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Urban Residential Land Use Reconstruction under Dual-Track Mechanism of Market Socialism in China: A Case Study of Chengdu

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Abstract: We study urban residential land use changes by analyzing the massive migration and relocation of two typical social classes: employees in government departments (EGD) and urban demolition displaced households (UDDH). After the reform and opening-up of China that has taken place during the last 30 years, the residential land use of both the EGD and UDDH groups has been notable in terms of the changing urban landscape in China's cities. A considerable number of studies highlight the large scale relocations of weaker groups usually through sample surveys at a microscopic scale, which sheds light on the relationships between market forces and government intervention and power. However, employees hired by state government departments and related branches (*Shiye Danwei*) have been neglected. Bridging the empirical research gap and using Chengdu as a case study, we compare residential relocations of EGD and UDDH groups in Chengdu. Our analysis based on field surveys conducted from 2009–2013 indicates that the relocations of EGD and UDDH are spatially agglomerated due to China's unique dual-track mechanism driven by market forces and government power since the late 1970s. The study shows that most of the UDDH are migrated from urban centers to fringes, while a large number of EGD still agglomerate close to urban centers. Government interventions differentiate residential relocations of EGD and UDDH, and market mechanisms reinforce these relocations. Potential problems caused by the dual-track mechanism are finally discussed and summarized.

Keywords: urban residential landscape; employees in government departments; urban demolition displaced; residential spatial differentiation; market mechanism

1. Introduction

Since 1978, one of the most significant features of China's transition from a planned to a market economy is the emergence of an enormous increase of migrants [1], which has been a hot topic attracting considerable attention in the literature from the early 1980s. Fast economic growth has brought not only large scale rural-urban migrations within metropolitan areas but also city wide massive migrations demonstrating new differentiation in the process of suburbanization or urban residential space restructuring (URSR) [2–6]. Instead of relying on the state or state-owned enterprises (*Shiye Danwei*) for welfare housing, the commercialization of urban housing establishes a free urban housing market [7–10] resulting in the government having allowed urban residents to buy and sell their houses since late 1980s [11]. Most families must turn to the urban commodity housing market to

satisfy their accommodation needs [7,8,12–15], and a city wide influx of migration and mobility has appeared since the reform and opening up of China. Migration and mobility in tandem with massive urban development and urban fabric restructuring have created the phenomenon of the redistribution of different social strata.

Although suburbanization is common in China's large cities [2], the intensive gentrification has led to a new trend of increasing numbers of the upper and middle class living in the inner city. This trend also results in the lower class and displaced individuals moving away from city centers in China. Illegal land expropriation and forced relocation have become one of the most severe social conflicts in China [16], and unfair compensation is currently one of the most criticized issues [13,17]. The regeneration of old city areas has resulted in an increasing extent of relocation to suburban areas, which has also pushed the process of suburbanization. China has experienced three periods of rapid urban expansion, respectively in the early 1980s, early 1990s, and beginning of the 2000s, with construction of roads and industrial sites. This new construction has encroached on massive suburban and rural areas and resulted in many farmers becoming landless. The three waves of urban expansion, also called the three Chinese “enclosure” movements, have caused a total amount of 7.65 million hectares from 1987–2005 and 1.72 million hectares from 2005–2011 of agricultural land to be converted into construction land [18,19], and urban sprawl has resulted in a total of more than 40 million farmers becoming landless with about 2 million individuals being displaced each year [17].

The structural changes in urban residential space are caused by gradual and complex institutional reform, which is closely related to political, economic, and social development. Current research indicates three types of study scenarios: the market force hypothesis, the government power hypothesis, and the synthesizing hypothesis. Firstly, some studies consider that it is market forces, namely social income polarization and the privatization reform of urban housing, after initial reformation and opening up, that has led to the large scale relocation and relational changes of urban residential space [2]. To some extent, market forces are a decisive factor which limit the availability of residential space [15].

Secondly, some scholars consider that the social factors driving urban space changes, such as the individual's preference for residential space, lead the coalition in some cities. Examples of this influence would be land use for the illegal construction of urban villages in Xi'an and Guangzhou [20]. Given the gradual nature of China's institutional reform, the state-led marketization and transition periods of decentralization and globalization will not only result in the formation of emerging social classes but also influence the choice of residence of different social classes [21,22], which would redefine the structure of urban residential spaces in China. For instance, the availability of residential space is a state-led process in which local governments want to maximize their income from the real estate boom [17] and local officials tend to collect more land sale revenues from the urban land market [15].

Thirdly, many scholars believe that urban space changes are the result of the interaction and integration of government forces, market forces, and social forces [5,6,23]. Since the reformation and opening up, China has entered the transition from a planned economy to a market economy with gradual institutional reform. This transition has resulted in a dual-track mechanism—both government interventions and market forces come into play in the transformation of the social-economic system. The balance between government forces and market forces will continue to be present, and the changes of residential locations and relocation of different social classes reflect the roles and interactions of government, market, and related social forces. The relocation of urban demolition displaced households (UDDH) and the floating population living in “urban villages” is closely related to the current market mechanisms and government interventions and power in China [15].

A comprehensive analysis of residential relocation of UDDH and employees in government departments (EGD) at a city scale to better understand residential location and relocation is needed in order to explore the roles of government and market forces in both migratory processes and urban spatial restructuring. Existing empirical case studies are typically based on a limited number of districts or communities and focus on the relocation of individuals in either the upper or lower economic

class. In this study, we do a comparative analysis of residential relocations of EGD and UDDH groups in order to develop an understanding of urban residential spatial restructuring by using the city of Chengdu as our study area.

Chengdu is one of the National Famous Historical and Cultural cities in China. Chengdu is also one of the third economic growth poles in western China, and in 2014 Chengdu had about 14 million inhabitants in its metropolitan area; 252 multinational corporations out of the world's top 500 have invested in Chengdu, which makes it rank third in China for attracting the top 500 companies. From the period of reform and opening up, Chengdu has experienced significant changes and rapid phases of urban expansion and social, spatial and structural changes, making it of high interest for urban research and administration study. Additionally, the residential relocation of UDDH and EGD among different cities in China since the 1990s has experienced a common progressive approach, although UDDH's relocation in Beijing and Shanghai could be more significant to urban spatial restructuring due to large scale relocations there. Our study is based on the data integration of face-to-face interviews (e.g., location, construction time, built-up area, building levels, overall housing units, land area for UDDH and EGD, and interviewee's attitudes to relocation and comments on related policy) and census data, which additionally is spatially examined with remote sensing data and GIS analysis; then, we conducted our empirical study, using and combining the path dependence, market socialism, and market transformation factors.

