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Association between Hometown Landholdings and Housing Quality of Rural Migrants in Urban Areas: Evidence from China

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Abstract: Urbanization progress in developing countries is reflected in the urban living conditions of their rural migrants. Housing quality, in particular, is linked to migrants' social integration and development of human capital. In China, where urban housing is highly stratified by urban citizenship via the "hukou" or household registration system, improving housing quality is a top priority for the central government in its pursuit of human-centered urbanization. Despite some social and economic elements affecting migrants' housing quality being documented, few studies have analyzed the determinants of rural migrants' housing quality from the perspective of rural landholdings or possession of use rights of rural lands, which is endowed by the land system of China. Using large micro-data from the China Migrant Dynamic Survey (CMDs), this study investigates the association between hometown landholdings and rural migrants' housing quality in their host cities. The empirical results suggest that possessing rural landholdings in their hometown is negatively correlated with rural migrants' housing quality in their host cities, wherein rural migrants' hukou transfer intention is found as an intermediary factor. Furthermore, the heterogeneity of the relationship across demographic characteristics and regions was investigated. In addition, short-term revenue derived from hometown landholdings is also verified to have a very limited positive effect on migrants' housing quality. Land transfer policies customized for subgroups of rural migrants across sociological attributes and urban stratification are concluded finally.

Keywords: housing quality; hometown landholdings; rural migrants; urbanization



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1. Introduction

Migrants' housing quality is a crucial determinant of their physical and psychological health [1,2], which can markedly affect their accumulation of human capital and thus may further influence the process of urbanization and social sustainable development [3,4]. Existing studies on Chinese rural migrants have primarily focused on urban settlement intentions, e.g., [5,6], and housing tenure choices in urban areas, e.g., [7,8]. Yet, as another essential aspect for migrants' residential choices, urban housing quality or livability in inflow areas has been given limited attention.

Building livable, resilient and safe cities has become a critical task of China's high-quality urbanization after 2020 (The 14th Five-Year Plan for the implementation of New-type Urbanization), where resident' housing quality is one of targets of housing reform for local government. In the past decades of urbanization, rural migrants in China have been gradually integrated into the urban economic system in many ways, but their discriminated status still hampers their housing quality in host cities, which has become one of the important manifestations of their "peri-urbanization". As "urban passengers" [9], immigrants have to invest less in the improvement of residential quality and living facilities [10], even though they are still trying to gradually complete an identity transformation through regional

mobility. It is admittedly true that rural migrants are still in a lower housing stratification and face social exclusion, of which residential exclusion caused by uneven housing quality has become a noteworthy obstacle for rural migrants' social integration into urban areas [11]. Compared with local residents in cities, rural migrants' housing quality in cities is still unsatisfactory. According to the 2021 Migrant Worker Monitoring Survey Report released by the National Bureau of Statistics of the P.R.C., the per capita living area of rural migrants in cities is only 21.7 m², which is still a big gap compared with that for urban residents (36.52 m²). Furthermore, it has been documented that rural migrants often have a high incidence of housing poverty (e.g., [12,13]). Based on the China Migrants Dynamic Survey implemented in 2017 (CMDS 2017 for short), 37.5% of rural migrants surveyed live in dwellings with a per capita housing area of 15 m² or below and can be considered to be in a state of housing poverty [14]. Rural migrants' housing stratification could lead to the differentiation of their cognition of subjective social status, which exerts key influence on their urban identities and sense of gains. Thus, one of the challenges of high-quality urbanization in China is to improve the housing quality of rural migrants in cities, so that they can obtain equal status with urban residents in terms of housing classes, and migrants' residential integration could be further promoted.

Meanwhile, in the existing documents on the topic of migrants' housing quality, e.g., [15–21], rare literature explores the determinants of migrants' housing quality from the perspective of their rural landholdings. Besides rural household registrations, rural landholdings endowed by the land system of China are another identity feature for them. Several studies have examined the association between rural migrants' hometown landholdings and their urban settlement intention [22] or social mobility [23], whereas, to our best knowledge, the relationship between rural migrants' hometown landholdings and their urban housing quality has not been investigated thoroughly. On the one hand, possession of use rights of rural lands could be considered as economic and emotional sources of security for rural migrants once suffering from a failure to citizenize. Rural migrants with "place attachment to the rural" migration are supposed to be "host cities' travelers" and are inclined to invest little in housing in inflow areas, which may lead to their poor urban housing quality. Thus, as long-held rights, retaining use rights of hometown lands may have a negative "lock-in" effect on rural migrants' housing quality. On the other hand, partly due to the effect of rural hukou, migrants often have to face wage discrimination in the labor market and are more vulnerable to economic shocks and crises [24]. As a short-term supplement to economic resources, revenue derived from rural land may be used by migrants to improve their urban housing environment and thus may have a positive "wealth effect" on housing quality with a limited marginal effect. It is delightful that China's unique land system and urbanization provide a good opportunity for this study. These explorations could be useful for rural land reform policies and urban–rural integration in developing countries.

This study aims to extend the existing literature with regard to the following aspects:

- First, following a recent work [25], an index of rural migrants' urban housing quality in host cities is constructed, showing their housing stratification in urban areas.
- Second, this study explores how retaining landholdings related to contracted farmland or a rural homestead may exert impact on rural migrants' urban housing quality, that is, we examine how retaining hometown landholding may negatively "lock in" the level of housing quality for rural migrants. Such an analysis can enrich knowledge on the association between rural land arrangements and migrants' residential livability in host cities, which is one of the issues of concern for urbanization in China.
- Third, this study examines how the "lock-in" impact of hometown landholdings varies across different subgroups, especially for migrants with cohorts, different employment statuses and flowing into various sizes of cities.
- Plus, the association between rural landholdings and migrants' urban housing quality is further extended by investigating the possible "wealth effect" of revenue derived from hometown landholdings on the housing quality of rural migrants.

The remainder of this paper is arranged as follows. Research on the background of migrants' housing quality and the land system in China is illustrated in Section 2. Section 3 provides a literature review of relevant studies and then develops the hypothesis of this paper. Section 4 discusses the data and selection of variables. Section 5 presents econometric methodology. The empirical results and discussions of findings are listed in Section 6. The influencing mechanism is discussed in Section 7, and the heterogeneity in subgroups is presented in Section 8. Finally, Section 9 concludes this paper with a discussion of conclusions and policy implications.

