Spatial Mismatch in Post-reform Urban China:

A Case Study of a Relocated State-owned Enterprise in Guangzhou

Abstract

Accompanying rapid urbanization and economic transformation, the reconstruction of inner city in urban China has been taking place during recent decades. However, the social and geographic inequality resulted from such reconstruction and experienced by minority groups has received less attention to date. To address this, a case study using individual-level data based on a survey of a relocated state-owned enterprise (SOE) in Guangzhou was conducted. The study shows that similar to other cities in the world, the spatial mismatch that results in long and time-consuming commuting as well as lower quality of life exists. It has considerable adverse impact on the low- and middle-income employees of the relocated enterprise. However, it was not social or racial segregation but institutional transformation that brought about the spatial mismatch in China. Based on the dual economic system in China, both the planned and market systems played important roles in the enterprise's relocation and their employees' daily lives. Institutional barriers associated with the welfare system had a great impact on the geographic immobility of its employees. These include the retirement and medical insurance systems inherited from the planned economy and the supply of work unit buses, which rendered employees more attached to and dependent on their enterprise. However, these provisions were big burdens to the enterprise which reduced their profit and led to lower spatial mobility of its lower-income employees.

Key words: Spatial Mismatch, Jobs-housing, Relocation, Urban restructuring, Dual economic system, China.

1 Introduction

First articulated by John Kain in the 1960s, the spatial mismatch hypothesis (SMH) was one of the most enduring theories on the problems concerning inner-city poverty, growing unemployment and social segregation (Kain, 1992; Kasarda, 1989; Horner and Mefford, 2007). The early papers on the SMH by Kain argued that racial segregation in the housing market affects the distribution of employment for African Americans and reduces their job opportunities. They further suggested that postwar suburbanization of employment has seriously aggravated the problem (Kain, 1968). Although there are some who rejected the hypothesis, arguing against the impact of residential segregation on the employment opportunities of African Americans (e.g., Offner and Saks, 1971; Master, 1975; Ellwood, 1981), the hypothesis has received wide attention in recent decades and is still alive (Kain, 1968, 1992; Holzer, 1991; Horner and Mefford, 2007). It was reviewed and summarized by researchers from different disciplines. The debate has focused on the issues of whether minorities have poorer geographic access to job opportunities than other groups, and on the core meaning and content of the hypothesis (Kain, 1992; Moss and Tilly, 1991; Ihlanfeldt, 1994; McLafferty and Preston, 1996; Preston and McLafferty, 1999). Under the rubric of the SMH, attention has been expanded from African Americans to other minority groups, such as Hispanic youths (Ihlanfeldt, 1993; Ihlanfeldt and Sjoquist, 1991), Latinos and other new immigrants, poor and low-wage workers, as well as minority women (Covington, 2009; Fan et al. 2014; C. Zhang, 2015).

Although much of the literature on the SMH focuses on race/ethnic discrimination issues, ethnic minority groups are too small in urban China for a meaningful examination of the SMH based on racial/ethnic discrimination (Li and Wu 2008). With the economic reform since 1978, the original socialist system of jobs and housing allocation in China has undergone considerable changes. As a result, both labor and housing markets emerged and the more market-oriented economic system brought about great changes in urban China. Accompanying the rapid economic development of the economy, great social inequality also emerged in urban China (Khan and Riskin, 2001). Wu (2004) argued that socialist development strategies were one of the main reasons for the new urban poverty in post-reform China, “macro factors such as economic restructuring (the decrease in manufacturing activities and the rise in the tertiary sector), the shrinking of state-owned enterprises (SOEs), and a development strategy economizing the use of labor are contributing to urban poverty.” Employees of old SOEs, therefore, have become one of the groups that face the threat of poverty.

The relocation of employment opportunities from the inner city to suburbs is the main cause of jobs-housing spatial mismatch in the original formulation for the SMH. Similar to the situation in U.S. cities in the 1960s when the SMH was first articulated, urban China has witnessed considerable reconstruction and plant relocation in recent decades. The relocation of SOEs in China serves as an analytical bridge to connect the processes of institutional transition and changes in urban structure. Thus, this study seeks to contribute to the literature on the SMH in the context of the institutional transformation in China through examining whether spatial mismatch exists among the new minority group brought about by institutional transition.

Central to China’s economic policy, the reformation of state-owned enterprises (SOEs) in recent

decades has been recognized as a great success, especially in improving their productivity and efficiency as well as their positive impact on the economy. However, as institutional reform unfolded, problems also emerged and were widely discussed (see Zheng and Chen 2009; Garnaut et al., 2006; Bai et al., 2009). Much research to date focuses on the economic and institutional reform of SOEs, while little attention has been paid to the important socio-spatial issues associated with such reform. The relocation of SOEs is part of the socio-spatial transition that has led to changes in the geographic distribution of jobs. These changes were generated by multiple factors embedded in the process of institutional transition. However, this institutional background as well as its impact on jobs and housing remain relatively unexamined.

During the socialist planning era of China, traditional *danwei* (which were mostly SOEs) played an important role in the allocation of jobs, housing and other social services for urban residents. The predominant spatial form of traditional work unit and its residential area, such as the *danwei* compound and *danwei* residential district that emerged in urban China during this period still have a great impact on its urban space currently (*Danwei Xiaoqu or Gongren Xincun*) (David, 2005; Wang and Murie, 2000; Wu, 2005; Wang, 2009).

