

## Article

# Influential Factors and Geographical Differences in the Redevelopment Willingness of Urban Villagers: A Case Study of Guangzhou, China

Lizheng Zhang, Yumin Ye and Jiejing Wang \* 

School of Public Administration and Policy, Renmin University of China, Beijing 100872, China; zhang\_lz@ruc.edu.cn (L.Z.); yeyumin@ruc.edu.cn (Y.Y.)

\* Correspondence: wangjiejing@ruc.edu.cn; +86-136-012-80548

**Abstract:** As a crucial part of China's development strategy, the redevelopment of urban villages and the redevelopment willingness of villagers have attracted considerable scholarly interest. However, the literature to date has neglected the effect of the geographical location of urban villages on the redevelopment willingness of villagers. The purpose of this study is to examine the influential factors of the redevelopment willingness of urban villagers, especially with regard to geographical differences and their effects. Based on prospect theory and 1083 questionnaires administered in 45 selected urban villages in Guangzhou, we use the ordinal logistic regression model to explore the influential factors behind villagers' redevelopment willingness in inner villages (<15 km from the city center), urban fringe villages (15–40 km from the city center), and suburban villages (>40 km from the city center). The results show that in inner villages the confirmation of residential land rights can significantly increase redevelopment willingness, but in urban fringe villages the number of stories in dwelling houses significantly decreases the willingness. Further, a high level of villagers' trust in the government, market enterprises, and the village collective each has a significant positive impact on the redevelopment willingness of villagers in urban fringe villages. However, only trust in the government and market enterprises have significant positive impacts on redevelopment willingness in the inner villages and only trust in the village collective is significant in this regard in suburban villages. The effects of geographical differences imply that China's redevelopment policy should be applied in a differentiated way based on the geographical locations of urban villages.

**Keywords:** urban village; villager; redevelopment willingness; geographical differences; Guangzhou



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## 1. Introduction

Due to China's rapid urbanization since the 1980s, urban built areas in large cities have extended to surround numerous villages that are located in formerly suburban areas and converted them into urban villages. Urban villages are defined as villages that have been developed into rental enclaves and encircled by expanding urban built-up areas [1]. Most of the farmland in urban villages has been expropriated but rural residential land (*zhai ji di*) has been retained due in part to the high cost of land expropriation. The indigenous villagers, who lost their farmland during the urbanization process, built dwelling houses on their residential land informally to accommodate the housing needs of rural migrants [2]. However, the creation of urban villages has resulted in many negative consequences, such as overcrowding, high density, inefficient land use, and poor living environments [3,4]. In China's 14th Five-Year Plan, urban redevelopment, including urban village redevelopment, features as an important national development strategy. However, redeveloping urban villages is difficult because it involves complex property rights and multiple interests. Specifically, China implements a dual land ownership system by which urban land is government-owned and rural land is owned by the village collective. The differences between the urban and rural land systems serve to protect the property rights of villagers,

thereby strengthening their bargaining power in the redevelopment process. Accordingly, the redevelopment willingness of urban villagers is a critical consideration in pursuing the redevelopment of urban villages.

The influential factors of urban villagers' redevelopment willingness have been examined in multiple studies. Personal characteristics such as age, educational attainment, the villagers' expectations of redevelopment, and the extent to which the villagers trust the government and the village collective have all been identified as influential in determining redevelopment willingness [5–7]. Economic attributes such as rental income and family economic status are also important in shaping villagers' redevelopment willingness [8]. Property factors such as illegal construction are also highlighted as having an effect on villagers' redevelopment willingness [9]. In relation to the redevelopment modes, scholars have argued that in comparison with a top-down approach such as a government-led mode, a bottom-up institutional arrangement can be more effective in promoting the redevelopment willingness of villagers [10–13].

Despite contributing to the field in many ways, the studies to date share the limitation of neglecting the heterogeneity of the villages. Land and property values within cities vary widely across geographical locations. In the redevelopment of urban villages, geographical locations determine property values, rental income, and the wealth change of villagers, thereby influencing the villagers' expectations with regard to redevelopment. For example, villagers in a central urban area may expect to gain property and wealth growth through redevelopment, whereas villagers in an urban fringe area may be more concerned about whether the redevelopment can be successfully finished. Differences between villagers in respect to what they expect from redevelopment may lead to differences in terms of which factors most influence redevelopment willingness. Therefore, the geographical locations of urban villages in cities may be associated with or even be determinative of villagers' redevelopment willingness.

The purpose of this study is to explore the factors influencing villagers' redevelopment willingness by considering geographical differences through a case study of Guangzhou City in Guangdong Province. We develop a conceptual framework on the basis of prospect theory [14], which has been widely used to explain risky decision behavior. Taking people's subjective expectations into account, prospect theory can be used to explain why the influential factors of villagers' redevelopment willingness differ between urban villages depending on geographical location. Based on a survey of 1083 villagers living in 45 selected urban villages in Guangzhou, we perform a series of ordinal logistic regression models to analyze the factors influencing villagers' redevelopment willingness. The role played by the geographical locations of the villages is a principal concern in this research such that our findings have implications for the redevelopment of urban villages, specifically by providing a foundation for effective policies differentiated based on location.

The study is structured as follows. In the next section, we review the literature related to villagers' redevelopment willingness. In Section 3, we describe the research design, including the conceptual framework, data source, variables, and methods, i.e., ordinal logistic regression models. In Section 4, we present our results. Finally, the main findings are presented and discussed in Section 5.

## 2. Literature Review

The urban village is a uniquely Chinese urban form that emerged during the period of rapid urbanization in the reform era [15]. In China's dual land ownership system, urban land is owned by the government and rural land is owned by the village collective, while rural land can be requisitioned by the government for urban development [16]. Each village household can moreover acquire a piece of residential land from the village collective for self-housing. Along with the invigoration of urbanization, industrialization and economic growth, the city government expropriated large amounts of farmland for urban sprawl while it left the residential land of villagers alone, as the expropriation of the latter is both costly and time consuming [11]. The indigenous villagers, who lost their farmlands