2. Research Background

2.1. Rural Migrants' Housing Quality in China

With the gradual advancement of urbanization, from the middle and late 1990s, China is experiencing the largest human migration in the world [26]. The living quality of rural migrants in cities has been gradually paid attention to by scholars in recent years. For a long time, the living conditions of rural migrants in cities have been unsatisfactory, and migrants' housing poverty is prominent [3]. Compared with local residents, housing inequality in urban areas for migrants is increasingly worse, although a series of housing policies targeting migrants was implemented by the Chinese government [27], such as subsidized housing estates. The current housing policies in China mainly focus on solving rural migrants' housing shortage rather than housing quality [28].

Firstly, rural migrants with their marginalized position often live in a relatively crowded environment and are predominately renters [29]. In general, compared with those flowing into small- or medium-sized cities, the dwelling conditions of rural migrants flowing into big cities or metropolises are relatively poor. In terms of per capita housing area, there is still a significant gap between rural migrants in urban areas and urban residents, even compared with the national average (*China Census Yearbook 2020*). Furthermore, housing stratification has obviously formed among rural migrants, as shown in Figure 1.

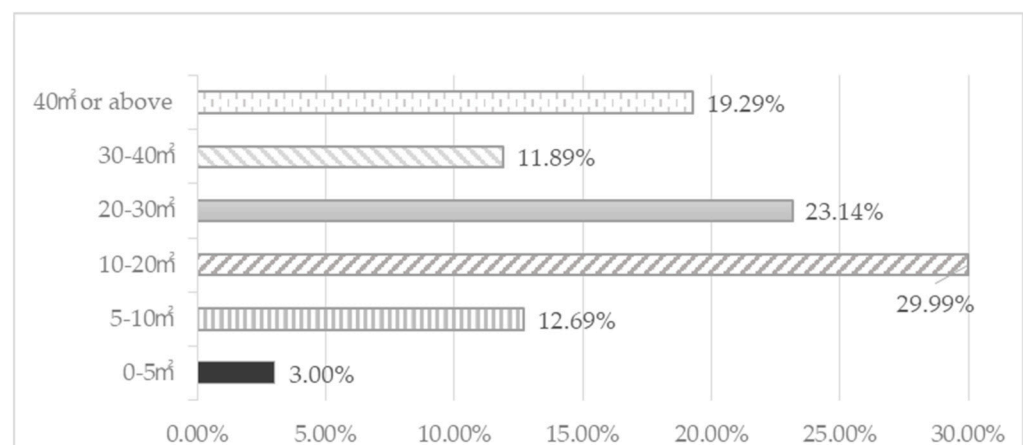


Figure 1. Housing stratification for rural migrants in urban China (categorized by the per capita housing construction area). Data source: CMDS 2017.

Secondly, based on CMDS 2017, it was estimated that about 82% of rural migrants live in buildings, which was 14% lower than that for urban residents. Furthermore, about 15% of rural migrants, who were mainly engaged in agriculture, forestry, fishing, the construction industry or those with no fixed occupation, have to live in poor bungalows. In addition, 3.8% of this group still live in sheds or basements with poor living conditions.

Thirdly, another issue that cannot be ignored is housing segregation. Rural migrants often have to resort to cheaper and more accessible housing due to economic and institutional barriers. Compared with local residents in cities, residential locations preferred by rural–urban migrants are more concentrated to the borderlands of cities [30], which are far away from urban core areas [31]. Urban fringes or urban villages were often disparaged as

neighborhoods of moldy housing, garbage-strewn streets and poor public safety [32]. It results in a serious separation of employment and housing, which degrades the housing quality of rural migrants and could reflect the degree of residential integration between this group and local residents [33]. The residential segregation (isolation) derived from the wide difference in housing quality between rural migrants and local residents has hindered migrants' social integration into urban mainstream society [34].

2.2. Land Reform and Policies in China

Since the foundation of the People's Republic of China in the 1949, a dual land ownership system has been established, meaning that rural land is owned by village collectives while urban land is owned by the state [35]. For rural land, the right of use can only be transferred among members of rural collectives, and its use cannot be changed by local collectives [36]. The Household Contract Responsibility System (HCRS), a far-reaching milestone in China's reform and opening up, was introduced around 1980. Residual income and partial management rights to rural land were granted to rural collective members by the system [37]. The Rural Land Contract Law released in 2002 further guaranteed the long-term stability of the rural land contract relationship.

However, the use of collective land by rural members is still limited to agricultural production, rural house construction, the establishment of township enterprises and other construction projects that are relevant to the collectives [36], but it could not be used for real estate development or others with potential income [38]. In the context of large-scale rural–urban migration, how to achieve equilibrium in the supply of land in urbanization by balancing increases in urban land with decreases in rural land (facilitated by out migration) is the priority and challenge for Chinese central government [39]. A large amount of “hollow villages” (vacant rural housing) have formed, since rural migrants work in urban areas but prefer to maintain or renovate houses in rural areas [40]. China's attempts on land reform in the context of urbanization have been launched. Over the decades, stabilizing the land property rights and promoting the farmland transfer have been focused on by farmland reform in China [41]. For example, a scheme of land management to “Dynamically Link Urban and Rural Development Land Use Changes” in 2004 was issued [42]. Furthermore, a new round of land reform in rural areas since 2014 has been continually promoted, the core of which is the so-called “three rights separation system” (ownership, the right to contract and the right to manage) [43]. Some successful experiences were gained through progressive experiments, such as “Dipiao” carried out in Chongqing, aiming to protect cultivated land, enhance rural collective members' income, optimize the urban–rural land use structure and attempt to alleviate the dilemma between arable land protection and land uses for urban development [40], whereas there are still few rural migrants with a willingness to give up their rights regarding rural lands, because of the interests attached to rural collective lands.

3. Literature Review and Hypothesis Development

3.1. Dimensions of Housing Quality

Housing quality mainly revolves around properties or characteristics related to housing, including the following two aspects: the first is the property of housing itself, such as building type, number of rooms, usable area, balcony area, quality and maintenance; the second is the neighborhood environment of the house, e.g., community type, recreational facilities, green space, floor area ratio, etc. [44].

