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Spatial or socioeconomic inequality? Job accessibility changes for low- and high-education population in Beijing, China

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ABSTRACT

Two forces can affect job accessibility: one is regional-level socioeconomic transformation that changes the total amount of job supply and job demand, and the other is intra-regional spatial transformation that affects the distribution of jobs and population. Transitional Chinese cities are experiencing accelerated changes in both forces, which may affect various population groups differently. Using Beijing, China, as a case study, the research tracks changes in job accessibility for the low- and high-education groups between 2000 and 2010 and examines to what extent the two forces affect the two education groups' accessibility changes. Results show that the socioeconomic transformation reduced job accessibility, particularly the for high-education population, while the spatial transformation stratified the city with diverging effects on job accessibility changes of the two education groups. Policies should consider both forces in promoting residents' socioeconomic well-being.

1. Introduction

Transitioning from a planned economy to a market economy, China has witnessed increasing inequality among population groups. Among the many dimensions of inequality, unequal access to opportunities, especially job opportunities, has gained much attention because job accessibility is tightly connected to socioeconomic mobility. In large Chinese cities like Beijing, two forces could significantly affect job accessibility of different education groups. One force is regional-level socioeconomic restructuring, which influences the total amount of job supply and job demand for different population groups. The other force affects intra-regional spatial distribution of jobs and population and hence the spatial separation between them. Together, the two forces could create or reshape—if it exists—inequality in job accessibility between education groups.

To date, little research has empirically examined how the socioeconomic transformation and the spatial transformation have changed job accessibility in China. This research attempts to fill in the gap by investigating to what extent the two forces drove job accessibility changes for low- and high-education groups in the Beijing metropolitan area between 2000 and 2010.

The organization of the paper is as follows. The next section reviews literature on job accessibility as well as on how socioeconomic and spatial transformations in China may affect job accessibility of various education groups differently. The data and methodology section describes how we measure job accessibility by education group and how we decompose job accessibility changes into the components that respectively reflect socioeconomic and spatial influences. After we present the results, we conclude the paper with policy implications.

2. Literature review

2.1. Job accessibility

Accessibility is widely accepted as a measure of "the potential of opportunities for interaction" (Hansen, 1959). It is "determined by the spatial distribution of potential destinations, the ease of reaching each destination, and the magnitude, quality, and character of the activities found there" (Handy & Niemeier, 1997). Of access to various opportunities, access to jobs is particularly important because it is conceptually associated with employment outcomes and commutes (Tilahun & Fan, 2014).

Much empirical research has examined the effects of job accessibility. Literature generally finds plausible association between job accessibility and commuting time/distance (Hu, 2015; Kockelman, 1997; Levinson, 1998; Wang, 2000). Empirical results of accessibility's effects on employment status are mixed: some research finds significant

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positive impact (Ihlanfeldt & Sjoquist, 1990; Ihlanfeldt & Sjoquist, 1991; Immergluck, 1998; Kawabata, 2003; Levinson, 1998), while others finds, at most, modest effects (Cervero, Sandoval, et al., 2002; Ellwood, 1986; Gao, Mokhtarian, et al., 2008; Gibb, Osland, et al., 2014). It is noteworthy that the effects of job accessibility vary by population group (Hu, 2016).

In transportation and land use planning practice, accessibility has been recognized as an important performance indicator (Boschmann & Kwan, 2010; Cervero, Rood, et al., 1995; Grengs, Levine, et al., 2010; Handy, 2002; Páez, Scott, et al., 2012). In the United States many long-range transportation plans and studies have adopted accessibility measures (Grengs et al., 2010). The United Kingdom has formulated Accessibility Planning (Curl, Nelson, et al., 2011). In developing countries such as China, although job accessibility has increasingly been proposed in academic research as an important planning performance measure (Fan, Allen, et al., 2014; Zhao & Lu, 2010), few cities have actually done so in practice.

Understanding of job accessibility in Chinese cities is still limited, particularly in the factors that affect its changes. Job accessibility is influenced not only by spatial transformation—intra-regional distribution of jobs and housing—but also by socioeconomic transformation—regional-level economic restructuring and sociodemographic shifts (Hu, 2014). The following two sub-sections review literature on the socioeconomic and spatial transformations in Chinese cities with a special focus on how the two forces affect job accessibility of low- and high-education population.

2.2. Socioeconomic transformation

We define socioeconomic transformation as regional-level economic restructuring and sociodemographic shifts. The transformation changes both the size and the composition of employment and population. The vast amount of literature on economic restructuring examines employment by industrial sector, and the literature on sociodemographic shifts focuses on population by socioeconomic characteristics. Little research has investigated the joint effects of the two forces on job supply and demand for various population groups, and consequently there is no consistent classification method to match population groups with their suitable jobs. We found that education can be a consistent and plausible socio-economic indicator to classify both employment and population.