This paper is organized into sections below: we present a theoretical approach of the dual-track mechanism of government and market and its roles for the differentiation of residential relocations between EGD and UDDH in urban spatial restructuring in Section 2. In Section 3, we introduce our field survey including face-to-face interviews taking place in Chengdu. We summarize and analyze the surveyed data in Section 4. In Section 5, we discuss the driving force mechanism of the differentiation of residential relocations between EGD and UDDH, and explore the possible effects on urban residential spatial restructuring and potential problems related to marketization and government roles by comparing and contrasting with some international studies. The paper concludes with a concise summary in Section 6, and dictates that additional studies are needed to explore impacts on social, economic, and environmental development.

2. An Urban Migration/Relocation Model of Two Social Classes under China's Imperfect Market

In a free market economy model, the market is the only dominant force in resource allocation and price determination with the government simply regulating the market in order to ensure legal and fluid operation of market mechanisms. Existing market economic systems of the United States and other Western countries are chiefly in line with this theoretical model. This requires the various economic elements to be free flowing and an entire price marketization of products and services. The essence of the free market economy model is the liberalization and fairness of a market economy with the exception of market monopolies and illegal government interventions.

However, the gradual mode of China's institutional transformation has resulted in a distinctive market socialism, which is an incomplete market economy model [23–26]. This incompleteness of China's market socialism not only reflects various restrictions of several key resources or supplies by the government, but also the incomplete price marketization of key products and services. This has also led to the market monopoly formation of state-owned enterprises and strong government intervention; in fact, the urban real estate market is a typical case in China. Urban land leasing systems were established in the 1980s, but local authorities have been responsible for about 70% of fiscal expenditures after the 1994 tax and fiscal reform [27], which brings about the formation of an incomplete land supply market. Since the 1980s, it has become the local officials' responsibility to develop local economies, especially GDP growth, which is used to assess the performance of local governments. By taking advantage of increasing real estate prices and the skyrocketed land bidding prices, local governments attempt to boost revenue [28]. A fruitful source of revenue for local governments is to seek additional revenue from selling more land areas through public auction.

Additionally, local governments have adopted compulsory price and administrative levies to requisite rural land and develop it into urban land [29,30]. However, the conversion of rural land rights from the collective to the state is still deemed to be an administrative allocation rather than a market transaction, owing to China's ambiguous land rights [31] and the land leasing system only being applicable to state owned land. In other words, "the formal, legal framework of China's rural collective ownership remains weak and ambiguous" [32]. The compensation offered to the collective and landless farmers is far below the "real" market value of the land after conversion and unreasonably fails to provide a means for them to live in the cities [17]. Landless farmers lose their social networks, steady agricultural income, and the landowner's sentimental attachment to the land [33]. The compensation as part of a new act for the assembly of urban land released by China's state council in 2011 to replace the old one announced in 2001 is regulated as "no lower than the market price of the similar property in the vicinity", which indicates a low limit for the compensation schedule [34]. Land transactions have been in the form of bidding auctions since the 1990s, but the lowest price and yearly total supply of auction land depends on the local government [35,36]. Local governments need to get enough capital from the land market to ease financial pressure, support the construction of infrastructure, and compensate economic losses in order to provide favorable conditions to attract projects and investments, e.g., low industrial land premium and tax relief, *etc.* [37]. Thus, a sophisticated dual-track mechanism of market forces and government intervention and power formed in an incomplete market economy has largely affected China's real estate market and the process of residential relocations of different social classes such as EGD and UDDH against a backdrop of urban space expansion and reconstruction [38,39].

According to Alonso's theoretical model of urban growth and housing supply [40], urban spaces were roughly divided into the city center, inner residential area, industrial zone, and suburban residential zone through the interplay between the housing market and urban expansion. Urban centers in China have more comprehensive and advanced infrastructure with convenient services such as commercial, education, emergency care, health and sanitation services, *etc.* Under the context of dual-track urbanization in China [41], the rich often like to live as close as possible to the city center and/or the suburbs or rural areas or new urban areas with better environmental and service facilities [42], rather than move to the relatively poor suburbs or rural areas with much lower levels of infrastructure. Usually, the real estate prices farther away from the city center are much cheaper and more affordable for people with a lower economic standing. Therefore, a trend of urban residential space restructuring has emerged in China: the lower economic class gradually moves to the periphery, and the upper and middle classes increasingly agglomerate in the city center and move to the periphery or new urban areas at the same time. In this way, Chinese cities have simultaneously exhibited trends of rapid suburbanization and growing prosperity of city centers since the 1980s [39].

Under the context of dual-track urbanization in China [41], EGD residential units are seldom replaced but almost always renovated at their original sites, new areas adjacent to their work place, or even old residential areas. Moreover, the prices of this housing sold to EGD are only about 1/2 to 1/3 of market values because government subsidies adopt the standards of affordable housing and do not count land leasing prices in the interest of marketizing these parcels. In contrast, the parcels of residential units of UDDH are always marketed after demolition, and UDDH have to pay the expensive market prices of new housing. It is impossible for governments to pay out a reasonable price to the relocating individuals, but they are settled in 'affordable housing' or resettlement housing in the low-cost areas, which are typically lower economic urban districts away from urban centers. Therefore, EGD are becoming spatially centralized or move to new urban areas, but the UDDH group is gradually relocating away from the urban center and becoming increasingly suburbanized.

3. Study Area and Field Survey

Centered in the Chengdu Plain, Chengdu is a very large city in West China. The main city of Chengdu is characterized as one single center with three circle structures, a typical "Ring + Radiation" of

transportation network and land use. Most cities in China share this common spatial structure (Figure 1).