At the early stage of the SOE reform during the 1980s, the stability of SOEs was ensured by providing them some free administratively allocated land for self-use. This enabled SOEs to build cheap housing for their employees and attract their employees to “attach” to them. This kind of spatial form continued even after the leasehold market was established when the PRC Land Administration Law was modified in 1988. Under the dual system of land use that covers both public land use (e.g., land use for transportation or public facilities) and tradable land use (e.g., land use for residential, commercial and industrial purposes), certain users (*danwei*, including some SOEs) can also receive some land from the government with administratively allocated land use rights without payment and get much profit if the land enters the land use market. Under this dual system, some *danwei* (including SOEs) built *danwei* welfare housing for their employees at low prices.

The housing reform in China was implemented since 1998 as part of the modernization reform of the enterprise system. It aimed at separating the function of housing allocation from *danwei* and encouraging individuals to purchase housing from the market. The market transformation stimulated the demand for both housing and land use and also fostered economic development. According to China’s land law and policies, the first-hand tradable land market is monopolized by local governments, which bought farm land at low prices from farmers collectives. After improving the essential infrastructure, land is then “prepared” and sold by local governments to developers at much higher prices. Land sale has become one of the main revenue sources for most local governments, and this stimulates land development rapidly. At the same time, the price of tradable land is mostly decided by location, which means that the relocation of an enterprise from downtown to less centrally located areas (e.g., suburbs) will bring in extra profit, especially for industrial SOEs that received land from their governments. This market-oriented transformation facilitates the relocation process. Under this transformation, urban space in most Chinese cities expanded rapidly after 2000. Meanwhile, some industrial SOEs started to relocate from downtown to suburban areas.

Most relocated SOEs had received land from local governments before. They can make extra

profit by moving to suburban areas, which involves selling their land in urban centers at high prices and buying new land at much lower prices in suburban areas. At the same time, accompanying the deepening of SOE reform, multiple forms of non-SOEs, such as foreign enterprises, private enterprises, and shareholding enterprises, emerged and developed rapidly. As a result, the profit and market shares of SOEs decreased after the 1990s. They suffered from losses amounting to more than 30% in the 1990s and such losses increased by more than 20% in the 2000s, resulting in mass layoff and lower income for their employees, who constituted urban poverty clusters according to some China scholars (Liang and Fang, 2011; Yuan et al., 2006) (Figure1).

Figure1 The situation of profit and loss of SOEs since 1980

(Data: Ministry of Finance of China, 1999; 2015)

The relocation of SOEs and profit-making land transactions were thus closely related to the institutional transition. However, the inequality experienced by the urban poor as a result of this process is often ignored by local governments. The impact of such enterprise relocation on their employees and other people thus needs careful examination. For instance, would employees of SOEs become the minority group faced with spatial mismatch or poor access to employment in ways similar to African Americans in U.S. cities? As a structural barrier, spatial mismatch has a great influence on commuting trips, residential mobility and the information-searching ability of vulnerable groups. It restricts their opportunities in urban housing and local labor markets (Preston and McLafferty, 1999). So what are the factors that impact on the spatial mismatch of these vulnerable groups under the institutional context of urban China and on social inequalities? How do they cope with the problems? To address these questions, this study examines whether SOE employees experienced the problems associated with the spatial mismatch of jobs and housing and how well they cope with these problems through a case study of an SOE in Guangzhou China.

2. Literature Review

The SMH has been widely discussed in recent decades and its scope has widened as it developed over time. The spatial mismatch experienced by minority groups under different contexts is a major concern in urban research in recent years. While much of the work on the SMH focused on

the role of race and residential segregation as major factors, Houston (2005) argued that the emphasis on racial discrimination may have hindered the spatial mismatch hypothesis from developing a coherent conceptual framework that incorporates wider structural and spatial issues. Stoll and Covington (2012) also indicated that racial differences in spatial mismatch “should be eliminated in 45–50 years if racial segregation levels continue to decline.” Therefore, broadening research scope to consider the much wider socioeconomic context of minority groups would be helpful for developing the conceptual framework of the SMH. On this point, Houston (2005) listed and assessed five key methodological challenges in his paper on the “methods to test the spatial mismatch hypothesis.” Among these challenges, “taking account of contextual factors” and “identifying the mechanisms through which space acts as a barrier to employment” are the ones which are important but seldom clearly highlighted in previous studies (Houston, 2005). To better understand and further explore the SMH, it is thus necessary to examine it in different political and institutional contexts through not only comparing between and within metropolitan areas in western countries but also examining it in the institutional context of socialist market-economy countries like China. Several studies have examined the SMH in the context of urban China through various perspectives, such as urban regeneration, neighborhood reconstruction, social housing development, as well as suburbanization (Xu et al, 2014; Wang et al, 2011; Zhou et al, 2013). Most of them focus on the spatial mismatch of housing supply and housing relocation. However, the role of other contextual factors such as institutional and economic transition in China and firm relocation in the past decades also needs to be examined in order to further enhance our understanding of the “spatial barrier to employment.”

