

THE IMPACTS OF CHINA HOUSING REFORM ON RESIDENTS' LIVING
CONDITIONS

by

YAO LI

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Student: Yao Li

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This thesis has been accepted and approved in partial fulfillment of the requirements for the Master of Public Administration degree in the Department of Planning, Public Policy and Management by:

Yizhao Yang	Chairperson
Laura Leete	Member
Renee Irvin	Member

and

Richard Linton	Vice President for Research and Graduate Studies/Dean of the Graduate School
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Original approval signatures are on file with the University of Oregon Graduate School.

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THESIS ABSTRACT

Yao Li

Master of Public Administration

Department of Planning, Public Policy and Management

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Approved: _____
Yizhao Yang

China's housing reform has brought significant changes to housing supply and allocation. This thesis uses a 2005 survey of Beijing residents to examine how housing conditions vary among different housing sources and across various population groups. Results indicate that people who owned their housing reported better housing conditions (larger space and better satisfaction with open space and landscape quality) than renters; residents living in privately developed housing reported better conditions than those living in publicly developed housing. People at a younger age (<40) group and higher income residents relied on multiple housing sources to obtain homeownership, while older-age (>50) and lower-income residents relied on purchasing past public housing or public-subsidized affordable housing to achieve homeownership. This research shows that while the reform has led to more housing choices and better housing quality for urban residents, it also resulted in greater inequality in housing and environment qualities among different population groups.

CURRICULUM VITAE

NAME OF AUTHOR: Yao Li

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon, Eugene
Capital Institute of Physical Education, Beijing

DEGREES AWARDED:

Master of Public Administration, 2011, University of Oregon
Bachelor of Arts, 2009, Department of Journalism and Management, Capital
Institute of Physical Education, People's Republic of China

AREAS OF SPECIAL INTEREST:

Housing Policy

PROFESSIONAL EXPERIENCE:

Data Entry Assistant, Department of Geology, University of Oregon, Eugene,
Oregon, 2011

Research Assistant Intern, University of Oregon, Eugene, Oregon, 2010

Research Assistant Intern, Tsinghua University, Beijing, China, 2010

GRANTS, AWARDS, AND HONORS:

Travel Award, Planning, Public Policy and Management, 2011

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CHAPTER I

INTRODUCTION

1.1. Background

Chinese Urban Housing Reform officially started thirty years ago. This reform was aiming to transform housing allocation from a welfare provision to a market-oriented system. At the welfare allocation stage, the overwhelming majority of houses in China were state-owned and residents did not have ownership. It was a social obligation for both the government and the state-owned work units to build public houses or dormitories for citizens with nominal rent. Due to the insufficient financial support, this housing provision led to a critical shortage of houses as well as a lack of maintenance. In order to improve the inferior living conditions, Chinese government officially launched the housing reform in 1979. This reform raised the rent of public housing and allowed publicly owned houses to be sold to public sector employees.

As an important component of the whole economic reform in China, the urban housing reform was a gradual process. Pilot cities were selected to examine the feasibility of the various public housing reform measures in the 1980s (Wang & Murie, 2000a). In this period, the central government raised the average rent which attempted to cover the full maintenance fees and allow a portion of publicly owned houses to be sold to their sitting tenants. The government also allowed developers to construct commercial housing. As a consequence, a number of public housing units were sold at heavily discounted prices (Deng, Shen & Wang, 2009).

After several experimental years, the nation-wide housing reform began in the late 1990s. In the meantime, the affordable housing project was launched. Affordable housing was identified as a key source to improve the living conditions for middle- and low-income families by providing houses at a reduced cost (Y. Wang, 2004; Yang & Shen, 2008), whereas regular private commercial housing was expected to be purchased by high-income people. Therefore, by the end of the 2000s, as a large portion of public houses had been privatized and numerous houses had been supplied in the market, a dual-housing system was created. The main characteristics of this system are: a social housing supply would be expected to benefit middle- and low-income households by providing affordable housing; and a private housing market would be expected to satisfy the demand of high-income people (Y. Wang, 2004).

1.2. Theoretical Framework

Several studies have examined the discrepancies in housing conditions and residential environment conditions for different social groups depending on housing patterns and housing types based on tenure and source. Housing tenure is defined as ownership condition of housing. Generally speaking, it includes tenancy and owner occupancy, which was directly influenced by the housing reform policy in China. A large number of scholars from various fields have investigated the outcomes and results of the housing reform. Some of them examined the impacts on specific housing type, such as affordable housing and private commercial housing, since these two types of housing were developed rapidly over the past two decades. Some studies were focusing on

particular social groups, such as low-income households and floating population in terms of these two groups of people were more likely to be affected by housing privatization.

Apart from the research on public policy, planning, sociology and demography, theories in economic and finance also contributed as the framework for better understanding the outcomes and impacts from the housing reform on urban economic development and urban spatial redevelopment.

In all, many scholars have realized the significance of objective indicators of gauging the success of the housing reform, such as per capita living space, the functional designs of each house unit and the quality of residential buildings. These factors can objectively reflect the living conditions and changes resulted directly from the housing reform. Although subjective indicators have been considered by some researchers towards residents' subjective satisfaction levels, the number of them is quite limited.

1.3. Significance of the Study

China's urban housing reform has dramatically increased the housing supply and effectively mitigated the housing shortage in urban China. By the end of 2004, the average living space per capita has been enlarged to 24.9 sq. meters (Xinhua News Agency), instead of 4.5 sq. meters in the early 1950s and 3.6 sq. meters in the late 1970s. However, it created greater inequality issues in housing conditions and accessibility among different social groups. Additionally, in terms of residential satisfaction has barely considered to evaluate the reform, my research will expect to fill the gap. Overall, understanding the existing problems, such as the inequalities that were generated by the urban housing reform; and acknowledging residents' real feelings of the reform, for

instance, their satisfaction levels, are both crucial for policy makers to amend and improve the relevant policies.

1.4. Organization of the Thesis

The thesis is divided by six main chapters. The first one is the brief introduction of the background of my topic and the structure of the research.

Chapter II offers a detailed review of the housing history in China, including the pre-reform period and the whole urban housing reform process. In this section, a general description of the impacts of the housing reform is also provided. In the Chapter III, there is a selective review of literature associate with objective and subjective living conditions. In this chapter, main characters and methods used by other scholars are briefly summarized.

Chapter IV describes the methodology that I have used in this research. It contains a description of the study areas and data source, and the specific procedures that I have followed in this study.

Chapter V presents the results and findings of my study. And the final chapter provides a discussion of and conclusion drawn from my findings, followed by recommendations for future research.

CHAPTER II

PROCESS OF CHINA HOUSING REFORM

2.1. Living Conditions in Pre-reform Period and Housing Production

Almost thirty years ago, the overwhelming majority of houses in China were state-owned and residents did not have ownership. At that time, the government was socially obligated to build houses or dormitories for people, not for profit, and work-unit based public housing was dominant (Zhu, 2007). This housing system is called welfare allocation.

Under this system, the government allocated housing investment funds to various state-owned enterprises and institutions to build public houses for employees according to their seniority and position within the work unit (Lee, 2000). The housing was owned by the state or work units. Employees possessed the right to use by paying a nominal rent, which was unable to cover the maintenance fees or other expenditures related to housing services (Ye, n.a). This nominal rent made the work units and state have little incentive for housing investment and improvement (Deng, Shen & Wang, 2009). As a result, China experienced continuously deteriorating urban living conditions and a widespread housing shortage under the welfare allocation system. The per capita living space, for example, declined from 4.5 square meters in the early 1950s to 3.6 square meters in the late 1970s (Li, 1998). These increasing housing crises forced the government to put the housing reform on the agenda.

Unlike Eastern Europe and Russia where reform took the form of “shock therapy”, the pace of housing reform in China was a gradual process (Zhang, 2006). Since 1979, with the commencement of the reform and opening-up policy¹, China’s housing system began to switch from welfare allocation to a market-oriented housing system. There were four stages of the housing reform policy until now, including the experiment period, the nationwide reform period, the comprehensive nurturing period and the affordable housing expanding period.

During these periods, many publicly owned houses were sold to their existing tenants or other public sector employees. Large numbers of new houses were built by commercial property developers for the emerging urban housing market (Y. Wang, 2000). Meanwhile, the affordable housing project and low-rent housing project were introduced, creating a dual-housing provision system: a social housing supply providing economic and affordable housing for middle- and low-income households, along with a commercial housing supply for high-income families (Y. Wang, 2004).

After the efforts of these years, urban residents’ living conditions have been significantly improved, and the homeownership rate in China reached 80 percent in 2004. “In fact, homes have become the most important new form of private property for urban Chinese” (Feng, 2003).

¹ The Chinese economic reform refers to the program of economic reforms called "Socialism with Chinese characteristics" in the People's Republic of China (PRC) that were started in December 1978 by reformists within the Communist Party of China (CPC) led by Deng Xiaoping. The goal of Chinese economic reform was to transform China's stagnant, impoverished planned economy into a market economy capable of generating strong economic growth and increasing the well-being of Chinese citizens (wiki: Chinese economic reform)

2.2. Chinese Housing Reform

2.2.1. Experiment Period (1979 – 1987)

In this period of time, certain cities, such as Xi'an, Liuzhou, Wuzhou and Nanjing, were selected to test the feasibility of the various public housing reform measures (Wang & Murie, 2000a). The central government raised the average rent in an attempt to cover the maintenance fees, and allowed a portion of publicly owned houses to be sold to public sector employees and construct commercial houses by developers. As a consequence, a number of public housing units had been sold to their sitting tenants at heavily discounted prices (Deng, Shen, Wang, 2009).

However, at this stage, the housing reform in these cities moved slowly because it had to proceed within the communist political framework, the housing finance and provision was part of the social welfare system. Rent was still not enough to cover maintenance of the dwellings, and most people were unwilling to purchase privatized public housing. During this period, only 2,418 privatized public houses were sold with two-thirds of housing expenditures were paid by the local government and state-owned enterprises (Zhu, 2007).

2.2.2. The Nationwide Reform Period (1988 – 1997)

In this period, the central government clarified the goals of the reform, which was to launch the comprehensive housing reform based on previous experiences in experimental cities and to accelerate the housing privatization process. The core missions were to constantly increase the rent of public housing in order to cover the necessary

repair and maintenance fees, and to sell the public rental housing to individuals at the national level.

As a result, rent covered basic maintenance fees and the housing allocation system had to be delinked from the state-owned enterprises gradually (Lee, 2000); on the other hand, the reform was still met with some obstacles, such as older workers in state enterprises were reluctant to change their existing benefit position unless there were obvious new benefits, since these enterprises who would not allocate new houses for retired employees in the welfare allocation era (Lee, 2000).

According to this situation, in 1990 Shanghai first implemented the Housing Provident Fund to motivate people's willingness to purchase public housing. The Fund required both public-sector employers and employees to make a monthly contribution to the employee's housing saving account, and this account could only be used for housing purchases before the employee retires (Y. Wang, 2001). This policy was quite successful and was emulated by many other cities in China in the following years.

Apart from that, there were also some important reform policies that were enacted around 1994. They included the co-ownership of housing responsibility, the Comfortable Housing Project as well as the Housing Provident Fund system (Lee, 2000; Zhu, 2007). Co-ownership of housing responsibility means that the state and work unit were no longer automatically responsible for the provision of housing but shared by the state, the work unit and the individual as a whole (Lee, 2000). The Comfortable Housing Project (anju gongcheng) was launched in 1995, aiming to sell housing for middle- and low-income families not for profit. It was the precursor to the affordable housing project.

Therefore, due to the effects of all these policies, the government stopped bearing the full responsibility of housing allocation. And the transformation of China's housing market from welfare allocation to housing commercialization was implemented at the national level.

2.2.3. Comprehensive Nurturing Period (1998 – 2006)

During this period of time, aiming to continuously facilitate the housing privatization and establish a housing market according to income levels, the central government promulgated the following updated policies.

Primarily, in 1998, the State Department Policy No. 23 terminated the housing welfare allocation and pushed the process of monetization of housing allocation (Zhu, 2007). Thus, the government would no longer distribute housing to the public and would allow the market to adjust based on citizens' housing demand (Ye, n.a).

Second, the state formally launched the Affordable Housing Project and Low-rent Housing Project. The Low-rent Housing Project was aiming to solve the housing difficulties for low- or extremely low-income households, allowing them to rent public house with heavily discounted rent. The affordable housing project was designed for middle- and low- income families, providing market houses at a much lower price than the market price with certain ownership restrictions.

At this stage, as the reform deepened, the real estate market was growing dramatically. More housing had been provided and the housing market had been established successfully. According to the calculation of the China Statistical Yearbook, from 1997 to 2005 the annual housing investment amount increased by 6 times; the

annual total housing sale increased from 79 to 544 million m²; and the per capita floor space in urban areas rose from 17.8 m² to 26.11 m² (Ye & Wu, 2008).

Moreover, the multi-level housing system based on annual income levels was created: high-income households buy commercial housing, while low and middle-income households buy affordable housing. Unfortunately, this project did not receive enough attention from the government until 2007.