3.1.1. Influencing Factors of Housing Quality

Influencing factors of immigrants' housing quality identified by the existing literature can be mainly categorized into subjective and objective factors. Firstly, for subjective factors, residents' long-term income has a significant impact on housing consumption [16]. In other words, housing condition or livability is considered to be the result of utility maximization under the constraints of housing market price and individ-

ual income [45]. Average household disposable income [25], permanent income [46,47] and uncertainty of income [48,49] have been identified as significant income factors affecting migrants' housing consumption [15]. Secondly, individual or family attributes such as family size, age of the head of the household and race have significant impacts on residents' decision making in terms of housing conditions [50]. Plus, it has been revealed that psychological factors, such as urban settlement intention, also have a complex association with migrants' housing in cities [20,21]. Rural migrants who intend to stay in their destination for a long time are more willing to invest in better housing, and reliable and high-quality housing is observed to be positively correlated with the settlement intentions of rural migrants [21].

As one of the objective factors, institutional barriers, such as the registration system (the hukou) (e.g., [18]) and social security (e.g., [51]), have proved to be crucial factors affecting migrants' housing conditions. Owing to the discriminatory hukou system, a large number of migrants were excluded from accessing subsidized housing and suffered housing poverty in urban areas [52,53]. Access to the social security system, which reflects the social and economic status of migrants to a certain extent, was identified as playing a significant role in housing quality through the mediating effect of migrants' settlement intention and the degree of social integration [51,54]. Furthermore, geographical migration distance and urban administrative level (or urban scale) are also factors that affect rural migrants' housing quality [19].

3.1.2. Measurement of Housing Quality

Housing quality is an important dimension of living quality. The housing quality of rural migrants has been the focus of scholars' attention, which was analyzed by descriptive analysis [55] or quantitative measurement. Indicators were generally selected by existing studies as core variables to measure the urban housing quality of rural migrants as follows: first, the degree of crowding, e.g., the per capita housing floor area (or living area), is used as the measure of living space crowding (e.g., [56]) and a core indicator to measure the housing stratification and inequality of migrants.

The second measurement is affordability of housing, which is often thought to be intrinsically linked to the usefulness of housing. Affordability of housing could be calculated by two categories of index, of which one is absolute index (housing expenditure) (e.g., [57,58]) and another is relativity index (e.g., the ratio of housing expenditure to income) (e.g., [59]). Since low-income households are more inclined to rent houses in the inflows, the rent-to-income ratio is often used as a measure of the housing affordability for this group at their destination [60].

The third one is the quality of living conditions, including the objective and sanitary conditions of the community, which also indicates the purchasing power of a migrant family in terms of housing. The housing environment can be assessed by the physical or functional state of housing conditions (referring to safety, usage, convenience, comfort, utility and health) [61]. Housing quality could be measured by a qualitative index that is a composite of qualitative aspects of housing, e.g., average value of the sum of several aspects of housing scores [62]. In this paper, following the literature [25], an improved housing environment index is used to describe rural migrants' housing quality through empirical analysis.

3.2. *The Role of Rural Landholdings in Migration*

The association between hometown landholdings and rural–urban migration has been under the spotlight in the existing literature. The urban settlement intentions of rural migrants have been empirically affected by the types of rural landholding. Actual tenure security, or land tenure arrangement, e.g., introduction of Rural Land Contracting Law, was found to motivate rural members to actively rent out their contracted land, which may increase their agricultural income and thus decelerate rural-to-urban migration [63]. It was also revealed that land arrangements, i.e., family farming, land transfer and abandon-

ment [64,65] or availability, type and quantity of hometown landholdings [66] utilized by rural–urban migrants, have a strong correlation with migration decision. Furthermore, the role of agricultural land in migration changed over time [67].

On the other hand, perceived tenure security [68], such as land tenure insecurity or land reallocation influenced by village leaders, was also empirically found to have a complex relationship with rural migrants' likelihood of migrating out of counties [69]. The impact of the above kinds of factors for rural landholdings on rural–urban migration decision would be modified with the presence of land rental markets [68].

So far, existing research on the role of rural landholdings in migration mainly focuses on urban settlement intention and has been extended to migrants' social integration in cities [70]. However, the literature has rarely explored how rural landholdings affect housing quality, which is another important aspect of the residence choice behavior of immigrants and could attract rising attention in the landscape of livable cities development in China nowadays [71]. In this paper, we try to extend migration research by investigating the association between rural landholding and migrants' housing quality in the host areas.

3.3. Hypothesis Development

Rational choice theory, focusing on actors and resources, emphasizes that people maximize their benefits by balancing costs and benefits when making decisions. The “rational” actor acts with a goal or intent [72]. Housing quality could be seen as the result of the choice made by migrants after carefully considering the resources they control and the scarcity of resources including economic wealth, social resources, information, etc. Under the existing rural land arrangement, rural migrants with geographical mobility are still entitled to rural landholdings of the outflows, i.e., the management right to rural contracted land and the right to use homestead land. Hometown landholdings could feature by long-term equities and short-term revenue derived from these equities. The long-term equities (the right to management and use of hometown landholding) are closely related to the nature of the household registration of rural migrants. Retaining the equities related to hometown landholdings not only provides a way out if the migrants' citizenization fails [73] but also makes rural migrants believe that their economic interests and social resources are still tightly “locked” in the countryside where they outflow. In comparison, as “city travelers”, rural migrants would not be inclined to invest much in the quality of urban living. Therefore, the core hypothesis in this paper is that retaining hometown landholdings has a negative “lock-in effect” on the housing quality of rural migrants in urban areas, which could be seen as a significant factor that “pulls” migrants back to rural areas. Furthermore, the marginal effect of the “lock-in effect” is predicted to be greater for the older generation of low-skill migrants without high education and would vary across different housing classes of rural migrants in urban areas. On the other hand, in the short term, cash flow brought by rural landholdings in a hometown can provide certain financial support for improving the urban housing quality of rural migrants. Thus, the annual revenue derived from hometown landholdings would have a positive “wealth effect” with a predictably limited marginal effect, which could be seen as a “push” factor for urbanization and is also verified in the empirical tests in this paper. The conceptual framework is shown in Figure 2.

