AN ANALYSIS OF PARTICIPATION AND WILLINGNESS TO SELL OF FARMERS IN AN URBAN VILLAGE REMOVAL PROGRAM -- A CASE STUDY IN ZHOUSHAN, EASTERN CHINA -

Land expropriation and compensation

A Thesis

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ABSTRACT

Urban villages, lying on the outskirts of Chinese cities, are being replaced by apartment buildings and infrastructure as rapid urbanization expands the boundary of urban land. Using Zhoushan, an island city in China as a case study, this paper examines the determinants of farmers' reservation price based on real options theory and their level of satisfaction towards the compensation they received from the government-oriented urban village removal program. The data collected from 214 surveys in 3 urban villages illustrate that villager's reservation price is associated with factors like the year of the house built, ease of conversion, and socio-demographic characteristics after using the double-hurdle model. The result can potentially be a reference for the improvement measures on the wellbeing of the farmers and future city planning, and contribute to the literature of land economics by providing insights on individual farmer's perception towards their land and property.

Keywords: urban village, real option model, double-hurdle model, reservation price

BIOGRAPHICAL SKETCH

Qiyu Li received her B.A. in Economics from Davidson College in 2019. She then continued her graduate study in Applied Economics and Management with a concentration in International Economics and Development at Cornell University. Her research interests are in international economics and development, and urban economics.

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I. INTRODUCTION

An urban village in China, also called *chengzhongcun*, is a type of informal settlement built in two areas: the outskirts or center area of the city (Liu et al. 2010). These villages, built by individuals or developers decades ago, are usually occupied by lower-income households, many of whom were active or raised in agriculture. As rapid urbanization spreads throughout the entire city, urban villages now are surrounded by modern urban constructions. The existence of underdeveloped urban villages is believed to harm overall city image and interfere with city planning and economic growth. Rightly or wrongly, urban villages are often associated with hygiene and safety issues. Estimates show that urban villages can generate an average 2.5 percent housing price depreciation on nearby properties and bring 3.3 - 4.3 percent housing price appreciation in Beijing (Zhang et al. 2016). Although the effect may not be as significant due to much less population in Zhoushan, the government-oriented urban village removal project has become part of the major municipal task for several decades.

To facilitate urbanization, the Chinese government has developed countrywide “urban village removal programs". This removal completely demolishes everything within the designated boundary (see Figure 1) and replaces it with new residential areas and commercial complexes (Wang 2019). In order to accelerate the transformation of Zhoushan city while protecting the legitimate rights and interests of the parties, the implementation plan is formulated according to the regulations on the actual situation of the block, in combination with Expropriation and Compensation of Houses on

State-owned Land and relevant laws, which states the expropriation and compensation of houses shall follow the principles of democratic decision-making, proper procedure and open results, and the property owners should be fairly compensated during expropriation. The villagers are informed of the relocation address, resettlement property delivery time, rules of property value evaluation, and three options for compensation, including cash for property, property for property, and a mix of the two[1]. An excerpt from the urban village removal handbook disseminated to villagers in Gongnong Road block, Zhoushan City states: " … I. Removal area: from Gongnong Road to West Huancheng Road, including all houses and auxiliary infrastructure… The compensation methods are property rights exchange and monetary compensation. Relocation address: Wengshan Xincun block… Resettlement property will be delivered within three years of urban village removal… Property rights exchange rules: 1) The building area of the original house and the building area of the resettlement house shall be evaluated by the real estate appraisal agency according to the market price of similar real estate, and the difference shall be settled according to their respective appraisal price. 2) It is allowed to purchase the resettlement house, and for the area not exceeding 50% of original the house, the price is settled at 38% of the assessed price of the resettlement house. 3) Due to the house types, if the area of the resettlement house is no more than 150% of the original house area, the insufficient area is compensated by 3000 CNY/m^2. 4) Temporary resettlement subsidy… (see

[1] Cash for property means the government pays an equivalent amount of cash for a property being removed; property for property means the compensation payment is in a form of assigning new resettlement property for a property being removed; a mix of two means the farmer can choose a combination of cash and property with equivalent value to the property being removed.

more policy in the Appendix). After acquiring the compensations, the villagers' behavior can be categorized into four types:

1) keep all compensations,
2) sold/plan to sell one or more properties,
3) lease compensated properties to someone, and
4) use compensated cash to buy new properties.

Figure 1. An example of a removal map in Dinghai District, Zhoushan

Out of 91 farmers who participated in the removal program in the survey, 16 claim they received total compensation lower than their reservation price, and among these 16 farmers, only 2 indicate they joined the program involuntarily. Most farmers agree they were willing to move away from their house due to the fact the relocation neighborhood provides a shelter of higher quality, complemented with better facilities and living environment. According to my survey, which is provided in greater detail

later, the majority of urban villagers are/were satisfied with the compensation, with only 4.40% choosing all cash as their compensation, 65.93% all property, and 34.07 both as presented in Table 1. Compensation type "all property" is favored by more than half of the urban villagers. "Exchanging property for property is more worthwhile as it offers more actual value than the other two types of compensation", explained one urban villager.

Table 1: Types of Compensation Chosen and Participant's Behavior

Compensation type	Percentage
All cash	4.40
All property	61.54
Cash and property	34.07
Participant's behavior	**Percentage**
Keep all compensations	49.45
sold/plan to sell one or more properties	16.48
Lease compensated properties to someone	4.40
Use compensated cash to buy new properties	18.68

Almost 50% of respondents claim they keep all the compensation (Table 1). Although plenty of farmers stay in their compensated houses, usually with their original neighbors living in the same community, there is another group of farmers aiming for an alternative use of their compensations. 16.48% sold one or more compensated properties, 4.40% lease the compensated properties to someone, and 18.68% used cash to buy one or more new properties. This further confirms the common belief shared by most farmers that trading for a property is a more optimal choice from the perspective of value preservation and cash-generating ability. When they responded to the reasons why they used the compensated properties as a method of earning cash, they expressed the intention of purchasing new properties in regular residential areas that differ from

the relocation area. The relocation neighborhood is similar to affordable housing, though comfortable enough to live in, but does not offer the same house appearance, environment, and geographical advantages as those commercially developed districts. For example, one advantage that most relocation areas do not possess is access to more prestigious elementary and middle schools. As of now most school-age children in Zhoushan go to public schools which require the attending student's registration location, also called "*hukou*", belongs to the corresponding school district, and the registration location is associated with their house location. Therefore, for the sake of their children and grandchildren, many urban villagers are inclined to purchase houses that offer more benefits after acquiring sufficient funds.

This paper focuses on the peri-urban villages in Zhoushan city, which are mostly owned by farmers. These villages have distinct characteristics: relatively low relocation cost and easy conversion between the agricultural land and capital projects. Extensive studies have analyzed urban villages in China from a macro perspective, such as spatial analyses of urban village's development (Kochan 2015, Hao et al. 2013), and rental cost of urban village inhabitants -- migrant workers (Zeng et al. 2019). While the benefits that removal programs bring are evident (Cai 2020, Li 2014), few studies have investigated removal programs from individual farmers perspectives and their satisfaction with the program.

An important economic question is whether villagers have the right to voluntarily participate in the program, and if so does this flexibility bring about real option value.

If farmers acquire a real option as a consequence of the program, does the compensation fulfill their reservation price for their property? This study uses city-wide surveys to collect data and information on two groups of farmers: farmers who participated in the program and those that did not. The results, drawn from farmer's choice of compensation and their subsequent behavior, are critical to understanding socio-economic implications on farmer's opinions on what is the best for their well-being, as well as the government's future city planning.

II. LITERATURE REVIEW

2.1 Impacts of Urban Villages

Urban villages are a phenomenon peculiar to China, which stems from China's unique land ownership system and the accelerating process of rapid urbanization (Zhou 2014). The urban villages have always been associated with "dirty, messy, poor" communities and have even been directly referred to as "slums" in Chinese cities (Jiang 2017, Yang 2002). Usually, each property is composed of a self-built multi-story house and a yard. Properties are in close proximity to each other resulting in localized , high population densities. The villages are often described as having narrow and uneven roads, and poor infrastructure. These characteristics indicate that urban villages urgently need a transition in every perspective. Despite the fact that urban villages are well-managed and have their own organization (Aldous 1995), Liu (2010) states in her study that the opinions on urban villages in China are below par among the media, the government, and academia. In addition to the government's need to utilize land for urbanization and reduce the negative externalities imposed by urban

villages, the demolition of urban villages is inevitable. Their removal under the government-oriented program appears to produce a positive spillover effect on increasing the home values of the surrounding neighborhoods. (Zhang et al. 2016).