At the same time, approaches for testing the SMH vary. One of the common approaches was to compare the employment status of minority and the other groups with the majority group (such as the whites), considering the home-work distance and accessibility of jobs (e.g., Ihlanfeldt and Sjoquist, 1991; Ihlanfeldt, 1993). Another approach was to test the SMH by comparing the employment rates or wages of the African Americans residing in the central city with those who live in the suburbs, or the job accessibility gap of the minorities in the inner-city and suburban areas (Harrison, 1972; Hughes and Madden, 1991; Hu, 2015). Besides employment status, employment rates and wages, other indicators such as commuting time and commuting mode are also widely used to examine the SMH (Holzer, 1991; DeRango, 2001; Gottlieb and Lentnek, 2001; Bao et al, 2014). Research along this line has found that poor residents could not afford fast but more costly commuting modes and thus often suffered from long travel times (Lau, 2011). At the same time, some studies proposed other meanings of “mismatch,” such as automobile mismatch or skill mismatch (Pastor and Marcelli, 2000; Taylor and Ong, 1995).

In recent years, more studies turned to discuss the effect of the SMH and related policy issues (e.g., Ihlanfeldt, 2002; Zhou et al. , 2013; Haas and Osland, 2014; Lau, 2010; Hui et al, 2015). Some policies aiming at resolving the unemployment of minorities related to the SMH were also tested or suggested (e.g., Ong and Miller, 2005; Gobillon et al., 2007). In addition, Chapple (2006) indicated that the opportunity to interact diverse social networks and link with jobs are also important considerations. Fan (2015) emphasized the importance of nonspatially related barriers to employment (such as skill mismatch and the lack of social support).

Although some past studies have conducted more direct tests to compare the barriers to jobs and housing relocation for employees before and after the relocation of their companies, limited

previous research using this firm-relocation methodology has been conducted because of the difficulties in data collection. As a result, pertinent issues associated with firm relocation are rarely discussed in the literature (Zax and Kain, 1996; Fernandez, 1994; Houston, 2001). In order to examine the impact of spatial mobility barriers and jobs-housing spatial mismatch on the employees of relocated enterprises, this paper analyzes individual-level data collected from a state-owned enterprise (SOE) in Guangzhou, China. Rather than looking at cross-sectional data at one time point, the data include the jobs, housing, and commuting status of the SOE employees before and after the relocation of the enterprise in which they work.

This paper aims to fill the significant knowledge gap in our understanding of the effects of firm relocation on the jobs-housing mismatch of their employees in the context of China's recent institutional transformation and their policy implications. It emphasizes the spatial outcomes of recent economic reform of urban China and aims at enhancing our understanding of the underlying mechanisms of jobs and housing relocation and the associated barriers for employees of relocated SOEs who are marginalized and facing the threat of poverty.

3 Data and Methodology

3.1 Study area

The state-owned enterprise (SOE) examined in this study is located in Guangzhou, China. Guangzhou is the capital city of Guangdong Province, whose gross domestic product (GDP) is the highest of all provinces in China in 2014. It is also one of the four largest metropolitan areas in China. Guangzhou has more than 2000 years' history and was an ancient commercial city in the country for thousands of years. In 2014, Guangzhou has a GDP of 16,706.87 billion yuan and ranked third in GDP in China. Its average annual GDP growth rate has been more than 10 percent since 1978, being in the forefront of the economic reform since 1978 and especially after the South Tour Speech of former President Xiaoping Deng in 1992.

The state-owned industrial enterprises in Guangzhou were largely founded in the 1950s, when industry was considered the most important sector of the city by the local government. Considering the convenience of transportation and land supply, some industrial clusters were planned and constructed near downtown and the adjacent areas at that time, which had also become part of the downtown and is now facing the need of relocation. Most of these SOEs were established during the 1950s to 1960s. They were established to meet the demand for heavy industry development at that time.

By 2001, the industrialized areas of Guangzhou were found mainly in Haizhu, Tianhe and Fangcun Districts (Figure 3), and most of them were located in Haizhu District. As one of the large state-owned industrial enterprises in Guangzhou that had relocated their production facilities from downtown to suburban areas, Guangzhong Enterprise Group Corp is chosen as the case study in this research given its appropriate relocation date, location and research feasibility.

Figure 3. Location of Guangzhong Enterprise Group Corp before and after the relocation

Guangzhong Enterprise Group Corp of Guangzhou is an SOE founded in the 1950s. It mainly manufactures heavy-duty machinery. It was on the China Machinery TOP 500 list in 2007 and 2008. In 2008, the factory located on Gongye Avenue in Haizhu District was moved to Zhongcun Industrial Zone in Panyu District. The new plant covers an area of 200,000 square meters, with a built area of 80,000 square meters. The number of employees was reduced from 1000 to 700 after its relocation, 500 of them are employees of the enterprise before the relocation and 200 are hired after the relocation.

3.2 Data collection

Data for this study were collected in three stages. In the first stage, in-depth interviews with administrators in the SOE's human resources department and older workers of the SOE were undertaken to revise and improve the main survey questionnaire. In the second stage, 242 employees of the SOE in total were randomly selected to participate in a questionnaire survey conducted during March to April in 2015 (226 completed surveys were valid). At the same time, 12 semi-structured interviews were conducted to obtain a better understanding of pertinent issues faced by the participants before and after the relocation of the enterprise. In the third stage, three additional in-depth interviews with elder workers who have been hired by the SOE for at least 20 years were conducted to enrich the interpretation of the results obtained from the questionnaire data.