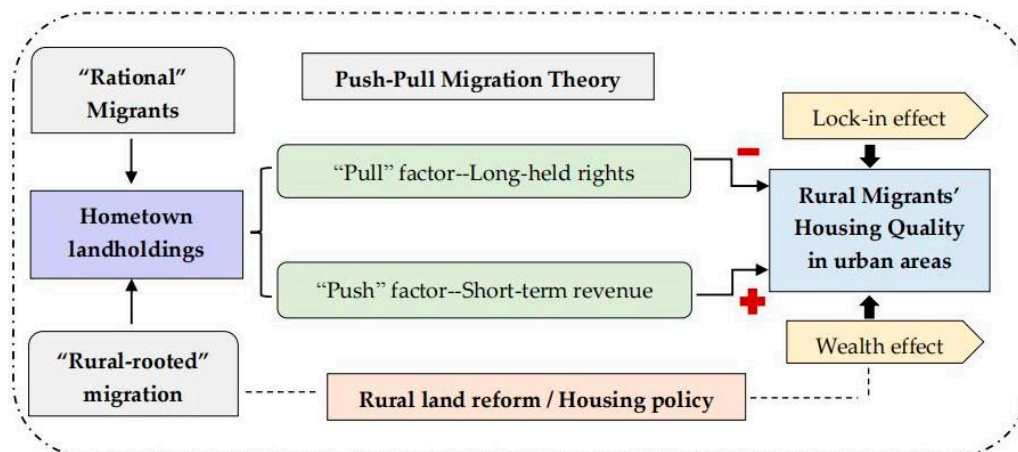


Figure 2. Conceptual framework of association between hometown landholdings and rural migrants' housing quality.

4. Data and Variables

4.1. Data Collection

The micro-level data in this paper were obtained from the special survey data of “living conditions and influencing factors of key diseases among migrants” from CMDS 2017. CMDS is an annual nationwide floating population survey conducted by the National Health and Family Planning Commission of China. Compared with the data investigated in previous years, the relevant information about the “hometown landholdings” of rural migrants and their housing conditions was newly added in CMDS 2017, which provides data support for further exploring the internal association and influencing mechanism between rural migrants' hometown landholdings and their housing quality in urban areas. The surveyed samples who have lived locally for more than one month and are not registered as permanent residents in their own districts were randomly selected by the stratified sampling procedure. The total number of samples for CMDS 2017 was 13,998, and the data covered eight cities in China: Guangzhou, Suzhou, Zhengzhou, Chongqing, Changsha, Qingdao, Urumqi and Xishuangbanna Dai Autonomous Prefecture in Yunnan. The spatial scope of the sample covers cities with different city levels, population sizes and degrees of development. So, the total data are highly representative, of which 40% were samples with inter-provincial mobility, and 60% were those with intra-provincial mobility. In our research, urban–urban migrants were omitted because only the population with agricultural household registration may have landholdings in rural areas according to the land policy in China. Also, we excluded samples that had stayed in the inflow for less than 6 months. After data cleaning and city-level variable matching, 10,420 samples were finally entered into the final data set.

4.2. Variables

4.2.1. Dependent Variable

In order to realize the high-quality urbanization of rural migrants, more attention should be paid to improving the quality of their living in inflow areas. The dependent variable in our research is an indicator variable of housing quality of rural migrants in urban areas. Housing quality is mainly described by characteristics related to housing, such as building type, number of rooms, usable area, balcony area, quality and maintenance. As mentioned above, CMDS 2017 firstly reveals the properties of urban housing conditions for migrants in the form of questionnaires, including housing type, health service facilities, sanitary installation, water, living area and privacy of residence, which makes it possible to quantify the urban housing quality of rural migrants. Based on the responses to the questionnaire, we assigned appropriate values to eight components of housing quality, as shown in Table 1. And then, the housing quality index (HQI), which is used to describe

housing quality for rural migrants in urban areas as a dependent variable, is measured by the standardized score (or z-score) of the sum of all eight different types of housing conditions in Table 1, referring to the paper [25].

Table 1. Composition of housing quality index.

Composition	Housing Quality Index (HQI)
Housing type (L ₁)	If living in a building, L ₁ = 5; in a cottage, L ₁ = 4; in a shed, L ₁ = 3; in a basement, L ₁ = 2; otherwise, L ₁ equals to 1.
Accessibility to health service facilities (L ₂)	The time required to commute from migrants' place of residence to the nearest health service (including community health centers, village clinics, hospitals, etc.) by the most accessible means of transport): if it is within 15 min, L ₂ = 4; if 15–30 min, L ₂ = 3; if 30 min–1 h, L ₂ = 2; if more than 1 h, L ₂ = 1.
Sanitary installation (L ₃)	If equipped with an indoor toilet, L ₃ = 1; otherwise, L ₃ = 0.
Dwelling environment (L ₄)	If living in a neighborhood with few pests, L ₄ = 1; otherwise, L ₄ = 0.
Water source available (L ₅)	If tap water or bottled water is available on a daily basis, L ₅ = 1; otherwise, L ₅ = 0.
Quality of drinking water (L ₆)	If the drinking water is purified, L ₆ = 1; otherwise, L ₆ = 0.
Privacy of residence (L ₇)	If migrants do not share a house with someone other than their families, L ₇ = 1; otherwise, L ₇ = 0.
Residential density (L ₈)	According to the per capita living area for rural migrants in urban areas, the residential density is divided into four levels (quartile), which are assigned from one to four values in order.

4.2.2. Key Independent Variable

As mentioned above, the CMDS 2017 data revealed hometown landholdings owned by rural migrants in the outflow area for the first time. Accordingly, hometown landholding for rural migrants (*H_land*), as a key independent variable in empirical testing, equals to one if rural migrants retain the right to either contracted farmland or a rural homestead in their hometowns. As shown in Figure 3, nearly 80% of rural migrants still retain either type of land, indicating that “rural-rooted migration” is still a preference choice by rural migrants.

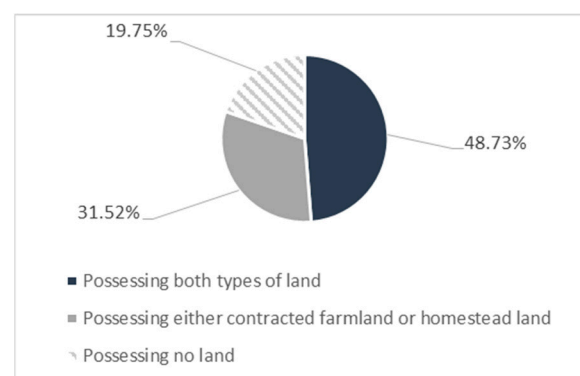


Figure 3. Hometown landholdings for rural migrants in urban China.

