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Lingering Educational Inequities under the Chinese *Hukou* System: A Human Opportunities Perspective

by

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China, an Asian powerhouse, has reached record levels of economic growth since milestone market reforms started in the late 1970s. It is poised to enter the next phase of development to join the ranks of advanced nations. Although it aspires to be a model of growth with equity by 2030, it seems unlikely to happen without further institutional progress. Institutional legacies like the Chinese *hukou* system has effectively created a highly stratified, segregated, and exclusive society. *Hukou* is more than a population census, it is also associated with rights to an array of important social services like education in the cities. It continues to institutionally exclude internal migrants from access to these entitlements, penalizing their life opportunities. The aim of the study is to quantify and compare the available and equitably allocated opportunities to access basic public education in the cities between rural migrant children and urban non-migrant children, under *hukou*. It uses the World Bank's Human Opportunity Index (HOI) methodology built on an 'equality of opportunity' framework to analyze a cross-sectional data from the 2008 Longitudinal Survey on Rural Urban Migration in China. It further makes a Shapley decomposition to identify important factors that contribute to these total inequalities. Results indicate that although overall opportunities were comparable, a disaggregation reveals worrying disparities. Opportunities for rural migrant children were consistently the lowest and the least equitably allocated in the coastal provinces. *Hukou* status was the largest significant contributor to total inequalities. Those at the junior middle school stage were relatively disadvantaged compared to their younger peers. These findings highlight that more affirmative action in the education of rural migrant children is needed to close opportunity gaps.

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1. Introduction

China's miraculous experience of a sustained growth averaging 9 percent annually is often attributed by many to the milestone market reforms since the late 1970s (Li et al. 2015; Lin, 2012; World Bank, 2016). Looking ahead, China ambitiously envisions itself as a 'modern, harmonious, and creative society' by 2030 (World Bank, 2013, p. 3). In particular, 'harmonious' means having equitable systems for its people, and an amiable relationship with the environment and other nations in the international arena (World Bank, 2013, p. 15). However, without affirmative action through further *hukou* reforms, its vision of a 'harmonious' society is likely to be undermined.

Hukou, is an enduring and peculiar feature to the Chinese society for more than two millennia (Young, 2013). It is not just a mere system for population record, but also functions as a critical determinant of an individual's life opportunities and exerts considerable influence on internal migratory patterns and settlement decisions (Johnson, 2017; Young, 2013). While the system is no longer able to strictly limit labor mobility per se as it did during the Mao era, it continues to differentiate and deny internal migrants' access to an array of important socioeconomic entitlements (most notably education, health care, and social security) tied to a local *hukou* at destination cities (Chan & Buckingham, 2008; Dreger, Wang & Zhang, 2015; Pi & Zhang, 2016; Wu, 2015; Young, 2013; Zhang, 2018a). This denial of access to public services is usually premised on the disincentives on the part of the already fiscally strained local governments at destinations (Zhang & Li, 2016). *Hukou*, with these differentiated rights attached to it, essentially acts like a 'citizenship in the given city' (Zhang, 2012, p. 503).

Urbanization is closely related to and usually expected to follow industrialization. However, the case of China is strangely counter-intuitive, where industrialization has far outstripped urbanization (Chan, 2009; Zhang, 2014). Despite the influx of rural-to-urban migrants, they are only regarded as *de facto* residents without full legal rights of urban citizenship and the accompanying entitlements of *de jure* residents (Chan, 2009; Zhang, 2014). It was estimated that the 'floating population' (流动人口), defined as individuals without a local *hukou*, doubled from 121 million persons in 2000 to a sheer size of 244 million persons in 2017 (NBS, 2018). Several highlight that China's actual urbanization rate is likely to be even critically lower in *de jure* terms than current figures in *de facto* terms suggest (Chan, 2009; Chan, 2012; Li, 2014; Zhang, 2014). 'China's rural migrants remain institutionalized outsiders in the cities they work and pay tax in', trapped among the lowest socioeconomic tiers, with little prospects of upward mobility (Young, 2013, p. 60; Zhang, 2017).

In the landmark 1948 document in the history of human rights, the Universal Declaration of Human Rights (UDHR) emphasizes the respect for and protection of the individual's rights and freedoms (United Nations, 1948). Yet, the *hukou* system continues to delineate and 'differentiate opportunity structures' even to present day (Cheng & Selden, 1994, p. 668; Liu, 2005, p. 137). The lingering inequities under the system clearly conflict with both its 2030 vision of a

'harmonious society' and the UDHR. Critics largely attribute rising distributional imbalances like economic inequalities to *hukou*'s creation of a highly stratified, segregated, and exclusive Chinese society (Lee-Wong, 2018; Lu, 2008; Wang, 2011).

1.1 Research Background and Gap

The literature to understand and quantify the costly ramifications of not reforming the *hukou* system is ongoing and ever-expanding. Existing research on the influence of *hukou* on migrant outcomes can largely be classified into three broad categories: economic, social, and developmental. Firstly, those on economic outcomes have studied the segmentation and discrimination in the urban labor market, where rural migrants are the most disadvantaged in both employment and earnings compared to local urban residents and other urban migrants (Cheng et al. 2013; Chen & Hoy, 2008; Fan, 2002; Gagnon, Xenogiani & Xing, 2014; Li, Gu & Zhang, 2015; Wang, Guo & Cheng, 2015; Zhang & Wu, 2017). Those on the social aspect have focused on the subjective well-being and integration of migrants in host cities, and vis-à-vis their settlement decisions (Du, Li & Hao, 2018; Han, 2010; Li, 2013). Lastly, studies on developmental outcomes have examined the impact of migration and socioeconomic disparities on children's school enrollment rates and academic performances, where rural migrant children likewise fare the worst (Chen & Feng, 2013; Chen & Feng, 2017; Jin, Liu, H. & Liu, L., 2017; Lai et al. 2014; Liang & Chen, 2007; Ma et al. 2018; Tam & Jiang, 2015; Wei & Hou, 2010; Wu, 2010; Wu, 2012; Wu & Zhang, 2015; Xiao & Bian, 2018; Xiong, 2015; Zhang, 2018b).