Economic restructuring in western countries has reduced the supply of good-paying low-skilled manufacturing jobs and increased the number of jobs that require high-education and high-skills (Muller, 2004; Sassen, 1990). Although still heavily relying on the manufacturing industry, many Chinese cities, including Beijing, experienced similar restructuring, particularly by encouraging the growth of the tertiary industries such as professional services and information technology industries. Economic restructuring is argued to be a major force of social polarization in Beijing (Gu & Shen, 2003), but little research has quantified how the restructuring changes job supply for different population groups in Chinese cities.

Literature that sheds light on the economic restructuring's effects on job supply in China pinpoints two forces—privatization and globalization, but the extent to which the two forces affect job supply for different population groups is uncertain. In 2014, the private sector employed about 70% of the total employees (National Bureau of Statistics of the People's Republic of China, 2015). Hu and Kaplan (2001) documented that in Beijing the private sector growth increased salary in certain professions, especially in professional services, while Dickson (2007) argued that in the whole country the private sector increased the demand for low-income low-skilled jobs, particularly in manufacturing and basic service sectors. Globalization also has drastically reshaped the economy and altered the industrial composition in China. Gu and Shen (2003) argued that the Foreign Direct Investment (FDI) has focused on the service sector and high-tech industries but not manufacturing in Beijing, but Wei, Leung, et al. (2006) found that a considerable amount of foreign investment actually went into the manufacturing sector in Shanghai. Overall, the growth of the private sector and the FDI has changed job supply and potentially enlarged the wage gap between employees with different educational attainments.

Meanwhile, the sociodemographic shifts have created a diverse labor force. Education can be a good socioeconomic indicator of the labor force (He, Wu, et al., 2010; Li & Wu, 2006). The two commonly-recognized disadvantaged groups tend to lack high education. One group is composed of migrant workers who work in low-wage labor-intensive industries (Gu & Shen, 2003; He et al., 2010; Liu & Wu, 2006; Wong, Fu, et al., 2007), and the other group is composed of permanent urban residents who are laid-off or unemployed but have limited human capital to gain economic means (He et al., 2010; Liu & Wu, 2006; Wu, 2002; Wu, 2004). It is noteworthy that in large cities like Beijing an additional low-income class has emerged: low-income college graduates who have high education but relatively low income (Gu, Sheng, et al., 2015). Nevertheless, their low-income status tends to be temporary.

Mismatch between job supply and demand exists, and the extent of the mismatch varies across education groups and employment sectors. For example, the gradually dwindling stock of rural low-education labor and the sudden rise in demand for it created a shortage of migrant workers in 2010 at the national level (Chan, 2010). Meanwhile, Guangdong province reported about 750,000 job vacancies in mid-2009, and these jobs were mainly in the skilled technician professions for which most low-education workers were not qualified (Chan, 2010).

The fast changes in economic structure and sociodemographic composition in Chinese cities continue creating and shifting the mismatch between job supply and job demand for different education groups. This research considers both changes and estimates their joint effects on job accessibility by education group.

2.3. Spatial transformation

The stream of literature that addresses how intra-regional spatial locations of jobs and housing affect individuals' economic prospects originates from Kain's (1968) Spatial Mismatch Hypothesis (SMH). He proposed the hypothesis in the context of the post-World War II spatial transformation in the United States: the affluent majority and jobs suburbanized, the disadvantaged minorities were constrained in the inner cities, these inner-city minorities lacked affordable and efficient transportation means to reach suburbanized jobs, and eventually the low job accessibility resulted in the inner-city minorities' inferior employment outcomes. Although empirical results to test the SMH are mixed (Fan, 2012; Ihlanfeldt & Sjoquist, 1998), the hypothesis provides a research framework to connect intra-region spatial transformation with individual person's socioeconomic outcomes.

Spatial mismatch could have occurred in Chinese cities (Fan et al., 2014). A fundamental force that affects intra-regional spatial arrangements of jobs and housing in China is institutional changes. In the planned economy, *danweis* (working units) in cities provide housing to its workers (Chai, 1996), and thus there was little spatial separation between jobs and housing. The 1978 economic reform and the urban housing reform in the 1990s have limited the role of *danwei* as a housing provider, while the private real estate market has become a major provider (Wang & Chai, 2009). This shift has potentially increased the spatial separation between jobs and housing.

In post-reform China spatial stratification of housing locations for different socioeconomic groups has started to manifest. In large cities like Guangzhou and Beijing, newly developed private market housing close to the city centers usually caters to high-income residents (Zhou, Wu, et al., 2013), while the surge in market housing price makes it difficult for low-income families to access urban housing (Chen, Zhang, et al., 2015). Within the low-income group the households with permanent *hukou* (household registration) have some state support and stay in public or ex-public housing, some of which is centrally located but