2.2.4. Affordable Housing Expanding Period (2007 – Today)

As the reform further developed, many housing affordability problems emerged since the market price of housing was escalating continuously. Meanwhile, less privatized public housing was available, reducing the amount of housing choices. Commercial housing would become the dominant feature if affordable housing did not exist, which would make it more difficult for middle- and low-income households to pursue homeownership. Therefore, in the recent three years, the government shifted attentions from housing commercialization to housing affordability.

In 2007, the State Department Policy No. 24 elucidated that local government should accelerate the development of affordable housing and low-rent housing, which formally marked the beginning of the affordable housing expanding period.

2.3. Overview the Impacts of Housing Reform

Overall, China launched a series of reforms since 1979. Like other housing reforms in European countries, it allowed “market forces and private enterprises to play an increasing role in the production and consumption of goods and services” (Wang &

Murie, 2000b). Thereafter, numerous policies had emerged to escalate the costs of rent and allow the emergence of a housing market with a new financial system. Home ownership elevated drastically through the reform, and housing privatization became one important element of economic reform in the late 1990s (Wang & Murie, 2000b).

The power of state's control over housing investment has shrunk. "Since the 1980s, the government has relaxed control over the use of work units' surplus and their funds" (Zhang, 2006). Instead, the government shifted its role to construct special projects for low- and middle- income households, and thus a rapid development of affordable housing and a low-rent housing supply was established. Based on Zhang's research: since 1995, a large scale of comfortable housing programs was launched, aiming to promote low-cost home ownership for low- and medium-income households and residents with housing hardships. The comfortable housing was only allowed to be sold for its production cost. In 1996, this program completed 15.8 million square meters floor space housing with a total investment of 12.5 billion yuan. The affordable housing project then followed, which is basically similar to the comfortable housing project. The only distinction between the affordable housing project and the comfortable housing project was that the price of affordable housing contains 3 percent of the profits. In 2010, more than 18 million middle- and low-income households moved to affordable housing communities (Zhang, 2010).

Generally speaking, China's housing reform directly influenced the housing types. Before the reform, people had very few choices of housing type. But after the transformation of the housing provision, more freedom for urban households had been obtained to choose their preferred tenure (renting or owning) and housing source (public,

private commercial or affordable housing) (Huang, 2003). The trend of homeownership of new housing units has been climbing since the 1990s. Homeownership rates rose from about a third in 1991 to about half in 1995, and to 72% in 2000 (F. Wang, 2003; Jiang, 2006). Until 2007, the homeownership rate had reached approximately 82 percent in urban China (Huang & Yi, 2011).

To date, as the housing stock in urban China grew dramatically, the housing choices were promoted (See table 1). To provide the adequate housing supply, 1.98 billion square meters of housing were built in Chinese cities and towns between 1949 and 1990 (Lee, 2000). In addition, residents' living space was also improved. According to Xinhua News Agency, in 2004 the average living space per person was 24.9 m², which was 21.4 m² larger than 1978 (Chen, 2003). Besides, housing investment also became an important part of state capital investment, and it had a tendency to increase. The total capital investment in residential buildings in the whole country was 2500.5 billion yuan in 2007, which is five times more than it was in 1995 (China Statistical Yearbook 2008).

The quality of life in neighborhoods and communities is also an important gauge to measure the achievements of the housing reform policy. According to Chen's research, quality of life has improved over the past two decades. For example, in China, more gated communities emerged in urban areas, which were more manageable and have a relatively high security condition; public facilities in new communities were supported and partially improved residents' quality of life; the quality and the design of housing and communities has improved based on people's perceptions; and more functionalized designs in relation to people's daily activities emerged in a large scale (Chen, 2003) (See table 2). These changes largely improved residents' quality of life as well as reshaped

their attitude towards housing and communities, although some old problems and inferior conditions were still a concern.

In sum, after twenty years of effort, the economical-based housing market has been established; housing ownership and tenancy both exist, more freedom regarding housing and the surrounding environment has been provided, and the government's control over the scale and patterns of housing investment has been heavily reduced (Zhang, 2006).

2.4. Problem Statement

Although urban households in China enjoyed more housing opportunities, it led to a more severe inequality issue toward housing allocation (Bian et al., 1997). In this section, I will be exposing some inequality issues due to the housing type mix in the current housing market, including housing quality, housing choice, community environment and accessibility.

First, in terms of the effects of the housing reform policy, more housing types had appeared. Normal public housing is built by work units or government, and affordable housing, including low-rent housing, is only built by the government. Private commercial housing is constructed by developers. Each type of housing faced different types of housing standards and dwellers. All these discrepancies created the inequality of living conditions – objective living conditions and subjective neighborhood environment assessments. Moreover, the household register system – hukou² – is crucial for housing choices, creating a deeper degree of inequality of living conditions. In urban China, only

² “Hukou equals an internal passport in China. It divided population into four groups based on birthplace (urban vs. rural) and registration status (permanent vs. temporary)” (Huang, 2003).

residents who have a permanent urban hukou can access public housing (including the affordable housing and low-rent housing). Rural or temporary hukou holders are only qualified for private commercial housing, which is not constrained by the individual's hukou status.

As the housing conditions and standards vary among different housing types, inequity is often embedded in housing provision and allocation processes in which various social groups have unequal accessibility toward different types of urban housing. Nevertheless, “ironically, equity is the goal of housing privatization” (Huang & Clark, 2002).

Table 1. Introduction to housing types

Type	Investing organization	Management	Ownership (valid years)	Residents	Market transaction
<i>Rent public housing</i>	Work units or governments	Work units	Government	Work units employees with permanent urban hukou	NA
<i>Own privatized public housing</i>	Work units or governments	Work units	Residents (70 years)	Work units employees with permanent urban hukou	Can be leased or sold by owners
<i>Rent private housing</i>	Developers	Developers or property management companies	Residents	No restrictions	NA
<i>Own private commercial</i>	Developers	Developers or property management companies	Residents (70 years)	No restrictions	Can be leased or sold by owners
<i>Affordable housing</i>	Developers (government subsidized)	Developers or property management companies	Residents (70 years)	Family annual income less than 60,000yuan with permanent urban hukou	Cannot be sold within 5 years since purchased; Government has the priority to purchase

Table 2. Housing related indicators over time

	1949-1956	Before 1979	1985	1990	1995	2000	2005	2005-
Average living space (sq. meter)	4.5	3.8	6.0	7.1	8.8	10.3	-21	30
Ownership rate	50%-90%	10%-15%		24%	-40%	72%	81.26%	83%
Building space		<30		40-50	50	65	83	
Housing quality and function	Inferior /room	Inferior /kitchen & bathroom, no living room			Different in quality/			Different in quality
Housing expenditure (% monthly income)	Rent: 2%-5%	Rent: 6%-8%		Rent: 10%	Rent: 10%-30% Mortgage: >=50%			
Average per capita property value (% total assets)	---	---		---	---	~1.05 million yuan (48%)		

(Source: Zhu, 2007; Wang & Murie, 1999)

CHAPTER III

REVIEW OF LITERATURE

Living conditions draw together multiple disciplines. Several scholars consider living conditions having housing conditions and environmental conditions of neighborhoods (Jiang, 2006; Dwyer, 1986; Feng, 2003). The indicators that serve the evaluation of housing and environment conditions are plenty. Many scholars explained this phenomenon in their research. They argued that housing conditions are complex concepts because they are context dependent and variable over time, and therefore no fixed 'objective' standards are able to comprehend them. (Lawrence, 1995; Wu, 2002). Lawrence also stated that housing conditions should explicitly link with the government housing policies and encompass qualitative aspects of the neighborhood environment.

The effects of living conditions are tremendous for individuals. For example, research shows that bad living conditions can lead to serious problems, such as poor mental and physical health, poor social relations in the home, and even detrimental effects on children (Baldassare, 1988; Gove and Hughes, 1983). And unfortunately, bad living conditions such as crowding in urban areas have long been recorded in China (Huang, 2003b). In turn, good living conditions, such as a healthy community, will improve people's quality of life (Cummins, 2000).

Living conditions are part of the quality of life, which has both an objective reality as well as a subjective dimension (Cummins, 2000; Marans, 2003). This chapter is organized by two sections in regard to living conditions and residents' living experiences. The first section will provide a comprehensive understanding of objective living

conditions, composed by several academic literatures contributing the objective living conditions. In the following section, an overview of quality of life and living experiences will lead the research to another angle – residents’ subjective residential satisfaction.

3.1. Objective Living Conditions

Research on living conditions has not stopped since the housing reform began (Clark et al., 1984; Dwyer, 1986; Wu, 2001; Chen, 2003; Jiang, 2006; Zhang, 2010). A number of studies have demonstrated the impacts that resulted from the housing reform policy by examining the living conditions based on housing types (Huang, 2003a; Huang & Clark, 2002; Feng, 2003; Jiang, 2006; Read, 2003; Chen, 2003; Wu, W., 2002 & 2004). In this section, I will examine the indicators that have been used by other scholars to evaluate objective living conditions, and how these factors affect people’s lives.

Objective living conditions were usually measured by living space, functionalized designs, housing facilities, accessibility to water, sanitation conditions, housing quality (Wu, W., 2002 & 2004; Jiang, 2006; Logan et al., 1999; Logan & Bian, 1993; Feng, 2003; Chen, 2003). Table 3 provides a summary of the indicators being used by other scholars.

Table 3. Measures of objective living conditions by other scholars

Objective Living Conditions	Measures	Literatures/articles
Living space/square footage/housing size	Per capita/ sq. meter	Wu, W., 2002 & 2004; Jiang, 2006; Logan et al., 1999; Feng, 2003; Chen, 2003.
Rooms per capita	Unit	Jiang, 2006; Huang, 2003b.
Housing facilities – Functionalized designs	Bedroom, kitchen, bathroom, bath or shower, living room, entry area, dinning area, service balcony, storage space, work area, other areas of serving residence.	Chen, 2003; Jiang, 2006; Wu, W., 2002 & 2004.
Housing facilities – Utilities	Public hot water supply, gas, cooking fuel, electricity, biomass, coal.	Jiang, 2006; Wu, W., 2002 & 2004;
Residential building quality	Building facade, sanitation conditions, construction material (concrete, brick or stone, wood, bamboo or grass, other).	Chen, 2003; Lawrence, 1995; Jiang, 2006.

In general, some scholars have examined the outcomes of the housing reform and agreed that the living conditions resulting from the reform have been improved. They also claim that the overall quality of housing has improved. More functionalized designs in relation to people's daily activities have emerged frequently since the 1980s (Y. Lee, 1988). Supporting this statement, Chen evaluated the housing quality of four experimental projects. He noted that even though some inferior living conditions were still unchanged, the housing quality had been promoted. Evidence showed that a number of people began to decorate the inferior homes according their own taste. This change reflected that people's attitude toward housing had also been developed with the improvement of living conditions (Chen, 2003).

Internal housing conditions are routinely measured by housing size and housing facilities over time (Jiang, 2006; Logan et al., 1999; Logan & Bian, 1993; Parsons, 1986; Chen, 2003). Due to the shortage and inferior conditions of housing supply before the housing reform in China, housing size and housing facilities – functionalized designs and public utilities – are crucial parameters to gauge the achievements of the reform.

According to prior research, urban citizens experienced a rapid expansion in per capital living space since 1980s. The average living space per capita ascended to 24.9 m² in 2004 from 3.6 m² in 1978 (Chen, 2003). Housing facilities also exceedingly improved. Chen (2003) evaluated the housing facilities through a pilot housing project. He noted that a few unit types were designed with a short corridor from the entry door to serve as a transitional space between the door and the main rooms; bedrooms were designed with larger space for the leisure purpose; dining rooms were designed for daily use and commonly found in the living room; and service areas were also highly concerned with

function. Yet, some major problems – such as monotonous housing forms, incomplete equipment, and low quality of construction – still existed (Feng, 2003; Tan, 1994).

Studies have reported that housing size and housing facilities varied differently depending on housing types (Huang & Clark, 2002; Huang, 2003a). Huang and Clark found a significant relationship between renters and owners on functional designs and living space. For example, they realized that owner-occupied housing on average is larger and the average rooms per person for owners is .3 more than renters' (Huang & Clark, 2002).

According to housing source, publicly developed housing provided by work units was usually featured with larger size, better functionalized designs and public utilities because the political power of the work units made them have more capacity to bargain with government authorities for financial support. (Logan & Bian, 1993). Affordable housing has an average 60m² housing size, which should be in the medium range of a city (Zhang, 2010). Private commercial housing was considered with large housing size and better housing facilities, because they were designed to sell at market price to high-income families (Read, 2003). The average housing size of the sold commercial housing in Beijing, for example, was almost 150 square meters per unit, which was far more than other types of housing (Beijing Real Estate Trade Organization). Finally, public rental housing has the relatively poor designs and small size (Huang, 2003a).