2.2 Current Situations of Farmers

Despite the fact that villages in Zhoushan have undergone numerous changes over the past decades and are situated between rural society and urban society, they can still be characterized as a "collective economy and grassroots organization" just like other villages throughout China (Liu et al. 2010). However, rather than how most urban villages are described in other cities such as Shenzhen (Hao 2011), in which they provide shelters for migrant workers and have issues associated with these rural immigrants, villages in Zhoushan mostly remain inhabited by indigenous farmers. Hence, they have a solid grasp of the value of their land and a strong emotional attachment to their birthplace.

Although farmers were free to retrofit the farmland allocated to them based on the headcount in each family, they were required to pay a fixed amount of rent, also called agricultural tax, in the form of crops to the government because all land is state-owned (Ho 2001). In the early 2000s, the agricultural tax was revoked and farmers no longer bear the responsibility unless farmers rent extra land from the local village committee (Gale 2013).

The economic reforms since 1978 have contributed to economic growth, but they also expanded the urban-rural disparities and living standards (Zhang et al. 2020). To mitigate these inequalities, a series of policies were implemented for rural revitalization. “Town-based urbanization” allowed conversion of agricultural to non-agricultural *hukou* for rural residents, developed land reforms that enabled farmers to sell their farming rights to other farmers, and promoted industrialization in towns. “Balanced development” placed a much stronger focus on integrating strategic towns into metropolitan economies (Chaoui et al. 2009). Urban village removal is part of the plans to accelerate the process of urbanization. The removal programs are implemented country-wide, and it is estimated that China has around 50,000 urban villages (Chong 2020). There are three measures to transform the villages in the City of Zhoushan, including village demolition and construction, village renovation, and a combination of demolition and integration. Beijing implemented the program on 171 urban villages from 2006 to 2010 and has 100 more remaining (Zhou 2018). Starting from 2018, some cities such as Shenzhen shifted towards a milder approach which preserves a certain amount of urban villages as a way of supplying affordable housing. 41 Out of the 54 urban villages in Zhoushan will adopt the first option which will demolish and rebuild the whole village according to the requirements of the urban master plan, and the villagers will be resettled through monetization (Zhoushan Daily 2017). The goal is to transform the urban villages into areas with higher production, improved standards of living, and effective governance that will be better integrated into the urban city (Zhang et al. 2020).

2.3 Double Hurdle Model

The model used in this study is the double-hurdle model. Introduced by Cragg (1971), the double-hurdle model consists of two stages: the first hurdle establishes the type of the participant, in which a participant would be a zero type if not participating, and the second hurdle embodies the "the extent of participation given that the individual is not a zero type" (Engel et al. 2014). Prior studies have demonstrated the effectiveness of such a model when handling samples with two distinct characteristics. In the cigarette consumption case, Jones (1989) has derived the likelihood function of the double hurdle model and proves the significance of dividing the participants based on their decisions, separating the "non-starters" from the "quitters" due to their inherent difference, and therefore, more precisely building the models for individual's choice. Another paper on tea consumption has gained crucial insights into the impacts of demographic variables on tea drinking and consumption quantity for different genders using the double-hurdle model (Chen et al. 2020). The finding is that variables such as age, family size, and having elderly individuals in the home are the key differences behind the driving factors of male's and female's tea consumption. The same model is also applied in the case of a proposed capacity reduction program in the Atlantic shark fishery (Musengezi et al. 2006). Musengezi examines shark permit owners' willingness to sell for their permits and vessels. Through the double-hurdle model that separates the owners by their choice of selling or not selling, Musengezi is able to understand permit holders' preferences in the permit buy-back program and draw underlying motives of their willingness to sell. Preference results that combine holders' socioeconomic and demographic factors along with vessel characteristics

indicate the essential aspects that the program managers need to consider during the planning phase of the program.

Since in this study the participants can be separated into two groups by their choice of participation in the urban village removal program, it would be reasonable to adopt the double hurdle approach to further pinpoint the extent of farmer's willingness to sell their property to the government. The real option model by Capossa and Helsley (1990), which is discussed in greater detail in Chapter III, also supports such a claim, but this study also considers household level hedonic values in the utility function, not just economic reservation prices based on profit maximization. The participants and nonparticipants own different land rents, and thus, perceive different land values based on the types of the land, this distinction is incorporated into the model.

III. CONCEPTUAL FRAMEWORK

In this section I introduce the concept of real options as it applies to urbanization efforts in China. The real option, an economically valuable right to take or abandon some tangible assets-related choice that is available to them (Investopedia), occurs in the urban village removal program. The farmers have the right to trade their properties and land for compensation by participating, and they also have the right to maintain their properties and prevent any loss by not participating. Once the farmers decide to participate in the removal program, they forego everything associated with the property and the land, and this change is irreversible. If the government covers the loss, that is, the compensation is above farmers' reservation price, they will exercise

their right to trade for the assets and agree to participate in the program. Hence, the real option model by Capozza and Helsley (1990) is used as a foundation of reservation price evaluation by the farmers. Capozza and Helsley point out the urban land prices can be determined by the present value of agricultural rent, cost of conversion, the value of option, growth premium, and value of accessibility as shown in Figure 2, and urban land prices can be estimated by using

$$p^{u}(t,\ z)\ =\ \frac{A}{r} + C + \frac{g}{r^{2}} + \frac{r-\alpha g}{\alpha r^{2}} + \frac{1}{r}[z^{*}(t)\ -\ z],\ z\ \leq\ z^{*}(t) \qquad (1)$$

where *P(t, z)* denotes the estimated price of the land, $\frac{A}{r}$ denotes the present value of agricultural rent, *C* is the cost of conversion, $\frac{g}{r^{2}}$ is the growth premium, $\frac{r-\alpha g}{\alpha r^{2}}$ is the irreversibility term that captures the difference between reservation rents under certainty and uncertainty, and $\frac{1}{r}[z^{*}(t)\ -\ z]$ is the value of accessibility that describes the distance between the property and the urban boundary at time *t*.

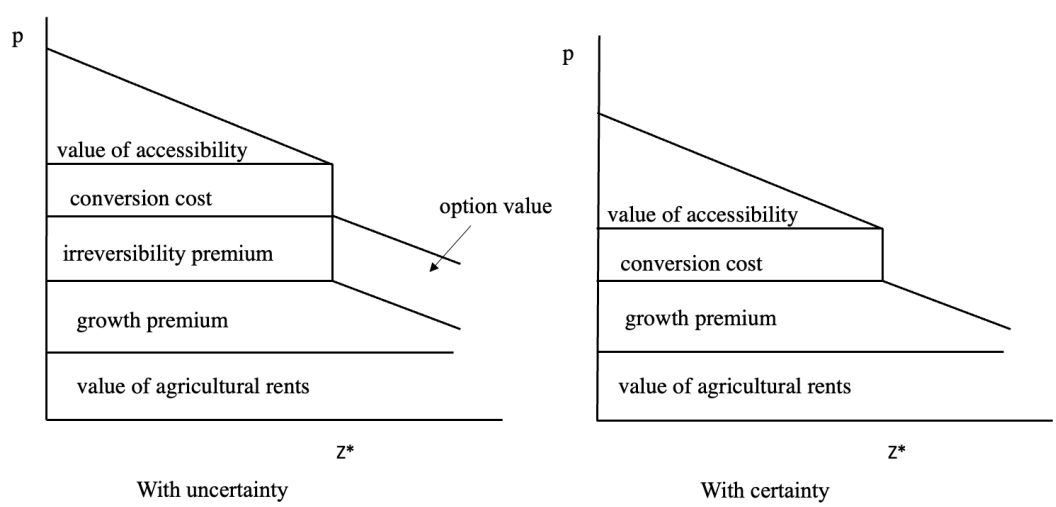

Figure 2 Land price models

Farmer's choice of agreeing to convert their land to urban use could be postponed because the opportunity cost of this choice includes an option value: "the value of the ability to avoid adverse outcomes in the risky urban land market while still retaining a claim on favorable outcomes" (Capozza et al. 1990), which is exactly the real option that farmers encounter in the program. The real option, also called the irreversibility premium, includes the hedonic values like emotional attachment, the geographical advantages of the property, and the characteristics of the property in this study. Thus, the land rent is summarized as in the equations below according to the real option model:

$$R(t,z) = \begin{cases} A + rC + \frac{r - \alpha g}{\alpha r} + z^*(t) - z & z \le z^*(t) \\ A & z > z^*(t) \end{cases}$$