Clearly, much of the existing research is preoccupied with outcome inequalities to justify and advocate for *hukou* reforms. However, less attention is given to understand the distributional asymmetries of important educational opportunities. It is noteworthy that inequities and inequalities may already exist at the start during childhood, and even precede these unequal outcomes. Without a deeper understanding of where from and how they arise undermines the efficacy of any efforts to tackle persistent outcome inequalities. Yet, access to education is intrinsic to life opportunities by 'expand[ing] each individual's abilities and options' (Vega et al. 2012, p. 9). 'To equalize opportunity is to equalize the effect of given obstacles upon all relevant agents in pursuit of equivalent sets of opportunities. It is … a very specific form of freedom' (Green, 1988, p. 4). The Chinese society offers a unique context to study how inequities under the *hukou* system manifest itself in differentiated educational opportunities among social groups. The paper augments existing research with an alternative view of inequalities at origin using a human opportunities perspective.

1.2 Significance

Even though written and mandated by law, that the provision of the nine-year compulsory basic education for rural migrant children be non-discriminatory, the specifics of fulfilling this obligation are left to the discretion of the respective local governments (State Council, 2006). To access public education in the Chinese cities, a child typically needs to fulfill two conditions: they reside within and be registered with a local *hukou* in the school district (Chen & Feng, 2013; Liang & Chen, 2007; Wei & Hou, 2010). As such, a rural migrant child who typically does not hold a local *hukou* is vulnerable to institutional exclusion from education in the cities. Nevertheless, there have been deviations from this standard practice. Given the aforementioned discretion and the uneven spread of educational finance, schools were allowed to collect extra '*jiedu*' fees[1] (借读费) from rural migrant children without a local *hukou* to obtain access to public education in urban cities (State Council, 1996; Wei & Hou, 2010). However, these fees are hardly affordable to an average rural migrant (Montgomery, 2012; Wei & Hou, 2010).

Yet, education is commonly acknowledged as an important mechanism for escaping from the poverty trap and improving social mobility (Liang & Chen, 2007; United Nations, 2018; Wu, 2010; Xiao & Bian, 2018; Yang & Duan, 2008; Zhou & Xu, 2017). Nonetheless, education is a double-edged sword as it can be 'a tool for social reproduction' (Tsang, 2013; Wu, 2010, p. 91; Xiong, 2015). Given the exclusive nature of *hukou* that differentiates opportunities to access quality public education among social groups, counteracts any mobility potential it offers especially for rural migrants in the lower socioeconomic tiers, and instead reinforces and perpetuates social stratification in the Chinese society (Li & Placier, 2015; Wu, 2010). Furthermore, disconnecting parts of the population from such opportunities is likely to have long-term consequences at all levels of its economy and society. Hence, given the many costly economic and social implications, it is imperative to understand and correct for these disparities. The study aids policy-makers to identify important penalizing factors and thereby allocate resources in a way that more effectively tackles persistent and unjust socioeconomic inequalities.

1.3 Aim and Objectives

The paper seeks to quantify and compare the available and equitably allocated opportunities to access basic public education in Chinese cities between rural migrant children and urban non-migrant children, under *hukou*. It uses a quantitative research approach. It adopts the World Bank's Human Opportunity Index (HOI) methodology that is built on an 'equality of opportunity' framework. It further makes a Shapley decomposition to obtain the relative percentage contribution of each socioeconomic circumstance to the overall inequalities.

[1] The permission to collect these extra fees was stated in article 12 of the 1996 'Procedures for Primary School Management', it was subsequently removed as per item 9 of the 2010 'Decision on Education Related Amendments and Abolished Articles' (State Council, 1996; State Council, 2010).

1.4 Scope

Due to the scarcity of migration data in the Chinese context, it delimits the scope of the study in several ways. Firstly, it uses a cross-sectional data from the 2008 Longitudinal Survey on Rural Urban Migration in China (RUMiC). Hence, it is beyond the study to examine the evolution of human opportunities which requires longitudinal data. Secondly, it makes a comparative analysis only between two social groups: rural migrant children and urban non-migrant children. The study consistently defines rural migrant children as individuals who belong to rural migrant households[2]; this group is in the Migrant Household Survey (MHS) as classified by the surveyors. Urban non-migrant children are individuals who belong to urban non-migrant households[3]; this group is in the Urban Household Survey (UHS) as classified by the surveyors. Thirdly, it only calculates the HOI at aggregate provincial levels rather than at the underlying city levels. Fourthly, it limits to children age from 6 to 15, a range within the obligatory nine-year compulsory basic education. Lastly, it does not factor in quality of the schools.

1.5 Outline

The paper is outlined as follows. Section 2 provides a brief background of the *hukou* system and its reforms in contemporary China. Section 3 presents a literature review of the existing research. Section 4 describes the 'equality of opportunity' framework, the central idea to the study. Section 5 describes the data and the World Bank's HOI methodology. Section 6 presents and discusses the findings. Section 7 concludes and suggests policy implications.

[2] A *rural migrant household* refers to a sampled household based on the rural *hukou* status of the randomly selected person living in a city at the time of the survey. Due to the lack of information on the province where the rural *hukou* of the individual is registered, the study does not distinguish between inter- and intra-provincial rural migrants.
[3] An *urban non-migrant household* refers to a sample household based on the urban *hukou* status of the randomly selected person living in the city at the time of the survey. Due to the lack of sufficient information to establish if an individual was born outside the province but later transferred their *hukou*, the study does not distinguish between natives and migrants who have successfully made a *hukou* transfer.

2. The Chinese *hukou* system

This section provides a brief background, key developments, and reforms of the *hukou* system in contemporary China that are relevant to the understanding of the study. '*Hukou* system' (户口制度), otherwise generally known as the 'Household Registration System', is a less nuanced term often used in the English literature to refer to all related aspects of the system (Young, 2013). However, in the Chinese literature, *hukou* literally only refers to the official household records and documents; instead, the term '*huji* system' (户籍制度) is used to refer to the individual's associated rights to social services (Young, 2013). However, this paper adheres to the convention in English literature and uses the term *hukou* system or, in short, *hukou* interchangeably to refer to both official records and its associated rights.