The 226 participants who returned valid questionnaires include two groups of employees: the old employees (hired before the relocation) and the new employees (hired after the relocation). The number of respondents from each of these two groups of employees was based on proportional sampling in order to ensure representativeness of the sample. The old employees are our main research subjects while the new ones are reference subjects - since the old employees have experienced the relocation and change in the institutional environment associated with industrial restructuring, while the new employees did not experience them and have been under the

influence of the market-oriented system. The jobs-housing mismatch experienced by the old employees is more typical and more critical in this research.

3.3 Research methodology

This study is a firm-based case study of a typical relocated SOE which is helpful for understanding the geography of employment in the study area. For the case study, survey questionnaires and semi-structural interviews were used to collect individual-level data from a sample of the SOE's employees for a better understanding of their jobs and housing situation before and after the relocation. A multivariate regression model is used to explore the factors that influence participants' spatial mismatch experience. In this study, commuting cost was used to estimate the extent of spatial mismatch, including commuting time and expenses, which were a significant cost in the daily life of the participants. Housing and employment status and the willingness of the participants to relocate are also analyzed, which reflect the potential for using their mobility to reduce the mismatch. We used the individual-level data collected through the questionnaire survey and in-depth interviews to perform our analysis.

4 Industrial Space Adjustment and Spatial Mismatch in Guangzhou

Spatial restructuring of employment in Guangzhou is largely associated with the relocation of industrial enterprises. Before the 1990s, industrial enterprises in China were responsible for the employment, housing, and other needed daily services of their employees, who lived in *danwei* housing close to their workplaces (e.g., factories). A large number of industrial enterprises were located in inner-city, such as Haizhu, Liwan and Yuexiu Districts. There was little spatial mismatch under this state-planned organization of economic and social life. However, in the 21st century, the socialist market economy system has been established. As house prices increased and the limited supply of land in downtown areas become more serious, enterprises began to relocate to suburban areas. At the same time, as the Asian Games was going to be held in Guangzhou in 2010, many industrial enterprises moved their production facilities to suburban areas in order to protect the environment of the inner city, under the auspices of the local government's urban plans.

In order to examine the change in the spatial mismatch of jobs and housing over time in Guangzhou, this paper uses the spatial mismatch index (SMI) that Martin (2001, 2004) used in his papers to measure the degree of jobs and housing mismatch in different metropolitan areas:

$$SMI_j = \frac{1}{2P_j} \sum_{i=1}^n \left| \left(\frac{e_{ij}}{E_j} \right) P_j - P_{ij} \right|$$

In this paper, instead of measuring the SMI of different metropolitan areas, we measure the SMI of different years in the Guangzhou metropolitan area. Thus, j is the year, n is the number of administration districts belonging to the Guangzhou metropolitan area, p_{ij} is the population of district i in year j , e_{ij} is the employment of district i in year j , P_j is the total population of year j , E_j is the total employment of year j . There are 12 districts in Guangzhou, and they are used as our analytical areal units based on the statistical data of Guangzhou from 1980 to 2012.

As shown in Figure 2, the SMI results indicate that spatial mismatch increased slowly before 2000 and rapidly after 2000. Spatial mismatch increased by 83.3% from 2000 to 2005. After 2005, the SMI maintained a high and smooth growth rate. Spatial mismatch became more serious as a result of the spatial restructuring process in Guangzhou.

Along with the rapid rise in the SMI after 2000, there has been considerable change in the urban structure of Guangzhou under the spatial strategy that seeks to expand the developed area of the city in all directions and inner city renewal. During this period, industrial enterprises began to set up factories in suburban areas. With the lack of consideration of constructing adequate housing near the newly relocated production facilities, the relocation of industrial enterprises has increased the jobs-housing mismatch in Guangzhou, leading to longer commuting distance for their employees and adversely affecting their daily life. However, such relocation was not merely a result of the enterprises' own decisions but also reflected the institutional transition at large. It also brought about various jobs and housing relocation barriers to the employees of the relocated SOEs who were marginalized and faced with the threat of poverty. In this paper, a firm-based study in Guangzhou was undertaken to understand the mechanisms of spatial mismatch among SOE employees and the barriers to their residential relocation.

Figure2 The marketization reform in China and the SM index of Guangzhou (1980-2012)
(Data: Guangzhou Statistical Bureau, 1980-2013)

5 Spatial Mismatch of Guangzhong Employees

In this and the following sections, three aspects of the spatial mismatch experience of Guangzhong employees are discussed, including long commuting distance and cost, poor living conditions and low spatial mobility, as well as their dissatisfaction with their current jobs and their limited ability in changing their careers.

5.1 Commuting distance and cost: Long distance and long commuting time

Relocation of a factory of the Guangzhong Enterprise Group Corp has led to longer commuting distance for its employees. Before the relocation, 32.9% of the old employees among the research participants lived in the *danwei* housing located on Gongye Avenue next to the Guangzhong

factory, and 26.3% owned and lived in the commodity housing in downtown. The rest mostly lived in employees' dormitory or rental housing close to Guangzhong. As most research participants of the enterprise lived close to their workplace, there was little spatial mismatch. After the relocation, however, the average commuting distance has increased more than 9 times. Only 20% of the old employees among the research participants moved from the urban center to areas close to the new factory site, while most of them have their own housing and chose to live in downtown area during the last 7 years (Figure 4).