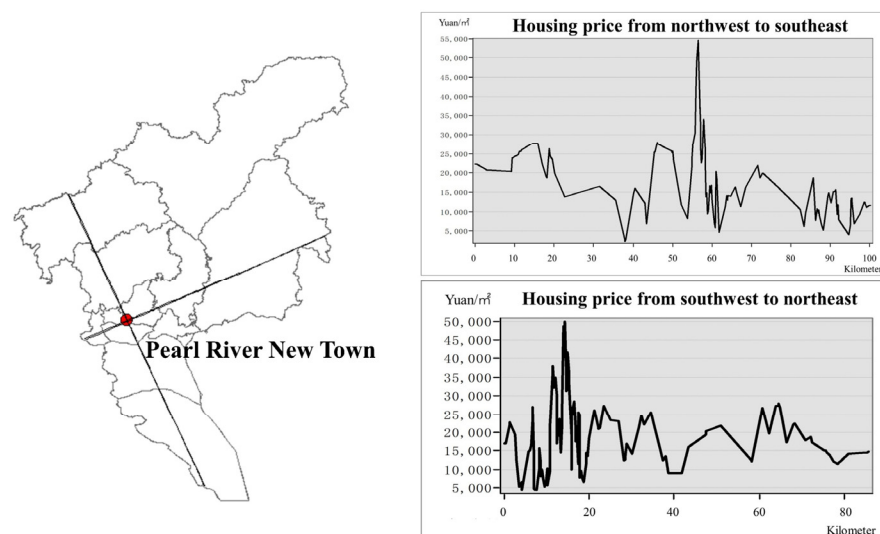
during the urbanization process, used their residential land to build houses informally to accommodate the housing needs of rural migrants, who are institutionally excluded from urban welfare (e.g., social housing) by the dual household registration system in China [2]. However, villagers' pursuit of profits by maximizing the use of available land resulted in some negative externalities, like overdevelopment, poor infrastructure, chaotic land use and limited open space, which created a breeding ground for health problems, fire hazards and crime [17,18]. The issues obscure the contributions urban villages make to migrant housing and lead to a dual landscape and spatial structure in urbanized areas [15,17]. Accordingly, the redevelopment of urban villages is regarded as a way to promote the efficient use of land resources, improve public facilities and contribute to the sustainable development of the city [19].

Studies on the role of villagers in the redevelopment of urban villages in China have developed through three stages. From the 1990s onwards, scholars have advocated the government-led mode of promoting urban village redevelopment, emphasizing the importance of government intervention, planning management, and urban design [20], with very little light shed on the willingness of the villagers. Since 2003, some researchers have investigated the impact of redevelopment on villagers and called for scholarly attention to be paid to villagers [21]. However, the role of the villagers has not been afforded sufficient attention, and the function of the urban "growth machine" in the redevelopment of urban villages was the main concern of scholars during this period [22,23]. After 2010, given the implementation of the New-Type Urbanization strategy that emphasizes people-oriented urbanization, scholars realized the importance of villagers in the context of redevelopment initiatives and therefore considered their willingness to be a key factor in redevelopment [16]. Scholars argued that urban village redevelopment should respect the redevelopment willingness of the villagers affected and take their interest demands such as reasonable compensation, social security, and public participation into consideration [6,24–26]. In this third stage of research development, scholars discussed villager-focused topics such as housing differentiation between villagers during redevelopment [27], villagers' satisfaction with redevelopment [28], and the post-redevelopment living conditions experienced by the villagers [29,30].

Up to the present time, studies on villagers' redevelopment willingness have principally explored the effects of personal characteristics, economic attributes, property factors, and redevelopment modes. In terms of personal characteristics, older and less-educated villagers are least willing to accept redevelopment because they often lack the professional skills needed to be competitive in a changing job market [7]. Using multivariate logit models, scholars reported that male, younger, and healthier villagers are more willing than others to accept redevelopment and also that a large family and a high level of social integration promote redevelopment willingness [31]. There is also a positive relationship between villagers' redevelopment willingness and their trust in the government and the village collective [5,6]. In addition, villagers with higher rental income and a lower evaluation of their current economic status are more likely than those in the opposite condition to accept redevelopment, because they anticipate gaining property or direct monetary compensation [8]. In terms of property factors, due to the urban and rural dual land systems, villagers play an important role in the formation of informality in urban villages [1,32] and illegal construction is shown to be a common phenomenon in that context [33,34]. If compensation for illegal construction does not meet the villagers' expectations, their redevelopment willingness will decrease [9], which may lead to the nail-house phenomenon (*ding zi hu*) and property rights activism [35]. With regard to the redevelopment mode, scholars have found that compared with the top-down approach, the bottom-up institutional arrangement enables villagers to benefit more from redevelopment and for this reason is effective at increasing their redevelopment willingness [10–12]. This is partly because the village collective can significantly reduce the transaction costs associated with the negotiation process [12,13].

A few studies on villagers' centralized residence willingness investigate possible differences in influential factors between different types of villages. For example, by examining villagers' centralized residence willingness from a macro and regional perspective, scholars compared the influential factors of villagers' centralized residence willingness in pure and nonpure farming areas [36]. They found that rural households in nonpure farming areas are more concerned with fairness in relation to future quality of life, whereas those in pure farming areas are more concerned with implementation and guaranteed compensation. However, there is a dearth of studies examining the locational differences between villages within a city at the micro-scale. A likely reason for this gap in the literature is the relatively weak data available, which prevents scholars from examining the effects of the heterogeneity of urban villages. For this reason, many studies focus on a single village or present a comparison between a few villages, which does not provide a basis for a systematic comparative analysis of the villagers' development willingness in urban villages in different geographical locations.

The geographical locations of urban villages may influence villagers' subjective expectations of redevelopment. Figure 1 shows the price of housing for multiple geographical locations in Guangzhou. Based on commercial housing price data from a real estate website (<https://house.focus.cn>), we mark 1518 geographical points in Guangzhou and their corresponding housing prices in GIS and find that housing prices decline rapidly from the city center (Pearl River New Town) to the peripheral urban area. In the context of urban village redevelopment, the value of the villagers' properties, the villagers' rental income, and changes in wealth vary dramatically depending on geographical location [37], which may further influence villagers' subjective expectations of redevelopment. It is important, therefore, to determine whether the geographical location (i.e., distance from the city center) of villages has systematic effects on the redevelopment willingness of villagers.