Objective living conditions has profound impacts on people's life, especially from the policy perspective. A rigorous way to evaluate a public policy is to examine whether the policy ensures equity for all the groups. The objective living conditions, however, is the measurable indicator to gauge the policy on equity acquisition. Feng (2003) notes that

housing conditions play an equal important role as income to measure the social and economic inequality. For instance, according to the statistics, the gap of the average living space between the extreme high-income group and extreme low-income group enlarged by 4 square meters (Zhang, 2010). This increase demonstrates that living space has been shifted to high-income group during these years. Consequently, Huang and Clark drew a link between this phenomenon and people's housing behaviors. They argued that the inequality of living conditions was resulted from the inequity of housing choice (Huang & Clark, 2002).

3.2. Subjective Residential Satisfaction

Resident environment, unlike the objective living conditions that can be simply measured by objective indicators, is more about the well-being and perceiving of the residents (Diener & Suh, 1997). Moreover, the primary focus of the effects of environment has tended to be on the individual rather than a boarder scale of analysis (Vemuri et al., 2011). Satisfaction is considered an appropriate indicator to investigate individual well-being and quality of life experience (Campbell et al, 1976). Many domains in regard to community and residence are applicable for examining satisfaction levels. Table 4 illustrated various areas being measured by satisfaction levels.

Other than the domains listed in Table 4, there are more areas that can be evaluated by satisfaction levels, for example, satisfaction in work and retirement, consumer satisfaction, satisfaction of public policy or other services (Scarpello & Campbell, 1983; Smith et al, 1969; Berkanovic and Marcus, 1976; Fornell, 1992). According to domains, scholars would choose different methodologies or approaches in

their research. The majority proportion of studies on people's well-beings were concentrated in developed countries, since the consistent, long-run data sets are more accessible (Conceição & Bandura, n.a).

Table 4. Domains being assessed by satisfaction levels by other scholars

Domains being assessed by satisfaction levels	Measures	Literatures/articles
Quality of life	—	Cummins, 2000; Appleton & Song, 2008.
Residential satisfaction	Degree of satisfaction from very satisfied to extreme dissatisfied.	Fang, 2005; Adriaanse, 2007; Phillips et al., 2005.
Overall housing satisfaction/housing comfort	Degree of satisfaction from very satisfied to very dissatisfied.	Wu, W., 2002; Frey et al, 2004; Appleton & Song, 2008.
Internal housing conditions (Housing size & housing facilities)	Degree of satisfaction from very satisfied to very dissatisfied.	Wu, W., 2004.
Environmental and neighborhood quality	Degree of satisfaction.	Kellekci & Berkoz, 2006.
Commute distance	Degree of satisfaction from very satisfied to very dissatisfied.	Wu, W., 2004.
Public policy	Degree of satisfaction from very satisfied to extreme dissatisfied.	Wu, F., 2003.
Consumer	f(expectations, perceived performance)	Fornell, 1992.
Job/social service/public goods	(Weighted) degree of satisfaction; yes-no response.	Scarpello & Campbell, 1983.

Quality of Life – A number of scholars acknowledged that quality of life is dependant on the individual's perspective, which is relevant to personal well-being (Diener & Suh, 1997). Studies identified many indicators, such as income, housing expenditure, physical attractiveness and intelligence, that correlate with well-being (Diener & Suh, 1997; Yang, 2008). Brock (1989) also defined three major approaches to determining quality of life. The first approach describes that quality of life is based on normative ideals – individual' religious, philosophical or other backgrounds. Second, the definition of quality of life is based on the satisfaction of personal preferences, pinpointing the things that people desire. Finally, he argued that quality of life is dependant on personal experiences.

Residential Satisfaction – Residential satisfaction is a major topic of several disciplines. It is an important component of quality of life (Lu, 1999). Residents' current environment and their desired environment largely affect residential satisfaction because the gap between them can create stress and dissatisfaction (Lu, 1999). Residents judge their current environment according to normative ideals, which is very similar to their judgment of quality of life. Through empirical studies, Lu (1999) concluded that the determinants of residential satisfaction were income, tenure, life cycle stages and housing quality. For example, homeowners will be more satisfied with their homes and neighborhoods than renters (Rohe and Basolo, 1997; Rohe and Stegman, 1994).

Residential satisfaction can be divided into two categories: housing satisfaction and neighborhood satisfaction (Lu, 1999; Morris et al, 2976).

Housing Satisfaction – Scholars frequently measure housing conditions by satisfaction levels. This does not rely on the respondents' ability to consider all relevant characteristics of a concept or consequences of a change of a social phenomenon (Frey et al, 2004). This method relies on people's ability to state their own satisfaction with their housing with some degree of precision. Appleton and Song (2008) examined the life quality and housing conditions by asking questions, such as "Considering all aspects of life, how satisfied are you?" Respondents answered the questions by circling themselves on a five scale multiple choice questionnaire, from very dissatisfied to very satisfied (Appleton and Song, 2008). Scholars can also synthesize the satisfaction degrees and other methods or indicators. For example, Wu's (2002 & 2004) research used a mix method, which combined the satisfaction level of migrants' current housing and the housing quality index to evaluate the overall housing conditions.

However, studies exploring objective–subjective relationships, such as housing conditions, have been proved limited. Research examining housing conditions only through gauging satisfaction levels is scarce (Marans, 2003).

Neighborhood Residential Satisfaction – Neighborhood or community environments are always evaluated by satisfaction levels (Jiang, 2006; Wu, W., 2004; Lawrence, 1995). In other words, the prevailing approach is to gauge the quality of community (Marans, 2003). According to previous studies, subjective neighborhood residential satisfaction can be measured by 1) residents’ subjective assessment of their neighborhood environment and 2) residents’ personal experiences or characteristics (Yang, 2008; Diener & Suh, 1997; Lu, 1999).

Determinants, such as income, tenure, life cycle stages, house size and quality, are crucial for residential satisfaction empirical studies (Lu, 1999). Many identical opinions from scholars studied in housing and neighborhood in the western world reported that being older and homeowner, high-income, having a relatively small family or large housing size would be related to more housing and residential satisfaction (as cited in Lu, 1999). Duration of residence, however, was shown to feature a positive effect on satisfaction levels in Marans & Rodgers’ research (1975). While in Onibokun’s study (1976), the effect is negative.

In China, though there were a few studies relevant to neighborhood residential satisfaction (Wong & Siu, 1998; Phillips et al., 2005; Ge & Hokao, 2004), the results were usually different due to the discrepancies of data collections and applied methods (Lu, 1999). Some scholars concentrated on specific groups rather than the society as a whole (Wu, W., 2002 & 2003; Jiang, 2006). Therefore, taking into account housing types

as the independent variables, inadequate studies have been done in this realm regarding the general society.

3.3. Conclusion of the Literature Review

In sum, numerable studies have investigated the objective living conditions and neighborhood environment qualities from various aspects related to the effects of Chinese housing reform. A growing number of literature also reported the increasing inequality in housing and neighborhood environments depending on housing types. For example, Huang (2003b) noted that housing type became an important factor for determining housing conditions, such as housing space and crowding conditions. Homeowners are more likely to have larger houses and less likely to suffer from residential crowding (Huang, 2003b).

Subjective residential satisfaction, on the other hand, provided information about the gap between citizens' current and desired living conditions. This approach has been commonly used by scholars to evaluate neighborhood environments (Phillips et al., 2005; Adriaanse, 2007; Vemuri et al., 2011; Yang, 2008). In China, residential satisfaction can also draw the attention of policy makers, regarding the housing reform policy. Fang (2005) examined the residential satisfaction in Beijing based on the mixed housing type and some controlling factors. She found that people's residential satisfaction had been enlarged during the relocation process of the housing reform, which needed to be manipulated by policy makers (Fang, 2005).

To date, few studies have considered both objective living conditions and subjective neighborhood residential satisfaction to evaluate the impacts of the housing reform in China. My thesis will fill the gap by addressing two research questions:

- To what degree do living conditions vary according to housing types and social groups?
- To what degree do residential satisfaction levels vary according to housing types and social groups?

CHAPTER IV

RESEARCH DESIGN AND METHOD

4.1. Study Area

I used the city of Beijing as the object of my study. Beijing is a fast-growing, dynamic metropolis in China with more than 10 million permanent residents and a floating population of over 7 million. It is representative because it broadly covers low-, middle- and high-income groups. Also, as the capital of China, Beijing is important in policy making and implementation (Y. Wang, 2001). It features a relatively complete and mature housing market, which includes all the types of housing that I need in my study. They are privatized public housing, rental public housing, privately developed commercial housing, rental private housing, affordable housing, low-rent housing, etc.

The housing market in Beijing has rapidly developed over the last fifteen years. In 2005, the area of latest completed residential construction was 28.4 million square meters, accounting for more than 13 % of the existing housing stock (Zheng & Kahn, 2008). Between 2004 and 2005, there were more than 960 new housing projects in Beijing.

Within Beijing, high-income residents locate near the city center, which is similar to most European cities and a few older American cities (Zheng et al., 2006). These places are also featured with more amenities and attract a more educated population (Waldfoegel, 2006). Figures 1 shows the map of Beijing.



Figure 1. The City of Beijing (Districts from number 1 to 4 are the inner city districts, districts number 5 to 8 belong to the middle city, and the rest area is the outer city).

4.2. Data Source

I took advantage of existing large-scale residential satisfaction survey data conducted in 2005. It had also been used in writing “A study of livable cities in China (Beijing)”, which was supported by the National Natural Science Foundation of China.

The data came from a questionnaire survey of 11000 participants throughout eight inner districts (Dongcheng, Xicheng, Chongwen, Xuanwu, Haidian, Chaoyang, Shijingshan and Fengtai District) and three outer districts (Tongzhou, Daxing and Changping District) in Beijing. The survey was sampled based on the distribution of population density, including questions about property rights, housing size, and other

aspects of residential satisfaction, such as transportation and commuting situations. Most interviewees cooperated with the surveyors with a positive attitude, which made nearly 8000 surveys eligible, and more than 6000 samples eligible for my study (Zhang, et al., 2006).

The main characteristics of this data set include: i) large sample size; ii) samples were selected from the “street level”; iii) most participants positively cooperated with the surveyors, which enhanced the confidence level; iv) survey was mainly conducted based on households of a family size of three; v) survey focused on young and middle aged people as well as middle- and low-income families; vi) interviewees were from various occupations.

The survey included question of residential satisfaction levels of urban residents in Beijing. According to the purpose of the survey, residential satisfaction was divided into six categories, including 32 indicators. These categories are: accessibility to neighborhood facility, neighborhood safety, neighborhood physical environment, neighborhood social environment, travel convenience and neighborhood pollution conditions (Zhang, et al., 2006).

The unit of the survey was households in urban Beijing, not including the floating population or travelers who had been in Beijing for less than six months. This sampling strategy considered that only residents who have been in Beijing for a long time are able to be deeply familiar with their living environment and housing conditions. The survey mainly used stratified sampling, systematic random sampling, convenience sampling and cross-control quota sampling (gender and age), as well as methods to secure the reliability, accuracy and representativeness of the data.

4.3. Analysis Plan

In this study, I employed the quantitative method to analyze the secondary data set that was collected in 2005.

Stage 1: Data Cleaning

At this stage, I selected variables that could be appropriate for my study. I disposed some ineligible data and categorized eligible variables into four categories. They are background information, housing types, objective indicators and subjective indicators. The variable selection process was guided by the literature and constrained by the information of the 2005 data set. One thing to notice is that I separated affordable housing from other housing types, because it was constructed by developers but benefited from subsidization by the government. Table 5 shows these variables and the measurements I employed.

Stage 2: Data Computation

Regarding background information, I specifically chose the moved-in year of the housing, housing location, family income and age. The moved-in year of the housing and housing location can directly reflect the outcomes of the housing reform policy, while the family's income level is crucial to an economic-oriented housing market. Although the housing market is still in the transition period, it might be affected by people's income in some degrees. Age is also important according to the literature.

I split the data into three categories based on the moved-in year of the housing, housing location, income and age respectively. For the moved-in year of the housing, the three groups are: housing obtained before 1995 (including 1995); housing obtained

Table 5. Variables been considered in the data cleaning process

Categories	Components	Type of measure/unit
Background	Age	Ordinal
	Gender	Nominal
	Education	Ordinal
	Housing location	Nominal
	Moved-in year of the housing	Nominal
	Family's monthly income	Ordinal
Housing types	Rented public housing	Nominal
	Rented private housing	Nominal
	Owned commercial housing	Nominal
	Owned privatized public housing	Nominal
	Owned affordable housing	Nominal
	Other types of housing	Nominal
Renter vs. Owner	Renter	Nominal
	Owner	Nominal
Housing source	Publicly developed housing	Nominal (rented public housing & privatized public housing)
	Privately developed housing	Nominal
	Affordable housing	Nominal
Objective indicators	Living space per capita	Ratio/sq. meter (square meters per person)
	Housing size	Ratio/sq. meter (square meters per house)
Subjective indicators	Daily shopping facilities	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Non-daily shopping facilities	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Restaurants	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Medical facilities	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Entertainment facilities	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Children's entertainment facilities	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Middle and primary schools	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Security	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Transportation;	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Calamities protection	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Urgent shelter	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Surrounding green areas	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Green areas in the community	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Sanitary	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Public areas	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Landscape	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Building density	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Relationships among neighbors	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Property management	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Community cultural	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Surrounding environment characteristics	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Public transportation utilities	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Traffic volume	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Convenient situation	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Daily travel convenience	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Travel convenience to inner city	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
	Vehicle exhaustion condition; air pollution	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best
Water pollution	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best	
Noise pollution from the road and plants	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best	
Noise pollution from schools and shops	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best	
Trash pollution	Degree of satisfaction from 1 to 5. 1 is the worst and 5 the best	

between 1995 and 2000; housing obtained after 2000 (including 2000). Since the data was collected in 2005, the final group could also be described as “the year between 2000 and 2005”.