According to the 1981, 2001, and 2013 Chengdu Statistical Yearbook (<http://tongji.cnki.net/overseas/engnavi/NaviDefault.aspx>), non-agricultural population of Chengdu increased from 1.92 million in 1980 to 3.46 million in 2000 and to 7.17 million in 2012, and its average rate of growth is 16.6% per year; simultaneously, the Chengdu built-up area was expanded from 60 km² in 1980 to 231 km² in 2000 and to 515.5 km² in 2012, and the average rate of growth is 28.5% per year. Urban regeneration and suburbanization have not only promoted spatial expansion and regeneration, but also have profoundly changed the social space structure. More importantly, the changes to residential areas of EGD and UDDH clearly reflect the city's political-economic and socio-cultural mechanisms. The resettled individuals in Chengdu are generally divided into urban demolition inhabitants and landless peasants on the urban fringes.

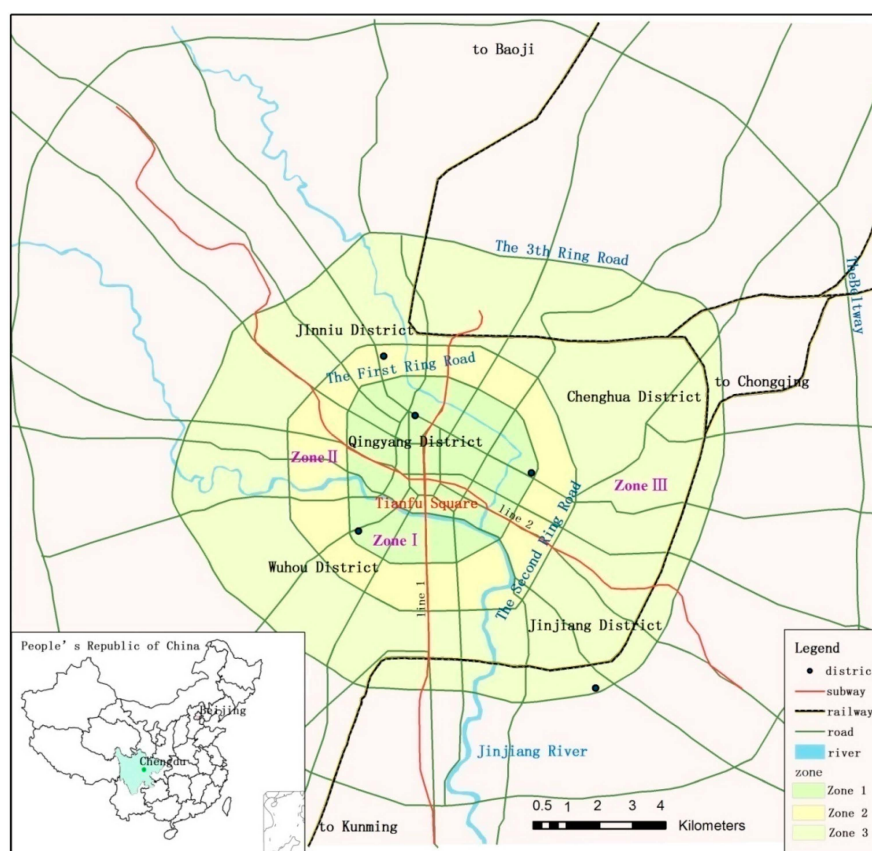


Figure 1. Location and urban spatial structure of Chengdu.

Our survey includes two parts. We first investigated about 300 interviewees, including 17 government officials, 15 enterprise managers, and the related residents by sampling typical residential areas for EGD and UDDH (Table 1) via face-to-face interviewing, which was conducted from May to October during 2010–2011 and in June and July 2013. We mainly chose interviewees about 40 years of age and older who experienced urban renewal and construction or urban demolition, *etc.* Female interviewees constituted 51% of the total, and interviewees with high school education and below accounted for about 40%. Questions concerning government policies and tools for residential relocation and migration, reasons for relocation, attitudes about housing construction enterprises, price decisions of affordable housing and resettlement housing, government employees and resettlement residents' attitudes to resettlement compensation, and opinions on current and optimal relocation sites were included in the interview.

The second survey is for detailed field data collection of residential parcels, including the spatial data and attribute data of separated living quarters and courtyards (e.g., sometime called Chinese quadrangles, a basic and traditional pattern used for residences and housing complexes) with house numbers in the survey area, and we conducted this survey from May to October in 2012. The surveyed attributes included construction time, housing type, residential parcel scale, land use type before the conversion to residential land, and the related details of Chengdu's residential courtyards or units. The scope of the sites and spaces of all residential areas were labeled and then geovisualized by using digital aerial photos and Landsat TM images.

Table 1. The second survey of a sample of residents for UDDH.

Num.	Name	Chinese name	Building time	Acreage (m ²)
1	Xiti Road community	西体路街区	Before 1980	93,795.9
2	No.6 community of 3rd section of Ring	居民房	19r 81–1985	9088.66
3	East 1st Road of Qingyang Community	青羊东一路小区	1986–1990	6235.18
4	Shiren district	石人小区	1991–1995	129,516
5	Mudian Road community	牧电路小区	1991–1995	75,626.8
6	Xiaojiahe community	肖家河	1991–1995	63,124.5
7	Dongguang district	东光小区	1991–1995	375,415
8	Changshouyuan community	长寿苑社区	1996–2000	140,613
9	No.202 community of Xinyi West Street	新义西街社区	1996–2000	126,089
10	Ruixiangyuan community	瑞康苑	1996–2000	43,426.2
11	NO.3 community of Jingtianlu	经天路社区	2001–2005	530,979
12	Jingzhu district	荆竹小区	2001–2005	302,120
13	NO.9 community of Jinsha	金沙路9号	2001–2005	127,728
14	Shengdeng Village Apartments	圣灯村公寓	2001–2005	189,273
15	Haitong community	海桐	2006–2010	189,930
16	Shufeng Garden community	蜀风花园城	2006–2010	125,890
17	River Phoenix community	沙河凤凰城	2006–2010	159,114
18	Orient New city community	东方新城	2006–2010	96,993.8
19	Orient Benefit city	东方惠城	After 2011	49,650.7
20	Jincui Garden community	锦翠花园	After 2011	37,721.4