4.2.3. Control Variables

According to the existing literature, influencing factors of immigrant housing consumption mainly include the demographic and sociological characteristics of immigrants, the characteristics of housing and environmental factors (e.g., macro-policies, economic conditions and natural environment) [74]. As revealed in the literature (e.g., [16,17,19,50]),

the following indicators describing characteristics of immigrants and their household are included in the empirical test: age, gender, educational attainment, marital status, fertility status, job status, per capita household disposable income, homeownership, migration scope and duration and social security. In addition, rural migrants' willingness to transfer the rural household to urban household registration (Hukou_Transfer), which is used as a mediating variable in Discussion on the Influencing Mechanism (Section 6), is also listed in Table 2 (1).

Table 2. (1) Definitions and descriptive statistics of variables (dummy/categorical variables). (2) Definitions and descriptive statistics of key variables (continuous variables).

(1)			
Dummy/Categorical Variables		CMDS 2017	
Variable	Description	Freq.	Percent
H_land	=1 if possessing either contracted farmland or homestead land in their hometown; =0 if possessing no land in outflow area.	8377	80.39%
		2043	19.61%
Homeowner	=1 if yes to owning a house in the current city; =0 if no.	1982	19.02%
		8438	80.98%
Female	=1 if female; =0 if male.	5058	48.54%
		5362	51.46%
Married	=1 if married; =0 if not married.	8518	81.75%
		1902	18.25%
Junior	=1 if graduated with junior high school degree; =0 if not graduated with junior middle school degree.	4690	45.01%
		5730	54.99%
Highedu	=1 if graduated with high school degree; =0 if not graduated with high school degree.	2667	25.60%
		7753	74.40%
Graduate	=1 if graduated with junior college degree or above; =0 if not graduated with junior college degree or above.	1461	14.02%
		8959	85.98%
Child	=1 if having child, no matter where; =0 if not having child.	9890	94.91%
		530	5.09%
Childlocal	=1 if having child and living together locally; =0 if without children locally.	5243	50.32%
		5177	49.68%
East_origin	=1 if outflowing from eastern China; =0 if outflowing from mid-west regions of China.	2707	25.98%
		7713	74.02%
Self-employed	=1 if being self-employed or employer; =0 if being employed.	3928	37.70%
		6492	62.30%
Secondary_indu	=1 if working in secondary industry; =0 if not working in secondary industry.	2970	28.50%
		7450	71.50%
Tertiary_indu	=1 if working in tertiary industry; =0 if not working in tertiary industry.	5592	53.67%
		4828	46.33%
Professional	=1 if working as professionals; =0 if otherwise.	778	7.47%
		9642	92.53%
Businessman	=1 if conducting business or trade; =0 if otherwise.	2452	23.53%
		7968	76.47%
MedicareU	=1 if paying medical insurance in host cities; =0 if not paying medical insurance in host cities.	2765	26.54%
		7655	73.46%
Hukou_Transfer	=1 if willing to transfer the rural household to urban household registration; =0 if unwilling to transfer the rural household to urban household registration.	3963	38.03%
		6457	61.97%

Table 2. Cont.

		(2)			
Continuous Variables		CMDS 2017			
Variable	Description	Mean	S.D.	Min.	Max.
Age	The household head's age in the year surveyed (unit: year)	35.5	9.98	18	59
Moveyears	Years of migration by the end of the year surveyed (unit: year)	5.90	5.60	1	45
LN_PerDI	Per capita disposable income of migrant households in the inflow areas [unit:1000 yuan (in log)] ¹	0.73	0.67	−3.44	4.09
Distance to hometown	Geo-distance from current city to the provincial capital of the residential province (unit: km, in log) ²	2.71	3.40	0	8.38
LN_POP	The population of current city in 2016 * [unit: 10,000 persons (in log)]	6.57	0.56	5.58	8.13
LN_PERGDP	GDP per capita of current city in 2016 * [unit: CNY 10,000 (in log)]	2.30	0.32	1.76	2.68
LN_HPrice	House price per square meter of current city in 2016 * [(unit: CNY 1000/m ² (in log)]	2.13	0.35	1.64	2.64

¹ Due to the availability of data, the daily living expenses to be deducted when calculating the disposable income include the expenses related to daily living consumption, including clothing, food, transportation, education, communication, medical treatment, entertainment, gifts, housing (rent or mortgage), etc., and do not include productive operation expenses. ² For the samples with intra-provincial migration, spatial geographical distance from the inflow area to the outflow area is assigned to 1. * Data on urban characteristics added to the empirical model are lagged by one year to avoid possible endogeneity that may be caused by bidirectional causality.

On the other hand, the city-level data of the inflow destinations, as social environmental factors, are collected from *China City Statistical Yearbook 2016* and Wind database. The definition and descriptive statistics of variables are shown in Table 2 (1,2).

5. Econometric Methodology

On the basis of the measurements of key variables (housing quality index and hometown landholdings) as defined above, we proceeded to examine how key determinants affected rural migrants' housing quality in their urban destinations, whether exerting "lock-in" effect or wealth effect.

Considering the housing quality index (HQI) is a continuous variable, the ordinary least squares (OLS) method was used in the benchmark regression model to empirically analyze how hometown landholdings affect rural migrants' housing quality. The empirical regression model is as follows:

$$HQI_i = \alpha + \beta_1 H_land_i + \sum \beta_k Control_k + \varepsilon_i, \quad (1)$$

where the subscript i refers to the migrant. The variable HQI_i is rural migrants' housing quality index in the inflow areas. H_land_i is a binary variable, indicating rural migrants' hometown landholdings. $Control_k$ contains a set of demographics, migration characteristics and occupational information of rural migrants, plus city-level attributes (including GDP per capita, population size and housing price in inflow areas). ε_i is the residual item.

For extended investigation, we explored how hometown landholdings exert the "wealth effect" on housing quality for rural migrants in urban areas, by using land revenue or quantity derived from hometown landholdings as key independent variables in models (2) and (3).

$$HQI_i = \alpha + \beta_2 Land_revenue_i + \sum \beta_k Control_k + \varepsilon_i, \quad (2)$$

$$HQI_i = \alpha + \beta_3 Land_quantity_i + \sum \beta_k Control_k + \varepsilon_i, \quad (3)$$

Here, *Land_revenue* refers to the average annual income (or sublease income) brought by the contracted land of the rural migrants (unit: CNY) (in log) and *Land_quantity* refers to the quantity (areas) of contracted land and homesteads (unit: m²) (in log).

