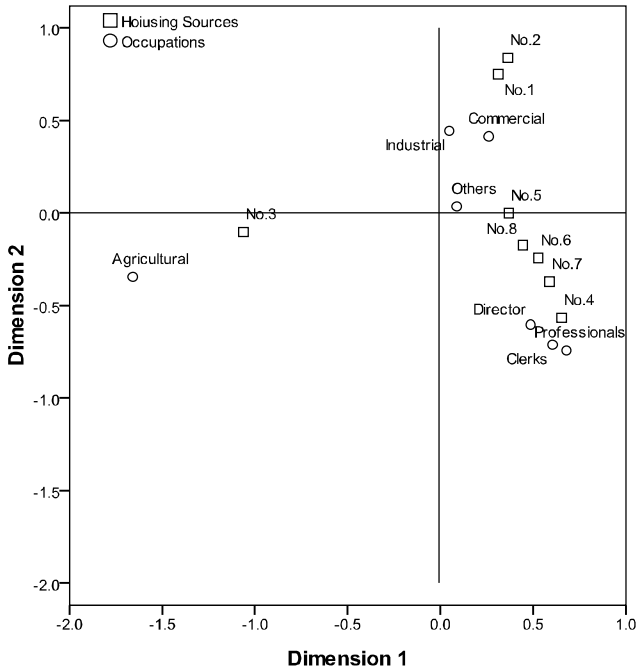

Figure 2 The housing sources and occupations

Two zero lines divide figure 2 into four parts. According to the location of the scatters, we can mine visually determine the advantages that different occupations in the choice of different types of housing. Figure 2 shows that directors, professionals, clerks have advantages in obtaining the commodity housing, affordable housing and used-to-be public housing. The commercial service people, industrial workers and people with other occupations tend to choice the housing types of low-renting, renting other housing and second-hand housing. And the agricultural people have a great percentage of choosing the self –building housing.

Above all, we can conclude that the directors, professionals and the clerks have more power in the market and the distribution system. While the no-elite groups can't control enough social resources to get the housing with large area or perfect location.

4. Conclusions

This paper views some sociologic literatures, focusing on examining the relationship between the housing conditions and the occupations. The study shows that there exist clear differences in the possession of housing resources based on the occupations. Specifically, the elite classes such as directors and professionals have powers in the markets and the distribution system, so the can access the housing with good quality (both in area and location). While the no-elite classes such as industrial workers, farmers, commercial service people in the dry tree in the housing market.

The housing situation provides a penetrating view of the issues of growing economic disparities and social stratification. Although the distribution of housing resources occurs against a backdrop of ongoing systemic change and presents a complex and multifaceted image, it cannot be denied that the possession of housing resources and the scattering of housing areas has been stamped inequality. This study has presented in detail disparities in housing resources among different occupations. It answers the question "Who gets what?", but the question "Why one gets what he or she gets?" remains to be answered.

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