Our study area is within the 3rd ring road of Chengdu (Figure 1). The urban fringes of Chengdu have been changing as part of the city's rapid urbanization process, and the city proper of Chengdu before the reform refers to the urban area by the edge of Jinjiang River and Fu River. Since 1980, both the rapid growth of urban population and the built-up area have promoted the formation of a new city proper which surrounds the single center of Tianfu Square and forms a "Ring and Radiation" spatial expansion pattern. The construction of ring roads in Chengdu reflects the urban sprawl process. The First Ring Road (FRR) was open to traffic in 1986, the Second Ring Road (SRR) in 1993, and the Third Ring Road (TRR) in 2002. In this study, we call the region within FRR Zone I, the area between FRR and SRR Zone II, the area between SRR and TRR Zone III. Surveying the residential households, we find that city dwellers usually distinguish their residential locations by relative distance to Tianfu Square and the nearest ring road. Currently, the citizens of Chengdu accept the region within SRR as the main part of the city, the southern and western regions between SRR and TRR as the urban built-up areas, and the northern and eastern regions between SRR and TRR as the urban fringe. The regions beyond TRR are the suburbs or marginal areas, which recently have continued to be developed from farm lands and villages to sparse built-up areas with a few resettlements.

4. Data Analysis and Results

Using ArcGIS 10.1, Landsat TM, digital aerial photos images, and our surveyed location and population information, we digitize the surveyed residential parcels, build topology, add the attribute data, spatially merge the adjacent lands with the same attributes, and generate a residential land

database. A total of 2911 residential parcels have been surveyed, and we create a residential parcel and attribute geodatabase for spatial mapping and analysis.

The results of our spatial analysis show that the fastest increasing period of residential land expansion in Chengdu is in line with the expansion of resettlement areas (Figure 2). Residential parcels for resettlement are roughly distributed in different districts, but areas within Zone I only account for 6.76% of the total resettlement area, 25.75% in Zone II, and 67.49% in Zone III (Table 2). The construction sequence indicates the resettlement housing for UDDH gradually advances towards the urban fringes and the majority of new resettlement areas are closer in proximity to TRR (Table 2). The resettlement land proportion in Zone III is 20.87% in 1990, 46.20% in 1995, 79.74% in 2000, 95.48% in 2005, 99.02% in 2010, 100% in 2013; but the corresponding proportions in Zone II rapidly decline from about 54% in 1981–1995 to 17.77% in 2000, 4.46% in 2005, 0.98% in 2010, and the corresponding proportions in Zone I further rapidly decline from 63.06% in 1980 to 26.95% in 1985, 22.99% in 1990, 5.55% in 1995, and 0.06% in 2005.

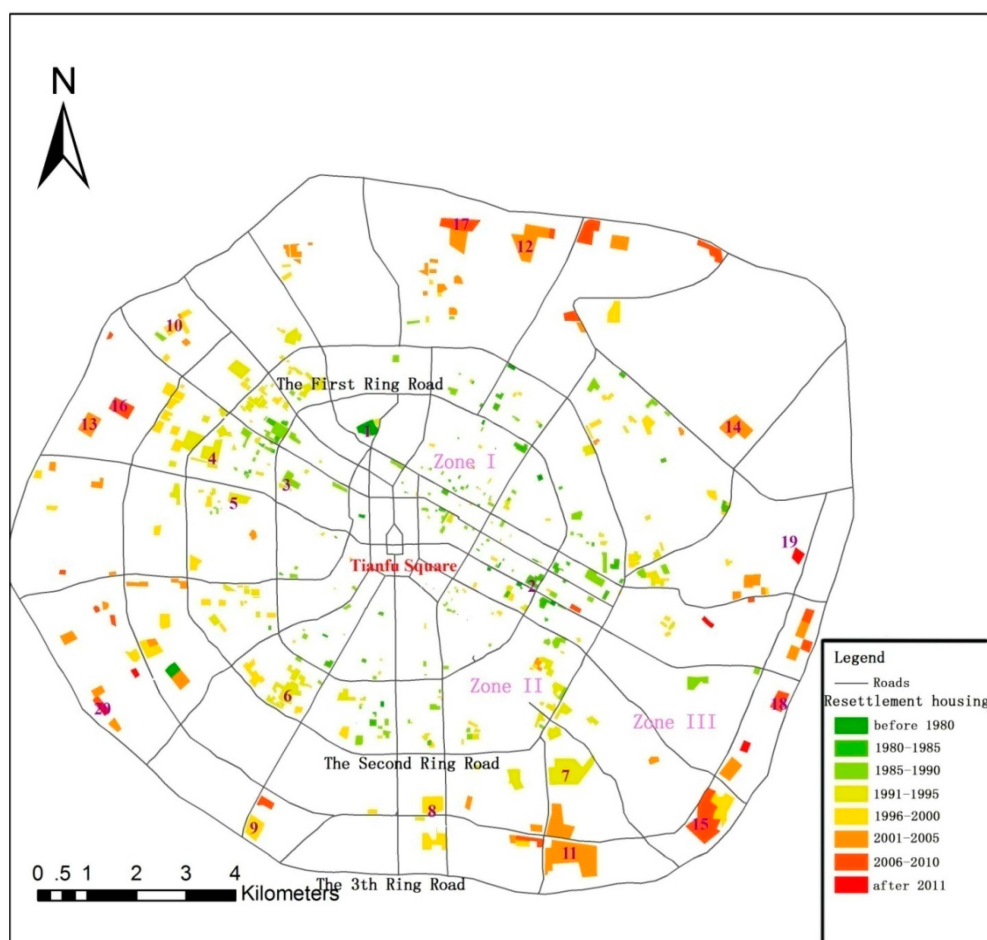


Figure 2. A spatial-temporal map of the resettlement housing land use for UDDH.

The reform and opening up of China have lasted more than 30 years, and the provincial, municipal, and district residential units, in accordance with the principle of adjacency to workplaces, decrease significantly from the city center to the outskirts of the city. The construction times indicate that the government units and their residential courtyards in Chengdu were first established in the 1950s, and most existing residential parcels were built in 1980–1998 (Table 3). As such, 96.3% of existing EGD residential areas are within SRR (*i.e.*, Zone I and II) and, among them, 69.45% within FRR (*i.e.*, Zone I).

Table 2. The spatial-temporal changes of resettlement housing land use.