**Figure 1.** Housing prices from the city center to the periphery in Guangzhou.

### 3. Conceptualizing Villagers' Redevelopment Willingness

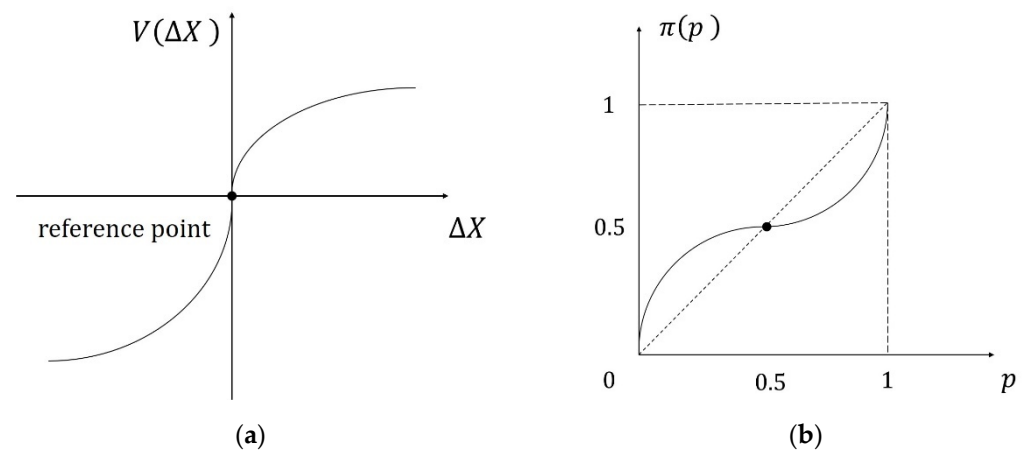
To what extent villagers are willing to accept urban village redevelopment can be theorized as a risk decision problem. For urban villagers, losing farmland means losing their livelihood such that they build dwelling houses on their residential land for rent and make a living in the rental economy. However, the redevelopment of urban villages may fundamentally change villagers' livelihoods, thereby causing great uncertainty. As the owners of the residential land in urban villages, villagers can decide whether or not to accept the redevelopment. If villagers choose not to accept redevelopment, they can hold their properties permanently and enjoy the rental income and the dividend from the collective economy but will lose an opportunity for property appreciation. If

villagers accept redevelopment, they may be compensated with high-value properties, better living environments and higher rental income. However, if the redevelopment fails to be completed, villagers will have to live away from home and potentially lose their properties, rental income and dividend. Some urban villages in Guangzhou initiated the redevelopment process over ten years ago but have not finished yet for complicated reasons. Therefore, villagers' redevelopment willingness reflects a risk decision between alternatives that involve risk and uncertainty such that it is necessary to analyze through the lens of risk decision theory how the extent of their willingness is affected.

### 3.1. Analytical Framework of Villagers' Redevelopment Willingness Based on Prospect Theory

#### 3.1.1. Analytical Framework

As a theory of behavioral science, prospect theory focuses on explaining how people make decisions when faced with risk and uncertainty [14]. According to prospect theory, decisions in these conditions can be explained by the value function  $V(\Delta X)$  and the weighting function  $\pi(p)$ , as shown in Figure 2.



**Figure 2.** Two Functions of Prospect Theory. (a) Value function  $V(\Delta X)$ ; (b) Weighting function  $\pi(p)$ . Figure 2 is based on "Prospect Theory: An Analysis of Decision under Risk" (Kahneman & Tversky, 1979).

The value function  $V(\Delta X)$  is used to measure people's evaluation of changes in their wealth or welfare. According to prospect theory, what people care about when making decisions is the change in their wealth or welfare  $\Delta X$  rather than their final state in terms of wealth or welfare  $X$ . Initial wealth level serves as the reference point. The value function  $V(\Delta X)$  refers to the evaluation of the magnitude of the change (positive or negative) from that reference point. Value function asymmetry indicates a "loss aversion" effect; that is, loss of  $\Delta X$  is afforded more weight in an evaluation than an equal gain in  $\Delta X$ . In the redevelopment of urban villages, villagers take vested assets and rental income as their reference point, and the subjective evaluation of any change in wealth expected to arise from redevelopment influences the extent of their development willingness. In this process, villagers are very sensitive to any loss of assets.

In addition, in prospect theory, the weighting function  $\pi(p)$  is used to describe people's estimate of occurrence probability of one certain prospect. According to prospect theory, people are not completely rational in evaluating the real occurrence probability  $p$  of changes. For example, they may underestimate high-probability events and overestimate low-probability events, so that the weighting function  $\pi(p)$  reflects a subjective and inaccurate estimate of objective probability. In the redevelopment of urban villages, the villagers' subjective estimates of the probability of successful redevelopment also influence their redevelopment willingness.  $V(\Delta X)$  and  $\pi(p)$  together determine how people behave when faced with risk.

More importantly, prospect theory sheds light on the effect of geographical difference on the redevelopment willingness of villagers. Compared with former risk decision



theories such as the expectancy theory [38] and expected utility theory [39], an important contribution made by prospect theory is taking people's subjective expectation into consideration. Prospect theory believes it is not the changes in wealth or the real occurrence probability but people's subjective evaluation of wealth changes or subjective estimates of occurrence probability that influence people's decisions. From this perspective, the villagers' subjective expectations should be considered when analyzing their redevelopment willingness. Additionally, their subjective expectation of the redevelopment is associated with the geographical location of the urban village, which may further influence their evaluation of wealth changes and their estimates of occurrence probability. For example, villagers in better locations usually regard the redevelopment as an opportunity to get rich quickly, and they may be more averse to wealth loss. It implies that a great gain in wealth is needed to increase their value function. However, villagers in worse locations may be more concerned about whether the redevelopment can be successfully finished. Prospect theory allows us to reveal the effect of geographical difference on the redevelopment willingness of villagers.

### 3.1.2. Research Hypotheses

First, according to the value function  $V(\Delta X)$  of prospect theory, some property factors are likely to influence villagers' redevelopment willingness. The villagers' evaluation of the changes in wealth expected to accrue from the redevelopment of an urban village will have a significant influence on their redevelopment willingness. Property rights are at the core of gaming in urban village redevelopment. In Guangzhou, the government authorities regard only residential land registered to the villagers and dwelling houses below three-and-a-half stories as legal properties. Further, the authorities do not provide any compensation for unregistered residential land. For villagers who have unregistered residential land, redevelopment will mean a loss of wealth. Hence, their subjective evaluation of redevelopment is likely to be negative such that they will be unwilling to accept it. Similarly, for dwelling houses villagers can only get a compensated floor area that is equal to the floor area of three-and-a-half stories in a villager's house. Moreover, if villagers' dwelling houses are below three-and-a-half stories, they can purchase some floor area at a low price and get the same compensation according to the policy. Hence, for villagers who have dwelling houses with fewer stories, redevelopment will mean more gains in wealth. As the number of stories in villagers' houses increases, the gains in wealth will decrease and finally become a loss of wealth when the dwelling houses are more than three-and-a-half stories. Thus, we propose the following two hypotheses:

**H1.** *Confirmation of residential land rights has a positive impact on villagers' redevelopment willingness.*

**H2.** *The increase in the number of stories in villagers' dwelling houses has a negative impact on their redevelopment willingness.*

Second, according to the weighting function  $\pi(p)$ , some expectation factors may also influence villagers' redevelopment willingness. The villagers' subjective estimates of the probability of successful redevelopment will affect their redevelopment willingness. The government, market enterprises and the village collective are the main bodies that participate in implementing urban village redevelopment in China [4]. The villagers' trust in the government, market enterprises, and the village collective will influence the extent to which they are confident in the success of a redevelopment effort. Thus, we propose the following hypothesis:

**H3.** *A high level of trust in the government, market enterprises, and the village collective on the part of villagers is associated with a high level of redevelopment willingness.*

Third, it is necessary to take into account the possible impact of the village's geographical location. We focus on Guangzhou as the case city for this study, take Pearl River New Town as the city center, and use Google Maps to calculate the straight-line distance from the

village to the center point. According to the de facto urban spatial structure of Guangzhou, we define urban villages located within 15 km of the city center as inner villages, urban villages located 15–40 km from the city center as urban fringe villages, and urban villages located more than 40 km from the city center as suburban villages. In general, land values decrease successively from the inner villages to the urban fringe villages to the suburban villages, which may affect villagers' subjective expectation from the redevelopment and further differentiate the given influential factors of redevelopment willingness between these three kinds of villages. Thus, we propose the following hypothesis:

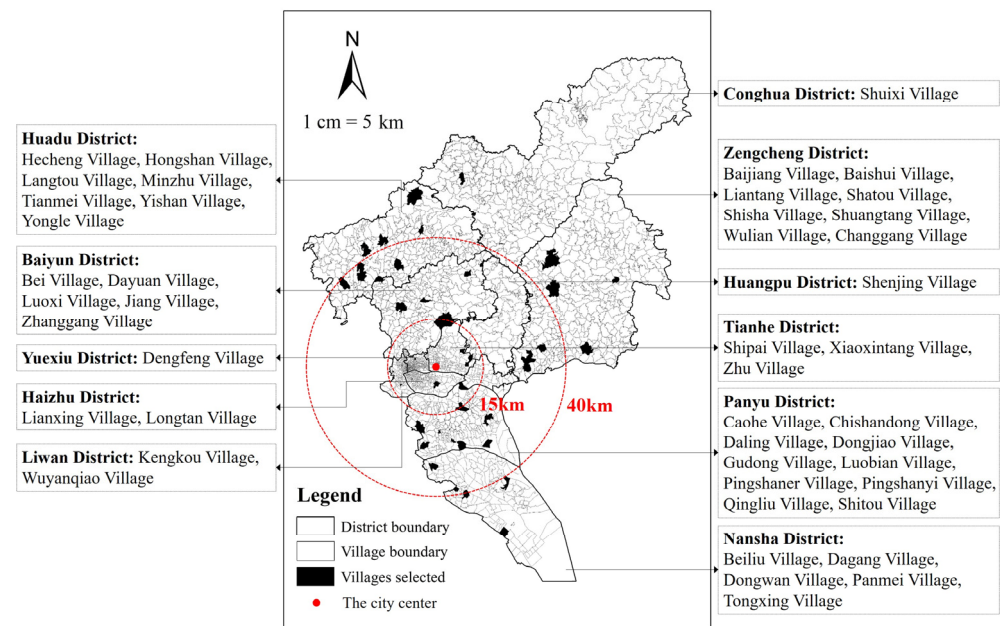
**H4.** *The geographical location of villages defined as distance from the city center differentiates the extent to which given influential factors affect villagers' redevelopment willingness.*

In addition, some variables considered likely to influence the villagers' value function  $V(\Delta X)$  and weighting function  $\pi(p)$  should be considered control variables such as villagers' age, educational attainment, occupation, frequency of community activities and satisfaction with living conditions.

### 3.2. Data Source

Urban villages occurred earlier in the Pearl River Delta than in other parts of China, especially in Guangzhou City [2]. As a super-large city in the Pearl River Delta, Guangzhou, the case city, experienced a rapid and extensive urbanization process following the reform and opening-up in 1978 and has a very large urban built-up area that incorporates hundreds of villages. Even in the suburban districts of the city, many villages are also surrounded by urban land and are therefore defined as urban villages. The large number of urban villages, the complexity of property rights and the difficulty of redevelopment make Guangzhou one of the most representative cities in China for urban village studies. Guangzhou has established a set of fairly complete and systematic policies to promote the redevelopment of urban villages. In strict alignment with these policies are unified compensation standards and a similar redevelopment mode for all the villages in Guangzhou. These standards and modes are beneficial for the present study, as their uniformity across villages means that it is possible to explore the influential factors of villagers' redevelopment willingness on the premise of similar compensation standards and a shared redevelopment mode.

We use a 2018 questionnaire survey conducted in 45 selected urban villages in Guangzhou. Figure 3 shows the spatial distribution of these villages. By consulting senior urban planners from Guangzhou's planning institution and city government officials, we identified 45 typical urban villages on the basis of location, population size, and land use density. For each urban village, we invited adult residents ( $\geq 18$  years old) to complete our questionnaire. To ensure that the sample would be representative of the population, we used a combination of cluster random sampling and quota sampling to select the respondents. The villagers in each urban village were subdivided into several clusters according to the natural villages/neighborhoods (*zi ran cun*). For each cluster, we adopted convenience and quota sampling to select respondents with different characteristics. We identified 1083 valid respondents with an effective rate of 87.6%. The survey we use included items about the villagers' demographic characteristics, economic attributes, property status, degree of social trust, and redevelopment willingness.



**Figure 3.** Spatial distribution of 45 survey villages.

Table 1 presents definitions and descriptive statistics of the variables. WILLINGNESS is the dependent variable. We measure the villagers' redevelopment willingness with this survey question: "Are you willing to accept comprehensive redevelopment and relocation?" The possible answers are "very unwilling", "unwilling", "neutral", "willing", and "very willing", scored as 1, 2, 3, 4, and 5, respectively. We find a substantial difference between the villagers in terms of the extent of their redevelopment willingness: 21.14% and 11.45% of the villagers are unwilling and very unwilling to accept redevelopment, respectively, whereas 16.99% and 27.61% are willing and very willing, respectively, to do so.