The relocation has also resulted in longer commuting time and distance for the SOE's old employees. The average commuting time of the participants increased from 30.7 minutes to 70.2 minutes, an almost 40-minute increase. The average commuting distance increased from 3.48 kilometers to 10.95 kilometers. Compared to the average commuting distance of all residents in Guangzhou, which was only 3.89 kilometers in 2002 and 5.91 in 2016 (based on data collected in 2002 from 1428 residents and in 2016 from 1029 residents), the commuting distance for the SOE's old employees is much longer after the relocation of its factory. However, when compared to the old employees among the research participants, there is much less mismatch for the new employees among the research participants: their average commuting time is 36.5 minutes and their average commuting distance is 7.09 kilometers. Thus, the SOE's employees experienced higher levels of spatial mismatch in terms of their longer commuting time and distance when compared to all urban residents in Guangzhou (Table 1).

Figure 4. Residence of old employees before and after enterprise's relocation and residence of new employees after enterprise's relocation

Table 1. The commuting status of the research participants

		Commuting Mode (%)						Commuting Time (min)	Commuting Distance (km)	Average Commuting Distance in Guangzhou (km)
		Bus or Subway	Work unit bus	Taxi	Private Car	Walking	Else			
Old employees	After relocation	8.86	77.85	1.27	1.9	5.7	4.43	70.16	10.95	5.91 (year 2015)
	Before relocation	26	0	0	0.67	60	13.33	30.66	3.48	3.89 (year 2002)
New employees	After relocation	10.96	43.84	1.37	2.74	41.1	0.03	36.54	7.09	5.91 (year 2015)

After the SOE's relocation, the average work-related activity duration (which includes work time and commuting time) of the respondents increased from 10 hours to 11.15 hours, and the increased time is mainly spent on commuting. Long commuting time has led to a decrease in the time spent on recreational and entertainment activities for the old employees. A large number of them indicated that they could not undertake any recreational and entertainment activity on weekdays since long commuting time made them very tired after work.

The main commuting mode of the old employees of the SOE is the work unit bus (单位通勤大巴). There are 7 work unit buses that can carry 300 passengers in each trip. These buses have several pick-up spots. Before the relocation, the main commuting mode was walking, which accounted for 60.0% of the commute trips. After the relocation, the main commuting mode is the work unit bus, which accounts for 77.9% of the commute trips. The work unit bus has become the major means that the SOE used to address the problems of spatial mismatch the relocation brought about. As a form of transportation allowance, it reduces employees' commuting expenses, especially in the case of long distance commuting. The average cost of commuting per month for the SOE's employees is RMB80.97, within the range they can bear. One employee indicated that "we don't need to change job or residential location to reduce the commuting distance, as the work unit bus relieves the commuting burden. The low income, however, is a serious problem." The work unit bus has made the long commuting distance and time tolerable to them.

Except for those living very close to the factory site, the work unit bus is also a main commuting mode for the SOE's new employees: 41.1% of the new employees among the respondents walk to the factory. Among these new employees, 43.8% use the work unit bus for commuting. The work unit bus has become the enterprise's crucial welfare service for ensuring a low turnover and stability of its employees (Table 1).

5.2 Relocation abilities: Poor living conditions and weak moving capacity

Our investigation revealed that most old employees among the participants have their own housing: 50.7% live in commodity housing and *danwei* housing, and 5.3% live in affordable housing. However, the housing condition is poor. 46.7% of these old employees ended up living in a house smaller than 50m² and 33.6% of them live in a house between 50 to 70m². More than half of the old employees among the respondents feel unsatisfied with their current residence.

Changing residential location is a way to mitigate the jobs-housing mismatch and improve the residential environment. However, although more than half of the old employees among the respondents feel unsatisfied with their current residence, only 20% have changed their residence since the SOE's relocation. The proportion of those who do not plan to change their residence reaches 75.6%. There are various reasons for their low residential mobility. The primary reason is their low income, which limited their ability to purchase new housing close to the current factory site. The average salary of the old employees is only RMB3,408 per month, which is quite low when compared to the average income of RMB6,830 in Guangzhou.

Another reason for the low residential mobility of the old employees is the SOE's welfare system, which is unexpected. As mentioned above, *danwei* housing is a kind of living insurance for SOE employees. However, it seriously restricts their choice of residential location.

First, *danwei* housing is an important reason why the SOE's employees are unwilling to move to a

new residential location to reduce their commuting time. For respondents who own housing, most of them own *danwei* housing and old staff dormitory in Shayuan, only 40.7% of them reduced their commuting time after residential relocation and 30.8% of them moved for more convenient commuting. For respondents who do not own housing, 71.4% of them reduced their commuting time after residential relocation and 60% of them moved for the convenience of commuting. Further, old employees among the participants who own *danwei* housing prefer downtown areas such as Tianhe in the Yuexiu district when considering moving to a new residential location. Based on the data collected in the interviews, most of these old employees have worked in the SOE for more than 20 or 30 years and have *danwei* housing. When considering buying a new house, most of them prefer better residential condition and more convenient public services, and only less than 20% of them prefer to move closer to the new factory site for shortening their commute trips. As a result, *danwei* housing not only does not help alleviate their burden of commuting or lessen the spatial mismatch they experience, but also roots most of these old employees of the SOE at the old *danwei* residential area. Even when considering residential relocation, shortening the commute trip is often not their main reason for doing so.