6. Empirical Results

6.1. Benchmark Regression Results

As shown in Table 3, M₁ and M₂ in Table 3 show benchmark regression results of how hometown landholdings affect rural migrants' housing quality in urban areas. In M₁, only micro-level attributes for rural migrants were added to the regression model, while variables for both micro-level and city-level attributes were added in M₂. The empirical results show that possessing hometown landholdings has a significant negative "lock-in effect" on rural migrants' housing quality in the inflow areas. Numerically, if rural migrants retain one type of hometown land (either contracted farmland or rural homestead in their hometown), the housing quality index for rural migrants in cities decreases by 32.3%. Under the current rural land policy, rural migrants still prefer to retain contracted land or homestead land when migrating to urban areas. "Rural-rooted migration" makes rural migrants believe that their key economic benefits are still "locked" in the rural areas where they originated from. Therefore, they tend to select housing with "transitional" characteristics and are not inclined to invest much in their urban dwellings. The empirical findings for control variables (individual characteristics of rural migrants, city-level attributes of host city) are in line with theoretic forecasts and are consistent with the previous empirical literature [16,31,50].

Table 3. Estimated results of hometown landholding and housing quality of rural migrants.

Full Sample	Baseline Regression Model		Extended Investigation	
	M ₁	M ₂	M ₃	M ₄
Independent Variables	Coef.	Coef.	Coef.	Coef.
<i>H_land</i>	−0.225 *** (0.077)	−0.323 *** (0.077)	−0.368 *** (0.079)	−0.446 *** (0.127)
<i>Land_revenue</i>			0.034 *** (0.011)	
<i>Land_quantity</i>				0.024 * (0.020)
Micro-level attributes				
Age	0.037 ** (0.023)	0.039 * (0.023)	0.038 (0.023)	0.038 (0.023)
Age_sqr	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)
Female	0.190 *** (0.063)	0.166 *** (0.063)	0.175 *** (0.063)	0.171 ** (0.063)
Junior	1.291 *** (0.112)	1.190 *** (0.110)	1.176 *** (0.110)	1.191 *** (0.110)
Highedu	1.940 *** (0.120)	1.777 *** (0.119)	1.761 *** (0.119)	1.777 *** (0.119)
Graduate	2.173 *** (0.136)	1.993 *** (0.136)	1.977 *** (0.136)	1.992 *** (0.119)
Married	0.068 *** (0.106)	0.018 (0.105)	0.016 (0.105)	0.021 (0.105)
Child	−0.024 (0.136)	−0.083 (0.136)	−0.086 (0.136)	−0.085 (0.136)
Childlocal	0.153 ** (0.076)	0.179 ** (0.076)	0.170 ** (0.076)	0.177 ** (0.076)

Table 3. Cont.

Full Sample	Baseline Regression Model		Extended Investigation	
	M ₁	M ₂	M ₃	M ₄
East_origin	0.512 *** (0.067)	0.844 *** (0.078)	0.824 *** (0.079)	0.845 *** (0.078)
Self-employed	0.179 * (0.103)	0.109 *** (0.102)	0.109 (0.102)	0.110 (0.102)
Professional	0.171 (0.115)	0.197 * (0.114)	0.198 * (0.114)	0.199 * (0.114)
Businessman	0.689 *** (0.095)	0.639 *** (0.095)	0.644 *** (0.094)	0.638 *** (0.094)
Secondary_indu	−0.054 (0.113)	−0.037 (0.113)	−0.044 (0.113)	−0.039 (0.113)
Tertiary_indu	0.739 *** (0.109)	0.644 *** (0.109)	0.640 *** (0.109)	0.645 *** (0.109)
Moveyears	−0.112 *** (0.015)	−0.090 *** (0.015)	−0.090 *** (0.015)	−0.090 *** (0.015)
Moveyears_sqr	0.002 *** (0.001)	0.002 *** (0.001)	0.002 *** (0.001)	0.002 *** (0.001)
MedicareU	0.092 (0.078)	0.034 (0.078)	0.036 (0.078)	0.033 (0.078)
LN_PerDI	0.652 *** (0.057)	0.610 *** (0.058)	0.605 *** (0.058)	0.606 *** (0.058)
Homeowner	2.652 *** (0.068)	2.553 *** (0.070)	2.549 *** (0.069)	2.544 *** (0.070)
Geographic factors				
Distance to hometown		0.052 *** (0.002)	0.053 *** (0.011)	0.052 *** (0.011)
City-level attributes				
LN_PERGDP		1.357 *** (0.167)	1.398 *** (0.167)	1.377 *** (0.168)
LN_POP		0.493 *** (0.052)	0.510 *** (0.052)	0.506 *** (0.053)
LN_HPrice		−1.887 *** (0.150)	−1.915 *** (0.150)	−1.891 *** (0.150)
Constant	−3.702 *** (0.430)	−5.829 *** (0.610)	−5.976 *** (0.615)	−5.939 *** (0.620)
Pseudo R ²	0.232	0.246	0.247	0.246
Observations	10,420	10,420	10,416	10,416

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Robust standard errors are shown in parentheses.

Furthermore, using Equations (2) and (3), we also investigated how land revenue or quantity derived from hometown landholdings influence housing quality for rural migrants (shown in M₃ and M₄ of Table 3). As shown in M₃, the average annual income brought by the hometown landholdings of rural migrants has a significant positive impact on their urban housing quality in cities. However, it is worth mentioning that the absolute value of the marginal effect of revenue derived from rural lands on housing quality is just 3.4%, which is just one-tenth of that for *H_land*. Overall, possessing hometown landholdings exerts a negative “lock-in” effect on rural migrants’ urban housing quality, even though income derived from hometown landholdings has a positive “wealth effect” on migrants’ housing quality with much less of a marginal effect than a “lock-in” effect. As shown in M₄, *Land_quantity*, as an alternative variable of *Land_revenue*, is verified to have a positive impact on migrants’ housing quality in the destinations at a significance level of 0.1, and the positive marginal effect is just 2.4%, which is similar to the result in M₃.