Construction time	Zone I (%)	Zone II (%)	Zone III (%)
Before 1980	63.06	36.94	
1981–1985	26.95	58.51	14.54
1986–1990	22.99	56.14	20.87
1991–1995	5.55	48.25	46.20
1996–2000	2.49	17.77	79.74
2001–2005	0.06	4.46	95.48
2006–2010		0.98	99.02
2011–2013			100.00
	6.76	25.75	67.49

We divide Chengdu EGD residential parcels into three types of provincial, municipal, and district units and analyze them respectively (Table 3, Figure 3). The government units typically occupy desirable locations, mainly within traditional urban centers, and have optimal natural and social environments. The construction peak of EGD residential units was during 1981–1995. Among the total EGD residential units, the provincial authorities occupied 62.27% of these in 1985, 58.62% in 1990, and 52.06% in 1995; while the municipal authorities occupied only 35.84% in 1985, 33.33% in 1990, and 36.99% in 1995.

Our surveyed data show that the higher the administrative level, the faster the construction and/or regeneration the residential land is conducted. In other words, the provincial EGD have the first priority for the construction and occupation of parcels of high quality, the second is the municipal units, and the third is the district units. The number of provincial EGD residential units in Zone I reaches 48.46% of the total EGD residential area, but the number of municipal authorities amounts to only 18.52% (Table 3). District-level authority units only account for 7.72% of the total EGD residential units within the total surveyed area.

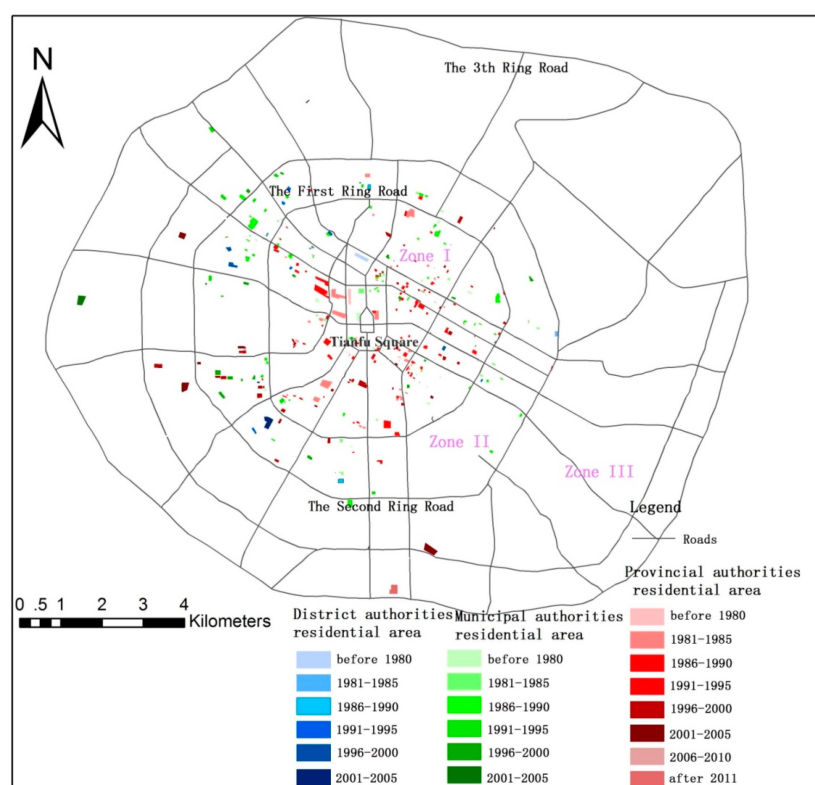
**Figure 3.** The residential distribution of employees in government departments (EGD).

Table 3. Spatial-temporal changes of residential land use for the three levels of government.

	Zone I (%)			Zone II (%)			Zone III (%)		
	Provincial	municipal	district	Provincial	municipal	district	Provincial	municipal	district
Before 1980	39.13	30.43	8.70	4.35	13.04	4.35	0	0	0
1981–1985	60.38	20.75	0	1.89	15.09	1.89	0	0	0
1986–1990	56.32	20.69	2.30	2.30	12.64	3.45	0	2.30	0
1991–1995	46.58	16.44	2.74	5.48	20.55	5.48	0	2.74	0
1996–2000	39.19	16.22	2.70	14.86	16.22	8.11	1.35	1.35	0
2001–2005	30.00	0	0	20.00	0	10.00	30.00	0	10.00
2006–2010	25.00	0	0	25.00	0	0	25.00	25.00	0
After 2011	48.46	18.52	2.47	6.79	15.12	4.94	1.54	1.85	0.31

Notes: The number of residential parcels is used for statistical analysis.

EGD residential units are chiefly concentrated in the city center, although relocations also show a trend of moving out, such as Tianfu New Area and development zones and some suburbs. In Zone I, the proportion of the provincial residential area to the total constructed residential area in the same period decreased from 60.38% in 1985 to 25% in 2010, the percentage of municipal residential area decreased from 20.75% in 1985 to 16.22% in 2005 and 0% in 2010, and the percentages of the district residential area were all less than 3% in different periods (Table 3). In 2006–2010, the provincial residential units in total accounted for 75%, 25% each located in Zone I, Zone II and Zone III; only 25% of the municipal residential area was located in Zone III. In fact, because some government departments were moved outside of Zone I, correspondingly the related EGD residential units were relocated outside of Zone I too. For example, the Chengdu government planned and constructed the Tianfu New Area in Zone III and the Chengdu municipal administrative offices moved to the Tianfu New Area in 2008, which resulted in the construction of some EGD residential units close to the Tianfu New Area in Zone III.

Currently, the provincial and municipal office units mainly agglomerate in the city center around Tianfu Square, and respectively form two centralized areas: one area around the Sichuan Provincial Communist Party Committee Departments adjacent to the commercial street and another area around the Sichuan Provincial Government Departments in Duyuan Street. EGD units at Yangshi Street, Commercial Street, West Yuhe Street, and Duozi Lane are located near the Sichuan Provincial Party Committee, Chengdu Municipal Party Committee and Municipal Government (e.g., the former location of Municipal Government and Party Committee was moved to the Tianfu New Area in 1998, but the old residential units remain). Centering on the provincial government, residential units are distributed in other areas along Duyuan Street for Provincial Science and Technology Department, Provincial Education Department, Provincial Food Authority, Provincial Finance Department, and other departments. Many EGD residential units are adjacent to beautiful scenic spots in the city center, such as Du Fu Thatched Cottage and Huanhuaxi Spot.