2.1 Background

In the early 1950s, there was more or less freedom of movement and residential choice between the city and the countryside, such rights were even guaranteed by a constitution announced in 1954 (Chan & Zhang, 1999). However, the inflow of rural-to-urban peasants was overwhelming that the central government instituted the 'People's Republic of China *Hukou* Registration Regulation' in January 1958 in response, to restrict mobility and migration (Chan & Zhang, 1999; Young, 2013). Henceforth, it built the foundation for the present day *hukou* system (Chan, 2009; Young, 2013).

An individual's *hukou* has a dual classification both by 'type' (类别) and 'location' (所在地). 'Type' is divided into non-agricultural and agricultural, often synonymous with urban and rural respectively (Song, 2014). The non-agricultural status was associated with an array of state-provided socioeconomic benefits (education, employment, housing, health care, etc.), while those with agricultural status were expected to be self-reliant with hardly any support from the state (Chan & Buckingham, 2008). 'Location' is defined as an individual's only registered official and permanent residence (Chan & Buckingham, 2008). It is divided into local and non-local in relation to an administrative unit (city, town, or a village) and thereby, determines an individual's rights and eligibility for social services in a given locality (Chan, 2009; Chan & Zhang, 1999; Song, 2014). As such, there are four categories of people in any place. Figure 1 illustrates this dual classification. The most vulnerable group is the rural migrants who hold a non-local rural *hukou*. Rural migrants typically aspire to the most prized category, which is to transfer their *hukou* into a local urban *hukou* (Chan, 2009).

Location / Type	Local	Non-local
Non-agricultural (Urban)	Urban resident	Urban migrant
Agricultural (Rural)	Rural resident	Rural migrant

Figure 1: Illustration of *hukou's* dual classification
Source: Adapted from Song (2014)

2.2 Migration and Reforms

The scale of migration varied during different times in China's recent history. During the Mao era from 1949 to 1978, migration was largely planned and tightly controlled with the use of quotas on *hukou* transfers by the central government (Chan, 2009; Chan & Zhang, 1999; Young, 2013). The eligibility for a *hukou* transfer was confined to the usual few purposes like permanently employed at a state-owned enterprise, enrolled at an institution of higher education, or promoted to a senior administrative position (Chan, 2009; Chan & Zhang, 1999; Young, 2013).

Conversely, the rise of markets in the post-Mao era have enabled rural migrants who are drawn by prospects of economic betterment to seek non-agricultural work especially in the coastal and southern cities (Young, 2013). This deviant migration increasingly challenged and pressured the *hukou* system to adapt yet retain its exclusive nature (Young, 2013). Consequently, the 1985 regulation mandated a temporary residence permit for migrants living or working in urban areas for more than three months outside their permanent residence, however without conferment of a local *hukou* status (Young, 2013).

Since the early 1980s, the central government has begun to devolve fiscal and administrative powers to local governments, including the autonomy and flexibility in *hukou* management (Chan, 2009; Chan & Buckingham, 2008; Song, 2014; Young, 2013; Zhang, 2012; Zhang & Li, 2016). This entailed considerable variability in the localities' barriers to entry. Local governments with vested interests, typically those in the elite tier like Beijing and Shanghai, capitalized on this autonomy to select and grant only the most desirable migrants (investment, education, or skill) a local urban *hukou* (Chan & Buckingham, 2008; Huang, 2014; Zhang, 2012). Conversely, in order to redirect migration to areas with low population densities, the central government started in 2001 to remove quotas on *hukou* transfers in all small cities and towns (Wang, 2004). Furthermore, lower entry requirements are used to ease such transfers (Young, 2013).

Nevertheless, skeptics caution against misconstruing such *hukou* reform efforts as a dismantling of the age-old urban-rural divide (Chan & Buckingham, 2008; Wang, 2004). The *hukou* transfer quotas of the Mao era are merely replaced by locally determined entry requirements in the post-Mao era, which tend to favor the rich and the highly-educated but remain elusive for most rural

migrants (Chan & Buckingham, 2008; Wang, 2004). The *hukou* system exhibits great continuity, in that it remains a powerful device to limit rural-to-urban migration and stratify the Chinese society.

2.3 Education for Migrant Children

In regard to the education of migrant children, a major policy document 'Decision of the State Council on Reforming and Developing Basic Education' in 2001 emphasized the primary obligation of local governments to provide the nine-year compulsory basic education through the public school system for migrant children (Chan & Buckingham, 2008). This directive was reiterated in 2003 and 2006 that such provisions be non-discriminatory and without the collection of any miscellaneous and school fees (State Council, 2006; Wei & Hou, 2010). Even though written and mandated by law, migrant children continue to face insurmountable difficulties to obtain quality basic public education in the cities. This is due to both the local governments' lackluster compliance and urban public schools that typically demand extra documentation and charge migrant children hefty fees for the lack of a local *hukou* (Chan & Buckingham, 2008; Grey, 2008; Jin, Liu, H. & Liu, L., 2017; Montgomery, 2012; Xu & Dronkers, 2016; Yang & Duan, 2008).

Table 1: Timeline overview of key development or regulation related to *hukou* system[4]

Year	Key Development or Regulation
1958	People's Republic of China *Hukou* Registration Regulation
1985	Provisional Regulations for the Management of Temporary Residents in Cities and Towns
Late 1980s	Increasing decentralization of *hukou* management to local governments
1993	Draft proposal to abolish *hukou* 'type' classification[5]
1997	Blueprint for Experiments in Small City and Town *Huji* Management Reform
2001	Removal of quotas on conferment of local urban *hukou* in small cities and towns
	Decision of the State Council on Reforming and Developing Basic Education
2003	Opinions on Further Improving the Work of Compulsory Education for the Children of Migrant Workers
2006	Revised People's Republic of China Compulsory Education Law
2014	National Plan for New-Type Urbanization (2014-2020)
	Opinions on Further Promotion of the Reform of *Hukou* Registration System[6]

[4] Source: Adapted from Chan, 2009; Chan & Buckingham, 2008; Song, 2014; State Council, 2006; Wang, 2004; Wei & Hou, 2010; Young, 2013; Zhang, 2012; Zhang & Li, 2016

[5] It was never formally implemented but rather experimented at the local levels during the 1990s and 2000s. The proposal was to reduce and consolidate the number of *hukou* statuses into three categories: permanent *hukou*, temporary *hukou*, and visitor *hukou*. However, this unification of previously non-agricultural and agricultural groups into the same category with equal rights applies only to residents who already had a local *hukou* (i.e. rural residents). Hence, is of little relevance to rural migrants.