I used a similar method to organize housing locations by districts. The subgroups are housing in the inner city, in the middle city and in the outer city. Other grouping strategies are shown below (See table 6).

Table 6. Grouping strategies

Variables	Subgroup	Components
Age	Below 30	Interviewee younger than 30 years old
	30-39	Interviewee between 30 and 39 years old
	40-49	Interviewee between 40 and 49 years old
	50-59	Interviewee between 50 and 59 years old
	Above 60	Interviewee older than 60 years old
Gender	Female	Female interviewee
	Male	Male interviewee
Education	Middle school or lower	Interviewee acquires or lower than a middle school diploma
	High school	Interviewee acquires a high school diploma
	Undergraduate	Interviewee acquires a undergraduate school diploma
Monthly Income	Graduate	Interviewee acquires a graduate school diploma
	Low	Less than 3,000 yuan per month
	Medium-low	3,000-4,999 yuan per month
	Medium-high	5,000-9,999 yuan per month
Location	High	More than 10,000 yuan per month
	Inner city	Dongcheng, Xicheng, Chongwen, Xuanwu
	Middle city	Chaoyang, Haidian, Shijingshan, Fengtai, Haidian
Outer city	Changping, Daxing, Tongzhou	
	Moved-in	
Year	Pre-1995	Housing obtained in or before 1995
	1995-2000	Housing obtained between 1995 and 2000
	Post-2000	Housing obtained in or after 2000 (2000-2005)

For the subjective satisfaction levels section, an example question from the 2005 survey is “how would you rate your daily travel convenience?” Answers were recorded on a scale of 1 to 5, with 1 being the worst and 5 the best. This is a commonly used method for measuring neighborhood satisfaction (Francescato, 2002; Galster & Hesser, 1981).

Since satisfaction levels were not equally important for all residential environments, the book “A study of livable cities in China (Beijing)” used the Experts Grading Method to weight the variables (Table 7 indicates the weighted values). Referring to the weighted value, I selected six variables from table 7. These variables are all graded higher than .20 by experts, which implies their significance. Also, these variables are normally difficult to change for property management companies, which can reflect the physical environment of a community. They are daily shopping facilities, green areas, landscape, public transportation services, travel convenience and noise pollution.

Finally, I computed the overall satisfaction levels using the following function:

$$\text{Overall satisfaction (x)} = \sum(x_1+x_2+\dots+x_6)/6$$

This equation indicates the computation of person x’s overall satisfaction towards the daily shopping facilities (x_1), green areas in the community (x_2), landscape of the community (x_3), public transportation services (x_4), travel convenience (x_5) and noise pollution (x_6).

Stage 3: Defining Dependent Variables, Independent Variables and Control Variables

Independent variables in my thesis are housing types. The dependent variables are divided into objective living conditions and subjective residential satisfactions. In the light of my first research question, at the objective living condition scale, the dependent variables are factors contributing the principal objective characteristics, which are measured by per capita living space (per capita square meters) and housing size (per unit square meters). Dependent variables for residential satisfaction are the six indicators associated with subjective satisfaction levels towards people’s neighborhood

environment. Variables related to background information are controlled. Tables 8 summarizes the independent variables, dependent variables and control variables.

Table 7. Weighted values for the computation of subjective residential satisfaction

	Main Category	Weighted value	Sub-category	Weighted value
Subjective residential Satisfaction	Satisfaction level of access to neighborhood facility	0.25	Daily shopping facilities	0.28
			Non-daily shopping facilities	0.09
			Restaurants	0.16
			Medical facilities	0.12
			Entertainment facilities	0.11
			Children's entertainment facilities	0.07
			Middle and primary schools	0.17
	Satisfaction level of neighborhood safety	0.30	Security	0.48
			Transportation;	0.35
			Calamities protection	0.07
			Urgent shelter	0.10
	Satisfaction level of neighborhood physical environment	0.12	Surrounding green areas	0.11
			Green areas in the community	0.33
Sanitary			0.26	
Public areas			0.13	
Landscape			0.26	
Building density			0.17	
Satisfaction level of neighborhood social environment	0.07	Relationships among neighbors	0.18	
		Property management	0.29	
		Community cultural	0.18	
		Surrounding environment characteristics	0.09	
Satisfaction level of travel convenience	0.15	Public transportation utilities	0.22	
		Traffic volume	0.25	
		Convenient situation	0.34	
		Daily travel convenience	0.17	
		Travel convenience to inner city	0.02	
Satisfaction level of neighborhood pollution conditions	0.11	Vehicle exhaustion condition; air pollution	0.16	
		Dirt or other pollution from plants	0.17	
		Water pollution	0.11	
		Noise pollution from the road and plants	0.25	
		Noise pollution from schools and shops	0.10	
		Trash pollution	0.20	

Table 8. Independent, dependent and control variables

Independent variables & Control variables		Dependent variables	
Categories	Components	Categories	Components
Housing types	Purchased commercial housing	Objective living conditions	Living space per capita
	Purchased privatized public housing		Housing size
	Rent commercial housing	Subjective residential satisfaction	Daily shopping facilities
	Rent public housing		Green areas in the community
	Purchased affordable housing		Landscape
	Other types of housing		Public transportation utilities
Control variables	Age, gender	Convenient situation	
	Family size	Noise pollution from the road and plants	
	Housing location	Overall satisfaction	
	Moved-in year		
	Family's income		

Stage 4: Statistical Analysis

At the final stage of my research, I did a descriptive analysis in advance, and thereafter I compared samples according to different housing types.

Descriptive Analysis – In this section, I chose the related variables to conduct a descriptive analysis. This method allowed me to infer the overall picture of objective living conditions, residents' assessment of their neighborhood environment as well as ownership conditions. The main variables I employed in this section are listed in Table 9:

Table 9. Variables been employed in the descriptive analysis

Characteristics
Housing size
Living space per capita
Housing size (large, medium large, medium small, small)
Moved-in year of the housing
Housing location
Family's monthly income
Age (below 30, 30-39, 40-49, 50-59, above 60)
Housing type
Residential satisfaction

Compare Means – After I created the descriptive analysis, I compared certain characteristics associated with objective living conditions and subjective residential satisfaction according to different housing types. This strategy is used oftentimes by other researchers (Yang, 2008; Greenberg, 1990; Jiang, 2006; Huang, 2003b; F. Wu, 2004). By observing the results, I could be aware of discrepancies among housing types.

First, I compared the objective characters, per capita living space and housing size, according to the geographic locations, housing obtained year, family's income and housing types. Second, I did a similar comparison of subjective residential satisfaction, including satisfaction levels derived from daily shopping facilities, green areas in the community, landscape of the community, public transportation services, travel convenience, noise pollution and overall satisfaction level of the community. Finally, I employed a multi-comparison method towards both the objective and subjective characters. This comparison focused on the impacts of housing regarding the influences of spatial location, housing obtained year and family income.

Regression (Pooled OLS regression) – In order to test how living conditions vary among different housing sources and across various population groups. The models regress subjective indicators on objective indicators, housing types, housing locations, moved-in year, family's income, gender, age and family size. The function is:

$$\begin{aligned} (\text{Subjective indicator})_i = & \beta_1 (\text{Categorized housing size}) + \beta_2 (\text{Housing type}) + \beta_3 \\ & (\text{Housing location}) + \beta_4 (\text{Moved-in year}) + \beta_5 (\text{Family's monthly income}) + \beta_6 \\ & (\text{Interviewee's gender}) + \beta_7 (\text{Interviewee's age}) + \beta_8 (\text{Family size}) + \alpha_i + \epsilon_i^3 \end{aligned}$$

Regression (Logistic Regression) – I also conduct a logistic regression. According to the raw questions, I merged the satisfaction level 1, 2 and 3 into the “unsatisfactory” group; while 4 and 5 the “satisfactory” group. The function is:

$$\begin{aligned} (\text{Being satisfied})_i = & \beta_1 (\text{Categorized housing size}) + \beta_2 (\text{Housing type}) + \beta_3 \\ & (\text{Housing location}) + \beta_4 (\text{Moved-in year}) + \beta_5 (\text{Family's monthly income}) + \beta_6 \\ & (\text{Interviewee's gender}) + \beta_7 (\text{Interviewee's age}) + \beta_8 (\text{Family size}) + \alpha_i + \epsilon_i \end{aligned}$$

³ ϵ = error.

In this model, the independent variable – Being satisfied – is a binary variable, which is coded as a 1 if the satisfaction level been rated is 4 or 5 and 0 otherwise (from 1 to 3).

CHAPTER V

RESULTS

5.1. Descriptive Analysis

5.1.1. Housing Type Makeup

Table 10 and table 11 show the frequency and percentage of the distribution of demographic indicators and the makeup of housing related indicators. There is a wide variation in the rate of housing depending on housing types. The biggest share out of all the housing types is owned by privatized public housing with 34%, which is 1.5 times more than owned private commercial housing and triple that of owned affordable housing. It also reports that ownership is the occupied type in Beijing, with twice as many owners as renters. Figure 2, figure 3 and figure 4 show the housing type makeup according to housing tenure and source. Based on the housing source, there are 53% of publicly developed housing, 35% of privately developed housing and 12.45% of affordable housing from the data set. This means that even though the government had terminated the public housing allocation in 1998, publicly developed housing was still the overwhelming housing source.

Figure 5 summarizes the geographic distribution of housing types in Beijing. Generally, most houses are located in the middle and inner city, while a small portion of houses are in the outer areas. One possible reason for this phenomenon is that the inner and the middle city are more functionalized, with more facilities and bigger populations than the outer city. Concerning the ownership, the sum of owners is always more than the

sum of renters in those three subareas of Beijing. In addition, except for rent public housing, all other types of housing are concentrated in the middle city. It may be because the space of the middle city (4 districts) is approximately 15 times the inner city (4 districts).

Table 10. Demographic characteristics

Variable	Frequency	Percent
Age		
Below 30	2,750	43.48%
30-39	1,431	22.62%
40-49	1,427	22.56%
50-59	572	9.04%
Above 60	145	2.29%
Total	6,325	100%
Gender		
Female	3,197	50.56%
Male	3,127	49.44%
Total	6,324	
Education		
Middle school or lower	501	7.92%
High school	1,704	26.94%
Undergraduate	3,760	59.45%
Graduate	360	5.69%
Total	6,325	100%
Monthly income		
Low (<3,000yuan)	1,697	26.83%
Medium low (3,000-4,999yuan)	2,389	37.78%
Medium high (5,000-10,000yuan)	1,750	27.66%
High (>10,000yuan)	489	7.73%
Total	6,325	100%
Moved-in year		
Pre-1995	3,609	57.07%
1995-2000	650	10.28%
Post-2000 (2000-2005)	2,066	32.66%
Total	6,326	

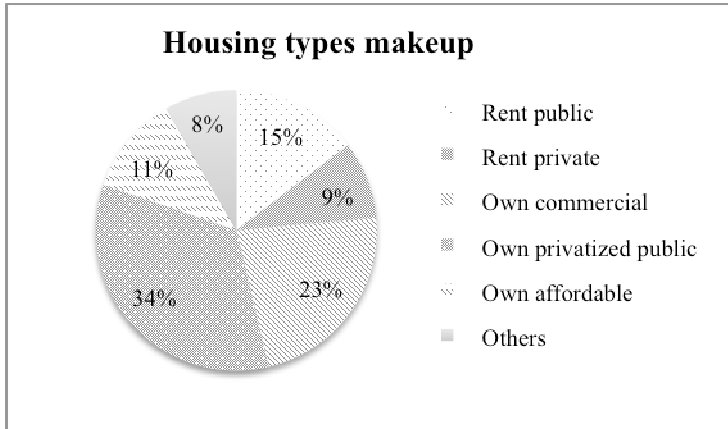


Figure 2. Housing Types Makeup by Housing Tenure and Source (overall)

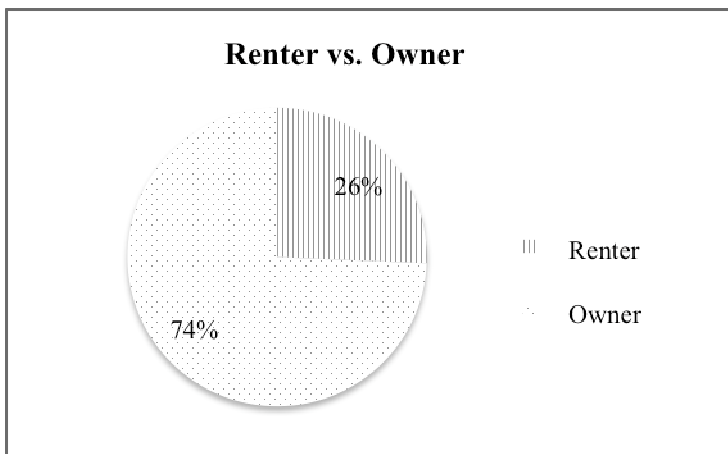


Figure 3. Housing Tenure Makeup (overall)

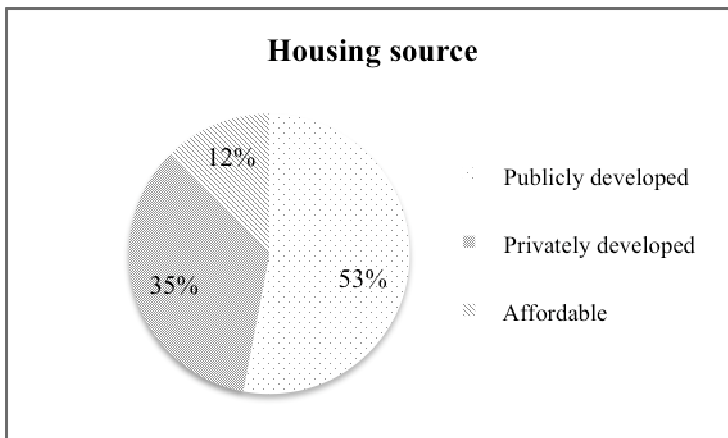


Figure 4. Housing Source Makeup (overall)

Figure 6 repeated the method used in figure 6. It indicates the distribution of housing over the years. For residents who moved into their current residence before 2000, more than 40 % reported privatized public housing with ownership. While after 2000, 39% of housing obtained is owned commercial housing, while the rate of owned privatized public housing dropped to 20 %.