EGD residential buildings generally are three to four stories high built in the 1960–1980s. After 1990, most of these buildings were gradually rebuilt at their original sites except for Kuanzhai Lane. Following renovations, these parcels of EGD residential units have not been marketed, and thus most of the parcels have not been relocated. In other words, EGD residential parcels are still government residential units after China's public housing privatization started and the welfare housing supply was discontinued in 1998. In addition, our survey results show that EGD residential areas still take the traditional residential unit role, whether they are old country yards or new ones bought from the market, and these parcels are managed by the same government unit.

Our survey did not determine the number of EGD and UDDH. Fortunately, we found that the housing land use area of EGD and UDDH is 1,981,217 m² and 10,999,290 m² which is respectively 3.71% and 20.59% of the total housing land use area (53,420,544 m²) of the city in 2012. This indicates among all urban housing, about one fifth or more resulted from UDDH that occurred in the last three decades causing major urban spatial reconstruction and significantly changing the urban landscape and social and cultural spatial structures.

We compared the differences between EGD and UDDH at each zone in the last three decades (Figure 4). Before 1980, there is very little difference between the residential areas of EGD and UDDH. However, significant differences occurred during the three decades in five-year increments from 1981–1985 to 2006–2010. Within Zone 1, EGD development nearly doubled that of EGD; while in Zone 2 and Zone 3, UDDH development was much higher than that of EGD. It is apparent that in the last three decades, EGD residential land was aggregated in Zone I, but UDDH was concentrated in Zone 3.

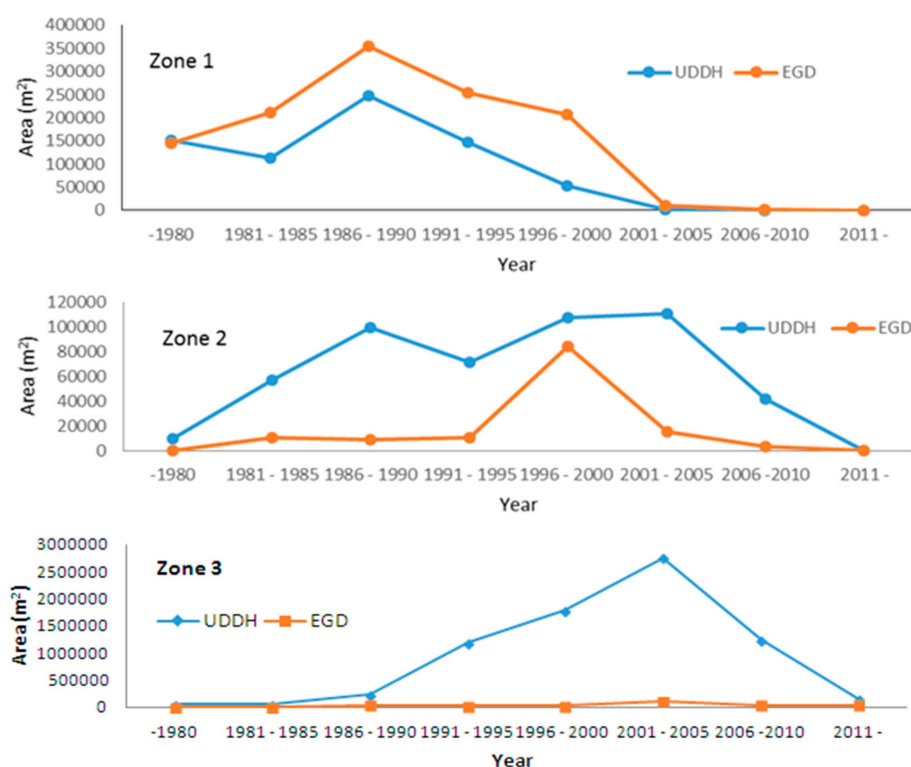


Figure 4. Residential land development of UDDH and EGD across the three zones in Chengdu.

We then used a simple *t*-test to statistically assess the continual five-year changes of developed residential area and summarized the results in Table 4. The *p*-values of the *t* tests were less than 0.05 which indicated the differences in the averages of developed residential areas between UDDH and EGU are significant. In Zone 1, the average development of the residential area in a five-year period of EGU is 1.65 of the area of UDDH; in Zone 2, the average developed area of UDDH is 3.74 times the area of EGU; and in Zone 3, the average developed UDDH area in a five-year period is 28.17 times the area of EGU. The Zone 1 centered EGU and Zone 3 aggregated UDDH pattern showed a significant urban residential segmentation in the last 30 years since the opening up (Figure 4 and Table 4).

Table 4. A two-sample *t* test to analyze residential areas of UDDH and EGU from before 1980 to after 2010 in five-year increments.

	Zone 1		Zone 2		Zone 3	
	UDDH	EGU	UDDH	EGU	UDDH	EGU
Mean (m ²)	89,578	148,118	62,139	16,636	938,582	33,316
Variance	8,278,095,788	17,625,808,150	1,838,364,540	773,392,826	972,745,807,356	1,069,300,829
<i>p</i> -value	0.018		0.004		0.016	

5. Discussion

According to the path dependence theory proposed by New Institution School as the representative of the North [43], China's gradual institutional reform model has resulted in the formation of a typical dual social structure [23,42]: (1) the incomplete or semi-marketization group who still enjoys certain welfare benefits under the old regime, such as the staff of government apartments and other related units in education and medical agencies, *etc.* (*Shiye Danwei*) and (2) the complete marketization group outside the old regime, such as private businesses, workers, farmers, and other social classes [41,44,45]. The two groups rely on different social welfare support, such as health care, education, and employment [46]. Because two mechanisms of marketization and administration in resource allocation still exist in China, the semi-marketization group with close relationships to government are likely to get access to development resources and opportunities by taking advantage of administrative tools and adjusting market mechanisms. In the housing market, government departments on behalf of the semi-marketization group use their political dominance to take advantage of the renewal of old residential areas and the construction of new residential units in the vicinity of their workplaces in order to access better social and natural environments close to the city center or in more desirable suburbs with good infrastructure. In addition, some government departments recently have occupied affordable housing. However, the complete marketization crowd composed of most workers, rural migrant workers, and rural collectives, *etc.* are gradually weakening and moving to less desirable locations, especially the suburbs located near areas of demolition and complete renovation. The complete marketization crowds are reluctant but must move out of their original residential areas due to the impact of social income polarization, the shortage of resources and information, and essentially the lack of political power.