Where farmers who decide to convert to urban land is described in the first equation, and they bear conversion cost C, option value $\frac{r-\alpha g}{\alpha r}$ and value of accessibility $z^*(t) - z$ in addition to the agricultural rent A, whereas the farmers who do not in the second equation only pay the agricultural rent A. Since the existence of the option value motivates farmers to evaluate their land differently, and thus, separates them into two groups: the participants and nonparticipants, this separation matches the economic model adopted by this paper -- double-hurdle model. It involves two phases in which the first phase splits the individuals by their decision to participate in a program as mentioned in Section 2.3.

The reservation price, which is the lowest price that urban villagers are willing to sell their properties at, is analogous to the land price they evaluate in this thesis. Loss aversions (Genesove 2001), desired move date (Glower et al. 1998), and other variations have impacts on the seller's selling price. In this study, the reservation price consists of factors like agricultural rent, access to water, medical centers and schools, ease of conversion and income growth, characteristics of the property that corresponds to the terms in equation (1), and hedonic values such as neighborhood relationships that belong to the option term. The reason why hedonic value is also considered is that Rosen (1974) formulated a framework based on the hedonic hypothesis that "goods are valued for their utility-bearing characteristics" and hedonic prices comprise an implicit value of attributes. Another study by Schaerer (2007) also takes the hedonic approach to evaluate the natural land uses. The factors including monthly rent, structural characteristics of the dwelling, environmental characteristics, and accessibility to land use in his model, are similar to those in this paper.

IV. METHODOLOGY

4.1 Survey Design

This study uses city-wide surveys to investigate the following question: are/were the farmers living in urban villages willing to accept the program and for which price would they sell their property voluntarily to the government? Due to the impact of COVID-19 and restricted traveling, the survey was distributed both online on

Qualtrics and in-person in one urban village and two relocation communities[2]. The participants were self-selected into the study either through Qualtrics or paper survey and were asked to answer the questions as precisely as possible. A paired mean test is conducted to reveal the respondents who attended through Qualtrics are similar to those who answered the paper survey (Table 2), and none of the means are statistically different. Hence, self-selection bias does not pose much threat to the results of this study. Following the real option model in Chapter 3, all variables, including hygiene of the community, the value of neighborhood relationships, how the property was built, the expected cash flow of the agricultural land by the time of the removal program, etc. were acquired through the survey. The participation decision was divided into three types: participated voluntarily, participated involuntarily, and did not participate, as all properties within a community would have to be demolished if the overall community agreement rate reaches above 93%[3] or above, even though there are still 7% of the inhabitants refuse to participate.

Table 2: Paired mean test by survey types

	Paper survey	**Qualtrics survey**	**Total**	**P-value for paired mean test**
Number of respondent	181	33	214	
	Mean	Mean	Mean	
Number of floors	2.57	2.36	2.54	0.90
Area of yard	3.88	4.18	3.93	0.21
Area of agricultural land	2.05	2.12	2.06	0.40
Year of house built	2001	1996	2000	0.98
Years of farming	9.19	9	9.16	0.56
Farmland income	4006.63	2647.27	3797.01	0.79
School district	0.55	0.52	0.54	0.63
Rent paid	420.50	186.67	384.44	0.85

[2] Relocation communites refer to neighborhoods built for the purpose of relocating the farmers who join the urban village program.
[3] The exact number varies across different villages, e.g. some villages may need to reach 95% The benchmark is set by the urban village removal program committee.

Rent received	42.43	29.70	40.47	0.72
Risk-adjusted discount rate	2.90	3.15	2.94	0.23
Reservation price	238.01	215.09	234.48	0.81
Income	3.30	3.36	3.31	0.41
Age	61.92	62.03	61.93	0.48
Education	2.96	2.94	2.95	0.53

Zhoushan, a city on the southeast side of Shanghai, is an archipelago with six major islands. Spatial qualities vary across the three villages. Figure 3 displays the relative locations of the three urban villages surveyed: the undemolished urban village is outlined in the left red circle, and two other resettled urban villages are in the middle and right circles. The undemolished urban village (figure 4) is situated on a small island close to one of the major islands. Although right next to a port, this urban village has limited access to infrastructure and services since the island aims to establish residential towns and so far the development only focuses on property construction. The other two resettled urban villages (figure 5) are located more inland on the major island. The resettled urban village in the middle red circle is now replaced by a high school and apartment complex, and the indigenous farmers are relocated to different resettlement communities across the district. The last urban village in the right red circle is replaced by an elementary school, a bus station, and residential apartments, and the farmers moved to the resettlement properties in the blue circle. Even though the two resettled urban villages now live in the highly urbanized districts, they experience much more adverse conditions before the program than the undemolished village in this survey.

Figure 3 Locations of three urban villages

Figure 4 Undemolished urban village

Figure 5 Resettled urban villages (in blue) and their original locations (in red)

4.2 Data

214 responses were collected from three urban villages with a total of around 500 residents in Zhoushan. Some options for questions include “yes”, “sometimes/ take some time”, and “no”, and dummy variables are used in the process of data manipulation. For example, three variables “water_ease”, “water_medium”, and “water_diff” are generated for the question “did you have easy access to clean water?”, and “water_ease” has a value of 1 if the participant chose “yes”, otherwise 0. A similar method is applied to the other variables. For options that contain a range, eg. level of annual income, 1 represents < 1000 CNY. See the survey in the appendix for reference. There are a few missing data for variables such as gender, age, and education, and they are filled with the mean value of the corresponding variables of the group of participants they belong to. Two responses of “not willing to sell " are

observed under the farmer's reservation price, and thus, the value of “999” is assigned to those responses.

43% of the respondents joined the program, among which 6 villagers indicated they “participated involuntarily”, and 57% have not joined the program yet (Table 3). The mean number of floors between the two groups is similar, with an average of a 2.5-story house per person. Farmers who participated have around 1 square meter higher average area of the yard and 1.35 mu[4] higher average area of agricultural land. All participants’ perceptions towards their geographic features are consistent: easy access to water, relatively easy access to medical centers, and public transportation. Approximately 50% of the farmers indicate they do not live in a school district and they have their relative’s tomb near their houses. On average, both groups believe they stay in a moderately clean neighborhood with good security, and they value relationships with neighbors a moderate amount. One issue here could be non-linearity, as out of the four levels given: “a great deal”, “a moderate amount”, “a little” and “none at all”, the impact of changing from “none at all” to “a little” may have a much larger impact on farmer’s reservation price than changing from “a moderate amount” to “a great deal”. 91.12% of all participants indicate their houses were self-built, but the average year of the house built differs by 21 years: farmers who joined the program had their house built in 1988 whereas farmers who did not build in 2009. As shown in Figure 6, the year of the house built varies from 1970 to 2019, and it appears to concentrate on 1985 - 1995 and 2015 - 2020. Such

[4] 1 mu ≈ ⅙ acre

phenomenon can be explained by the pattern that urban villagers who had their house demolished, which mostly happened between 2005 - 2009, usually built their houses in the 80s and 90s, whereas those who have not joined the program understand the amplifying effect of house renovation[5] on the amount of compensation they will receive. Therefore, a large number of farmers managed to revamp their houses in the 2010s before the program took place.