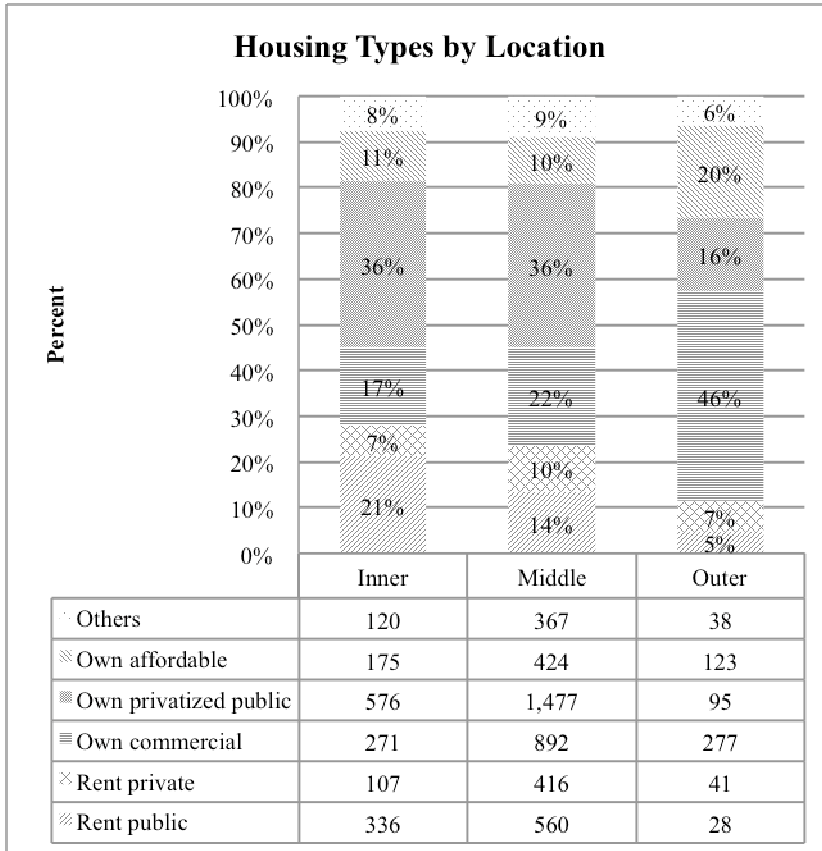


Figure 5. Housing Types by Locations

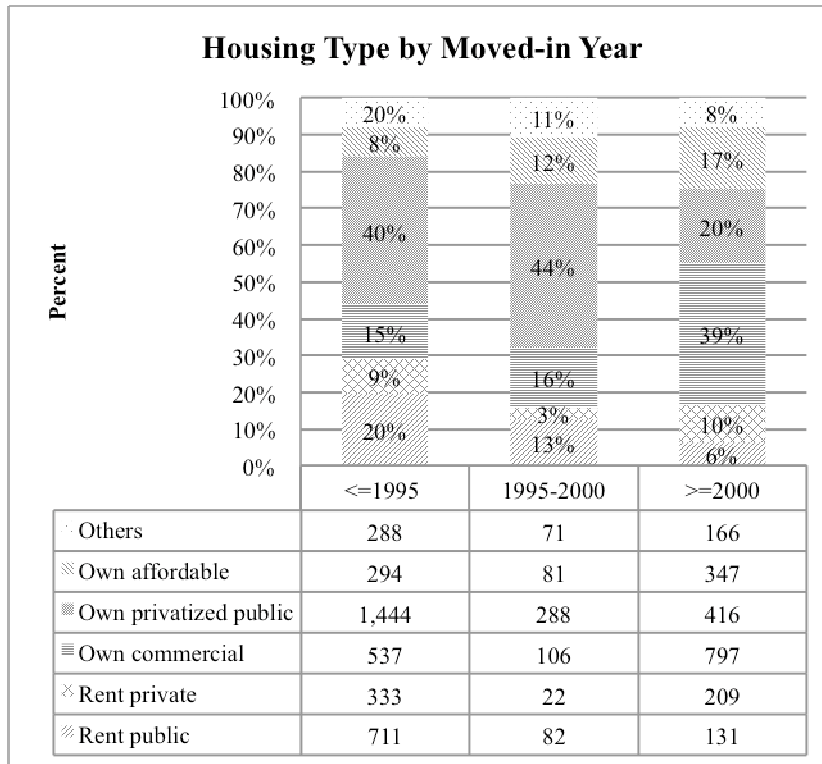


Figure 6. Housing Type by Moved-in Year

Moreover, public housing used to occupy the majority of the housing market before 2000. Since 2000, the dominant position has been replaced by privately developed housing due to the decline of public housing provision and the sharp increase in private commercial housing between 1995 and 2005. In fact, in 1998 the central government terminated the public housing allocation, and this could be the reason for the switch of the dominant type of housing source. But the former Minister of National Construction Department officially announced that housing allocation had been ended in most parts of China in 2000. Moreover, since there are more public institutions in Beijing, Beijing experienced a longer and more complicated housing privatization than other urban cities in China (Yang & Shen, 2008).

Table 11. Housing characteristics

Variable	Frequency	Percent
Housing size		
<=50 sq. meters	1,190	18.94%
51-89 sq. meters	3281	52.23%
90 -119 sq. meters	1226	19.52%
>=120 sq. meters	584	9.30%
Total	6,281	100%
Location		
Inner city	1,586	25.07%
Middle city	4,137	65.41%
Outer city	602	9.52%
Total	6,325	100%
Ownership		
Renter	1,488	25.66%
Owner	4,310	74.34%
Total	5,798	100%
Housing type		
Rent public	924	14.61%
Rent private	564	8.92%
Own commercial	1,440	22.77%
Own privatized public	2,148	33.97%
Own affordable	722	11.42%
Others	525	8.30%
Total	6,323	100%

Figure 7 reports the distribution condition of housing types according to family's income levels. It shows that rent public housing and owned privatized public housing are the main housing sources for low-income families. The proportion of rent private housing is also higher than that in other groups. The percentage for the owned private commercial housing for high-income families is 43 percent, which is 27 percent more than that of the low-income families. Affordable housing, on the other hand, should not have been available for high-income families. However, 13 percent of high-income households were living in affordable houses.

Housing types distribution by interviewee's age is shown in Figure 8. Based on the figure, the overwhelming tenants of private housing are below 30. Though the

dominant housing type for them is privatized public housing with ownership, this proportion is relatively lower than that for other groups. Almost half of the people over 60 years old are living in owned privatized public housing. Thus, there is a tendency that older people are more likely to live in owned privatized public housing than younger people. Besides, the proportions of living in affordable housing for people less than 50 years old are pretty much the same with people above 60.

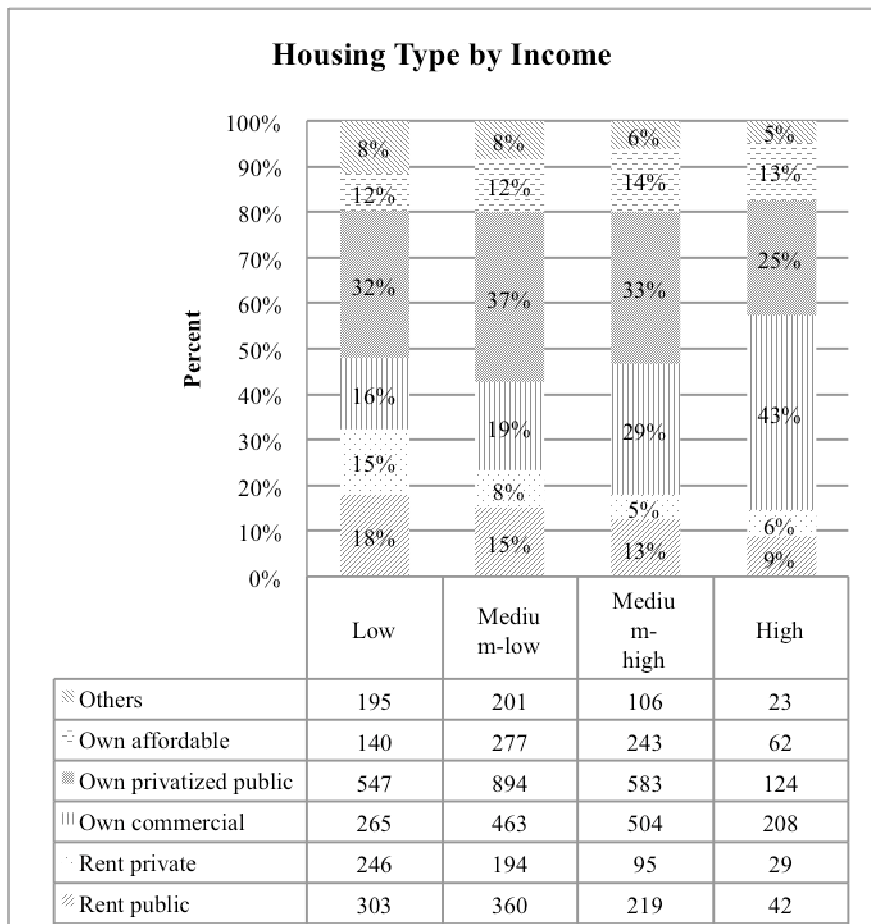


Figure 7. Housing Type Makeup by Income

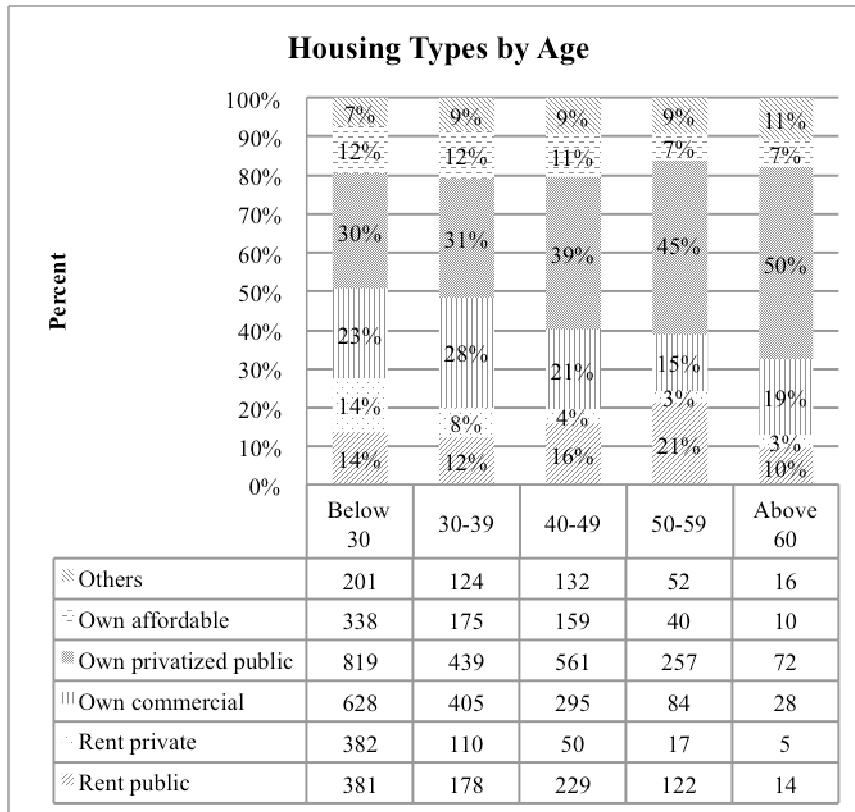


Figure 8. Housing Type Makeup by Age

5.1.2. Objective Character Analysis

In table 12 the observations, means, standard deviations, minimum values and maximum values are all provided. First, regarding objective living conditions, the maximum values are all provided. First, regarding objective living conditions, the average living space per capita for all types of housing is 35 sq. meters, while the average housing size is 76 sq. meters. The range of the average per capita living space is from 10 sq. meters to 65 sq. meters, and housing size ranges from 45 sq. meters to 107 sq. meters.