On behalf of the State in assigning resources, the three levels of government make full use of their power to choose desirable settlements for their employees, which shows the clear path dependence that they have inherited from the socialist period [23]. Residential units for EGD are generally close to their offices and the regions possessing beautiful natural environments, and historical and cultural heritage. EGD residential units are most often adjacent to the urban center and/or scenic spots in suburbs and/or in new urban areas. Thus, these residential units are usually retained in places with convenient transportation, beautiful environments, and heritage. The provincial departments follow historical traditions, making use of the existing old government office sites, and also constructing new offices in or close to the city center in order to facilitate the management of the whole province. Municipal departments are generally in the vicinity of the provincial government units in the city center or in new urban areas in order to easily manage the whole city. District authorities are located in the district center or at sites with beautiful environments within their jurisdictions, which are convenient for jurisdictional service and management.

Prior to 1990, EGD residential units were concentrated in better locations in the city center, while the resettlement of the marketization crowd was scattered across the city area. Since 1990, the land-leasing policy has been implemented, the city planning efforts have been strengthened to promote local economic development, and therefore the resettlement areas have gradually advanced into urban fringe areas in an agglomerated format with increasing amounts of farmland being occupied. It has greatly affected the living standards of the resettled residents due to the lack of development of infrastructure. In the process of urban space expansion, EGD has still occupied the better residential locations, but the remaining population, especially the lower economic and weaker classes, have gradually moved out to the suburbs in the past 30 years. This somehow confirms the point of the Neo-Marxist theory: the essence of urban spatial configuration is the physical manifestation of the social status of each class in a city, e.g., the differentiation of residential areas is the physical manifestation of changing relationships among various social groups.

Unlike the EGD residential units, residential location choices of the vast majority of the complete marketization crowd, such as rural-urban migrants and urban fringe farmers under the market mechanism continue to become narrow and limited, and their residences are pushed to the city edge.

In other words, in the process of urban demolition and renovation, most ordinary citizens in old settlements are increasingly migrating further away from the city center to lower income areas, where there is limited social, economic, and cultural infrastructure.

According to our survey, over 80% of relocated residents such as people in Dongguang District and Jingzhu District are not satisfied with the amount of monetary compensation they receive for demolition, and think that monetary compensation provided by government or developers needs to be increased roughly at least 30%–50% in order to meet the market value of their old housing and maintain their living expenses, not considering the loss of social relations, *etc.* Most of the farmers, such as those in Shengdeng Village Apartments, believe the government should not expropriate their entire farmlands and they are more reluctant to give up their former housing plots (*Zhaijidi*). Similarly, more than 90% of relocating farmers consider land prices for expropriation should be increased by at least 30%–50%, and that the government should guarantee the protection of their livelihood (e.g., job assistance) and strengthen the management and supervision of the arable land expropriation compensation retained by village-level governments.

Most of the interviewees of UDDH agreed that they expect to be relocated to a new urban area. They believe that most of the buildings in their current residential area are very old and were built before 1980. Families typically live in tiny spaces with old utilities, limited parking lots, and poor security monitoring, internet, and other infrastructure. They hope that they can be relocated to a community close to central business centers or new urban centers to improve their life environment and quality. By relocation, they also expect to increase the built-up areas of their new houses, retain housing values, and they even hope that the new houses can be beneficial to their next generations' development. The UDDH care more about the socioeconomic benefits. However, there are still some persons who, are typically older than 70 years old, would not like to be relocated due to the loss of social connections. Our survey indicated that 68% of UDDH agreed that relocation typically helps improve their lives' quality except for in those rural areas which are too far away from urban centers. However, we also found in the interview that about 3% UDDH think the government exploited them, and they did not agree that the State has the right to possess, use, and dispose land.

In opposition, all government officials surveyed in this study think that Chengdu's existing compensation standards containing the municipal government premium and subsidies have surpassed the national and provincial standard of compensation, because all land belongs to the country and the demolished houses are old and in poor condition. Most officials also privately acknowledge that land leasing revenue (actually including rent gap) is indeed one of the main financial resources which allow governments to improve infrastructure, public spending, and attract investment, and stated that the government cannot "make bricks without straw". A few officials confessed that "the government has been also trying to guarantee the lives of landless peasants, but because of peasants' low levels of education (mostly middle school or even primary school level), the employment problem is still serious". Some officials said that "Chengdu municipal government is doing well and the relevant demolition contradictions or conflicts are much less than other cities in China". Local government's and/or developer's compensation for demolition focuses on the existing old housing in accordance with the construction area of residential houses and household demographic situation, but ignores employment, transportation, education, and other social and cultural factors.

It comes to be understood that the majority of resettled populations have increasingly been moved away from the city center, and they are migrated and resettled by government and/or developers. It is a compromise made by stakeholders since the low prices of land parcels and housing on the outskirts are seen as acceptable by developers and governments, as the majority of individuals relocating have low incomes. Also, rural collective land is easily occupied because collectively-owned land has been assigned low compensation levels under expropriation, and rural landless farmers with low political power have no choice but to accept them. On the other hand, low monetary compensation according to total building area of old and small demolished houses often results in the original occupants, usually low-income and even laid-off workers, having great difficulty remaining in their original

locations closer to the city center where commercial housing has high prices. In addition, through administrative means, the government has relocated the poor and weak groups to the agglomerated resettlement areas. Therefore, the market mechanism seemingly forces the majority of relocating individuals to urban fringe areas, which is primarily driven by an incomplete socialist market regime and the state-owned land institutional setting.