[6] To better integrate migrants into the present model of social benefits offered only to local urban residents.

3. Literature Review

This section presents major and recurrent threads in the existing research on the potential consequences of not reforming the Chinese *hukou* system. Research has typically focused on the influence of *hukou* on migrant outcomes in three particular aspects: economic, social, and developmental. This review also connects and discusses these key findings with relevant theories from the wider literature on international migration and sociology. It concludes by identifying the gap in existing research, and thereby justifies the contribution of the paper's proposed study.

3.1 Labor Market

The first group of studies has focused on the economic aspect of migrant outcomes, in terms of migrants' employment and earnings prospects in the urban labor market. Rural migrants without a local *hukou* at destination are denied many urban occupations, and are relegated to the 'so-called "3D jobs" (dangerous, dirty and demeaning jobs), that local urban residents generally find inferior and undesirable' (Chan & Buckingham, 2008; Guo et al. 2017; Kuang & Liu, 2012, p. 2). The clustering and binding of particular groups to specific sectors and occupations can be explained by the dual market theory where the labor market is segmented into primary and secondary (formal and informal) sectors (Fan, 2002; Massey et al. 1993). Employment in the secondary sectors tend to be relatively unstable, and offer lower wages and little mobility chances (Fan, 2002; Massey et al. 1993; Sert, 2016). Several studies have found that migrants, especially those of rural origins, face greater difficulties obtaining employment not only in the state sectors, but also jobs with formal labor contracts (Gagnon, Xenogiani & Xing, 2014; Li, Gu & Zhang, 2015; Zhang & Wu, 2017).

Besides occupational segregation, migrants also face wage discrimination, which is the wage differential unexplained by observable characteristics (Qin et al. 2016; Qu & Zhao, 2017). Although urban and rural migrants differ considerably in observable characteristics like education and skills, both similarly lack a local *hukou* at destinations they work in (Chen & Hoy, 2008). Several studies have highlighted that the basis for discrimination in the urban labor market has been progressively shifting away from an urban and rural divide towards a local and non-local divide (regional divide); however, rural migrants are the most disadvantaged by discrimination from both types of divide (Chen & Hoy, 2008; Cheng et al. 2013; Fan, 2002; Wang, Guo & Cheng, 2015).

3.2 Subjective Well-Being and Integration

The second group of studies has focused on the social aspect of migrant outcomes, in terms of migrants' subjective well-being and integration into the host cities. China, is an ethnically homogenous society with the majority, Han (Afridi, Li & Ren, 2015). Yet, *hukou*-assigned identities act as a potent mechanism to institutionally and socially exclude internal migrants (Afridi, Li & Ren, 2015). Given these integration challenges, Chinese internal migrants are confronted with tough settlement decisions even within the same country just as international migrants in host societies.

Several factors influence the extent of migrants' integration in host cities. Consequently, this has bearings on the decisions between settlement and return migration. In Bourdieu's theory, there are three kinds of capital: economic, cultural, and social (Annen, 2018). Social capital includes actual and potential resources that are deployed given an individual's embeddedness in a network of social relations (Annen, 2018; Zolin et al., 2016). These network connections among migrants, previous migrants, and non-migrants in origin and destination reduce costs and raise the expected net returns of migration as they expand (Massey et al. 1993). However, the findings in the existing research on the potential for social capital to mitigate the impact of *hukou* on migrants' integration are mixed. Li (2013) argues that as migrants in Beijing actively build and negotiate place identity through affiliation with the host city (dwelling, community, and organization) and social networks (family, kin, and friend), they develop stronger inclination to settle permanently. Conversely, Du, Li and Hao (2018) argue that although villages-in-the-city of Guangzhou harness critical social capital for migrants to familiarize with the city, the *hukou* has created such deep-seated constructs of place and identity that are difficult for migrants to challenge and renegotiate. As a result, very few develop attachment (protection and satisfaction) and identity (self-awareness and identification with the locality they reside in).

Evidently, *hukou* may have instituted and entrenched the division of social groups. The negative perceptions of the migrant group are likely to be self-reinforcing and irreversible, impeding their chances to achieve parity in treatment with the local urban residents. Han (2010) attributes the disadvantageous social constructs of rural migrants to the way they are policed in the cities. These rural migrants because of their association with the countryside are often perceived to lack '*suzhi*' (素质), otherwise referred to as 'quality' in English. It encompasses many aspects related to an individual's character and ability. As such, they are deemed by subjective local urban residents and the media as unworthy to reside in the cities, undermining their integration. Hence, *hukou* not only relates to physical residential spaces, but also connotes the 'quality' of an individual's thinking and behavior.

3.3 Education

The third group of studies has focused on the developmental aspect of migrant outcomes, in terms of children's educational attainment and socioeconomic resource disparities. Firstly, rural migrant children without a local *hukou* are less likely to be enrolled in cities' schools than both local urban children, and even their peers in rural hometowns (Liang & Chen, 2007; Wu &

Zhang, 2015). This disadvantage is not compensated for even if they belong to households with relatively advantageous characteristics (Liang & Chen, 2007). Closely related to school enrollment is that of transitions to higher stages of education. Several studies have revealed that *hukou* plays a significant role in determining these transitions, and that rural migrants have far fewer opportunities at each stage beyond junior middle school as educational expansion since the late 1990s has been urban-biased (Tam & Jiang, 2015; Wei & Hou, 2010; Wu, 2010; Wu, 2012; Xiao & Bian, 2018).