In accordance with previous studies [5–9,31,35] and drawing on prospect theory, we use four sets of independent variables: personal characteristics, economic attributes, property factors, and expectation factors. We also account for the effect of geographical differences between urban villages on redevelopment willingness. Based on the AIC (Akaike information criterion) rule, the independent variables entered models are shown in Table 1.

With regard to personal characteristics, the villagers' educational attainment level is relatively low: 15.0% have no more than an elementary school education, and those with a junior high school education as their highest level of education account for the largest number of respondents (34.2%). With regard to economic attributes, the average monthly income of the villagers is 2.8 thousand Chinese yuan.

In terms of the property factors, we asked the villagers to indicate whether they had land use permits for their residential land. The PERMIT variable shows that most of the villagers (80.6%) have land use permits. However, there is great variation between the villages with regard to the number of stories in the dwelling houses. The STORY variable indicates that the average number of stories is 3.14.



**Table 1.** Variables: definitions and descriptive statistics.

Variable	Variable Description	Minimum	Maximum	Mean	Standard Deviation
<b>Dependent variable</b>					
WILLINGNESS	Very unwilling = 1, Unwilling = 2, Neutral = 3, Willing = 4, Very willing = 5	1	5	3.18	1.26
<b>Independent variables</b>					
<b>Personal characteristics</b>					
Gender					
MALE	MALE = 1	0	1	0.65	0.48
Age of villager					
AGE		18	99	46.73	12.82
Level of educational attainment					
ELEMENTARY	Elementary school or below = 1	0	1	0.15	0.37
JUNIOR	Junior high school = 1	0	1	0.34	0.47
SENIOR	Senior high school or technical school = 1	0	1	0.23	0.42
COLLEGE	College and above = 1	0	1	0.28	0.45
<b>Economic attributes</b>					
Occupation					
EMPLOYER	Employer = 1	0	1	0.01	0.09
SALARIAT	Salariat = 1	0	1	0.47	0.50
SELF-EMPY	Self-employed = 1	0	1	0.09	0.29
FARMING	Farming = 1	0	1	0.15	0.36
OTHERS	Others = 1	0	1	0.29	0.45
Monthly income					
INCOME	Unit: ten thousand <i>yuan</i>	0	5	0.28	0.29
Renting status					
RENTING	Have rental income = 1	0	1	0.38	0.49
<b>Property factors</b>					
Confirmation of residential land rights					
PERMIT	Have residential land use permit = 1	0	1	0.81	0.40
Number of stories in dwelling house					
STORY		1	8	3.14	1.36
<b>Expectation factors</b>					
Frequency of community activities					
NEVER	Never participate = 1	0	1	0.37	0.48
ONCE	1 time per month = 1	0	1	0.26	0.44
TWICE	2–3 times per month = 1	0	1	0.21	0.41
THRICE	Over 3 times per month = 1	0	1	0.16	0.36
Satisfaction with living conditions					
SATISFACTION	Very dissatisfied = 1, Dissatisfied = 2, Neutral = 3, Satisfied = 4, Very satisfied = 5	1	5	3.45	0.60
Villagers' trust					
TRUSTGOV	Villagers' trust in the government: Highly distrust = 1, Distrust = 2, Neutral = 3, Trust = 4, Highly trust = 5	1	5	3.27	1.09
TRUSTMARKET	Villagers' trust in the market enterprises: Highly distrust = 1, Distrust = 2, Neutral = 3, Trust = 4, Highly trust = 5	1	5	2.93	1.04
TRUSTVILLAGE	Villagers' trust in the village collective: Highly distrust = 1, Distrust = 2, Neutral = 3, Trust = 4, Highly trust = 5	1	5	3.37	1.02
<b>Geographical regions</b>					
INNER	0–15 km from the city center = 1	0	1	0.25	0.44
FRINGE	15–40 km from the city center = 1	0	1	0.52	0.50
SUBURBAN	>40 km from the city center = 1	0	1	0.23	0.42

For the expectation factors, the villagers' satisfaction with their living conditions is measured by 19 questions focused on aspects such as villagers' satisfaction with environmental health, sports facilities, public security, living area, housing quality, and the condition of the roads. The possible answers to each question are "very dissatisfied", "dissatisfied", "neutral", "satisfied", and "very satisfied", scored as 1, 2, 3, 4, and 5, respectively. The SATISFACTION variable is the average score of the 19 questions, and its value (3.45) indicates that the villagers' overall life satisfaction is between "neutral" and "satisfied." We also used a Likert-type five-point scale to measure the extent to which the villagers trust various bodies involved in redevelopment, i.e., the government, the village collective, and market enterprises. The results show that the villagers express the most trust in the village collective and the least in market enterprises.

In terms of geographical differences, the sample population represents 11 inner villages (275 respondents), 23 urban fringe villages (558 respondents), and 11 suburban villages (250 respondents).

### 3.3. Model Specifications

Because the WILLINGNESS dependent variable is ordered, we use the ordinal logistic regression model to explore the influential factors associated with it. First, we use a baseline model of all the urban villages to examine the effects of the independent variables and geographical differences on the villagers' redevelopment willingness. Then, we apply three models for urban villages in different regions to investigate the heterogeneity in the influential factors of villagers' redevelopment willingness. The  $j$  level of the ordinal logistic regression model can be expressed as:

$$\ln \left[ \frac{P(y \leq j|X)}{1 - P(y \leq j|X)} \right] = g(X\beta) = a_j + \sum_{k=1}^n \beta_k x_k \quad (1)$$

In this equation,  $y$  denotes the villagers' redevelopment willingness. The subscript of  $j$  is a certain level of villager willingness, and the value of  $j$  is 1, 2, 3, 4, or 5.  $P(y \leq j|X)$  reflects the probability of the villagers' redevelopment willingness being less than or equal to a certain level  $j$ .  $X$  is the independent variable matrix,  $\beta$  is the coefficient matrix of the independent variable,  $a_j$  is the intercept term of the  $j$  level of willingness,  $n$  is the number of independent variables,  $x_k$  is the independent variable, and  $\beta_k$  is the regression coefficient of  $x_k$ .