Second, the service and routes of the work unit bus have also limited the locational choice of these employees' housing. Some participants moved to the areas near the bus routes such as Shayuan in Haizhu District and Luoxi Bridge in Panyu District. Consideration of the location of the work unit bus stops restricted the locational choice of housing of Guangzhong's employees.

The third reason that hampers the residential mobility of the SOE's employees is their current socioeconomic status, family structure, and social networks. Apart from the employees' low income (and thus low ability to purchase and own housing) and the welfare system that caused residential immobility, social networks such as the attachment to existing networks of relatives, friends and colleagues living in traditional *danwei* housing also has some effects on them. The average age of the SOE's old employees among the participants is 45.4 years old, 12 years older than the new employees among the respondents, making considerable difference in the willingness to purchase housing. The main reasons for the unwillingness of the old employees to move are the inconvenience of daily activities or travel as well as inconvenient commuting for families, while the reasons for the new employees are the inconvenience of daily activities or travel and the high prices of housing. When asked "If there was housing with low prices near the factory, would you buy it?" (which eliminated the financial factor), only 57.2% of the old employees among the participants would buy housing near the new factory site, and Haizhu District where the enterprise was located before its relocation is their most preferred choice mainly because some of their friends and colleagues are still living in and around the *danwei* residential area. Social networks formed under the work unit system became an important consideration when the old employees of the SOE considered buying a new house. For the new employees among the respondents, 72.6% of them would like to buy housing near the new factory site, and Panyu District where the enterprise is now located is their first choice of residential location (Table 2).

Table 2. The intentions of housing purchase of the research participants

District	Liwan	Tianhe	Yuexiu	Haizhu	Baiyun	Huangpu	Fangcun	Panyu	Zengcheng	Else
Old employees	8.09%	6.36%	10.98%	46.82%	4.62%	0.58%	1.73%	15.03%	3.47%	2.31%
New employees	4.44%	10.00%	20.00%	21.11%	5.56%	1.11%	0.00%	28.89%	4.44%	4.44%

5.3 Career capacity: Dissatisfaction with current career but weak capability to change their careers

From our investigation, about 80% of the old employees among the participants are dissatisfied with their current careers. The reasons for their dissatisfaction include low income, long commuting distance and undesirable work environment. All of these factors increased the burden of their work and social life.

There are several barriers when considering changing their jobs. Although most old employees among the participants are unsatisfied with their jobs, 71.7% of them do not intend to change their jobs mainly because they cannot find better ones. Among those who do not intend to change their jobs, only 24% are satisfied with their present jobs. Other reasons for no intention to change their jobs include reaching the retirement age and having worked for too long to change. For the remaining 28.3% of the old employees that has a plan to change job, the most important reasons are for higher income (42%) and for being close to their family (34%), which reflects the low income and long commuting associated with of their current positions.

The employment condition of the SOE's employees has become a major obstacle for changing their jobs. High skill requirements, lack of time because of heavy work, and poor access to job opportunities are the three main reasons that make it difficult for the old employees among the respondents to find a new job. Because of the long-term stability of SOE occupation, the old employees think they have weak ability to compete in the market because of the high skill requirements. The long work hour and long commuting time, which limit the time available for them to search for a new job, and the limited social networks in their work environment was said to be the reasons for poor access to job opportunity. At the same time, the lack of ability to get job information is also a barrier for changing their jobs. When being asked how job information is obtained, 36% of the old employees rely on their friends and family members. Therefore, the old employees of the SOE have weak capability to change their careers.

Besides, the barriers to job change embody the institutional characteristics. Guangzhong undertake 70% of endowment insurance of about RMB700 per month which guarantee the income of their employees after retirement. The SOE's welfare system hinders employees to find new jobs because once they quit their current job and find another, they are no longer entitled to any retirement benefits. Even though the salary of the SOE's employees is lower than those of private enterprises, Guangzhong employees are still willing to stay in the SOE for the social benefits and stability. Once left, they would not have the same job security provided by the SOE. The welfare system is just like "chicken ribs" (i.e., tasteless but wasteful to discard; a Chinese idiom based on *The Records of the Three Kingdoms* [三国志]).

6 Factors on Spatial Mismatch for Guangzhong Employees

In this section, a multivariate regression model is used to explore the effects of different factors on the commuting time of the SOE's employees and to examine whether institutional factor such as housing ownership affects their experience of spatial mismatch. The dependent variable of the regression model is commuting time after the SOE's relocation. The key independent variables include housing ownership and a dummy variable that indicates whether an SOE's employee

remains at the SOE after its relocation (old employees) or was hired after the relocation (new employees). The control variables include personal socioeconomic attributes such as gender, age, income, family structure, and education level that may influence the choice of residential location. The model passes the test of significance and correlation with an R^2 of 0.210. Some conclusions are as follows (Table 3):

First, the variable of whether the respondent is an old employee or not has a significant impact on commuting time after controlling for personal socioeconomic attributes. This means that the old employees experience longer commuting time after the SOE's relocation. At the same time, housing ownership, especially welfare housing and housing-reform housing also have significant impacts on commuting time. The significant results associated with both the variable of whether the respondent is an old employee or not and the variables of welfare housing and housing-reform housing indicate that institutional factors have an important impact on the spatial mismatch experience of the SOE's employees.

