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Differences in pupils' school commute characteristics and mode choice based on the household registration system in China

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ABSTRACT

Population mobility and rapid urbanization have caused migrant pupils to have commuting problems. Taking Jinjiang as an example, this research focused on the differences in school commute characteristics and mode choices between pupils from registered households and migrant households. Using two-stage (schools and students) sampling, we designed questionnaires based on pupils' school commuting patterns and collected the data for the two groups. In addition to descriptive statistics, the pupils' choices of weekday active commuting to school were analyzed with a binary logistic model. We found that most pupils commute. Furthermore, for their weekday school commutes, most migrant pupils walk (77.48%) or commute by motorcycle (17.57%), whereas most household registered pupils walk (34.51%) or commute by private car (29.53%) or motorcycle (24.67%). Trip distance has a more significant influence on the active school commuting of household registered pupils than on the active school commuting of migrant pupils. Age significantly affects the commuting of migrant pupils only.

1. Introduction

Recently, the migrant population has grown in China because of the development of urbanization. According to the 2012 "Report on Migrant Population Development in China" (Migrant Population Service Management Department of China's Family Planning Commission, 2012), by 12 a.m. on October 1, 2011, the total national migrant population reached 229 million. One inevitable problem of this substantial population mobility is that some members of the migrant population, such as low-income migrants who travel from rural areas to work in urban areas, do not receive the same treatment as those who are registered in their own urban household. This situation is caused by the Chinese household registration system. According to this system, the Chinese population is divided into an agricultural population and a non-agricultural population (The People's Republic of China, 1958). This system is a long-standing policy in China, preventing a large amount of the agricultural population from moving from an area with a low urbanization rate to an area with a high urbanization rate, particularly moving from the west of China, which has a low urbanization rate, to the east, which has a high urbanization rate. According to the Chinese household registration system, migrant people without urban household registration cannot be paid equally or have equal access to job opportunities as people who are local urban registered residents. Additionally, many migrant people without household registration cannot afford houses in the city or receive the public welfare that is available to urban registered residences, and their children are unable to attend schools that offer high-quality education. All these situations place those people in a state of half-urbanization (Huang et al., 2012). Therefore, two different groups of people exist and develop as time passes. The migrant group that moves into cities with their school-aged children is more likely to have school commuting problems.

Studies on students' commutes to school, especially students' active commuting to school, have been conducted in many countries. Students' active commuting to school is defined as students (5–18 years old) who walk or ride a bike as their commuting mode. Some studies state that students' active commuting to school can help reduce the risk of obesity (McDonald, 2007). Susilo and Waygood (2012) examined the mechanisms underlying children's activity and travel engagements and how these mechanisms have changed over time in the Osaka metropolitan area of Japan. Hinckson et al. (2011) described trends in active commuting to school among children from the Auckland region of New Zealand by following the implementation of the School Travel

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Plan (STP) program. Buliung et al. (2009) explained temporal and spatial trends in active transportation for school trips in the Greater Toronto Area, Canada's largest city-region. McDonald (2007) identified the causes of change in active transportation to school over the past 30 years in the U.S.

In addition to the trend of pupils' active commuting, several studies have also found the impact of personal characteristics, distance, built environment, parents and other influence factors on pupils' active commuting. Leslie et al. (2010) and McDonald (2012) studied the effect of gender on students' active commuting and found that boys biked to school more than girls. Hinckson et al. (2011) reported a high likelihood of older children engaging in active commuting. Distance is an important influential factor in pupils' active commuting to school. Analyzing the United States National Personal Transportation Survey data, McDonald (2007) showed that distance from home to school might account for a decline on the number of students who walk or bike to school. In the aspect of built environment, Mitra and Buliung (2012) found that block density, signalized intersections and walking density were associated with active travel. In addition, the impact of parents on students' active commuting mainly included parents' perception of traffic danger (Rothman et al., 2015), parental employment status and commute patterns (McDonald, 2008b). The latter is caused by the fact that many children who commute to school are accompanied by their parents.