Because  $P(y \leq j|X)$  is a cumulative probability and  $\sum_{j=1}^5 P(y = j|X) = 1$ , we can use the following equation to calculate the occurrence probability of  $y = j$ :

$$P(y = j|X) = \frac{\exp(a_j + \sum_{k=1}^n \beta_k x_k)}{1 + \exp(a_j + \sum_{k=1}^n \beta_k x_k)} \quad (2)$$

## 4. Results

### 4.1. Influential Factors of Redevelopment Willingness

Table 2 presents the baseline regression model of all the villages. The parallel regression assumption is an important prerequisite of the ordinal logistic regression model; that is, the independent variable should have the same effect on the ratio of dependent variables at any given dividing point. To examine the parallel regression assumption, we use the Brant test, which is widely used for this purpose [40]. The result of this test shows that the  $p$  value of Model 1 is insignificant (0.256), indicating that Model 1 satisfies the parallel assumption. Additionally, we use the robust estimator of variance to address the potential heteroscedasticity in the ordinal logistic regression models.

**Table 2.** Ordinal logistic regression results for all villages.

Variable	Model 1
MALE	0.099 (0.122)
AGE	−0.001 (0.005)
Level of educational attainment (reference group: ELEMENTARY)	
JUNIOR	0.305 (0.188)
SENIOR	0.285 (0.218)
COLLEGE	0.319 (0.239)
Occupation (reference group: FARMING)	
EMPLOYER	0.588 (1.048)
SALARIAT	−0.169 (0.188)
SELF-EMPY	−0.059 (0.275)
OTHERS	0.115 (0.184)
INCOME	0.174 (0.181)
RENTING	0.177 (0.131)
PERMIT	0.336 ** (0.143)
STORY	−0.140 *** (0.050)
Frequency of community activities (reference group: NEVER)	
ONCE	0.221 * (0.139)
TWICE	0.174 (0.156)
THRICE	0.208 (0.181)
SATISFACTION	−0.121 (0.114)
TRUSTGOV	0.301 *** (0.068)
TRUSTMARKET	0.310 *** (0.066)
TRUSTVILLAGE	0.198 *** (0.070)
Geographical region (reference group: FRINGE)	
INNER	1.031 *** (0.147)
SUBURBAN	0.333 ** (0.154)
<i>N</i>	1083
Prob>chi <sup>2</sup>	0.000
Pseudo R <sup>2</sup>	0.058

Note: \*, \*\*, \*\*\* represent significance at 10%, 5%, and 1%, respectively. Robust standard errors are reported in parentheses.

First, the property factors are shown to have significant impacts on the villagers' redevelopment willingness. The coefficient of PERMIT is positive and significant, suggesting that confirmation of residential land rights can increase villagers' redevelopment willingness. To be more specific, the odds ratio (O.R. =  $e^{\beta}$ ,  $\beta$  is the coefficient of the independent variable) indicates the ratio between the probability of villagers' redevelopment willingness being equal to the level  $j + 1$  and probability of villagers' willingness being equal to the

level  $j$ . The O.R. of PERMIT is 1.40, implying that for villagers who have a residential land use permit, the probability of having higher redevelopment willingness is 40% higher than those who do not have a permit. The negative coefficient of STORY indicates that an increase in the number of stories in the dwelling decreases the villagers' redevelopment willingness. The O.R. of STORY is 0.87, which shows that each increase in the story of villagers' dwellings decreases the possibility of having higher redevelopment willingness by 13%. Hypotheses 1 and 2 are verified in Model 1.

Second, the expectation factors are also significantly associated with the villagers' redevelopment willingness. The coefficients of TRUSTGOV, TRUSTMARKET, and TRUSTVILLAGE are all positive and significant at the 1% level, the O.R. of which are 1.35, 1.36, and 1.22, respectively. These results suggest that for each increase in the level of trust on the villagers' part in the Guangzhou government, market enterprises and the village collective, the possibility of having higher redevelopment willingness will increase by 35%, 36%, and 22%, respectively. Hypothesis 3 is, therefore, also verified. In addition, compared with the villagers who never participate in community activities, those who take part in such activities once a month have a higher level of redevelopment willingness.

Third, the variables related to geographical location also have significant effects on villagers' redevelopment willingness. The coefficients of INNER and SUBURBAN are both positive and significant. These results suggest that compared with the urban fringe villages, which are 15–40 km from the center, the inner villages and suburban villages are more likely to accept redevelopment, thereby indicating that geographical difference is critical in determining villagers' redevelopment willingness. Hypothesis 4 is also verified in Model 1. Given these results, the relationship between geographical differences and the extent to which influential factors are associated with redevelopment willingness warrants further investigation via grouped regression.

#### *4.2. Influential Factors of Redevelopment Willingness of Villages in Different Locations*

In order to further analyze the effect of the geographical locations of urban villages, we perform three subsample regressions, as shown in Table 3. Model 2, Model 3, and Model 4 examine the influential factors of willingness in the inner villages, urban fringe villages, and suburban villages, respectively.

The results of Models 2, 3, and 4 indicate that the most important influential factors for the redevelopment willingness of villagers differ depending on geographical location. The coefficient of PERMIT is significant only in the inner villages (O.R. = 2.26) but insignificant in the urban fringe villages and the suburban villages. In terms of the inner villages, confirmation of residential land rights can promote villagers' redevelopment willingness, Hypothesis 1, therefore, is verified in this village type but disproved in the other two types of villages. The coefficient of another property factor, STORY, is negative and significant in the urban fringe villages (O.R. = 0.74) but insignificant in the inner villages and suburban villages. For each increase in the story of dwelling houses, the possibility of having higher redevelopment willingness decreases by 26% in the urban fringe villages, which suggests that the negative effect of STORY in the urban fringe villages is much stronger than in Model 1. Hypothesis 2 is therefore verified for the urban fringe villages but not for the inner villages or the suburban villages. Although the effect of the number of stories in the dwelling houses is not significant in either the inner villages or the suburban villages, the possible reasons for this result are not the same in these two contexts. In the inner villages, for historical reasons, the villagers have constructed a large number of illegal buildings with the goal of securing rental income. In those villages, the average number of stories in the dwelling houses is 3.72. Given that no compensation is offered for floor area of more than three and a half stories, most of the villagers in the inner villages would bear a significant loss of property if redevelopment were to go ahead. Accordingly, the number of stories does not significantly influence the villagers' redevelopment willingness. In terms of the suburban villages, due to the relatively remote geographical location, the average number of stories is only 2.45 with 91.2% of the dwelling houses being fewer than 3.5 stories.

Hence, almost all the villagers in the suburban villages would be eligible for compensation and gains in wealth in the context of redevelopment. That is, the number of stories in the dwelling houses does not have a significant effect on redevelopment willingness in suburban villages.