Second, in terms of the personal socioeconomic attributes of the SOE's employees, gender and family structure have some impact on their commuting time. Men's commuting time is relatively longer than women's. Family structure has some impact on commuting time, which reflects that life cycle has some influence on the jobs-housing choice of the SOE's employees. However, income, age, education level and household registration status do not have a significant impact on participants' commuting time.

Thus, the results obtained with the regression model convincingly indicate that SOE-related institutional factors are more important for explaining the spatial mismatch experience of its employees rather than their socioeconomic attributes such as income, education and local resident status when examining the differences between the old and new employees.

Table 3. The result of multivariate regression model for commuting time and the factors

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Diagnostics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	49.865	23.423		2.129	.035		
Old employees	14.399	7.213	.161	1.996	.047	.542	1.843
Housing ownership(#Self-built housing of else)							
Commodity housing	11.881	9.283	.125	1.280	.202	.372	2.686
Welfare housing	38.144	12.996	.222	2.935	.004	.622	1.608
Housing -reform housing	21.221	10.349	.191	2.050	.042	.408	2.451
Rental housing	-15.017	10.431	-.123	-1.440	.152	.488	2.050
Enterprise dormitory	-.927	9.180	-.010	-.101	.920	.390	2.567
control variables							
Gender (#Female)	18.711	6.949	.177	2.693	.008	.822	1.217
Age (#≥50 years old)							
<25	-13.684	17.078	-.064	-.801	.424	.547	1.827
25-30	-2.727	10.778	-.025	-.253	.801	.369	2.714
30-40	3.684	8.329	.037	.442	.659	.498	2.009
40-50	2.171	7.357	.023	.295	.768	.563	1.778

Income (#more than 6000yuan per month)							
<1000	29.814	19.586	.148	1.522	.130	.376	2.658
1000-2000	13.721	15.059	.162	.911	.363	.113	8.885
2000-3000	13.878	14.789	.152	.938	.349	.134	7.449
3000-4000	7.088	15.841	.054	.447	.655	.239	4.182
5000-6000	1.933	15.724	.014	.123	.902	.281	3.557
Family Structures (with friends or else)							
Live alone	-42.701	16.105	-.323	-2.651	.009	.239	4.178
With parents	-39.492	16.947	-.258	-2.330	.021	.290	3.448
With partner	-37.437	15.871	-.334	-2.359	.019	.177	5.643
With partner and parents	-29.671	15.765	-.242	-1.882	.061	.214	4.683
With partner and children	-30.241	15.270	-.351	-1.980	.049	.113	8.878
Of three generations	-34.091	16.848	-.243	-2.023	.044	.245	4.084
Education level (#bachelor degree or above)							
Junior high school or below	3.853	11.962	.024	.322	.748	.613	1.630
Senior high school or below	-4.424	8.525	-.051	-.519	.604	.365	2.740
Junior college	-11.607	7.985	-.130	-1.454	.148	.443	2.259
Household registration status	5.220	6.882	.055	.759	.449	.677	1.476

Note: The dependent variable is commuting time.

The case study on Guangzhou Enterprise Group Corp of Guangzhou in this paper examines the impact of the SOE's relocation on the jobs-housing spatial mismatch of its old and new employees. Using the new employees as a reference group, the spatial mismatch the old employees face is a result of both institutional and market factors.

6.1 Institutional factors: Institutional transformation and current policies have some impacts on spatial mismatch

The transformation from a planned economy to a market economy in China is the root cause of the spatial mismatch employees of the relocated SOE face. In the planned economy period, enterprises were all state-owned. They were responsible to provide work, residence and other services to their employees, who often lived in *danwei* welfare housing close to their workplace (i.e., the factory site). Since the implementation of the market economy, SOEs began to reform and the welfare housing they provided to their employees was gradually abolished. This led to the need of many SOE workers to live farther away from their workplace. Further, before relocation, SOEs such as Guangzhong have the land use rights of the factory site. But through relocation, the enterprises sold the land and transferred the land use rights of the old site and bought new land in suburban areas for the new factory site at much lower price, while the old employees received no allowance for relocating from the former factory site to the new suburban location.

Urban planning policy and industrial development policy promoted jobs-housing spatial mismatch. Urban planning in China upholds the principle of functional division that different types of land use need to be laid in different locations. Under this system, residential and employment areas have expanded along with the expansion of cities, but the distance between these two functional areas has gradually increased. At the same time, according to this principle of functional division,

the newly developed industrial areas are always “pure” industrial areas in which residential areas and public facilities nearby are highly limited. That is why most of the old and new SOE employees did not move to areas near the enterprise’s new location after its relocation.

Enterprise welfare policy also contributed to the jobs-housing spatial mismatch to a certain extent. The work unit bus, stable employment, and other welfare provisions reduced the need or necessity for their employees to find new jobs and move which may mitigate the jobs-housing spatial mismatch.

6.2 Market factors: The mechanism of SOE relocation and its impact on spatial mismatch

Under the market economy, maximizing profit becomes the primary goal of the enterprises in China. Many enterprises under the market economy moved to the suburbs for cheaper land, which significantly aggravated the jobs-housing spatial mismatch. However, the relocation of SOEs to suburban locations was not simple a consequence of SOE reform conceived as an issue of institutional transition or urban policy of environment protection. It was not only derived from the economic and institutional transition but also embodied in a complex nexus of multi-agent intentions and actions.