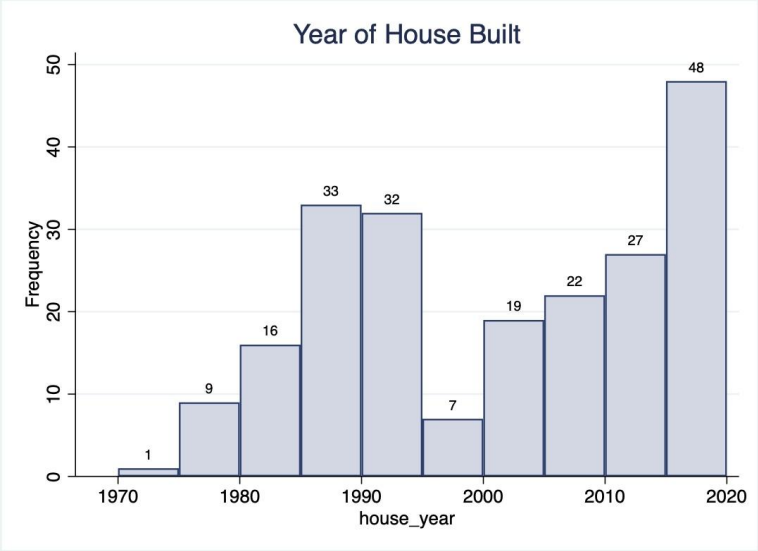

Figure 6 Year of house built

Table 3: Summary statistics for demographic and behavioral variables

	Farmers joined the program	Farmers did not join the program	Total	P-value for paired mean test
Number of respondent	91	123	214	
	Mean	Mean	Mean	
Number of floors	2.45	2.59	2.54	0.19
Area of yard	4.48	3.52	3.93	0.00
Area of agricultural land	2.84	1.49	2.06	0.00
Year of house built	1988	2010	2000	0.00
Years of farming	11.8	7.20	9.16	0.00
Farmland income	4783.85	3066.91	3797.01	0.16
Rent paid	426.67	353.20	384.44	0.66
Rent received	49.29	33.94	40.47	0.31

[5] House renovation here stands for completely re-build the house, including the exterior and the interior.

Risk-adjusted discount rate	3.33	2.65	2.94	0.00
Reservation price	144.43	293.69	234.48	0.00
Income	2.57	3.86	3.31	0.00
Age	68.15	57.33	61.93	0.00

	Percentage to the respondent of this group	Percentage to the respondent of this group
Easy access to water	93.41%	91.87%
Easy access to medical center	60.44%	47.97%
Access to public transportation	42.86%	56.91%
In school district	48.35%	58.54%
Have tombs nearby	51.65%	44.72%
Neighborhood is safe	86.81%	82.11 %
Neighborhood is clean	65.94%	58.53%
Neighborhood relationship not important	2.20%	13.01%
Income grows fast	2.20%	8.13%
Easy conversion	72.52%	67.48%
Female	31.87%	56.91%
Education		
Elementary school	16.48%	10.57%
Middle school	49.45%	20.33%
High school	19.78%	14.63%
Some college	8.79%	29.27%
Bachelor's degree	5.49 %	25.20 %
Time of participation		
2005 - 2009	75.82%	0%
2010-2014	15.38%	0%

The average rent paid by the farmers to the government or local village committee is almost ten times the average rent that farmers received. Such a drastic difference is due to the cancellation of agricultural rent in the early 2000s. Figure 7 indicates the majority of participants experienced rent lower than 100 CNY or cannot recall the precise amount. The rent, paid in crops, is usually worth less than 100 CNY, but the mean is impacted by those who now formally rent over 4 mu of farmland and pay a

significantly more amount of rent to their local village committee. The rents received by the farmers cluster in the range of 0 - 500 CNY, which has been rather consistent throughout the time because these transactions usually happen in an informal setting: farmers are more prone to casually lend their free land to the neighbors with oral agreement and charge a farmland rent much lower than the market price, rather than filing official transfer documents.

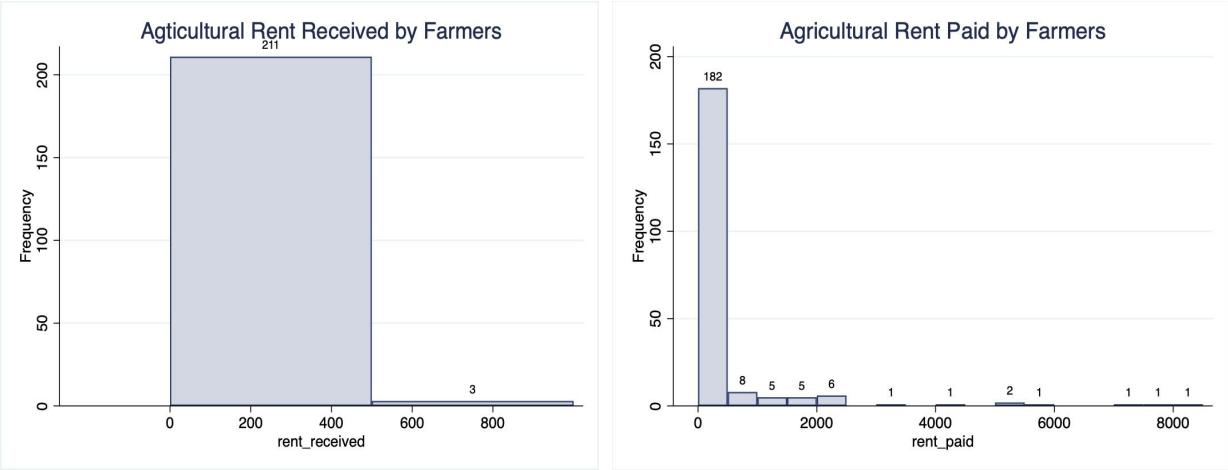

Figure 7 Agricultural rent paid and received

Farmers who did not participate in the program are less likely to be risk-averse. This can be justified by the socio-demographic characteristics of the group. Previous studies find that education, wealth and age are influential on investor's risk tolerance: investors that are younger, receive higher education, and possess more wealth are more risk-taking (Dorresteijn 2017, Oztop et al. 2020, Halek et al. 2001). The average age of nonparticipants is 57 and the participants is 68, and the level of income and education received by the nonparticipants are higher than the participants. Therefore, it is reasonable to assume the non-participants are more likely to accept higher risks in investments in exchange for higher returns.

4.3 Econometric Framework

Stemmed from the real option model, the distinction between the farmers proposes the double-hurdle model could be a good fit. The double-hurdle model has two processes: the first hurdle is participation decision, which defines whether the farmers participated in the urban village removal program; the second hurdle, given participation decision is yes, is the payment decision which can take on any price level. There is no fixed order between the two processes and they are independent of each other.

The first hurdle is described as in equation (2) below,

$$\begin{aligned} D_i &= \alpha Z_i + u_i \\ &= \alpha_1 * school\_dis + \alpha_2 * hygiene + \alpha_3 * house\_year \\ &+ \alpha_4 * neighbor\_relationship + \alpha_5 * ease\_conversion \\ &+ \alpha_6 * gender + \alpha_7 * education + \alpha_8 * time\_particip + u_i \end{aligned} \quad (2)$$

where D_i is a latent variable describing the participation decision, the value of which is 1 if the farmer participated and 0 otherwise, u_i has normal distribution with mean of 0 and variance of 1, Z_i is a vector of explanatory variables that are related to the discrete participate/nonparticipate decision and α is a vector of parameters.

The second hurdle consists of

$$
\begin{aligned}
y_i^* &= \beta X_i + e_i \\
&= \beta_1 * num\_floor + \beta_2 * area\_agland + \beta_3 * farmland\_years \\
&+ \beta_4 * school\_dis + \beta_5 * hygiene + \beta_6 * water\_ease \\
&+ \beta_7 * water\_med + \beta_8 * med\_ease + \beta_9 * med\_medium \\
&+ \beta_{10} * house\_year + \beta_{11} * neighbor\_relationship \\
&+ \beta_{12} * rent\_out + \beta_{13} * rent\_in + \beta_{14} * income\_growth \\
&+ \beta_{15} * mean\_r + \beta_{16} * ease\_conversion + \beta_{17} * gender \\
&+ \beta_{18} * monthly\_inc + \beta_{19} * education + \beta_{20} * age \\
&+ \beta_{21} * time\_particip + e_i
\end{aligned} \tag{3}
$$

$$
y_i = \begin{cases} y_i^*, & if\ y_i^* > 0\ and\ D_i > 0 \\ 0, & \text{otherwise} \end{cases}
$$

Where y_i is the revealed reservation price for individual i, y_i^* is the corresponding latent value of individual i's actual reservation price, e_i has a normal distribution with mean of 0 and variance of σ^2, X_i is a vector of the individual's characteristics and β is a vector of parameters.