Table 12. Description of Objective Indicators

Category	Observation	Mean	Std. Deviation	Minimum	Maximum
Living space per capita	6281	35.4485	24.9280	2	260
Housing size	6281	76.1016	31.4860	8	300

Table 13 shows the observations, means, standard deviations, and minimum and maximum values of living space per capita and housing size based on the geographic distribution, timing distinctions and income levels. For per capita living space, the average of the outer city is 41.54 sq. meters, followed by 36.03 sq. meters in the middle city and 31.58 sq. meters in the inner city. The standard deviation for the inner city is 22.79, which is the smallest compared to others. This means that the living space per capita in the inner city has the smallest variation compared to the middle and outer cities. The maximum value depending on subareas (inner, middle and outer city) is 260 sq. meters, which is in the middle city. The smallest maximum value is 150 sq. meters in the outer city. The basic distinctions among groups and the variations within a group of per capita living space are basically the same for housing size. The only distinction is that the smallest standard deviation is found in the outer city.

Based on the year range, after the drastic increase of housing supply since 2000, the biggest per capita living space has become 40.25 sq. meters, which is approximately 5 sq. meters larger than it was from 1995 to 2000, and almost 8 sq. meters larger than it was before 1995. Aside from that, with the raise of living space per capita and housing size, the variations over time have also been enlarged by 2.2 sq. meters for per capita living space and 10.8 sq. meters for housing size from 1995 to 2005. Echoing the increase of private commercial housing over this period, this enlargement of variations could possibly be influenced by the increasing number of commercial housing since the space of it varied according to the demands of different kinds of residents.

According to the income levels, the highest average living space per person is 41.61 sq. meters for high-income households. Interestingly, the mean of low-income

households for the living space per capita is 36.30 sq. meters, which is followed by the high-income households and larger than middle-income families. Yet for the housing size, the order of the means descends with income levels (high to low).

The significances of variances according to geographic locations, timing, family's monthly income and housing types toward objective indicators (per capita living space and housing size) are discussed below:

Geographic Locations – Results show that there is a statistical significance between geographical location and living space per capita (See table 13). And the significance of housing size is the same as that of living space per capita. On average, living space per capita is larger in outer districts than in middle and inner districts. The per capita living space in the inner districts is 31.58 sq. meters, 36.03 sq. meters in middle districts and 41.54 sq. meters in outer districts.

Timing Distinctions – Table 13 also demonstrated the changes of objective living conditions over three periods: “years before 1995”, “years between 1995 and 2000” and “years after 2000”. According to statistical tests, there is a strong statistical relationship between housing size and time span. On average, houses obtained after 2000 are larger than houses obtained before. The average increase of housing size also increased over the years. The same tendency happened to living space per capita as well.

Income Levels – In a market-oriented housing provision, people's income level will affect their housing quality and living conditions dramatically. However, in a transition housing market such as China's, the effects could be possibly alleviated sometimes.

According to table 13, housing size is significantly associated with family's income levels. On average, housing size grows with the increase of family's income level. The average housing size for low-income families is 66.40 sq. meters, which is 33 sq. meters less than the average housing size for high-income families.

Housing Type Impacts – Table 13 shows a wide variation among housing types. For example, the maximum average per capita living space is 42.75 sq. meters of owned commercial housing, while for the rent public housing, the living space per capita is 27.56 sq. meters. The disparity is statistically significant. Moreover, the mean of living space per capita of affordable housing is close to that of owned commercial housing, and the standard deviation is approximately 2 less than that of owned commercial housing. This means that the variation of per capita living space of affordable housing is smaller than owned private commercial housing's.

The housing size, on the other hand, is also affected by housing types. The mean of the housing size of owned privately developed housing is the biggest with 94.31 sq. meters. The rent private housing type has an area of 52 on average, which is the smallest among all the housing types. The significance of housing size among the independent variables in the housing group is exactly the same as the per capital living space.

In addition, dividing the average per capita living space by the housing size will produce the average family size for each type of housing. For example, the average family size of the rent public housing residents is 2.18 ($60.31/27.55$), while the average family size of the rent private housing residents is nearly 1.58 ($51.94/32.93$). In sum, except for rent private housing, the average family sizes for all other types of housing residents are above 2 in the "Housing type" group in table 13.

Table 13. Description of Objective Indicators by Different Parameters

	Observation	Mean	SD	Min	Max
Living space per capita					
Location					
Inner city	1571	31.5810	22.7879	3	200
Middle city	4108	36.0346***	25.3676	2	260
Outer city	602	41.5415***	25.7008	3.3333	150
Moved-in year					
<=1995	3571	32.6843	22.9306	2	260
1995-2000	648	35.3961	23.9975	3	160
>=2000	2062	40.2521***	27.6687	2.5	230
Income level					
Low income	1672	36.2994	28.3117	2	236.4
Medium-low income	2377	33.6127**	22.6597	2.5	260
Medium-high income	1743	35.4063	23.2436	2.5	200
High income	489	41.6132***	27.6876	6.5	220
Age					
Below 30	2713	44.5160	30.3528	2.5	260
30-39	1431	32.0431***	19.7476	2.5	200
40-49	1422	26.0773***	12.9765	3	110
50-59	571	25.8912***	15.3291	2	120
Above 60	144	28.8942***	18.7236	3	126
Housing type					
Rent public	915	27.5579	20.9523	2.5	200
Rent private	561	32.9984***	26.6708	2.5	260
Owned commercial	1438	42.7506***	27.2541	7	220
Owned privatized public	2121	32.9468***	22.5399	3	236.4
Owned affordable	722	41.8723***	25.9585	4.4667	193
Others	522	33.0989***	23.5613	2	230
Housing size					
Location					
Inner city	1571	69.1734	28.3249	8	300
Middle city	4108	76.8959***	32.4897	9	300
Outer city	602	88.7615***	27.5584	10	208
Moved-in year					
<=1995	3571	69.3289	28.2947	9	300
1995-2000	648	76.8444***	24.9248	9	280
>=2000	2062	87.5973***	35.0303	8	300
Income level					
Low income	1672	66.4049	30.5500	8	236.4
Medium-low income	2377	73.6777***	27.5130	10	300
Medium-high income	1743	82.1425***	29.3822	10	300
High income	489	99.5068***	42.0078	13	300
Age					
Below 30	2713	75.4018	31.1874	8	300
30-39	1431	77.8108	30.8071	9	300
40-49	1422	75.6829	30.8643	10	300
50-59	571	75.5280	35.7152	9	300
Above 60	144	78.7101	31.6374	12	200
Housing type					
Rent public	915	60.3132	26.2665	10	300
Rent private	561	51.9755***	27.9144	8	260
Owned commercial	1438	94.3138***	31.0398	20	300
Owned privatized public	2121	71.8593***	24.3472	10	300
Owned affordable	722	87.2121***	27.9924	13.4	200
Others	522	81.5485***	38.5796	10	300

The first rows (inner city, <=1995, low-income, below 30 and rent public) are the reference groups in mean comparison. ***p<.001 **p<.01 *p<.05

5.1.3. Subjective Character Analysis

Considering subjective living conditions (See table 14), the average score of overall satisfaction is 3.38 (Std. Deviation =.5), which is above the medium (2.5). This indicates that on average, residents are satisfied with their current residential environment. According to the data, 3 (neutral) and 4 (satisfactory) are most frequently chosen by people.

To be specific, the mean of the satisfaction levels for daily shopping facilities is the highest, while the mean for landscape is the lowest. The average satisfaction level for green areas is 3.33, which is higher than the satisfaction for landscape. This could possibly imply that planners or developers did not fully take advantage of the green spaces to make them beautiful landscapes. Furthermore, Beijing is a typical example of a mixed land-use development city. People shop on a daily basis. Therefore, either housing developers or residents pay close attention to the proximity of shopping facilities in communities, which under some circumstances stimulates the development of those facilities, such as grocery stores and super markets.

Table 14. Description of Subjective Indicators

Category	Observation	Mean	Std. Deviation	Minimum	Maximum
Daily shopping facilities	6318	3.7437	.8062	1	5
Green areas	6303	3.3319	.9644	1	5
Landscape	6203	3.0714	.9061	1	5
Public transportation	6270	3.6155	.8310	1	5
Travel convenience	6255	3.2747	.8929	1	5
Noise pollution	6271	3.2130	1.1114	1	5
Overall	6048	3.3849	.5485	1	5

Table 15 indicates the overall satisfaction level according to different parameters. They are location, moved-in year, family's income and interviewee's age. It shows that income level and age are two important characters that significantly affect the overall

satisfaction level. On average, high-income people have higher satisfaction levels than the low-income people; and the middle-aged are the least satisfied with their residential environment.

Table 15. Description of Overall Satisfaction Level

	Observation	Mean	SD	Min	Max
Location					
Inner city	1519	3.4073	.5658	1	5
Middle city	3960	3.3712	.5431	1.1667	5
Outer city	569	3.4200	.5364	1.1667	4.8333
Moved-in year					
<=1995	3446	3.3838	.5551	1	5
1995-2000	625	3.3437	.5174	1.3333	5
>=2000	1977	3.3997	.5460	1.1667	5
Income level					
Low income	1588	3.3086	.5918	1.1667	5
Medium-low income	2285	3.3681**	.5289	1	5
Medium-high income	1701	3.4380***	.5195	1.3333	5
High income	474	3.5309***	.5462	1.8333	5
Age					
Below 30	2660	3.4298	.5530	1	5
30-39	1379	3.4040	.5105	1.1667	5
40-49	1344	3.3390***	.5634	1.1667	5
50-59	531	3.2476***	.5429	1.5	5
Above 60	135	3.3062	.5839	1.3333	4.5

The first rows (inner city, <=1995, low-income and below 30) are the reference groups in mean comparison.

***p<.001 **p<.01 *p<.05

Housing Type Impacts – Compared to location, moved-in year and income, more specific research has been done according to housing types. In general, there are statistical differences within the “Renter vs. Owner” and “Housing source” groups (See table 16 and table 17). The statistically significant differences have not frequently appeared among the housing type groups in regard to subjective living conditions (See table 18).

There is no statistically significant difference between renters and owners for daily shopping facilities. On average, publicly developed housing residents are more satisfied with daily shopping conditions than residents in other housing sources. The

mean of the satisfaction level of daily shopping facilities for publicly developed housing residents is 3.73, which is .06 higher than that of privately developed housing residents and .08 higher than that of affordable housing dwellers. In table 18, the housing types that have higher scores than average for the daily shopping facilities are rent public housing, owned commercial housing and owned privatized public housing. However, the variations among these groups are not statistically significant.

For the green areas and landscape assessment, there is no statistically significance in the satisfaction levels of green areas between renters and owners. Nevertheless, the averages for landscape satisfaction are different. The mean of the satisfaction level for homeowners is .22 higher than tenants'. Additionally, both privately developed housing and affordable housing have slightly higher means than the mean for publicly developed housing for landscape, and these discrepancies are statistically significant. Privately developed housing owners gave the green areas a 3.53 rating on average, and gave landscape a 3.27. These values are higher than all the residents' ratings for these two variables. Statistical tests have verified the significance of this difference.

ANOVA tests also demonstrate more statistical significances between renters and owners. For instance, moderate statistical significance exists between renters and owners according to the satisfaction level of public transportation services and travel convenience. Compared to the different satisfaction levels of public transportation and travel convenience between affordable housing homeowners and public housing tenants, the distinction has been enlarged by .06. This difference also echoed the hypothesis that I made earlier in this chapter that more public services might not guarantee a significant increase in travel convenience.

There is a significant difference concerning the satisfaction levels for noise pollution, which occurs between the renters and owners for all housing types. The difference is .07, which is fairly small. Owners are more satisfied than renters on this indicator (See table 16).

In the end, the overall satisfaction levels varied among several housing types according to the statistical tests. First, homeowners have a higher overall satisfaction level towards their residential environment than tenants on average. Second, the mean of privately developed housing residents for the overall satisfaction level is higher than publicly developed housing dwellers by .07. Finally, the average satisfaction level for the overall residential environment of commercial housing owners is significantly higher than any other residents who live in a different housing type.

5.2. Correlation Analysis

Table 19 shows the results from statistical tests of the relationships between objective and subjective indicators.