EGD has had a much better fate than UDDH in the process of residential space restructuring. EGD residential units are almost always renovated or constructed at nearby sites through administrative assignment. For example, residential units owned by the Sichuan Provincial Finance Department *etc.* still surround Tianfu Square or are close to Chunxi Road where land leasing prices are the highest in Chengdu. This leads to a low possibility for large-scale EGD residential relocations. For example, new EGD residential units between South SRR and TRR have been constructed since 2008, because Chengdu municipal administrative departments moved to the Tianfu New Area in 2008, which had been planned and built since 2005. These new residential units have been sold to EGD in the form of commercial houses with affordable prices, and their establishment has driven the development of so-called commercial houses in that special neighborhood. However, some officials or EGD have admitted the prices of these so-called commercial houses are 30%–50% lower than the market values, because land prices are not included due to their construction at their original locations.

We can summarize two modes of housing supply in the current urban residential market. (1) EGD under the incomplete market of China have access to housing supplied in a new residential area by renovating old residential units, reconstructing new residential units in government office areas, subsidizing housing prices, and reserving the typical features on the socialist stage by means of administrative allocation. (2) Most UDDH can own housing by means of two ways: one way is to purchase cheaper commercial houses in suburbs in the real estate market, since UDDH only receive low monetary compensation in the real estate market; another way is to buy resettlement housing far from the city center.

In this study, we identified two main classes of citizens, the EGD and the UDDH, and spatially examined their housing patterns in the process of urban spatial reconstruction under a paradigm of China's dual-track mechanism. We understand that it is difficult to absolutely separate market forces from government power and interventions in China, and likewise it is not easy to absolutely separate the effects of individual behavior, including government forces from market roles, in a typical market economic system. In China, government plays a dominant role and individuals such as the UDDH group have to conform due to lack of financial and social support as we discussed above; but in a market economic system, individuals' behavior often plays leading roles, with the government and market then following suit. For example, in the USA, the middle class prefers suburban environments and increasing proportions of the middle class are moving to suburban areas, and the market elements and government policy are in line with this type of migration against the backdrop of an open market. The related social and cultural factors further strengthen these types of changes which have constitute the suburbanization process in the USA.

Our study is a complex Chinese version of "The City as a Growth Machine" [47]. However, the general city is the areal merchandise representing the interests of land-based owners, who always try to profit through increases in the land use of the area. While this occurs, the central and local governments play different critical roles at the expense of competing localities to achieve economic growth. Local governments or municipalities are basically growth machines that produce wealth for those in power by exploring real estate at the taxpayers' expense. Now urban growth, local economic development, and those who lead and control these two processes, are still central to the politics of cities [48]. However, the spatial process in Chengdu is not as complex as the residential segmentation in Europe, where social and ethnic factors are critical for neighborhood selections [49,50], which determined that the spatial patterns after urban restructuring due to relocations and segregation in those cities (e.g., Dutch cities) were not as those in the USA and the zoning patterns that we analyzed in this study. The segregation of UDDH away from the center of Chengdu with higher land prices

seems close to that of the income-based residential patterns occurring in Israeli cities, which were modeled using an agent-based model according to the Schelling model of segregation [46,51] that showed the wealthy would not reside near poorer neighbors. However, in our field survey, we did not find any direct conflicts between EGD and UDDH, and no one in EGD mentioned s/he would not like to reside close to UDDH. We also found from our interview that EGD or UDDH did not think that they were segmented in the process of relocation, but they agreed that it may be a trend for the wealthy and the poor to be spatially separated in the future. We understand that in the opening up process, EGD would not like to be suburbanized due to lack of sufficient social and cultural infrastructure, and that UDDH have to be suburbanized due to lack of sufficient money and the sky-rocketing land prices within or close to central business districts.

6. Conclusions

Urban spatial organization and remodeling essentially reflect political and socio-economic relationships and their changes [52–54]. The evolution of the social production model is a changeable spatial process [54]. China's gradual reform, under the multi-actor governance structure that involves complex relations among different stakeholders, has created an incomplete state-oriented socialist market which has led to the existence of an intermingled dual mechanism of market forces and administrative means. In the flawed real estate market of China, governments can treat differently the residential relocations of employees in government departments (EGD) who are the part of the semi-marketization class, and the urban demolition displaced (UDDH) who are part of the marketization class, which has undoubtedly reduced the impartiality of urban space use in the urban residential spatial restructuring process.

Market monopoly and land leasing under certain administrative allocations of land resources have caused a path dependence of urban social spatial restructure. EGD in China's incomplete market have gained access to housing by renovating original, old residential units or constructing new residential units in government office areas, which is reminiscent of the features of urban landscapes on the socialist stage. EGD purchase their housing at low prices but in much better locations, usually close to the city center with access to high quality services and social, economic, and cultural infrastructure. However, UDDH with low monetary compensation either have to purchase commercial houses in the open real estate market or buy resettlement housing provided by government or developers. Both commercial housing and resettlement housing of low prices are typically far away from the city center in suburban areas with poor social, economic, and cultural infrastructure. The UDDH, mainly including most workers and farmers, have become the lower income and politically weaker class in urban areas and are easily forced to move to the suburban areas due to lack of sufficient political support.

China's central government has recognized the issues of segregation and marginalization due to this dual-track mechanism. A recent report issued by the Development Research Center of the State Council makes the case for market-based allocation of land, people, and capital [55]. In this report, a new model of urbanization for China pointed out two closely related priority areas 'reforming land management and institutions', which emphasizes more efficient use of land that requires stronger property rights for farmers, much higher compensation for land requisition, new and updated mechanisms for converting rural construction land to urban uses, and market-driven pricing for urban land allocation. The process of 'reforming urban planning and design', which promotes better use of existing urban land through flexible zoning, with smaller and mixed land use plots, would result in denser and more efficient urban development.

Under the transition from limited access societies to open access societies [15], central governments and local governments would pay more attention to the fairness of the institutional base, since the path dependence of residential relocations of different classes such as EGD and UDDH driven by the intermingled government intervention and market forces has caused a series of problems. Most of UDDH who belong to the lower income and politically weaker classes face further segregation and

high unemployment risk in the process of dual-track urbanization [17,56,57]. EGD are increasingly aggregated in the urban centers or certain suburbs and new urban areas with a high quality natural environment, and social and cultural infrastructure. It seems further institutional reforms, especially of and ownership and land leasing systems, need to be conducted in order to decrease the social inequity and better distribute the benefits from urban demolition and land development among different social strata.

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