The log-likelihood function for the double-hurdle model is estimated by the following equation (Engel et al. 2014)

$$
LL = \sum_0 ln[1 - \Phi(X_{1i}^{'}\beta_1)\Phi(\frac{X_{2i}^{'}\beta_2}{\sigma})] + \sum_+ ln[\Phi(X_{1i}^{'}\beta_1)\frac{1}{\sigma}\phi(\frac{t_i - X_{2i}^{'}\beta_2}{\sigma})]
$$

Where Φ and ϕ are the standard normal probability and density functions, σ and β are parameters for each model (Wodjao 2007). Two double-hurdle models will be applied in this paper -- Cragg's double-hurdle model and Engel's double hurdle model. For Cragg's double-hurdle model, *Xi'* represents the independent variables for the Probit

model and the Truncated regression model, respectively. For Engel's double-hurdle model, Xi' represents the independent variables for the Probit model and the Tobit model.

V. EMPIRICAL RESULTS

To reduce multicollinearity, not all variables acquired from the survey are included. As shown in Table 4 that exhibits the empirical specifications, variables are selected based on the components in Capozza's real option model and the characteristics of the property. For example, *ease_conversion* corresponds to cost of conversion C in equation (1). Recent agricultural rent paid and received, that is, agricultural rent value above 100 CNY, and discount rate are chosen and are converted into binary variables. The regression only considers agricultural rents from recent transactions due to the extremely low rent that farmers pay to the government from decades ago, and thus these rents can potentially deviate the coefficient estimate from its normal level and cannot serve as an appropriate reference point. Similarly, the cost of conversion C and income growth premium $\frac{g}{r^2}$ have corresponding variables *ease_conversion* and *income_growth.* The irreversibility term $\frac{r-\alpha g}{\alpha r^2}$ that represents the difference between reservation rents under certainty and uncertainty is assumed to be highly irreversible. The value of accessibility $\frac{1}{r}[z^*(t) - z]$ is measured by variables such as *school_dis, hygiene, water_ease,* and *med_ease.*

Table 4: Empirical specifications and correlation prediction

Terms	Corresponding variables	Empirical Specification	Predicted correlation
P	*low_sellPrice*	Reservation price	
$\frac{A}{r}$	*rent_in*	The present value of agricultural rent and Risk-adjusted discount rate	+
	rent_out		+
	mean_r		-
C	*ease_conversion*	The cost of conversion	-
$\frac{g}{r^2}$	*income_growth*	The growth premium	+
$\frac{r-\alpha g}{\alpha r^2}$	/	The irreversibility term is assumed to by highly irreversible	
$\frac{1}{r}[z^*(t) - z]$	*water_ease*	The value of accessibility	+
	water_medium		+
	med_ease		+
	med_medium		+
	hygiene		+
	school_dis		+
Elements of Property	*farmland_years*	Years of farming	+
	num_floor	Number of floors per property	+
	area_agland	Area of agricultural land	+
	neighbor_relationship	Relationship with neighbors	+
Demographic characteristics	*gender*	Gender	+/-
	monthly_inc	Monthly income	+/-
	education	Level of education	+/-
	age	Age	+/-

Predicted correlations, listed in Table 4, are inferred by the marginal effects of each term. For instance, the real option model suggests $\frac{dP^u}{dC} = 1$, meaning an increase in capital cost will result in a constant price rise, while the model expects an increase in

risk-adjusted discount rate $\frac{dP^u}{dr} = \frac{-\alpha(Ar+4g+r(z(t)-z))+r}{\alpha r^3} < 0$ will lead to falling land prices. Predictions regarding elements of the property and socio-demographic characteristics are more intuitive: increasing *farmland_years* and *neighbor_relationship* contribute to additional emotional value, and more *num_floor* and *area_agland* are associated with higher property value.

The results shown in Table 5 are based on two double hurdle models by Cragg (1971) and Engel and Moffatt (2014). In both models, the magnitude and the signs of the coefficient estimates, chosen according to the land price model by Capozza, are similar. This indicates the estimates are consistent across the two models. Since the coefficients in *churdle* model cannot be directly used for interpretation, marginal effects are applied to each coefficient to demonstrate the impact of each variable when it changes from its base level, holding all other explanatory variables constant.

Table 5: Regression results of double hurdle models

Variable	*churdle*	Marginal effect	*dhreg*	Marginal effect
num_floor	10.89	9.004	9.317	9.317
	(10.01)	(1.09)	(8.831)	(8.831)
area_agland	7.276	6.018	5.385	5.385
	(9.954)	(0.73)	(8.350)	(8.350)
farmland_years	0.360	0.298	0.220	0.220
	(1.353)	(0.27)	(1.180)	(1.180)
school_dis	17.77	43.00	18.10	18.10
	(17.07)	(0.05)	(14.44)	(14.44)
hygiene	17.69*	14.06	15.15*	15.15*
	(10.13)	(1.49)	(8.688)	(8.688)
water_ease	129.5	107.1	116.0*	116.0*
	(83.67)	(1.55)	(68.70)	(68.70)
water_med	123.3	102.0	108.3	108.3
	(86.46)	(1.43)	(71.47)	(71.47)
med_ease	-38.93*	-32.20	-33.56*	-33.56*

	(22.41)	(-1.74)	(19.66)	(19.66)
med_medium	25.92	21.44	19.19	19.19
	(18.75)	(1.39)	(16.16)	(16.16)
house_year	3.796***	3.351***	3.344***	3.344***
	(1.104)	(3.49)	(0.954)	(0.954)
neighbor_relationship	2.677	31.73	0.177	0.177
	(13.91)	(0.04)	(12.07)	(12.07)
rent_out	-40.45	-33.45	-28.21	-28.21
	(39.86)	(-1.02)	(31.99)	(31.99)
rent_in	-7.067	-5.844	-4.344	-4.344
	(22.08)	(-0.32)	(18.80)	(18.80)
income_growth	3.510	2.903	4.415	4.415
	(15.18)	(0.23)	(12.86)	(12.86)
mean_r	3.073	2.541	2.485	2.485
	(5.162)	(0.60)	(4.414)	(4.414)
ease_conversion	-35.42***	-24.01*	-31.84***	-31.84***
	(10.27)	(-2.57)	(8.972)	(8.972)
gender	9.989	18.13	10.49	10.49
	(15.43)	(1.27)	(13.28)	(13.28)
monthly_inc	23.90***	25.26***	20.93***	20.93***
	(7.843)	(3.72)	(6.978)	(6.978)
education	-20.39*	-22.35*	-18.07*	-18.07*
	(11.77)	(-2.20)	(10.11)	(10.11)
age	-3.348***	-2.919***	-3.048***	-3.048***
	(0.974)	(-3.53)	(0.840)	(0.840)
time_particip	8.562	-2.017	6.388	6.388
	(7.744)	(-0.01)	(6.705)	(6.705)
cons	-7,289***		-6,373***	
	(2,191)		(1,888)	
First hurdle				
school_dis	5.389		5.715	
	(156.2)		(328.9)	
hygiene	-0.108		-0.113	
	(0.823)		(0.826)	
house_year	0.0404		0.0399	
	(0.0643)		(0.0645)	
neighbor_relationship	6.463		6.742	
	(161.5)		(309.0)	
ease_conversion	1.007		1.005	
	(0.835)		(0.836)	
gender	1.880		1.877	
	(1.455)		(1.456)	
education	-1.043		-1.044	
	(0.739)		(0.742)	
time_particip	-1.733		-1.809	
	(43.83)		(83.73)	

cons	-76.47	-75.17
	(369.9)	(675.0)
Observations	214	214

*Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

The results interpreted in the paper below are based on *churdle* model due to the similarity between the two models. The model, demonstrated in Table 5, suggests hygiene, access to water and medical centers, the year of the house built, ease of conversion, monthly income, level of education, and age are influential on farmer's reservation price. Having easy access to water and having medium-easy access to water, relative to having difficult access to water, are associated with a 107.1[6] and 102 increase, respectively, in farmer's reservation price. The year of the house has a positive correlation with the reservation price. Each additional increase in the year of house building contributes to a 3.351 rise in the lowest price farmers would accept to sell. If the urban villagers perceive their properties can be easily converted into capital uses, the reservation price is likely to fall. Switching from level 3 -- "Neither agree nor disagree" to level 4 -- "Agree" on "It will be easy to convert my land into other use" will reduce the reservation price by 35.42. Socio-demographic variables such as monthly income, level of education, and age have an effect on urban villager's opinions on their willingness to sell as well. Receiving monthly income by one level higher leads to a 25.26 increase in the reservation price proposed. Education and age, on the other hand, are associated with 22.35 and 2.919, respectively, shrink in farmer's willingness to sell. In the first hurdle, geographical and socio-demographic variables

[6] All coefficient estimates are in unit of 10,000 CNY

including *school_dis, hygiene, house_year, monthly_inc,* etc. are incorporated into the regression, but none of the variables are statistically significant.