6.2. Robust Checks

In this section, we test the robustness of our findings firstly by experimenting with an alternative measurement of H_land_i (shown in M_5 and M_6 of Table 4). For M_5 , $Land_index$ is defined as follows: if a rural migrant possesses both contracted farmland and homestead land in the outflow area, $Land_index$ is defined as two. If one type of the above landholdings is owned by rural migrants in the origin area, $Land_index$ is defined as one. If rural migrants do not have either of these rights in the outflow place, it is assigned as zero. For M_6 , $Contracted_land$ refers to only possessing contracted land, $Homestead_land$ refers to only possessing homestead land and $Both_Lands$ is for possessing both types of lands, taking possessing no rural land as a reference. The empirical results in M_5 and M_6 are consistent with the benchmark models. What deserves to be noted is that possessing contracted farmland, or both types of land, has a significant negative effect on rural migrants' housing quality in urban areas. Especially, if rural migrants possess contracted farmland when migrating, the housing quality index for rural migrants in cities decreases by 60.4%.

Table 4. Robustness test with alternative measures of key variables.

Full Sample	Alternative Measures of H_land		Alternative Measures of HQI		
	OLS Regression		Quartile Regression		
Empirical Test	M_5	M_6	Quartile (25%)	Quartile (50%)	Quartile (75%)
Explanatory variables	Coef.	Coef.	Coef.	Coef.	Coef.
$Land_index$	−0.206 *** (0.041)				
Without any land(ref.)					
$Contracted_land$		−0.604 *** (0.151)			
$Homestead_land$		−0.105 (0.089)			
$Both_Lands$		−0.409 *** (0.084)			
H_land			−0.353 *** (0.115)	−0.247 ** (0.014)	−0.160 ** (0.077)
Micro-level attributes	Y	Y	Y	Y	Y
City-level attributes	Y	Y	Y	Y	Y
Observations	10,420	10,420	10,420	10,420	10,420
Pseudo R^2	0.247	0.248	0.156	0.119	0.094

Note: ** $p < 0.05$; *** $p < 0.01$. Robust standard errors are shown in parentheses.

Secondly, as shown in columns 4–6 of Table 4, quartile (25%, 50%, 75% for HQI) regressions were used to examine the empirical relationship between hometown landholdings and rural migrants' housing quality in urban areas as a robustness test. The different quartiles of housing quality index (HQI) can represent the housing stratification of rural migrants in urban areas. The results in Table 4 show that all the regressions with alternative specifications draw consistent findings and suggest that our benchmark findings are robust. Moreover, the lower housing class is, the greater the negative lock-in marginal effect of hometown landholdings on housing quality index is.

7. Discussion on the Influencing Mechanism

Hometown landholding is closely linked to rural household registration in China, since relevant rights and interests are tied up in the household registration system. For rural migrants, acquiring urban household registration would mean giving up their land rights in their hometown. According to statistics (CMDS 2017), just less than half of rural migrants would choose to give up agricultural household registration. After all, hometown landholdings can still serve as social security for most rural migrants to some extent [70]. Only when the benefits of obtaining urban hukou are higher than the costs related to giving up the rights for a contracted farmland or homestead will they voluntarily choose to transfer their household registration. However, based on the residential purchase restriction policy executed in the inflow cities at the time, obtaining local urban hukou may be a key step to obtaining homeownership, which is an important channel to improve rural migrants' housing quality [25]. Thus, by applying the procedure of the mediating effect test [75], rural migrants' willingness to settle down in cities (hukou transfer) could be identified as a mediating variable for the impact of hometown landholding on housing quality of rural migrants as follows:

Step 1: based on Equation (1), the negative impact of hometown landholdings on the housing quality index (HQI) of rural migrants in urban areas is identified (shown in Step 1 of Table 5).

Table 5. Test for influencing mechanism.

Mechanism Test	Step 1	Step 2		Step 3
Dependent variable	HQI	Hukou transfer intention		HQI
Empirical method	OLS	Probit		OLS
Model	Equation (1)	Equation (4)		Equation (5)
Variables	Coef.	Coef.	Marginal effect	Coef.
<i>H_land</i>	−0.323 *** (0.077)	−0.284 *** (0.033)	−0.110 *** (0.013)	−0.309 *** (0.078)
Hukou_Transfer				0.129 ** (0.064)
Micro-level attributes	Y	Y	Y	Y
City-level attributes	Y	Y	Y	Y
Constant	−5.829 *** (0.610)	0.959 *** (0.257)		3.064 *** (0.128)
Pseudo R ²	0.246	0.067	0.067	0.247
Observations	10,420	10,420	10,420	10,420

Note: ** $p < 0.05$; *** $p < 0.01$. Robust standard errors are shown in parentheses.

Step 2: to test the effect of hometown landholdings on hukou transfer intention, probit regression is used following the model (Equation (4)) below:

$$Hukou_Transfer_i = \alpha + dH_land_i + \sum \beta_k Control_k + \varepsilon_i, \quad (4)$$

where the subscript i refers to the migrant. The variable *Hukou_Transfer* refers to the willingness to transfer the rural household to urban household registration. ε_i is the residual item.

The coefficient d of *H_land* is the center of attention. As shown in Step 2 of Table 5, controlling for micro-level and city-level control variables, hometown landholding has a

significant negative impact on rural migrants' willingness to transfer the rural household to urban household registration, which is consistent with the relevant literature [65]. Furthermore, once rural–urban migrants have access to contracted farmland or rural homesteads in their hometown, the propensity for rural migrants to transfer rural hukou to an urban household decreases by 11% compared to those without such access.

Step 3: hometown landholdings (H_land), together with the variable $Hukou_Transfer$, are put into the empirical model of housing quality of rural migrants. The model (Equation (5)) is shown as follows:

$$HQI_i = \alpha + d'H_land_i + f Hukou_Transfer_i + \sum \beta_k Control_k + \varepsilon_i, \quad (5)$$

The mediating effect of rural migrants' hukou transfer intentions on the impacts of hometown landholdings on rural migrants' urban livability is identified as shown in Table 5. In Step 3, we focus on coefficient d' of H_land and coefficient f of $Hukou_Transfer$.

The empirical results in Table 5 show that the lock-in effect of hometown landholdings on rural migrants' housing quality in urban areas can be partially achieved through the intermediary variable (migrants' intention to transfer from a rural household to urban household registration). The intermediary effect accounts for 4.4% of the total effect of hometown landholdings on rural migrants' housing quality in urban areas.