Rural migrant children who are unable to access mainstream public school education in the host cities, attend segregated private migrant schools that are typically associated with low-quality teaching, poor infrastructure, and instability under the constant threat of closures (Jin, Liu, H. & Liu, L., 2017; Lai et al. 2014; Wei & Hou, 2010; Xiong, 2015). Several studies have found significantly weaker academic performances related to the poorer educational quality among children enrolled in these schools, compared to local urban children and their rural peers in public schools (Chen & Feng, 2013; Chen & Feng, 2017; Ma et al. 2018). Conversely, others argue that even though rural migrant children may be enrolled in public schools, they remain marginalized, segregated, and denied access to quality teaching and educational resources (Liu & Laura, 2018; Xu & Dronkers, 2016; Zhang, 2017).

Besides school quality, socioeconomic resource disparities also influence the developmental processes. Parents of rural migrant children tend to work in lowly-paid secondary sectors with long working hours and therefore, are less involved in and capable of supervision of their child's education and progress (Xiong, 2015; Zhang, 2018b). Similarly, Jin, Liu, H. and Liu, L. (2017) used a framework of family educational support (economic, study, environmental, parenting style, and parent-child relationship) and found that rural migrant children receive less in every of the five aspects than their urban counterparts. They attribute these disparities in support fundamentally to the dualistic *hukou* system.

3.4 Gap and Contribution

Evidently, much of the existing research is preoccupied with outcome inequalities to justify and advocate for *hukou* reforms. However, less attention is given to understand the distributional asymmetries of important educational opportunities. It is noteworthy that inequities and inequalities may already exist at the start during childhood, and even precede these unequal outcomes. In other words, the playing field may not even be level to begin with. Without a deeper understanding of where from and how these uneven playing fields arise undermines the efficacy of any efforts to tackle persistent outcome inequalities. As such, this paper provides an alternative view to research on the *hukou* system by examining inequalities at origin from a human opportunities perspective.

As this review section earlier illustrated, the poor labor market outcomes of rural migrant parents that emerge under *hukou* potentially spillover and transmit through differential amounts of

capital stock available to their children. This consequently, has implications for the developmental opportunities and outcomes of rural migrant children. Furthermore, in the Chinese context, the *hukou* system segments the population into social groups with different statuses (local and non-local) that define an individual's rights to access socioeconomic entitlements like education in the cities. Hence, inequalities of socioeconomic resource compounded by inequities from the institutional exclusion by *hukou* status imply that educational opportunities for rural migrant children and urban non-migrant children are likely to be very different.

Yet, education is commonly acknowledged as an important mechanism for social mobility and is intertwined with future labor market outcomes (Wu, 2010). Coleman (1975) argues that the concept of 'equality of educational opportunity' is misguided when education is perceived as an end in itself (p. 28). Instead, an effective public schooling 'reduce[s] handicaps that children face as a function of their early environments … [and] leads in the direction of equal adult opportunities' (p. 28). Nonetheless, education is a double-edged sword as it can be 'a tool for social reproduction' (Tsang, 2013; Wu, 2010, p. 91; Xiong, 2015). If opportunities to access public education are restricted and exclusive only to individuals of certain social strata, it will inevitably trap parts of the population in the lower socioeconomic tiers (especially those from rural migrant households), disconnected from partaking in and sharing the benefits of economic growth.

This urban-rural divide that the *hukou* institution has cemented entails both economic and social costs at all levels of China's economy and society. At the micro-household level, rural migrants who internalize the highly stratified and deterministic nature of the economy and society under *hukou*, may become disillusioned and disincentivized to invest in the further accumulation of human capital, diminishing their prospects of social mobility (Heckman & Yi, 2014; Mejia & St-Pierre, 2008). Also, the institutional exclusion from socioeconomic entitlements at destination drive precautionary savings of these internal migrants, suppressing the much-needed Chinese consumption (Chen, 2018). At the broader macro- and meso-levels, as the economy structurally transforms into a complex, knowledge and skill-based one, the shortage and mismatch of labor are likely to impact productivity and economic growth (Meng, 2012; Mohabir, Jiang & Ma, 2017). As for the social costs, rising tensions and instability related to perceptions of social justice and equity among groups may emerge (Cheng, 2014). This impedes China's pursuit of a 'harmonious society' by 2030.

Hence, the paper's study unifies both inequities and inequalities that a child faces by 'circumstances' beyond their control at the start to examine how opportunities differ between two major social groups: rural migrant children and urban non-migrant children. The Chinese society with its age-old *hukou* institution offers a unique context to study differentiated opportunities as a result of the chronic divide and exclusion it has created. The study contributes to the important understanding of educational inequities for rural migrant children under the Chinese *hukou* system from a human opportunities perspective. It aids policy-makers to identify important penalizing factors and thereby allocate resources in a way that more effectively tackles persistent and unjust socioeconomic inequalities.

4. Analytical Framework

This section explains and clarifies the concept of ‘equality of opportunity’. It is central to and informs the HOI method used to meet the study’s aim: to quantify and compare the available and equitably allocated opportunities to access basic public education in Chinese cities between rural migrant children and urban non-migrant children, under *hukou*. Lastly, it briefly justifies the concept’s appropriateness for the Chinese context.

4.1 Which type of distributive equality?

Arneson (1989) argues in ‘Equality and Equal Opportunity for Welfare’ that societies are faced with a fundamental distribution problem evident in the observed disparities between the rich and the poor. Even though equality is understood to be the distributive exemplar, what exactly are we or should we be equalizing remains less clear. Three types of equality are discussed, namely, of resources, of welfare, and of opportunity for welfare.

In the first type of equality, of resources, is a distribution of an identical share of goods to everybody. However, there are two main objections to this distributive thinking. Firstly, it fails to consider the initial heterogeneity of each recipient of the identical share. To illustrate this point, consider two individuals. One of whom is an individual with disabilities, the other is a healthy individual. If accrued an identical share of resources, the individual with disabilities has to spend most of the given resources on medical related expenses, while the healthy individual can use it to realize aspirations. Unless the individual with disabilities is given an amount of resources to make up for the disparities in health, and on top of that, given an identical share of goods, is ‘equality of resources’ achieved. In other words, an individual’s endowments are also counted as resources. The second objection asserts that an individual given an identical share of goods be held liable for the preferences they form and re-form as a result of this distribution. While certain preferences made are undeniably beyond an individual’s control, some are consciously chosen or are changed with time. Consequently, to achieve an ‘equality of resources’ requires individuals with lower degrees of preference satisfaction be compensated for to the point of equalization with others, similar to the first instance of disparities in endowments. However, this conflicts with the view that individuals should be held responsible for their own preferences.