Studies on students' active commuting from the perspective of household registration are rare because household registration systems are uncommon worldwide. Foreign research on different groups of people focuses mainly on analyzing of low-income and minority groups. McDonald (2008a) showed that low-income and minority groups, particularly blacks and Hispanics, use active travel modes to commute to school at much higher rates than whites or higher-income students. Moreover, few people pay attention to students' active commuting to school in China. Sun et al. (2015) examined the mode of transport to school in China in terms of the physical and mental well-being of national representative samples of children. In China, most scholars studying students' commuting focus mainly on analyzing the composition of students' travel mode; then, they put forward the corresponding traffic improvement measures (Han et al., 2011; He and Li, 2007). The survey of a primary school in Nanjing found that the pupils who commute to schools mainly take private cars, electric bicycles and bicycles, and measures to encourage public transportation and school bus service were proposed (Han et al., 2011). Several scholars have also begun to pay attention to the influence of parents' travel mode and employment status on students' mode of commuting (He et al., 2014; Ma et al., 2016).

Students' active commuting is affected by personal characteristics, the built environment, family and so on, but few studies have analyzed the differences in students' active travel in different groups from the perspective of household registration. Therefore, this paper aims to conduct research on this aspect. The overall framework is as follows: Sections 2 and 3 describe the study areas and investigation process of student commutes. Through the data obtained, Section 4 provides descriptive statistics on characteristics of students' commutes to school, which includes statistics of modes and distance regarding students' commutes to school; Section 5 establishes the logistic regression model of students' active commuting to school; Section 6 discusses and summarizes this research and prospects for the next stage of the study.

2. Geographical setting

Located in the southeast coast of Fujian Province, Jinjiang is one of the most developed cities in China. Its comprehensive competitiveness, it ranked fifth of the top 100 counties (cities) in 2012. Most enterprises in Jinjiang are labor-intensive enterprises that attract a large number of migrant workers to work in Jinjiang. According to the sixth national Chinese census data (Jinjiang Statistics Bureau, 2012), the permanent population in Jinjiang is 1.99 million, of which the migrant population with registration in other cities is 1.01 million. At the end of 2012, the number of pupils in Jinjiang reached 164,100, of which the number of local household registered pupils was 54,900 and the number of migrant pupils was almost twice as large (109,200). Most migrants in Jinjiang do not have urban household registration, and the differences in employment and income between migrant people and household registered people cause differences in their children's school commute characteristics. This paper uses Jinjiang as an example to provide a basis for school commutes between different groups of pupils during the urbanization process in China.

3. Data sources and investigation design

Because of the unknown amount of household registered and migrant pupils for all schools, a two-stage sampling survey was adopted; sampling was first conducted on schools and then on students. Moreover, because of the different distances between students' residences and schools, the school commute pattern may vary. Therefore, this study designed the questionnaire based on students' school commuting patterns.

3.1. Phased sampling design

Provision 12 of the "People's Republic of China Compulsory Education Law" stipulates that local governments at all levels should guarantee the education rights of school-age children and adolescents to attend nearby schools in household registered districts without entrance exams. In recent years, a student who enters a school outside of household registered districts must pay high-priced school selection fees, which attempt to deter students from attending these schools and thereby avoid overcrowding in schools that offer higher-quality education. Meanwhile, housing prices increase every year in the districts with high-quality schools. To some extent, high-quality schools are often surrounded with students from high-income families. Therefore, the research data includes commuting conditions for pupils throughout the city and also reflect that different groups of people have different access to education resources. School samples were collected from various districts, and student samples were collected from different schools.

The total urban area of Jinjiang is 721.7 km^2 and includes the following four districts: the main urban district; the west urban district; the Andong district; and the Jinnan district. According to their education quality, primary schools are classified into demonstration schools and regular schools, where demonstration schools offer higher education quality than regular schools. Because Jinjiang city is a balanced development, each district has demonstration schools and regular schools. The difference is that the demonstration schools are located in the central area of each district, and the density of the road network is higher. Because of the implementation of zone divisions and the policy of admission into the nearest school in Jinjiang, housing prices are high around demonstration schools, and many migrant children have no opportunity to attend these demonstration schools. According to the district distribution, one primary school was selected from each district. Then, two demonstration schools and two regular schools were sampled on the basis of different types of schools. The specific sampling method is shown in Fig. 1.

Given the strict management of Jinjiang primary schools, it is difficult to investigate all students at all schools after the school sampling, so the better choice is conduct a sampling survey in classes. Two classes (excluding experimental classes, key classes and other special classes) were randomly selected in each grade, and students were randomly selected from the sampled classes for investigation. Special classes were excluded because the proportion of students in these types of classes is less than 10% of a regular class (Fig. 2).