According to the correlation test, the relationship between objective indicators and green areas or landscape is statistically significant. To be specific, an increase in per capita living space is associated with an increase for the satisfaction level of green areas and landscape satisfaction. Moreover, an increase of housing size is associated with an improvement for the satisfaction level of green areas and landscape as well. The relationship between objective indicators and transportation related subjective indicators (public transportation services and travel convenience) is negative, meaning the increase in housing space will lead to lower satisfaction levels for traffic conditions.

Table 16. Subjective Characters by Housing Tenure Types

	Renter		Owner	
Daily shopping facilities	3.7500	.8262	3.7612	.7954
Green areas	3.2152	1.0056	3.4070	.9393
Landscape	2.9350	.8972	3.1516***	.8940
Public transportation	3.6606	.8358	3.6144	.8250
Travel convenience	3.3324	.8853	3.2702*	.8929
Noise pollution	3.1714	1.1372	3.2374*	1.1005
Overall	3.3614	.5300	3.4149***	.5490

The first column (renter) is the reference group in the mean comparison
 ***p<.001 **p<.01 *p<.05

Table 17. Subjective Characters by Housing Sources

	Publicly developed		Privately developed		Affordable	
	3.7906	.8229	3.7283*	.7719	3.7046*	.8011
	3.2785	1.0004	3.4535***	.9117	3.4300***	.8856
	3.0030	.9269	3.1936***	.8545	3.2258***	.8600
	3.6288	.8411	3.6611	.7991	3.5189***	.8422
	3.2962	.9002	3.3189	.8644	3.1545***	.9163
	3.2016	1.1210	3.2436	1.0989	3.2368	1.0963
	3.3779	.5621	3.4433***	.5128	3.3854	.5475

The first column (public built) is the reference group in the mean comparison
 ***p<.001 **p<.01 *p<.05

Table 18. Subjective Characters by Housing Types

	Rent public		Rent private		Own commercial		Own privatized public		Own affordable		Others	
Daily shopping facilities	3.7950	.8364	3.6755	.8059	3.7490	.7574	3.7886	.8173	3.7046	.8011	3.5840***	.8195
Green areas	3.1887	1.0292	3.2585	.9650	3.5295***	.8788	3.3170**	.9856	3.4300***	.8856	3.0460	.9667
Landscape	2.9058	.9117	2.9835	.8712	3.2743***	.8343	3.0444***	.9304	3.2258***	.8600	2.7968	.9326
Public transportation	3.6583	.8298	3.6643	.8463	3.6599	.7801	3.6161	.8458	3.5189*	.8422	3.500**	.8568
Travel convenience	3.3388	.8793	3.3219	.8958	3.3163	.8522	3.2779	.9086	3.1545***	.9163	3.1476***	.9026
Noise pollution	3.2096	1.1345	3.1089	1.1399	3.2964	1.0782	3.1981	1.1153	3.2368	1.0963	3.1329	1.1218
Overall	3.3693	.5339	3.3481	.5228	3.4800***	.5043	3.3815	.5737	3.3854	.5475	3.3854***	.5475

The first column (rent public) is the reference group in the mean comparison
 ***p<.001 **p<.01 *p<.05

The satisfaction level for noise pollution is also associated with those objective indicators. Yet there is only a moderately significant relationship between the satisfaction level of noise pollution and per capita living space. However, the significance is strong for the relationship between housing size and noise pollution satisfaction. The relationship between the objective indicators and subjective satisfaction level of noise pollution is positive, implying that the larger housing is associated with a relatively peaceful environment.

Table 19. Relationships between Objective Characters and Subjective Characters

Subjective	Objective	
	Living space per capita	Housing size
Daily shopping facilities	.0085	.0024
Green areas	.1189***	.1651***
Landscape	.1370***	.1656***
Public transportation	-.0128	-.0158
Travel convenience	-.0085	-.0061
Noise pollution	.0316*	.0593***
Overall	.0720***	.1018***

***p<.001 **p<.01 *p<.05

5.3. Pooled OLS Regression Analysis

In all cases, the coefficient for family's income is positive. It shows that a higher family income may lead to a better satisfaction level towards people's residential environment. Negative coefficients are also commonly caused by age, which means that older people may be more likely to suffer from unsatisfying residential environments than younger people. Most coefficients on moved-in years are negative, except for green areas. This articulates that residents who moved in a house before 1995 felt more satisfied with their neighborhood environment. But for the green area, they felt less satisfied compared to the residents who moved in their houses later.

Table 20 represents that accessibility to daily shopping facilities for rent public housing is significantly better than rent private housing and affordable housing (the group of “other” is excluded), although the significance of this level is fairly slight. The coefficient for the distance from the city center is negative, meaning that people living farther from the city center are less satisfied with their shopping conditions.

Looking at the satisfaction levels for green areas shows that the coefficient for housing size is significantly positive, meaning that residents living in larger housing are more satisfied with the green areas of their community. And it also means that objective indicators can compensate for people’s satisfaction levels for green areas, and vice versa. Furthermore, people living in privately developed housing with ownership are more satisfied with the green areas of the community than public housing tenants.

It is logical to assume some similar coefficients for landscape and green areas (See table 20). The relationship between the housing size and the satisfaction level for landscape is strongly significant, holding other indicators constant. Owned privately developed housing, owned privatized public housing and affordable housing all feature significantly higher satisfaction levels for landscape than rent public housing does. The coefficient for location is ambiguous and not significant. Family size also has a significant negative coefficient for landscape. An additional person in the family can result in a .04 decrease for the satisfaction level of landscape.

Table 20 also represents the impacts of housing type on satisfaction of public transportation services. The coefficient for affordable housing is negatively significant. This means that residents living in affordable housing are unsatisfied with their public

transportation services. This may result from the location, since a large number of affordable housing communities are located in places that are far away from the city center. In this model, the coefficient for housing location is negative, representing the negative relationship between the distance from the city center and the satisfaction level of public transportation services.

The coefficient for affordable housing is significantly negative according to the satisfaction level of travel convenience. To link the negative coefficient with the satisfaction of public transportation, it can be interpreted that residents living in affordable housing have to experience relatively bad travel conditions, which may generate a longer commuting time and bad accessibility to other places.

Table 20 includes the coefficients for the satisfaction of noise pollutions. There is strong statistical significance in the coefficient for outer ring residents' satisfaction levels, meaning that they are enjoying a more peaceful neighborhood environment than inner city residents. Apart from that, tenants in private housing are more likely to suffer from a noisy environment.

For the overall satisfaction level, the table shows that there is a positive coefficient for housing size. It means that there is a trade-off between overall residential satisfaction and the objective indicator, meaning the overall satisfaction level can be increased by either improving the neighborhood environment, especially green areas and landscape, or by enlarging the housing size. Aside from that, middle city residents may be least satisfied with their neighborhood environment compared to residents in other locations.

Finally, each of the statements above is under the condition of holding the rest indicators constant.

5.4. Logistic Regression Analysis

The results from the logistic regression analysis are quite similar with the results from the OLS regression analysis (See table 21). However, the overall satisfaction level in the logistic regression analysis shows that residents living in commercial housing will be more satisfied with the overall residential environment, holding other indicators constant. On the other hand, income increase becomes less effective for increasing residential satisfaction. Only people at the high-income group are more likely to be satisfied with their neighborhood than people at the low-income group, holding other parameters constant. The coefficient for age is also less significant in this analysis. Result shows that only people from 30 to 39 are significantly less likely to be satisfied with their residential environment. And interestingly, people above 60 years old are more likely to be satisfied with the overall neighborhood environment. But this relationship is not statistically significant.

Table 20: Pooled OLS Regression

	Daily shopping	Green areas	Landscape	Public transportation	Travel convenience	Noise pollution	Overall
N	6271	6256	6158	6223	6209	6224	6003
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Housing size							
Small (<=50 sq. m)	–	–	–	–	–	–	–
Medium-small (50-89 sq. m)	.0230	.2192***	.1400***	.0229	.0013	.0027	.0623**
Medium-large (90-119 sq. m)	-.0191	.2953***	.2316***	-.0671	-.0599	-.0149	.0526*
Large (>=120 sq. m)	-.0009	.3879***	.3916***	-.0456	-.0017	.1803**	.1501***
Housing types							
Rent public	–	–	–	–	–	–	–
Rent private	-.1035*	.0365	.0652	.0248	.0220	-.1265*	-.0143
Owned commercial	-.0406	.1216**	.2021***	.0202	.0043	.0082	.0521*
Owned privatized public	-.0103	.0451	.0836*	-.0432	-.0579	-.0282	-.0101
Owned affordable	-.0843*	.0615	.1843***	-.1232**	-.1554***	-.0305	-.0284
Others	-.1737***	-.2307***	-.1564**	-.1187**	-.1467**	-.0900	-.1685***
Locations							
Inner city	–	–	–	–	–	–	–
Middle city	-.1057***	.0647*	-.0497	-.0624*	-.0751**	-.0383	-.0507**
Outer city	-.1632***	.1227**	.0502	-.0390	-.0803	.1848***	-.0051
Move-in year							
Pre-1995	–	–	–	–	–	–	–
1995-2000	-.0453	.0172	-.0329	-.0542	-.0558	-.0485	-.0361
Post-2000 (2000-2005)	-.0609*	.0692*	-.0038	-.0551*	-.0542*	-.0403	-.0250
Monthly income							
Low (<3,000yuan)	–	–	–	–	–	–	–
Medium low (3,000-4,999yuan)	.0444	.0304	.0492	.1021***	.0874**	.0140	.0546**
Medium high (5,000-10,000yuan)	.1480***	.1273***	.1125***	.1144***	.1062***	.0809*	.1100***
High (>10,000yuan)	.2635***	.1672***	.1917***	.2350***	.2054***	.1056	.1847***
Gender							
Female	–	–	–	–	–	–	–
Male	.0120	-.0248	.0112	.0113	.0201	-.0511	.0019
Age							
Below 30	–	–	–	–	–	–	–
30-39	-.0404	-.0491	.0044	-.0887***	.0351	-.0733*	-.0329
40-49	-.0674*	-.1373***	-.0811**	-.1137***	-.0589	-.0705	-.0754***
50-59	-.1911***	-.1860***	-.2086***	-.2180***	.0051	-.1917***	-.1602***
Above 60	-.1858**	-.1554	-.0470	-.1801*	-.0374	-.0553	-.0940

Table 20. Pooled OLS Regression (Continued)

Family size	-.0065	-.0275*	-.0411***	.0265*	.0020	.0043	-.0051
R-square	0.0259	0.0501	0.0546	0.0202	0.0134	0.0121	0.0419

***p<.001 **p<.01 *p<.05

Table 21: Logistic Regression

	Daily shopping	Green areas	Landscape	Public transportation	Travel convenience	Noise pollution	Overall
N	6278	6278	6278	6278	6278	6278	6278
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Housing size							
Small (<=50 sq. m)	–	–	–	–	–	–	–
Medium-small (50-89 sq. m)	.0693	.3094***	.1170	.0654	-.0551	-.1204	-.1306
Medium-large (90-119 sq. m)	-.0285	.4961***	.2597*	-.1640	-.1853*	-.1836	-.0481
Large (>=120 sq. m)	-.1113	.7407***	.6638***	-.1120	-.0880	.1716	.3309*
Housing types							
Rent public	–	–	–	–	–	–	–
Rent private	-.3060**	.0413	-.0299	.1877	-.0346	-.2579*	-.0820
Owned commercial	-.1274	.1708	.3954***	.1040	-.0762	-.0595	.0899
Owned privatized public	-.1555	.0480	.0927	-.0812	-.1426	-.0655	.0025
Owned affordable	-.1955	.0114	.3379**	-.1436	-.3895***	-.0681	.0529
Others	-.4824***	-.3985***	-.1749	-.2103	-.2789*	-.1513	-.3789*
Locations							
Inner city	–	–	–	–	–	–	–
Middle city	-.2640***	.1019	-.0538	-.0856	-.2383***	-.0588	-.1987**
Outer city	-.3904***	.2365*	.2195*	-.0881	-.1087	.2039*	.0506
Move-in year							
Pre-1995	–	–	–	–	–	–	–
1995-2000	.0069	.1419	-.1459	-.1450	-.0889	-.1491	-.2277
Post-2000 (2000-2005)	-.1491*	.1145	-.0263	-.1459*	-.0641	-.0288	-.0154
Monthly income							
Low (<3,000yuan)	–	–	–	–	–	–	–
Medium low (3,000-4,999yuan)	.1175	.0217	.1274	.2029**	.1585**	-.0069	-.0890
Medium high (5,000-10,000yuan)	.4442***	.2117**	.1824*	.2556***	.1982**	.0719	-.0905
High (>10,000yuan)	.7394***	.2556*	.3530**	.4992***	.3971***	.2124	.2886*
Gender							
Female	–	–	–	–	–	–	–
Male	-.0082	-.0574	.0147	-.0002	.0381	-.0888	.0271
Age							
Below 30	–	–	–	–	–	–	–
30-39	-.1266	-.1421*	.0021	-.1983**	.0306	-.1082	-.1895*
40-49	-.1562*	-.2488***	-.1046	-.2834***	-.1082	-.0344	-.0336
50-59	-.4177***	-.2232*	-.2699*	-.4558***	-.0118	-.1132	-.1336
Above 60	-.2394	-.3354	.0720	-.1889	.1225	-.0739	.0822

Table 21: Logistic Regression (Continued)

Family size	.0071	-.0474	-.0896**	.0849**	.0127	-.0049	.0153
Log Likelihood	-3907.5737	-4234.9616	-3755.9866	-4160.3582	-4214.5788	-4110.6804	-3006.0408
Pseudo R2	0.0181	0.0230	0.0242	0.0117	0.0078	0.0052	0.0115

***p<.001 **p<.01 *p<.05

CHAPTER VI

DISCUSSION AND POLICY IMPLICATIONS

6.1. Discussion

In this study, residents' living conditions are the analyzed objects. This study employed the "household" as the research unit to analyze both the objective conditions in housing and the subjective conditions in residential environments. The objective living conditions are defined as per capita living space (square meters per person), and housing size (square meters of a house). Subjective indicators, on the other hand, are used to gauge the neighborhood environment. This strategy is employed because residents can make adjustments to their houses easily by themselves according to space and functional designs of the housing, whereas they cannot easily make changes to their neighborhoods. If the designs are unreasonable, meaning the facilities cannot meet residents' needs, it will not be a satisfactory neighborhood. Therefore, a more comprehensive and reasonable way to measure the neighborhood is to inquire about public satisfaction rather than to simply consider the quantity of public facilities. Take the green area as an example, if a community is close to a big and well-designed public park, it does not have to construct a large amount of green areas for the community. A community can adjust its designs and features based on the locations and surrounding environment. This is aiming to provide a satisfactory environment for residents. Therefore, the neighborhood environment is a complicated concept that cannot be simply measured by objective indicators.