The second concept is the ‘equality of welfare’. He equates welfare with preference satisfaction, where preferences include only those in an individual’s self-interest and an end in itself, rather than for further ends. Individuals, however likewise derive different levels of welfare as a result of certain choices they make for which they are solely responsible for. Thus, it is a poor distributive ideal. To illustrate this point, consider two individuals who can achieve identical levels of welfare with the same effort; however, one expends efforts in self-interest, the other pursues causes not in self-interest but for further ends (for example, saving whales).

Consequently, the latter individual achieves lower levels of welfare based on the concept's assumption of preference satisfaction is restricted to only those in one's self-interest.

Hence, given the problems with the first two concepts of distributive equality, there is a third idea of 'equal opportunity for welfare' where:

> 'An opportunity is a chance of getting a good if one seeks it. For equal opportunity for welfare to obtain among a number of persons, each must face an array of options that is equivalent to every other person's in terms of the prospects for preference satisfaction it offers' (p. 85).

Although individuals may face an equivalent set of options, they may differ in their knowledge of and attitudes towards these options. Hence, the concept requires additional assumptions to be made. A set of options is effectively equivalent if any one of the reasons hold: firstly, persons display comparable abilities of rationality to choose among options; secondly, there are differences in options to offset any unequal abilities to choose among options; lastly, the options are equivalent and any unequal abilities to choose among options is attributable to the individual's negligence (thereby, responsibility). In other words, if individuals effectively in knowledge, rationality, and motivation face the same set of options and expected values of outcomes (such as welfare synonymous with preference satisfaction as aforementioned), any actual resultant inequality of welfare is a consequence of their own choice for which they should be personally liable for. Consequently, in Arneson's view, the 'idea of equal opportunity for welfare is the best interpretation of the ideal of distributive equality' (p. 77).

A closely related work is Roemer's 'A Pragmatic Theory of Responsibility for the Egalitarian Planner'. Roemer (1993) argues that earlier works generally agree that society should protect people against bad outcomes that are a result of circumstances and not of those from conscious choices they make which are within their control. He makes tangible the idea that 'equality of opportunity' for any outcome (such as welfare) holds given that the expected value of outcome is the same for all individuals who employed similar degrees of responsibility 'regardless of their circumstances' (p. 149). For example, in the context of education, 'equality of opportunity' for education prevails if public schools are available to all children regardless of their circumstances, no outcome differential such as labor market earnings are deemed unethical.

Figure 2 is a diagrammatic summary of the concept of 'equality of opportunity' based on Arneson and Roemer's works. An outcome is determined by two components. Firstly, 'choice' which is within the control and responsibility of an individual. Secondly, 'circumstance' which is outside or beyond the control of an individual. Any inequalities of outcome that arise from conscious choices an individual makes is 'just' and for which they are personally responsible for, without any compensation for. On the other hand, inequalities of outcome that arise from circumstances beyond an individual's control is 'unjust' and for which an egalitarian planner should take measures to protect an individual against and correct for. As Green (1988, p. 4) argues that 'to equalize opportunity is to equalize the effect of given obstacles upon all relevant agents in pursuit of equivalent sets of opportunities'.

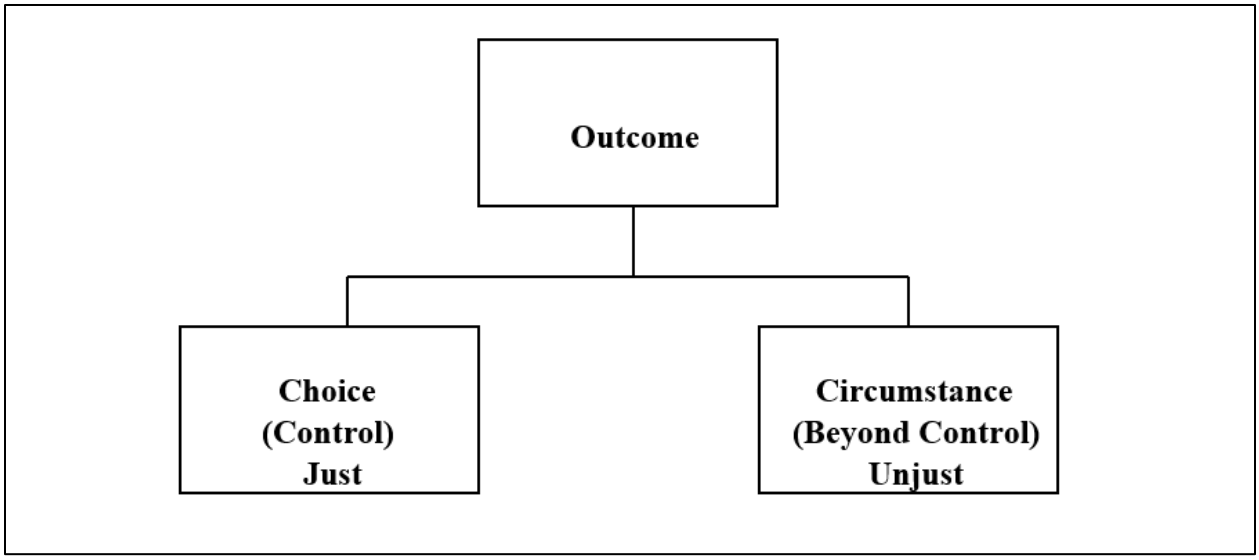

Figure 2: 'Equality of opportunity' framework (own illustration)
Source: Adapted from Arneson (1989); Roemer (1993)

4.2 Human Opportunity Index (HOI)

The HOI methodology was first applied to study human opportunities of children in 19 countries in Latin America and the Caribbean (LAC) (Vega et al. 2012). The HOI provides a numeric measurement of how far a society is from achieving provision of opportunities to all, where circumstances outside an individual's control do not matter. In other words, it is a measure of the average coverage for a particular key good or service corrected for equity (otherwise known as 'equality of opportunity-sensitive coverage rate'). To illustrate this point, consider two societies each with two social groups. Both societies have the same overall coverage rate of a particular service. However, one society allocates the available service to only one particular social group and none at all to the other. Conversely, the other society allocates the scarce service equally to both social groups. The latter society is said to be closer to the ideal of equity than the former, from the HOI view. The HOI assumes a range of values from 0 to 100, where 100 indicates a society has attained universal coverage for all services. For 'equality of opportunity' to prevail in a society requires a child's opportunity to access key goods or services to be uncorrelated with 'circumstances' outside or beyond their control (familial, communal, and societal). The allocation of opportunities should be non-systematic and does not disadvantage any particular social group.