**Table 3.** Models 2–4: Subsample regression results of different villages.

Variable	Model 2	Model 3	Model 4
MALE	−0.031 (0.250)	0.271 (0.180)	0.082 (0.256)
AGE	0.019 (0.012)	−0.011 (0.008)	0.005 (0.009)
Level of educational attainment (reference group: ELEMENTARY)			
JUNIOR	0.939 (0.748)	0.034 (0.262)	0.034 (0.345)
SENIOR	0.286 (0.759)	0.296 (0.312)	−0.058 (0.444)
COLLEGE	0.473 (0.794)	0.069 (0.346)	1.171 ** (0.483)
Occupation (reference group: FARMING)			
EMPLOYER	(omit)	0.463 (1.268)	−0.056 (1.678)
SALARIAT	0.478 (0.384)	0.091 (0.260)	−0.927 ** (0.373)
SELF-EMPY	0.883 (0.718)	0.229 (0.436)	−0.895 ** (0.425)
OTHERS	0.600 (0.418)	0.457 * (0.260)	−0.290 (0.322)
INCOME	0.266 (0.224)	−0.043 (0.335)	0.622 (0.417)
RENTING	−0.208 (0.278)	0.552 *** (0.187)	−0.637 * (0.366)
PERMIT	0.814 ** (0.343)	0.289 (0.204)	0.332 (0.306)
STORY	0.109 (0.087)	−0.296 *** (0.074)	−0.106 (0.143)
Frequency of community activities (reference group: NEVER)			
ONCE	0.183 (0.295)	0.340 * (0.196)	−0.108 (0.335)
TWICE	−0.095 (0.323)	0.242 (0.238)	0.703* (0.372)
THRICE	−0.435 (0.356)	0.212 (0.255)	1.000 ** (0.424)
SATISFACTION	−0.342 ** (0.180)	0.154 (0.165)	−0.297 (0.303)
TRUSTGOV	0.291 ** (0.136)	0.325 *** (0.097)	0.106 (0.169)
TRUSTMARKET	0.570 *** (0.180)	0.340 *** (0.092)	0.145 (0.146)
TRUSTVILLAGE	0.089 (0.127)	0.183 * (0.106)	0.316 * (0.183)
N	275	558	250
Prob>chi <sup>2</sup>	0.000	0.000	0.000
Pseudo R <sup>2</sup>	0.074	0.060	0.068

Note: \*, \*\*, \*\*\* represent significance at 10%, 5%, and 1%, respectively. Robust standard errors are reported in parentheses.

With regard to the expectation factors, the villagers' trust in the government, the village collective, and market enterprises also differ in terms of the respective effects on redevelopment willingness across the village types. In the urban fringe villages, the villagers' trust in the government, the village collective, and market enterprises can each significantly increase redevelopment willingness. Hypothesis 3, therefore, is verified in the urban fringe villages, but only partly verified in the inner villages and the suburban



villages. In the inner villages, the villagers' trust in the government and market enterprises can promote redevelopment willingness, and the effect of the latter (O.R. = 1.77) is much stronger than that in Model 1 (O.R. = 1.36). However, the effect of the villagers' trust in the village collective is not significant in this context, which may be attributable to the fact that 82.9% of the respondents in the inner villages had completed the reform from villager committee to resident committee (*cun gai ju*). That is, in order to integrate its urban and rural management systems, Guangzhou reformed its management system for villages in the central urban district in the year 2002, which entailed reconfiguring the village collectives so that they became joint-stock companies and establishing resident committees to undertake the administrative management functions formerly discharged by the village committees. Overall, this reform weakened the influence of the village collectives so that the villagers' trust in the latter had little impact on their redevelopment willingness. However, in the suburban villages, only a high level of villagers' trust in the village collective can increase their redevelopment willingness, and this effect is much stronger in Model 4 (O.R. = 1.37) than in Model 1 (O.R. = 1.22). Overall, the extent of the villagers' trust in the village collective plays a crucial or even a decisive role in the redevelopment of suburban villages.

In addition, some of the other factors also differ in terms of their impacts on the three types of villages. First, the coefficient of COLLEGE is positively significant only in the suburban villages compared with villagers with a lower level of education. Those with a higher level of education are more likely to understand the long-term benefits of redevelopment and are therefore more likely to accept it. However, in the inner villages and the urban fringe villages, due to their locational advantage and higher land values, the villagers, regardless of their education level, are generally aware of the benefits that can accrue from redevelopment. Thus, the educational attainment of the villagers does not have a significant impact on redevelopment willingness. Second, participation in community activities does not have a significant effect on redevelopment willingness in the inner villages but can promote it in both the urban fringe villages and the suburban villages. This effect is especially strong in suburban villages, indicating that social interaction in suburban villages is important in determining the extent of redevelopment willingness. Third, the effect of RENTING is positively significant in the urban fringe villages but negatively significant in the suburban villages. A possible reason is that villages in the urban fringe villages who have rental houses usually have more properties such that they can expect to realize correspondingly greater economic benefits from redevelopment. However, renting out houses is more difficult for villagers in suburban villages. Due to the relative remoteness of suburban villages in relation to the city center, villagers in suburban villages can only take advantage of lower rents to attract low-income renters. In the wake of redevelopment, however, the rent will increase and low-income people would rather find low-cost houses in other villages that have not been redeveloped. Villagers in the suburban villages, therefore, fail to secure rental income.

In general, to a greater or lesser extent, personal characteristics, economic attributes, property factors, and expectation factors all show differences in terms of their effects on redevelopment willingness between the inner villages, urban fringe villages, and suburban villages. Thus, the geographical location of an urban village is a crucial factor to take into consideration in analyzing the redevelopment willingness of villagers.

Further, in order to verify the robustness of Models 1–4, we conducted a sensitivity test by adjusting the classification standards of villages in different geographical locations. We redefined urban villages located within 20 km of the city center as inner villages, those located 20–35 km from the city center as urban fringe villages, and those located more than 35 km from the city center as suburban villages. Based on these definitions, four new models are developed and the results show that the coefficients and significance levels of the main variables remain robust, which verifies the robustness of the above results.

## 5. Conclusions

China has undergone a rapid and extensive urbanization process since the reform and opening-up, which also converted once-rural villages into urban villages on a large scale. As the redevelopment of urban villages becomes a part of national development strategy in China, it is necessary to explore the influential factors of villagers' redevelopment willingness. Existing studies have investigated the effect of personal characteristics [5–7], economic attributes [8], property factors [9] and the redevelopment modes [10–13] on villagers' redevelopment willingness. However, the literature has neglected the heterogeneity of the villages—partly due to a lack of available data.