VI. DISCUSSION

A few factors appear to have contradicted correlations compared to the predictions. Having easy access to medical centers is expected to weaken farmer's willingness to sell, and therefore, they would ask for a higher amount of compensation in the program. This claim is also supported by the expectation of the land price model, demonstrated by the positive marginal effect of distance $\frac{dP^u}{dz} = \frac{1}{r}$ where $r > 0$.

However, the coefficient estimates exhibit positive signs for farmers having medium-easy and difficult access to medical centers and suggest urban villagers owning geographical advantages report less reservation price than those who don't. This can potentially be explained by the fixed effect of villages. By running the variants of "water and village" and "medical and village" with all other variables unchanged, now the *churdle* model (see Appendix Table 1) separates the impact of different levels of access to medical centers based on each village. For village 1 that is not yet removed, having difficult access to medical centers relative to having easy access, reduces the reservation price by 82.35 whereas having medium-easy access increases 56.12. Village 2 ranks medium-easy, difficult and easy access from the highest to the lowest, and village 3 ranks difficult, medium-easy and easy access. The results of the two resettled urban villages, village 2 and village 3, appear to be less plausible compared to intuition, but this might be due to the types of medical centers

they referred to. A village usually has its local medical center that operates under poorer conditions and limited services, and has less flow of patients as the growing awareness of health propels villagers to visit professional medical centers in the city center. Therefore, if urban villagers referenced local medical centers in their responses, they are more likely to enter a lower reservation price because such a feature is no longer regarded as a value-added advantage.

Another contradicting variable is the risk-adjusted discount rate *mean_r*. The expected sign for *mean_r* is negative given $\frac{dP^u}{dr} = \frac{-\alpha(Ar+4g+r(z(t)-z))+r}{\alpha r^3} < 0$, while the empirical result suggests a higher discount rate is associated with a higher reservation price. The attribute of the buy-side in this transaction -- government, may explain this scenario. Unlike individual buyers, who are subject to risk-adjusted discount rates when considering their purchase, the government will inevitably undertake the program regardless of the discount rate. Hence, when determining their reservation price, farmers' reservation price is less likely to take the discount rate into account and may be listed higher than the price given the current *mean_r*.

VII. ROBUSTNESS CHECK

The method likelihood ratio is applied as a robustness check to test the possibility of alternative explanations. Double-hurdle model is an extension of the Tobit model, and Engel's double-hurdle model integrates a Probit model that determines participation

and a Tobit model that determines the expenditure level. When $\Phi(X'_{1i}\beta_1)$ in the log-likelihood function for the double-hurdle model equals 1, the function is equivalent to that of the Tobit model. Therefore, the likelihood ratio is used to distinguish between the double-hurdle model and Tobit model (see Appendix Table 2). The likelihood ratio test compares the log-likelihood value of Tobit with the sum of the log-likelihood value of the Probit and truncated regression models (Genanew et al. 2010), and it can be acquired through the function below:

$$\Gamma =- 2[lnL_{Tobit} - (lnL_{Probit} + lnL_{Truncated})] \sim \chi^2_n$$

where Γ is likelihood ratio statistic, L_{Tobit} represents the likelihood value for Tobit model, L_{Probit} for Probit and $L_{Truncated}$ for Truncated regression, χ^2_n is the chi-square value with *n* be the number of independent variables in the equations. If the likelihood ratio statistics exceeds the chi-square value, then the null hypothesis $H_0 = Tobit\ Specification$ will be rejected against the alternative hypothesis $H_1 = Double - Hurdle\ Specification.$ The test (Table 6) demonstrates the double-hurdle model is more suitable in modeling farmer's reservation prices in Zhoushan. Tobit model also falsely picks up the effects of variables, such as area of agricultural land and neighborhood relationship.

Table 6: Likelihood Ratio tests of Tobit specification

	H0=Tobit Specification H1= Churdle specification	H0=Tobit Specification H1= Dhreg specification
Test Statistic	58.12	37.19
Prob > chi2	0.0000	0.0001

Besides the model comparison, the study investigates a modified *churdle* model after removing several variables such as area_agland, farmland_years, hygiene, etc. to determine the performance of key coefficient estimates. Table 3 in Appendix reveals the core estimates have similar magnitude and levels of significance, and the removal of statistically significant and statistically insignificant variables has little impact on the outcome.

VIII. CONCLUSION

This thesis investigated China's urban relocation program through the lens of real options theory. Real options in the context of urban relocation assumes that farmers have the flexibility to move to a new property, receive cash for existing property or a combination of both. It is this flexibility that gives rise to an irreversible decision and option value. The option value has properties similar to a call option on financial assets, with the strike price equal to the farmer's individual reservation price. This reservation price is determined by the characteristics of the village from which the farmer lived to the characteristics of where the farmer used. In terms of social welfare, farmers can maintain the status quo with constant utility if the farmer does not move, but can benefit in utility if the combined hedonics associated with moving exceed the reservation price. The reservation price might be viewed as a 'willingness to move'. This value was obtained by survey from each of 214 respondents to a survey conducted in 2020. The survey also determined whether the farmer actually took the government's offer or did not. To evaluate problems of this type I used a double hurdle model. The first model determined the likelihood that an individual would accept the

offer, and the second determined the individual and local attributes that affected the reservation price. The reservation price considered not only how much income was forgone by giving up the productive use of agricultural land, but also the incremental gains in living standards and quality that came with moving.

In this paper, the socio-demographic and economic factors of urban villagers are analyzed for the purpose of studying the underlying drivers of villager's reservation price in urban village removal programs in Zhoushan. The analysis uses a double-hurdle model against the Tobit model to separate the participation decision and reservation price level, and quantitatively examines compositions of the real option model. The results are mostly consistent with previous findings and predictions. The value of accessibility, including access to water and access to medical centers, indicates farmers living closer to urban infrastructures are more likely to demand a higher reservation price. People have different benchmarks while referring to medical centers and while evaluating the distance. Thus, the initial double-hurdle model does not render the estimates as expected, but this can be justified by the effect of the individual village. Variable *transportation* is omitted due to its potential multicollinearity with access to medical centers. The hygiene, property and socio-demographic characteristics like the year of the house built, cost of conversion, monthly income, and age are also influential determinants in a farmer's reservation price. Although cases like the compensation being offered lower than the reservation price occur, most farmers are still satisfied with the compensations and are willing to sell with the aim of acquiring an upgraded living area.

Policy implications can be drawn based on urban villager's preferences and behavior in the program. Farmer's preference in exchanging property for property and the choice of keeping all the compensation indicate their strong need to take the compensated house as their future residence. Therefore, upgrading the physical features such as house quality and resources of the relocation area is one major task. The second half of the farmers who either sold the compensated house or purchased the house elsewhere suggests the overall development of the removal area and area nearby still needs improvement. The removed area, some transformed into office buildings, mostly were altered into roads. Facilities like hospitals, schools, and retail stores need to be a crucial section of urban planning.