For local governments, the main motivation comes from the financial gain of land use transformation and administrative achievement. Based on the current land law and policies, urban land use development is an important way of making profit. The relocation of factories from downtown to the suburb always means new development of tradable land in central locations. At the same time, as an important way of urban renewal, the redevelopment after enterprises’ relocation can also help achieve urban beautification and showcase administrative achievements of local governments. The aim for industrial upgrading is also a motivation for land use functional replacement for local governments.

For relocated SOEs, the motivation for relocation comes from the extra profit made possible by the relocation and the improvement in the production environment. Most industrial SOEs received administratively allocated land before, and the price of such land has increased considerably as a result of urban growth in cities. SOEs can get extra profit by selling their original land in urban centers at high prices and buying new land with at lower prices in suburban areas. With the development of the enterprises themselves, some of them also face the problem of upgrading and expanding their facilities. The relocation and construction of new plants in suburban areas can meet these needs.

For owners of rural land, under land administration law and policies, turning rural land use to urban land use is restricted. The relocation of SOEs gives them ample opportunities to make such change in land use attribution and to profit from the process, especially in suburb areas. At the same time, the relocation of SOEs also brought about some extra investment in local infrastructure and increased the prices of the land for other use.

However, the employees of SOEs are excluded from this nexus of multi-agent actions. What they face is more serious spatial mismatch, which is one of the main sources of urban inequalities in contemporary China.

7 Conclusions and Discussion

Aiming to test the SMH in the context of the institutional transformation and recently emerged poverty in China, and to fill the knowledge gap concerning how firm relocation affects the spatial mismatch experience of the employees of a recently moved SOE, this paper explores the conditions, mechanisms, and barriers to job change and housing relocation for employees of a relocated SOE who are marginalized and facing the threat of poverty in China. It focuses on an SOE (Guangzhong Enterprise Group Corp) which was relocated recently as a case. Comparing the jobs-housing situations of its employees who were hired before the relocation (old employees) and the employees who were hired after the relocation (new employees), the paper examines the SMH in the context of urban China. The results show that old employees of the relocated SOE experience more serious jobs-housing spatial mismatch and major barriers to job change and housing relocation.

The institutions of the planned economy era (e.g., *danwei* housing and the SOE welfare system) are the main contributors to the spatial mismatch experience observed in the study. These institutional factors became major structural barriers that render the reduction of jobs-housing spatial mismatch through residential relocation or job change more difficult. While *danwei* housing offers cheap and viable housing options to the SOE's old employees, it seriously restricts their choice of residential location. Existing social networks and family structure also make old employees, who often have no intention to reduce their commuting time, rely on their current *danwei* housing. The welfare system also had a great impact on the geographic immobility of its employees. These include the retirement and medical insurance systems inherited from the planned economy and the supply of work unit buses, which rendered employees more attached to and dependent on their enterprise. However, they were big burdens to the enterprise since they reduced its profit and led to lower spatial mobility of its lower-income employees. Moreover, the isolated working and social environment of the SOE limits its employees' access to job information and opportunities. Their means for job searching are rather limited. These institutional characteristics of the planned economy era still play an important role on jobs-housing spatial mismatch currently. They significantly reduce the capacity of the SOE's employees in coping with their jobs-housing mismatch.

Furthermore, the urban planning policies upholding the principle of functional division also have some impact on the spatial mismatch experience of the relocated firm's employees. The market-oriented transformation underlay the SOE relocation process also directly caused the jobs-housing spatial mismatch experienced by the old employees of relocated SOEs, who are excluded from the multi-agents of firm-relocation.

Further, this study also contributes to broadening the conceptual framework of the spatial mismatch hypothesis in important ways. Much of the work on the SMH in the western context, especially in the U.S., mainly focused on the role of race and residential segregation as major factors of jobs-housing spatial mismatch. While Houston (2005) has argued for extending the SMH beyond racial discrimination and incorporating wider structural factors into the SMH framework, few studies have explored non-racial factors to date. This study not only examines the SMH in a non-western context. It also incorporates a range of institutional factors that are seldom

considered in previous studies. It shows how specific institutional factors contributed to the spatial mismatch experience of the SOE's employees and how broad structure processes like economic reform significantly bear upon their experience. Extending the present study through comparisons between different types of SOEs and between SOEs and other kinds of enterprises can further deepen our understanding of jobs-housing spatial mismatch for the workers in China.

With respect to policy implications, this study indicates that the strategies for mitigating jobs-housing spatial mismatch for the old employees of the SOEs in China may differ from the common strategies used in the U.S. context (see Chapple, 2006 and Fan, 2012). Besides improving job and residential mobility, potential strategies should also include the removal of institutional barriers such as the dual welfare system. The locations for relocating current enterprises or plants also need to be considered within the context of urban renewal. That is, the shorter the distance between the new and original location, the better. Different from those who face passive residential relocation under the affordable housing program (see Zhou et al., 2013), employees of relocated SOEs have lost their rights to negotiate with their employees and local governments who received extra profit from the relocation program. Therefore, public participation and compensation for the old employees of SOEs are crucial during the process of relocation. At the same time, it is important for land use plans to recognize the need to include more residential and mixed land use in suburban areas.

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