The typical individual of analytical interest is the child age 0 to 16, who are at an age where conscious choice is unlikely to be of any significance. This addresses the inseparability problem of 'choice' and 'circumstance' contributions to outcome inequalities. In the study on LAC, it

focused on seven personal socioeconomic circumstance for comparability across countries[7]. However, the good or service and the circumstances are adaptable to each country-specific context.

In the Chinese context, the *hukou* institution, defines a child's rights to access basic public education in urban cities. In effect, *hukou* status acts as a societal circumstance that is outside the child's control. Furthermore, as earlier discussed in the previous section that family background and socioeconomic resource disparities are among significant contributing factors to a child's probability of school enrollment. Therefore, the flexibility of the HOI to encompass these different circumstances, presents a unique and appropriate method to meet the study's aim.

[7] Per capita family income, gender of child, gender of household head, location of residence (urban or rural), number of siblings, parents' education, and presence of both parents in the house.

5. Data and Method

This section first briefly introduces the data used for the study. Then, it provides the definitions of the opportunity and circumstance variables. Lastly, it outlines the steps to construct the HOI and to decompose the total inequalities.

5.1 RUMiC Dataset[8]

The dataset used was the Longitudinal Survey on Rural Urban Migration in China (RUMiC)[9] which is a collaboration between the Australian National University, the Beijing Normal University, and the Institute for the Study of Labor (IZA). It is an especially unique dataset to study topics on internal migration in China. The fieldwork started in 2008. It contains three independent surveys: the Urban Household Survey (UHS), the Rural Household Survey (RHS), and the Migrant Household Survey (MHS). The RHS includes approximately 8,000 households, while the UHS and MHS each includes about 5,000 households. RUMiC covers key migrant sending and receiving provinces. It contains rich demographic and socioeconomic variables about household heads and its members, including information on the education of children age 16 and below. The paper's study used a cross-sectional data from the year 2008 (first wave) due to limited availability of survey waves and attrition. Nevertheless, the dataset is appropriate and indispensable for the study's aim. Appendix A provides the RUMiC's sampling design, coverage, and attrition.

5.2 Variables

5.2.1 Child

The study's aim is to examine a child's access to basic public education. Based on the State Council's directive, a nine-year compulsory basic education through the public school system is the obligation of local governments (Chan & Buckingham, 2008). This covers a six-year elementary school education and a three-year junior middle school education. Based on existing research related to the Chinese education system, a child age 6 to 15 falls within the frame of this

[8] The brief discussion in this subsection refers to Akgüç, Giulietti & Zimmermann (2013).
[9] The first wave started in 2008. As at 2013, four waves have been collected for the UHS and RHS, and five waves for the MHS. However, only the first two waves from 2008 to 2009 are made available to researchers from universities and research institutes, subject to approval from IZA, the depository and provider of the scientific files. The dataset can be applied for at the following link: https://datasets.iza.org/dataset/58/longitudinal-survey-on-rural-urban-migration-in-china

nine-year compulsory basic education (Grey, 2008; Jin, Liu, H. & Liu. L., 2017; Liang & Chen, 2007). Hence, the study follows this convention and defines the child as an individual whose age is from 6 to 15. This is also aligned with the World Bank's HOI definition of a child to address the inseparability problem of 'choice' and 'circumstance', as a child is at an age where conscious choice is unlikely to be of any significance (Vega et al. 2012).

5.2.2 Opportunity

Opportunity refers to having the access to the service: basic public education. In other words, education in a public school. Rural migrant children who are unable to access mainstream public school education in the host cities, attend segregated private migrant schools of inferior quality and fewer educational resources (Jin, Liu, H. & Liu, L., 2017; Lai et al. 2014; Wei & Hou, 2010; Xiong, 2015). These schools assume a central role of education for rural migrant children as public school places in larger cities like Shanghai and Guangzhou are restricted (Chen & Feng, 2017). The paper made three critical assumptions that a child needs to fulfill to constitute access. Firstly, the child is enrolled in a public school. Secondly, the child is compatible with the typical age of the given grade ('correct age'). This is because a child of 'correct age' is more likely to have had the opportunity to enroll in school on time and have received a minimum quality of education to be promoted successfully to the next grade without repetition. To illustrate, assuming formal education begins at the age of 6, if a child of this age is in grade one of elementary school is 'correct'. Lastly, the child is a current in-school student. Conversely, if any of the three critical assumptions is not met as the child is enrolled in a private school, over the 'correct age', or dropped out of school regardless of reason, is considered to have no access.

5.2.3 Circumstances

Circumstances include those familial, communal, and societal that are outside or beyond a child's control. The study refers to existing research similarly on children opportunities to access basic public education in other contexts like developing Asia, LAC, and Tunisia to select the circumstances (Jemmali & Amara, 2018; Son, 2013; Vega et al. 2012). However, with slight modifications to tailor to the unique Chinese context of the *hukou* system, and based on comparability and availability within the RUMiC dataset. The seven circumstances used in the analysis were: gender of the child, *hukou* status of the child, education of the household head, age of the household head, gender of the household head, household size, and per capita household income. Table 2 provides a summary of each term or variable, and relevant critical assumptions.