Due to the lack of studies on urban villager's reservation prices in China, more research needs to be done to continue investigating the factors associated with villager's willingness to sell and their opinions towards the removal program. Especially given the program has taken place over a decade, participants who first joined the program can differ significantly from those who recently joined in terms of their socio-demographic characteristics, and the geographical features of their properties. Future studies should use more precisely phrased questions while asking for respondent's access to resources, expand the sample size, and include more villages and their geographical mapping to better capture their surrounding environment.

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APPENDIX. Additional Tables

Table 1. *churdle* results with interaction terms

VARIABLES	Reserv_Price	fisrt_hurdle
num_floor	12.33	
	(10.22)	
farmland_years	0.596	
	(1.314)	
school_dis	23.33	5.373
	(16.13)	(150.7)
hygiene	15.45	-0.108
	(9.940)	(0.823)
water_ease#village1	0	
	(0)	
wate_ease#village2	14.85	
	(49.37)	
water_ease#village3	229.8***	
	(88.90)	
wate_medium#village1	-129.0	
	(141.5)	
water_medium#village2	10.59	
	(80.04)	
water_medium#village3	245.0***	
	(93.44)	
water_diff#village1	0	
	(0)	
water_diff#village2	2.777	
	(125.5)	
water_diff#village3	9.297	
	(169.1)	
med_ease#village1	0	
	(0)	
med_ease#village2	-34.28	
	(50.27)	
med_ease#village3	-47.32*	
	(25.68)	
med_medium#village1	56.12	
	(39.05)	
med_medium#village2	30.84	
	(55.63)	
med_medium#village3	-44.98*	
	(26.36)	
med_diff#village1	-82.35	
	(79.57)	
med_diff#village2	0	
	(0)	
med_diff#village3	0	
	(0)	
house_year	2.608**	0.0404

	(1.154)	(0.0643)
neighbor_relationship	-6.494	6.431
	(13.58)	(150.3)
rent_out	-10.24	
	(27.43)	
rent_in	1.234	
	(21.78)	
income_growth	4.499	
	(14.68)	
mean_r	5.299	
	(5.119)	
ease_conversion	-35.76***	1.007
	(9.981)	(0.835)
gender	15.10	1.880
	(15.20)	(1.455)
monthly_inc	19.50**	1.046
	(7.930)	(0.663)
education	-12.41	-1.043
	(11.89)	(0.739)
age	-3.003***	-0.0286
	(0.961)	(0.0407)
time_particip	-31.71	-1.719
	(20.41)	(39.14)
Constant	-4,731**	-76.54
	(2,307)	(338.0)
Observations	214	214

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2: Tobit Regression Results

VARIABLES	Resv_Price
num_floor	7.216
	(8.939)
area_agland	-1.430
	(8.609)
farmland_years	1.116
	(1.267)
school_dis	40.16***
	(15.30)
hygiene	26.33***
	(9.263)
water_ease	82.10
	(74.67)
water_med	101.7
	(77.92)
med_ease	-45.54**
	(21.36)
med_medium	20.92
	(17.50)
house_year	4.336***
	(1.013)
neighbor_relationship	-19.56
	(12.80)
rent_out	-8.187
	(34.01)
rent_in	-6.746
	(20.48)
income_growth	22.75*
	(13.52)
mean_r	4.411
	(4.726)
ease_conversion	-25.73***
	(9.716)
gender	24.25*
	(14.24)
monthly_inc	31.62***
	(7.390)
education	-27.31**
	(10.59)
age	-2.560***
	(0.881)
time_particip	-3.926
	(7.061)
Constant	-8,433***
	(2,005)
Observations	214

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Modified Churdle Model

	(1)	(2)
VARIABLES	Reserv_Price	first_hurdle
num_floor	7.504	
	(10.02)	
school_dis	21.23	4.067
	(16.51)	(100.9)
med_ease	-34.99	
	(23.10)	
med_medium	20.18	
	(18.86)	
house_year	4.502***	-0.0139
	(0.696)	(0.0226)
rent_out	-27.89	
	(27.44)	
rent_in	-4.389	
	(22.27)	
mean_r	1.590	
	(4.937)	
ease_conversion	-36.99***	0.350
	(9.949)	(0.293)
gender	14.91	0.908
	(15.60)	(0.602)
monthly_inc	19.86***	0.282
	(7.432)	(0.215)
age	-1.956***	0.0293
	(0.721)	(0.0192)
Constant	-8,591***	25.33
	(1,389)	(45.49)
Observations	214	214

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

APPENDIX. Survey in English and Mandarin

Q1.
This survey is voluntary. All information you give will remain anonymous and no individual response will be disclosed. This survey should take no more than 5 minutes to fill.

The survey aims to collect relevant data on urban villager's reservation price and the compensation offered in the urban village removal program for academic purposes.

Q2.
How many floors does your house have?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ >4

Q3. What is the area of your yard?

- ○ <20 m²
- ○ 20 - 30 m²
- ○ 30 - 40 m²
- ○ 40 - 50 m²
- ○ 50 - 60 m²
- ○ 60 - 70 m²
- ○ >70 m²
- ○ not applicable

Q4. Please select the area of your agricultural land

- ○ <1 mu
- ○ 1 - 2 mu
- ○ 2 - 3 mu
- ○ 3 - 4 mu
- ○ >4 mu
- ○ not applicable

Q5. Did you have easy access to clean water?

- ○ Yes
- ○ Sometimes
- ○ No

Q6. Did you have easy access to medical care?

- ○ Yes
- ○ Takes some time
- ○ No

Q7. Did you have easy access to public tranportation?

- ○ Yes
- ○ Takes some time
- ○ No

Q8. Was your property in/near school districts?

- ○ Yes
- ○ No

Q9. Were there any graves/tombs of your relatives nearby?

- ○ Yes
- ○ No

Q10. Did you have security guard in the district?

- ○ Yes
- ○ No

Q11. Was your district kept clean?

- ○ Very clean
- ○ Moderately clean
- ○ Moderately not clean
- ○ Not clean _____

Q12. Was the property self-built?

- ○ Yes
- ○ No

Q13. What year was your house built?

Q14. Concerning the land you were last farming, how many years have you farmed this piece of land?

Q15. How much do you value neighborhood relationships?

- ○ A great deal
- ○ A moderate amount
- ○ A little
- ○ None at all

Q16. How much income/month did your agricultural land typically generate in thousand? (relative to your neighbor's/ other villager's profit)

The highest	
Most likely/ typical	
The lowest	
Not applicable	

Q17. Did you ever rent in or rent out the land? If not, please skip to Q20.

- ○ Yes
- ○ No

Q18. If you rented in the land,

how much you paid the last time you rented?	
don't know: may refer to the neighbor	
not applicable	

Q19. If you rented out the land,

how much you charged the last time you rented?	
don't know: may refer to the neighbor	
not applicable	

Q20. If you ever had investments, please answer this question; if not, please skip to Q21.

I prefer receiving investment returns sooner than later

- ○ Strongly disagree
- ○ Disagree
- ○ Neither agree nor disagree
- ○ Agree
- ○ Strongly agree

I prefer investments with lower risk than higher risk

I require a higher return for taking on additional risk

Q21. I expect my future income to grow

- ○ slowly
- ○ constant
- ○ faster

Q22. Please select you preference regarding each statement.

It will be easy to convert my land into other use

- ○ Strongly disagree
- ○ Disagree
- ○ Neither agree nor disagree
- ○ Agree
- ○ Strongly agree

Q23.
Did you agree to participate the urban village removal program?

- ○ Yes
- ○ Yes, but not voluntarily
- ○ No

Q24. What price did you hope to receive for your house and land?

Q25. What was the minimum price you were willing to accept?

Q26.
What was the type of compensation you received?
If you did not participate the program, please skip to Q30.

- ○ All cash
- ○ All property
- ○ Some cash and some property

Q27. How much actual compensation in total did you receive, converting to cash? (if remember)

Q28. How far away was your farm house from where you currently live?

Q29. What did you do with the compensation?

- ○ Kept all compensations
- ○ Sold/Plan to sell one or more compensated properties
- ○ Lease the compensated properties to someone
- ○ Used cash to buy one or more new properties

Q30. Please select your gender

- ○ Male
- ○ Female

Q31. Please select your income range during the program

- ○ < RMB 1000/month
- ○ RMB1000 - 3000/month
- ○ RMB3000 - 5000/month
- ○ RMB5000 - 7000/month
- ○ RMB7000 - 9000/month
- ○ RMB9000 - 11000/month
- ○ > RMB 11000/month

Q32. Please select your highest level of education received

- ○ Elementary school degree
- ○ Middle school degree
- ○ High school degree
- ○ Some college degree
- ○ Bachelor's degree
- ○ Master's degree and above

Q33. Please enter your age

Q34. What year was the program offered?

