



Land use, mobility and accessibility in dualistic urban China: A case study of Guangzhou[☆]



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ABSTRACT

The concept of accessibility has been widely employed to understand the jobs-housing relationship in US cities. However, relevant studies in Chinese cities are rare. Little attention has been paid to accessibility modelling, variations among population groups, and the influence of land use arrangement and transport infrastructure in Chinese cities. To address this deficiency, the present paper provides measures on the job accessibility of workers with different *hukou* status in Guangzhou. The study yields the following findings: 1) inner-city districts have better job accessibility compared to suburban areas; 2) local *hukou* workers have significantly higher job accessibility than non-local *hukou* workers; 3) job suburbanization seems not to be effective in improving job accessibility or narrowing the gap between local and non-local *hukou* workers; and 4) investment in public transport would significantly improve the mobility and job accessibility of non-local *hukou* workers and help to alleviate accessibility inequality.

1. Introduction

Today, traffic congestion and automobile use are the norm in large cities, as residence and employment continue to suburbanize and travel demand continues to increase. To understand and find ways to mitigate transport-related problems have been the interest of academics and policy makers alike. One of the most promising and heatedly discussed approaches involves the study of jobs-housing relationship. The jobs-housing ratio, which simply considers the number of suitable jobs or housing units within a certain area (Cervero, 1996; Sultana, 2002), is the most widely used measure to gauge jobs-housing relation. However, it ignores the influence of jobs and housing in adjacent areas. To overcome this deficiency, various accessibility models incorporating the influence from adjacent areas as well as the interactions between land-use and commuting have been formulated (Hanson & Schwab, 1987; Koenig, 1980; Levinson, 1998).

While a considerable amount of works have been made to understand jobs-housing relations in US cities from the perspective of accessibility (e.g. Black & Conroy, 1977; Hu, 2014; Kwan, 1999; Shen, 1998; Wang, 2003), more efforts are still needed to examine the mechanisms underlying job accessibility variations across various local

contexts and people with different socio-economic attributes. In studies on China, the bulk of research uses jobs-housing proximity and commuting cost as indicators in the evaluation of access to jobs (e.g. Fan, Allen, & Sun, 2014; Li, 2010; Li & Liu, 2016; Zhao & Lu, 2010); relatively few employ job accessibility models. Moreover, in Chinese cities the paths of land use and transport infrastructure development under market transition are quite different from the Western experiences. These, in addition to the People's Republic's rather unique institutional setting such as the persistence of the *hukou* divide, should be taken into consideration in analysing jobs/housing relations and measuring accessibility in Chinese cities (Zhao & Lu, 2010). The present paper purports to examine job accessibility for different types of *hukou* holders in Guangzhou.

In the following, we further elaborate the importance and uniqueness of *hukou*-based divisions in Chinese cities. Then, we review the literature on accessibility. Next, we introduce the study area, data and methodology. The empirical analysis that follows depicts the basic characteristics of job accessibility for different *hukou* holders. Based on these results we conduct scenario simulations to see how job suburbanization and change in travel mobility would affect job accessibility. The final section concludes.

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2. *Hukou* and dual societal structure

The *hukou* system is one of the most powerful social control tools in China (Cheng & Selden, 1994). In pre-reform times, the distinction between rural and urban *hukou* was of utmost importance (Chan, 1994, 1996). While urban *hukou* holders were entitled to public welfare benefits including education, housing, and medical services, people with the rural *hukou* did not enjoy such benefits. Conversion from rural to urban *hukou* was strictly controlled (Chan & Buckingham, 2008). Since the late 1970s, large numbers of rural *hukou* holders have moved to cities. However, housing and labour market segmentations associated with *hukou* delineation remain salient. Along with tremendous rural-urban migration, China initiated the localization of *hukou* management that vested local authorities with more power on *hukou* matters. The *hukou* location (the official residential location), rather than the rural-urban distinction, becomes the principal mechanism for local authorities to regulate migration. Municipal governments are able to refuse undesired migrants, for example, unskilled and poorly educated rural migrants, the local *hukou* status; meanwhile they benefit from the cheap labour of the migrants (Chan, 2009). Chan and Buckingham (2008) contend that the “invisible *hukou* wall” dividing the Chinese society remains intact after decades of reform, but the significance of such a wall has shifted from the national to the local scale.

Specifically, a large portion of non-local residents are ineligible for jobs in government and state-owned organizations and are excluded from most local public services and welfare entitlements, such as public housing, school, and healthcare. Moreover, non-locals are faced with numerous constraints on home purchase, such as subject to higher down payment requirement, and barring from buying a second home, and are excluded from the drawing of local car license plates in major cities like Guangzhou, Shenzhen and Beijing. Such restrictions contribute to their extremely low rate of housing and car ownership. The segmentations between different types of *hukou* holders in the labour and housing markets, which are not simply segmentations between low- and high-skilled/income/education workers (Li & Liu, 2016; Ma, Yuan, & Zhao, 2012; Qiao, Qian, & Yao, 2009), are likely to have significant influence on people's jobs-housing relations and commuting decisions.