8. Heterogeneity in Subgroup

8.1. Cohort Difference

The different growth environments create obvious intergenerational differentiation within rural migrants. Table 6 (1) presents heterogeneity analysis on the impact of hometown landholdings on migrants' urban livability by cohort. The coefficients for the key explanatory variables are all significant, and their signs are consistent with those of a full sample. The marginal lock-in effect of migrants' hometown landholdings on housing quality in urban areas for older generation's (40.5%) is nearly one and a half times that for the new generation. The possible reason is that, compared with the new generation, older generations of rural migrants are in different stages of life, when they would need to undertake more family responsibilities, including children's education and elderly care [76]. The older generation has a stronger attachment to rural lands, which brings them a greater sense of gain from emotional attachments and security, especially for those who may return to their hometown in the future. Therefore, they are more reluctant to give up the rights of hometown landholdings.

Table 6. (1) Heterogeneity analysis (by cohort/employment attributes). (2) Heterogeneity analysis (by migration scopes).

Heterogeneity	(1)			
	Cohort		Employment Attributes	
	(1) New Generation	(2) Older Generation	(3) Low-skill jobs	(4) High-skill jobs
Explanatory variables	Coef.	Coef.	Coef.	Coef.
H_land	−0.278 *** (0.091)	−0.405 *** (0.145)	−0.418 *** (0.095)	−0.076 (0.128)
Micro-level attributes	Y	Y	Y	Y
City-level controls	Y	Y	Y	Y
Observations	6444	3976	7190	3230
Pseudo R ²	0.218	0.272	0.252	0.174

Table 6. Cont.

Heterogeneity	(2)		
	Inter-Provincial Migration	Intra-Provincial Migration	
Housing quality	(1)	(2)	(3)
Explanatory variables	Inter-province	Inter-cities	Inter-counties
	Coef.	Coef.	Coef.
<i>H_land</i>	−0.455 *** (0.116)	−0.295 *** (0.109)	0.056 (0.282)
Micro-level attributes	Y	Y	Y
City-level controls	Y	Y	Y
Observations	4124	5694	602
Pseudo R ²	0.227	0.281	0.178

Note: *** $p < 0.01$. Robust standard errors are shown in parentheses.

8.2. Heterogeneity across Employment Attributes

Table 6 (1) also shows heterogeneity analysis across employment attributes. Migrants are classified into two groups according to different occupational characteristics. Low-skill jobs (labor-intensive occupations) refer to front-line production or labor work (including non-fixed occupations) such as peddling, catering, delivery, etc. By contrast, management personnel requiring higher education, such as civil servants and professional and technical personnel, are classified as the group with high-skill jobs (technique-intensive occupations). In general, rural migrants are mostly engaged in labor-intensive jobs, accounting for 69% of the total, while only 31% of the total are engaged in high-skill jobs, which is closely related to the low education level of this group as a whole.

As shown in Table 6 (1), the negative marginal effect of hometown landholding on migrants' housing quality index for the group engaged in low-skill jobs is significant at 1% level and more than five times that for migrants occupied in high-skill jobs. In comparison, the negative lock-in effect of hometown landholding on migrants' housing quality index is not significant for rural migrants engaged in high-skill jobs. A possible reason is that rural migrants engaged in labor-intensive work are more likely to suffer from career turmoil [77,78]. As a result, they pay more attention to the guaranteed functions brought about by possessing contracted farmland or a homestead and have passive motivation regarding hukou transfer, thus resulting in less investment in urban housing quality than those engaged in high-skill jobs.

8.3. Regional Heterogeneity

Inter-provincial migrants account for about 40% of rural migrants. Long-distance migration is often accompanied by a lack of social resources at the destination. It is not easy for rural migrants to gain access to external social capital in urban areas, which could provide a channel to gain new information, resources or career opportunities [79,80]. In comparison, hometown landholdings, denoting a social connection to local community, have an important impact on their economic status and emotional dependence. Due to the lack of social network resources, rural migrants with inter-provincial migration are often reluctant to give up their land resource endowment in their hometown, which are often considered as property security or emotional ties to their hometown. Then, compared with intra-provincial migration (inter-cities or inter-counties), they are more cautious in changing household registration, thus resulting in a greater negative marginal effect of hometown landholdings on their housing quality in urban areas.

9. Conclusions and Policy Implications

Making cities and human settlements inclusive, safe and sustainable is a great vision and responsibility for the whole of society [81,82]. Under the macro-background of a healthy China and high-quality urbanization, the housing environment of rural migrants should be paid more attention. Using the Chinese micro-level data collected in CMDS 2017, this paper contributes to the literature of migrants' housing quality by showing that hometown landholding has a significant negative impact on their urban living quality at their destinations. For most rural migrants, hometown landholding is often regarded as a future reliable economic resource, which is deeply "rooted" in rural areas and is closely related to rural hukou registration. Rural migrants' passive hukou transfer motivation results in them having limited access to preferential housing policy in urban areas. Furthermore, urban living is often thought by rural migrants to have transitional and temporary characteristics, and migrants are reluctant to invest much in urban housing quality within limited economic conditions. The above considerations would result in a high occurrence of unsatisfactory housing quality for rural migrants at their destinations. The lock-in effect of rural hometown landholding on migrants' urban housing quality reminds us that hometown landholding, as a negative "pull" factor of outflow areas, is also an essential factor when formulating policy related to the residential livability of rural migrants in urban areas.

Our findings have policy implications as follows. Firstly, market-oriented reform of clear property rights under the guidance of the government is a typical feature of China's rural land system adjustment. In order to spur rural migrants to be voluntarily untied from the "land-interest system", the government needs to properly solve the issue of transferring land resource endowment among rural migrants in the countryside. Local government has implemented different modes (i.e., the "Dipiao" transaction system in Chongqing, and the unification of urban and rural construction lands in Guangzhou) to promote the circulation of contracted land and rural homesteads, which are generally targeted at the total of rural migrants. However, it was found in this paper that the marginal effect of hometown landholdings on urban housing quality varies with the different sociological features of rural migrants. It is suggested that policies related to land transfer should be formulated according to subgroups of rural migrants, considering employment attributes or migration scopes. Secondly, it was also proved that the impact of hometown landholdings on migrants' urban housing quality was verified to be differentiated across migrants' residential stratification in the inflow areas. Thus, policies related to land transfer could be customized more precisely according to rural migrants' urban stratification. These findings are useful not only for urban–rural integration in China but also for improving the living conditions of vulnerable groups in developing countries. Of course, due to the limitations of the survey data used, using cross-sectional data in empirical regression makes it impossible to track changes in housing quality for the same migrant household over time.

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