- before 2000
- 2000 - 2004
- 2005 - 2009
- 2010 - 2014
- 2015 - 2019
- 2020 - now

1. 这项调查是自愿的。您提供的所有信息将保持匿名，并且不会透露任何人。填写此调查问卷应不超过5分钟。
本研究的目的是研究城中村拆迁项目中，村民的房屋保留价格（即愿意出售的价格）与政府实际给予的补偿之间的差距，以及这种政策是否能满足村民的需求。

2. 您的被拆迁房有几层楼？（若您的房屋尚未拆迁，请根据当前房屋情况来填写）

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ >4

3. 被拆迁房的院子或空地的面积约为多少？（若您的房屋尚未拆迁，请根据当前房屋情况来填写）

- ○ <20 m²
- ○ 20 - 30 m²
- ○ 30 - 40 m²
- ○ 40 - 50 m²
- ○ 50 - 60 m²
- ○ 60 - 70 m²
- ○ >70 m²
- ○ 无院子或空地

4. 您的耕地面积约为多少？

- ○ <1 亩
- ○ 1 - 2 亩
- ○ 2 - 3 亩
- ○ 3 - 4 亩
- ○ >4 亩
- ○ 无耕地

5. 您的被拆迁房离干净的水源近吗？（若您的房屋尚未拆迁，请根据当前房屋情况来填写）

- ○ 近
- ○ 有点距离
- ○ 远

6. 您的被拆迁房离医院或卫生中心近吗？（若您的房屋尚未拆迁，请根据当前房屋情况来填写）

- ○ 近
- ○ 有点距离
- ○ 远

7. 您的被拆迁房离公交设施近吗？（若您的房屋尚未拆迁，请根据当前房屋情况来填写）

- ○ 近
- ○ 有点距离
- ○ 远

8. 您的被拆迁房离学校近吗？（若您的房屋尚未拆迁，请根据当前房屋情况来填写）

- ○ 近
- ○ 远

9. 您的被拆迁房附近有亲属的墓碑或坟墓吗？（若您的房屋尚未拆迁，请根据当前房屋情况来填写）

- ○ 是
- ○ 否

10. 您的小区或被拆迁房周围治安如何？（若您的房屋尚未拆迁，请根据当前房屋情况来填写）

- ○ 好
- ○ 不好

11. 您的小区或被拆迁房周围卫生如何？（若您的房屋尚未拆迁，请根据当前房屋情况来填写）

- ○ 干净
- ○ 有些干净
- ○ 有些不干净
- ○ 不干净

12. 您的被拆迁房是自己建造的吗？（若您的房屋尚未拆迁，请根据当前房屋情况来填写）

- ○ 是
- ○ 不是

13. 您的被拆迁房是何年建造的？（若您的房屋尚未拆迁，请根据当前房屋情况来填写）

14. 若您有耕地，您在这片地上耕作了几年？

15. 您认为邻里关系有多重要？

- ○ 非常重要
- ○ 重要
- ○ 不怎么重要
- ○ 不重要

16. 您的耕地每月收入约为？（以千元为单位）

最高收入	
平均收入	
最低收入	
无	

17. 您是否有向他人/政府缴纳耕地租金，或向他人出租耕地？若无，请跳到第20题。

- ○ 有
- ○ 无

18. 若向他人缴纳耕地租金，

您最后一次支付的租金为多少元一年？	
不清楚，但我的邻居支付租金为	
无	

19. 若向他人出租耕地，

您最后一次收取的租金为多少元一年？	
不清楚，但我的邻居收取租金为	
无	

20. 若您有过任何投资，请回答以下三个问题。若无，请跳到第21题

收到投资回报的时间越早越好

- ○ 非常不赞同
- ○ 不赞同
- ○ 中立
- ○ 赞同
- ○ 非常赞同

相较于高风险投资，我更喜欢低风险投资

如果需要承担额外的风险，我要求回报更高的投资

21. 对于未来收入的增长，我的期望是

- ○ 增长慢
- ○ 增长匀速
- ○ 增长快

22. 请选择您认同的选项 （若您的房屋尚未拆迁，请根据当前房屋情况来填写）

将我的被拆迁房转化为其他设施（如公交车站，医院等），比较容易

- 非常不赞同
- 不赞同
- 中立
- 赞同
- 非常赞同

23. 您是否参加了城中村拆迁项目?

- 是
- 是，但非自愿
- 否

24. 拆迁时，若出售您的被拆迁房和耕地，您的期望最高价格为多少？以万元为单位。（若您的房屋尚未拆迁，请根据当前房屋情况来填写）

25. 拆迁时，若出售您的被拆迁房和耕地，您愿意接受的最低价格为多少？以万元为单位。（若您的房屋尚未拆迁，请根据当前房屋情况来填写）

26. 若您参与了城中村拆迁项目，您收到的赔偿类型为，
（若未参加项目，请跳到第30题）

- 全部现金赔偿
- 全部房屋赔偿
- 现金+房屋赔偿

27. 您实际收到的总共赔偿（现金+房屋），用现金结算，大约为多少？以万元为单位。

28. 您现在居住的地方与被拆迁的房屋距离约为多少？（以骑电瓶车的时间为单位，如骑电瓶车5分钟）

29. 您是否对拆迁赔偿做了什么？（多选）

- ☐ 保留了所有赔偿
- ☐ 卖出一套或多套赔偿的房屋
- ☐ 出租一套或多套赔偿的房屋
- ☐ 用赔偿的现金购置新房屋

30. 请选择您的性别

- ○ 男
- ○ 女

31. 城中村拆迁项目进行时，您的月收入约为
若未参加项目，请选择现在的收入

- ○ < 1000元/月
- ○ 1000 - 3000元/月
- ○ 3000 - 5000元/月
- ○ 5000 - 7000元/月
- ○ 7000 - 9000元/月
- ○ 9000 - 11000
- ○ 11000

32. 请选择您的学历

- ○ 小学
- ○ 中学
- ○ 高中
- ○ 大专
- ○ 本科
- ○ 研究生即以上

33. 请填写您的年龄

34. 您参加城中村拆迁项目的时间为

- ○ 2000年之前
- ○ 2000 - 2004年之间
- ○ 2005 - 2009年之间
- ○ 2010 - 2014年之间
- ○ 2015 - 2019年之间
- ○ 2020 - 现在
- ○ 未参加

APPENDIX. Supplementary Material

An excerpt from the urban village removal handbook disseminated to villagers in Gongnong Road block, Zhoushan City:

I. Removal area: from Gongnong Road to West Huancheng Road, including all houses and auxiliary infrastructure.

II. Personal residence compensation and relocation:
   - Personal residence includes commercial property and self-built houses. The compensation methods are: property right exchange and monetary compensation.
   - Relocation address: Wengshan Xincun block.
   - Relocation property delivery time: within three years of urban village removal.
   - Relocation property types: small high-rise, high-rise residential, apartment type 50, 60, 70, 80, 90, 100, 110, 120, 130.
   - Property right exchange rules:
     1. The building area of the original house and the building area of the resettlement house shall be evaluated by the real estate appraisal agency according to the market price of similar real estate, and the difference shall be settled according to their respective appraisal price.
     2. It is allowed to purchase the area of resettlement house according to the scope of original house area not exceeding 50%, which is settled at 38% of the assessed price of resettlement house
     3. Due to the house type, if the area of the resettlement house is no more than 150% of the original house area, the insufficient area is compensated by 3000 CNY/m^2
     4. Temporary resettlement subsidy: the temporary resettlement house shall be settled by the owner. The temporary resettlement subsidy shall be calculated as 12 CNY/month per square meter of the original house area. If the temporary resettlement subsidy is less than 650 CNY/month, it shall be calculated as 650 CNY/month. The period of subsidy is from the month when the original house is relocated to 6 months after the notice of the resettlement house is delivered。