This study used quantitative methods to investigate inequalities in living conditions depending on housing types and it attempted to use a new strategy to investigate overall living conditions.

As I noticed earlier, in the transitional housing market the Chinese housing reform provided more choices in housing consumption, which satisfied different groups of people in the society. People's basic housing conditions have been improved drastically. At the overall level, homeowners have been consistently increasing over the past decade. Currently, the overwhelming majority of residents are homeowners. According to Huang (2002), housing structure has changed significantly since 1978. Ownership has been elevated tremendously. But in his research in 1996, homeownership did not outweigh tenancy in urban China (Huang & Clark, 2002).

Additionally, both privately developed housing and affordable housing grew rapidly over the past fifteen years. This finding has already been presented by many scholars (Wang & Murie, 1999; Read, 2003). For example, from 1995 to 1997, approximately five million sq. meters of new private commercial housing were completely constructed (Read, 2003). Compared to the traditional housing market, private commercial housing began to dominate the market, and it has a tendency to increase.

Housing conditions have generally improved. On average, residents' living space has been enlarged dramatically. To be specific, homeowners' housing conditions are better than renters'. Owners are more likely to have larger houses as well as per capita living space than renters. This finding is almost identical to previous research that

revealed homeowners would be less likely to experience crowding than renters (Huang, 2003). Affordable housing and privately developed housing residents are more likely to experience less crowding housing conditions. Houses provided by public institutions are considered the smallest in housing size and featured the highest living density. Conversely, residents living in commercial housing with ownership are less likely to suffer from crowding housing conditions.

In this study, I examined objective living conditions by looking at per capita living space and housing size. I found that there are great disparities among housing types and their residents.

According to the moved-in year, residents who moved in their house after 2000 are more likely to have a larger house and suffer less from crowding. In turn, those carry over houses from the pre-2000 housing stock are more likely to be smaller. Individuals in these houses are more likely to experience a moderate crowding condition.

Age is also associated with objective living conditions. Young people, especially those below 30 years old, enjoy larger living space individually and comfort conditions. Middle-aged people are highly unlikely to experience such comfort housing conditions compared to younger people. People over 50 years old are less likely to be approved for mortgage in China. For this group of people, it is also difficult to drastically develop their career. Thus, they are less likely to improve their housing conditions than younger people at this stage of the reform.

Income, as an important determinant of a completely economically-driven housing market, has becoming significant in the transition housing market in China.

High-income families are more likely to live in larger houses than low-income households. This is similar to privately developed housing, such as commercial housing, which is completely market-oriented.

In the past, when publicly developed housing was dominant, the housing allocation was based on people's needs and employees' seniority or position. Now, in today's housing market, this housing provision has been gradually replaced. Young people with a high family income who live in inner city owned private commercial housing benefit the most. However, the living conditions for middle-aged low-income households who rent public housing in the middle ring are relatively worse off in Beijing.

People's satisfaction levels were also distinct for their neighborhood environment in my study. Owners have better satisfaction levels towards their neighborhoods for landscape, travel convenience and noise pollution. They were overall more satisfied with their neighborhood than renters.

Residents also significantly considered privately developed housing communities as better than public institution communities, which appears to concur with Read's (2003) research that new private commercial housing communities are more likely to feature better designs and management conditions. According to Wang and Murie (1999), since the 1980s the central government has been focusing on housing quality and infrastructures in newly built housing communities, especially commercial housing communities. Therefore, new private commercial housing residents would be better off than others (Wang & Murie, 1999).

By controlling relevant indicators, I also examined the residential satisfaction levels for daily shopping facilities, green areas, landscape, public transportation services, travel convenience and noise pollution.

On average, residents are more satisfied with daily shopping facilities than other subjective indicators in my study. However, in Chen's (2003) report on some experimental communities in other cities, public facilities, such as grocery stores and supermarkets, were not developed based on the needs of residents. This discrepancy could possibly result from geographic distinctions, which means in Beijing communities may be surrounded with more daily shopping facilities. Otherwise, it could be an improvement over the years.

Satisfaction levels for green areas and landscape are relatively determinate of the overall satisfaction levels in my study. There are great disparities depending on housing types, especially the satisfaction levels for landscape. Rent public housing was the worst in this assessment, while owned private commercial housing or owned affordable housing was significantly better on average. Owned commercial housing residents were highly likely to be satisfied with the landscape designs in their community. Moreover, despite residential satisfaction of green areas in their neighborhood, they may not be satisfied with the landscape. This phenomenon is possibly due to developers or management companies simply constructing green areas to meet the standard. They may not be fully dedicated or have the ability to design satisfactory landscapes for their residents.

Moreover, residents are less likely to be satisfied with the landscape. In this study, compared to the satisfaction levels towards other subjective indicators, neither green areas nor landscape obtained satisfied recognition from residents. To support this finding, a statement from Wang and Murie's research (1999) provides evidence. They argued that the government used to ignore the external landscape or green areas in the neighborhood. Thus, although some of the estate projects began to promote the quality of landscape and quantity of green areas (Wang & Murie, 1999), and improvements are evident, these two fields are still lagging behind.

Transportation conditions also show a discrepancy according to housing types. Affordable housing residents are significantly dissatisfied with their transportation conditions, both public transportation services and travel convenience.

Furthermore, the average lower satisfaction level for travel convenience than public transportation services in my study is also compatible with Yang and Shen's (2008) research. They stated that more than 70 percent of clustered places offer good public transportation conditions, but few of them are close to public facilities, such as schools and hospitals, which generate inconvenient travel conditions (Yang & Shen, 2008). Thus, the design of bus or subway lines and infrastructures might not be reasonable enough and need to be improved.

Apart from that, income and age can affect residential satisfaction as well. Higher income may promote their subjective well-being (Ferrer-i-Carbonell, 2005; Sacks et al, 2010). In this study, this effect is still significant. High-income households are more

satisfied with their neighborhoods than poorer people in every aspect of this study except noise pollution.

Age can affect some subjective indicators, for instance, daily shopping facilities, green areas, landscape and public transportation services. Generally, older people with lower income are less likely to live cozily than younger people, and they are also less likely to change their living conditions compared to younger people with high-income.

One interesting finding is that objective indicators can compensate people's overall satisfaction levels, and vice versa. This indicates that if the community mainly features small sized houses, developers or management companies can still promote people's satisfaction levels by directly improving the quality of the environment, especially the landscape or green areas. Otherwise, if the neighborhood environment is relatively bad, developers may provide larger houses to their residents to improve their satisfaction levels.

6.2. Data Quality and Improvement

In this research, a large-scale residential survey that was conducted in 2005 is used as the sole data source. This data set was used in writing "A study of livable cities in China (Beijing)", which was supported by the National Natural Science Foundation of China. This survey was conducted based on population density in Beijing, using a random sampling strategy. The actual sample size is 11000, with an approximately 73% eligible rate.

This survey contained four sections total. The first section inquired about the current living conditions of the interviewees, such as “What is your housing size?” and “What is your housing type?” etc. The second section is the core component of this survey. It asked for subjective residential satisfaction based on 32 indicators. The third segment of this survey included some questions about expectations towards housing of interviewees. And the final section of this survey includes the personal information of interviewees.

Generally, it is a qualified survey and data set. But for my research, the first section – current living conditions– did not contain enough information. Other supplementary data, including more information about functional designs and living density would be helpful, such as living space and rooms per capita. Moreover, updated data will be needed due to the rapid development of the housing market in China. New housing types such as low-rent housing and public rental housing have emerged since 2005. These new types of housing might be fairly important to correct some of the inequality issues that existed before 2005, or they might lead to a more serious inequity housing market.

Apart from that, sample errors can be serious problems in this 2005 data set. In order to acquire a large sample size, a large number of surveyors were invited to participate. Most of them were college students in different majors. This situation could possibly have led to some errors during the interview and data entry process. Some of these errors could be found and corrected during the data cleaning process, but some of them are unavoidable and unascertainable. And these may also happen to respondents as well. Thus, this inaccurate information could somewhat affect the results. In turn, as long

as they are minor, these errors could not affect the main findings due to the large sample size.

6.3. Limitation on Research Method

This research covered both the objective and the subjective aspects of living conditions. Because of the different definitions of housing conditions and residential environment, and the different debates on analysis methodologies, there are various ways to measure them, as I discussed in previous chapters. Yet in this study, due to the limitation of the data set, the objective section only includes two indicators – the housing size and per person living space – it cannot provide a comprehensive assessment on residents' housing conditions in Beijing. This was also the case with the analysis on residential satisfactions. The six subjective indicators I selected from the data set can only partially reflect residents' satisfaction levels towards their neighborhood. This somehow generated some shortages for my research.

In addition, I set up several regression models to specifically look at the relationships between housing sources (along with some other demographic indicators) and residential satisfaction levels. These models analysis were set up straightforward and easy to comprehend for analyzing my research questions. However, although the data was collected based on population density in Beijing, the intention to acquire commuting information of the survey caused the interviewees to be mostly current employees, and thus disturbed the sample distribution, lowering the representative.

Finally, in the subjective section, people's subjective well-beings were vulnerable. They are highly associated with personal judgment criteria. And this is hard

to adjust by simply using a statistical analysis method. Interviewing over time to keep a long run consistent data set and generating a larger sample size may reduce the vulnerability (Conceição & Bandura, n.a).

6.4. Policy Implications

This study provides a brief overview of the Chinese urban housing reform since the early 1980s, taking both objective and subjective indicators into account. Given the findings from this research, on the one hand, the significant improvements in both housing conditions and the residential environment are evident; on the other hand, the inequality issues are consistently revealed.

First, more housing choices allow people to thoroughly make their housing decisions. But still, constraints, like the hukou system, generated severe inequality within housing consumptions. Younger people in the past were highly unlikely to access large houses and better residential environments. Now, they have become the biggest beneficiaries. In turn, older people who used to experience high-quality housing and neighborhoods became the biggest losers through the housing reform. To mitigate this inequality, one solution is to advocate the Housing Provident Fund so that older people may have more opportunities to access better housing. Other than that, the government may alleviate the constraint of the hukou system, allowing more medium- and low-income people to live in subsidized housing.

Second, due to the transition phase, new private commercial housing surpassed the traditional public developed housing in almost every aspect of living conditions. This phenomenon elucidated that the market-oriented housing system had been gradually set

up. Yet, to achieve a complete economically-driven housing market, the government should protect the welfare of the low-income group in advance. Otherwise, the hardships in housing for low-income and medium-income households will be much greater than before. Affordable housing or other types of subsidized housing are urgently needed.

Third, public amenities need to be organized more reasonably and accessibly. According to the findings, even though people are satisfied with the quantity of buses and subways around their communities, they may still feel less satisfied with the travel convenience. This problem reveals that planners sometimes did not effectively take advantage of the resources of the public facilities.

Finally, the positive relationship between the housing size and green areas, landscape or the overall residential satisfaction is also illuminating, which means larger housing size can compensate for the deficiencies of the satisfaction levels of green areas, landscape, and even the overall satisfaction level, and vice versa. This finding may help planners or developers to extraordinarily enhance the advantages of the community, and to minimize the insufficiencies.

In sum, since the housing market in China is still in a transition period, policy makers need to spare no effort to alleviate inequalities across all the social groups, allowing the domestic economy to adjust the housing market and providing adequate subsidized housing to disadvantaged groups.

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