Based on a questionnaire survey conducted with respondents living in 45 selected urban villages in Guangzhou, we explore the influential factors of villagers' redevelopment willingness. In particular, we focus on geographical variations across three types of villages defined according to the respective distance from the city center. For all the urban villages, the results show that the confirmation of residential land rights has a positive effect on the villagers' development willingness, whereas a large number of stories in the dwelling houses has a negative impact. A high level of trust on the part of the villagers in the government, the village collective, and market enterprises can significantly promote redevelopment willingness. More importantly, we find that geographical distance from the city center causes these influential factors to be significantly differentiated in their effects on villagers' redevelopment willingness. The effect of the confirmation of residential land rights is significant for inner villages but not for urban fringe villages or suburban villages. The number of stories in the dwellings does not have a significant impact on redevelopment willingness in the inner villages or the suburban villages, although it does have the effect of significantly decreasing redevelopment willingness in the urban fringe villages. A high level of trust on the part of the villagers in the government, the village collective, and the market enterprises can all significantly increase redevelopment willingness in the urban fringe villages, whereas only trust in the government and market enterprises can increase redevelopment willingness in the inner villages, and only trust in the village collective is shown to have a significant influence in suburban villages.

## 6. Discussion

This study provides a systematic analytical framework based on prospect theory to examine the influential factors of the redevelopment willingness of villagers. This framework takes the subjective expectation of villagers into account such that it can be used to test the effect of the heterogeneity of urban villages, which is largely neglected in the literature published to date. We find that the geographical locations of urban villages are differentiated in terms of the extent to which the influential factors impact redevelopment willingness. In comparison with villagers living in the suburban villages, those in the inner villages and urban fringe villages are more sensitive to the potential loss of wealth that may result from redevelopment. Additionally, villagers in suburban villages place a higher value on social trust between themselves and the village collective in comparison with villagers in other two types of villages. From a policy perspective, the effects of geographical differences on villagers' redevelopment willingness clearly indicate that China's redevelopment policy should focus on the heterogeneity of villages and appropriately differentiate based on geographical location.

First, confirming residential land rights is a necessary policy if the redevelopment willingness of villagers living in the inner villages is to increase. From the perspective of institutional economics, clear property rights are the premise of an effective market. However, for historical reasons, property rights related to residential land in urban villages are quite complicated and the criteria according to which residential land is allocated differs between villages. The government, therefore, would be well-advised to fully consider the respective history and current reality of the villages and comprehensively confirm rights to residential land, especially in the inner villages.

Second, despite our finding that under strict compensation standards villagers with illegal structures are unwilling to accept redevelopment, the government should continue to uphold such standards. The reason for this recommendation is that the villagers' subjective evaluation of wealth changes can be influenced by the reference point of the value function  $V(\Delta X)$  in prospect theory. For example, villagers might learn of the compensation standards used for other urban villages and compare these with the standards to which their villages are subject. If more compensation were offered to another urban village, villagers will think they are being treated unfairly and refuse to accept redevelopment. Instead of taking their own situation as the reference point, the villagers would take the compensation offered to other urban villages as the reference point in relation to the value function. If the government deregulates its compensation standards, villagers in the urban fringe villages and suburban villages will require the same compensation as given to the inner villages, which the government is unlikely to offer such that the likely result would be a decrease rather than an increase in the villagers' redevelopment willingness.

Third, we suggest that pluralistic cooperative governance be strengthened and villagers' trust in the government, the village collective, and market enterprises be fostered. In order to increase the villagers' redevelopment willingness, it appears necessary for the government to transform its long-established management mindset into a governance mindset as a foundation for simplifying its approval procedures and maintaining stable redevelopment policies. Market enterprises should strengthen their communication with villagers and improve their credibility. As is shown in existing studies, if the local government can gain the villagers' trust and the economic strength of private enterprises is supported, the redevelopment process can be much smoother [41]. These two points are especially important in the context of the inner villages. The village collective should, therefore, take steps to improve grassroots governance, to hold and ensure the integrity of democratic elections, and to provide transparent collective economic management, especially in suburban villages. One of the key factors affecting villagers' trust in the village collective is clan force, which constitutes an informal power situated between the villagers and village collective. Clan force may help to mediate between opposing interests and promote villagers' redevelopment willingness but may also cause conflicts of interests and result in a decrease in the villagers' redevelopment willingness. How to avoid the negative effects of clan force and maximize the positive effects of increasing redevelopment willingness is an important question that is worthy of study both by scholars and the government.

Fourth, since the education attainment and community activities significantly increase redevelopment willingness in suburban villages, it is suggested that the villagers' risk management ability be improved and social interaction in the suburban villages be promoted. In the face of rapid urbanization processes, the original traditional villages are forced to transform into urban villages, but the villagers' ability to manage risk still remains limited. Villagers have been conditioned to be risk-averse over thousands of years of a small peasant economy in China such that they do not show signs of being able to adapt to a complicated urban environment in which they must, make risky choices. This situation is evident in suburban villages in particular but can be remedied by higher levels of education and participation in community activities, both of which can serve to increase redevelopment willingness. Based on our results, we suggest that the government hold lectures, run community colleges, and organize community activities to help villagers gain a new understanding of the relationship between government, market, and society and to support them in apprehending and managing risk in the new urban environment they are faced with.

The redevelopment willingness of urban villagers is an important but complex academic problem. This paper offers a systematic analytical framework based on prospect theory that is able to comprehensively examine the influential factors of redevelopment willingness. Based on this, we put forward some proposals for future studies. First, whether villagers' decision-making is or is not rational is a longstanding subject of debate in the

literature. One school of thought is of the opinion that farmers lack the desire to accumulate profits and prefer to minimize costs rather than maximize benefits and therefore usually behave irrationally [42–44]. However, others have expressed the opposite opinion [45,46]. Because the framework we proposed considers villagers' subjective cognition, it may help future studies to analyze villagers' irrational behaviors in the face of redevelopment by exploring the difference in the value and weighting functions between villagers. Second, our findings provide useful insights into how the heterogeneity of urban villages affects villagers' redevelopment willingness. To advance in this investigative direction, researchers could draw on different classification methods to account for more effects associated with the heterogeneity of urban villages and thereby contribute to our understanding of villagers' redevelopment willingness. Third, we choose Guangzhou, one of the most developed cities in China, as the case city. Further empirical investigations based on more cases, especially in less-developed cities in the western and northern areas of China, are needed.

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