3. Determinants of job accessibility

Hansen (1959) defines accessibility as the potential of opportunities for interaction. Related definitions include “ease of spatial interaction” and “potentiality of contacts with activities or supplies” (Bruinsma & Rietveld, 1998). Land use structure and transport mobility are two major determinants influencing accessibility to opportunities (Hughes, 1995; Niedzielski & Eric Boschmann, 2014; Wachs & Kumagai, 1973).

3.1. Land use

Scholars have investigated the interrelationship between land use and job accessibility from various perspectives since the 1960s. One such perspective is the spatial mismatch hypothesis (Kain, 1968; Zax & Kain, 1996), which sees that the trapping of minority workers in central-city areas under employment suburbanization jeopardizes their employment accessibility. Mathematical models have been put forward to evaluate the spatial variations of accessibility. Black and Conroy's (1977) simulation study shows that in Sydney relocating jobs to public transport corridors has limited influence on job accessibility, but dispersing employment throughout the urban area, i.e. job suburbanization, increases job accessibility considerably, especially for automobile commuters. Shen (1998) finds that in Boston inner-city residence enhances the accessibility to job opportunities for low income workers. Kawabata and Shen (2006) compare the variations in job accessibility by commuting mode among Boston, Los Angeles and Tokyo, and find that the accessibility gaps between public transit and auto users in

Boston and Los Angeles are much more striking than that in Tokyo: the latter has a mean job-accessibility value for transit users more than six times higher than Boston, and ten times higher than Los Angeles. Hu (2014) examines the influences of changing job and housing distributions in Chicago on employment accessibility and finds that simultaneous suburbanization of poor job seekers and jobs suitable for them improve their job accessibility.

3.2. Transport mobility

Hughes (1995) compares three main strategies for addressing inner city poverty, namely, dispersal, development, and enhancing mobility, and concludes that improving mobility to connect poor inner-city residents to suburban employment opportunities is the most effective approach to alleviate urban poverty. In this connection Shen (1998) reveals that in Boston limited mobility caused by low car ownership seriously constrains job accessibility for low-income workers despite their geographical proximity to central employment opportunities. Her later study (Shen, 2001) finds that jobs seekers travel by car have greater accessibility than those depend on public transit regardless of residential location. Moreover, for auto commuters the accessibility differentials between residential locations are smaller than the differentials between automobile and public transit jobs seekers. Echoing these findings those found in Cleveland (Wang, 2003), San Francisco and Los Angeles (Kawabata, 2003). Sanchez, Shen, and Peng (2004) in their study of six US cities find no association between access to public transit and the employment outcome of low-income workers. They contend that assisting automobile purchase may be a more effective strategy to improve low-income workers' job accessibility. Similarly, Rogalsky (2010) finds that, compared with enhancing access to public transit, more investment in car ownership would be more effective in increasing the daily mobility of working poor women. The ineffectiveness of public transit-oriented policies could be attributed to the sprawling urban structure in US cities. Kawabata and Shen (2006) compare US cities and Tokyo and find that the transferability of the US findings to Asian cities is high, given the latter's much higher densities and public transit-oriented transport systems.

3.3. Extant studies in China

Most studies on urban commuting in Chinese cities focus on commuting cost and jobs-housing proximity (e.g. Fan et al., 2014; Li & Liu, 2016; Zhao & Howden-Chapman, 2010; Zhao & Lu, 2010). For example, Zhao and Howden-Chapman's (2010) in their study on Beijing find that the lack of migrants' lack of local *hukou* status leads to inferior job accessibility and higher commuting cost, after controlling for other socioeconomic attributes. Zhao and Lu (2010) suggest that in Beijing market-oriented housing reforms have changed the relatively balanced jobs-housing relation of the pre-reform era, when most urban housing was provided by government and other state work units at very low price, and when most residents lived and worked in the same compound. They conclude that the interactions between housing provision, market system and *hukou* system significantly influence commuting time and job accessibility. The above-cited works are based primarily on job-housing proximity or commuting cost; they have been criticized for not incorporating influences from adjacent areas (Wang, 2003). Moreover, accessibility model-based studies in China, e.g. Deng, Cai, and Yang (2012) and Chen, Zhang, and Yang (2013), have focussed on the access to infrastructures instead of jobs. One exception is Liu and Wang (2011), which evaluates the job accessibility of each *jiedao* or small district of Beijing and finds that the inner-city areas have higher levels of job accessibility and that the commuting cost of low-income workers is more sensitive to job accessibility. Their study, however, ignores job competition from workers in *jiedaos* other than the one of their own; furthermore, the study neglects institutional factors, especially the influence of *hukou* on job accessibility.

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