Table 2: Overview of mentioned variables in subsection 5.2

Term or Variable	**Definition**	**Critical Assumptions**
Child	Age 6 to 15	Age range compatible with nine-year compulsory basic education
Opportunity	Has access to basic public education Elementary School: age 6 to 11 Junior Middle School: age 12 to 15	Refer to assumptions under 'access'
Access	0 if no access; 1 if access	Binary 1. Enrolled in a public school 2. 'Correct age' 3. In-school student
Circumstances	Gender of the child (0 if female; 1 if male)	Binary
	Hukou status of the child (0 if rural; 1 if urban)	Binary Does not distinguish between local and non-local Non-local urban *hukou* is classified as urban *hukou* Local rural *hukou* is classified as rural *hukou*
	Education of the household head (years)	Continuous
	Age of the household head (years)	Continuous
	Gender of the household head (0 if female; 1 if male)	Binary
	Household size (number of persons)	Continuous
	Per capita household income (yuan)	Continuous Derived using information on total household income divided by household size

5.3 Method

5.3.1 Constructing the HOI

There are six steps in constructing the Human Opportunity Index (HOI). The explanations and mathematical notations used in this subsection were drawn from similar studies in other contexts like developing Asia, LAC, and Tunisia (Jemmali & Amara, 2018; Son, 2013; Vega et al. 2012). Appendix C contains a graphical illustration of the HOI.

Firstly, we define a dichotomous variable $z_i$which takes the value of 0 if the *i*th individual does not have access (in this case basic public education) and 1 if the *i*th individual has access. Secondly, it follows that E (z_i) = p_i= P (z_i), p_i is the probability that the *i*th individual has access. This predicted probability, $\hat{p}_i$, is obtained using the estimated coefficients from a separable logistic model given a vector of *k* circumstance variables X_{i1}, X_{i2}, …, X_{ik}

$$\hat{p}_i = \frac{exp\left[\hat{B}_0 + \sum_{k=1}^{m} x_{ki}\hat{\beta}_k\right]}{1+exp\left[\hat{B}_0 + \sum_{k=1}^{m} x_{ki}\hat{\beta}_k\right]} \quad (1)$$

Thirdly, using this predicted probability, $\hat{p}_i$, compute the overall coverage rate, C

$$c = \sum_1^n w_i \hat{P}_i \quad (2)$$

Where $w_i = \frac{1}{n}$ or some sampling weights

Fourthly, compute the Dissimilarity Index (D-Index), $\widehat{D}$, as a relative mean deviation. The D-Index[10] measures the dissimilar coverage rates across groups defined by circumstances (circumstance groups[11]). The index represents the share of people who would need to have a good or service reassigned as a percentage of all people who have access to the good or service. It follows that 1-D[12] is the percentage of all available opportunities correctly assigned.

$$\widehat{D} = \frac{1}{2C} \sum_{i=1}^{n} w_i \left|\hat{P}_i - C\right| \quad (3)$$

Fifthly, compute the penalty, P. More simply, the penalty can be understood as the percentage of all people who have access to the good or service that would need to be reassigned to circumstance groups[13] with group-specific coverage rates below the overall average coverage rate to achieve 'equality of opportunity'. In other words, if all circumstance groups have group-

[10] Commonly used in the sociology discipline.
[11] A circumstance group is a social group in which its members share a particular set of circumstances.
[12] Alternatively, the D-Index can be understood as a measure of the extent of 'inequality of opportunity' explained by the individual's circumstances. It assumes a range of values from 0 to 1; where 0 means there is absolute 'equality of opportunity' among individuals in a society, while 1 means one person in a society takes all the opportunities and hence there is absolute 'inequality of opportunity'.
[13] These groups are referred to as 'opportunity-vulnerable' groups.

specific coverage rates that are equal to the overall average coverage rate, the penalty is zero without a need for any reassignment of opportunities.

$$p^{14} = C \times \widehat{D} \quad (4)$$

Lastly, compute the HOI, which is simply the 'equality of opportunity-sensitive coverage rate'. In other words, the average coverage rate discounted by the penalty for inequity.

$$HOI = C - P \quad (5)$$

5.3.2 Shapley Decomposition

The aforementioned D-Index measures the total contribution of all circumstance variables to the 'inequality of opportunity'. However, it is useful to understand the relative percentage contribution of each socioeconomic circumstance to the overall inequalities. This is particularly relevant to the Chinese context of the *hukou* system, to quantify and understand the relative contribution of *hukou* status to a child's opportunity to access basic public education in the cities. This aids policy-makers to identify important penalizing factors and thereby allocate resources in a way that more effectively tackles persistent and unjust socioeconomic inequalities. The statistical quantification of this decomposition was presented in Son (2013).

Firstly, a variable $y_i = \frac{p_i}{(1-P_i)}$ is the ratio of the odds of $z_i = 1$ (access) against $z_i = 0$ (no access). In other words, the larger y_i is, the greater the odds that the *i*th individual has access to an opportunity. This odds ratio can be written in a natural logarithmic form

$$ln(y_i) = \sum_{j=1}^{k} \beta_j x_{ij} \quad (6)$$

The maximum likelihood estimate of y_i is then

$$ln(\hat{y}_i) = \sum_{j=1}^{k} \hat{B}_j x_{ij} \quad (7)$$

Where $\hat{B}_j$ is the maximum likelihood estimate of β_j derived from the logistic model in equation (1) and $\hat{y}_i$ is the estimate of the *i*th individual's odds ratio explained by the circumstance variables

As y_i is a monotonically increasing function of p_i, the inequality of p_i will be equivalent to the inequality of y_i. It follows that the inequality of $\hat{y}_i$ will be equivalent to $\hat{p}_i$. Hence, the

[14] $p = \frac{1}{N}\sum_{k=1}^{v}(M_k - \bar{M}_k)$. Computing the penalty requires identifying all 'opportunity-vulnerable' groups. For each 'opportunity-vulnerable' group, k, $\bar{M}_k$, is the number of people with access to a good or service needed for its coverage rate to equal the overall average coverage rate, and M_k, is the number of people in group k, with access. $M_k - \bar{M}_k$ is the opportunity gap for the vulnerable group, k. The penalty is the sum of the opportunity gaps for all vulnerable groups divided by the total population (N).

'inequality of opportunity' explained by a circumstance variable can be measured using the inequality of $\hat{y}_i$.

Next, take variance on both sides of equation (7)

$$var(ln(\hat{y}i)) = \sum_{j=1}^{k} \hat{B}_j \, cov\left(x_{ij}, ln(\hat{y}_i)\right) \quad (8)$$

This decomposes the 'inequality of opportunity' (measured by the log variance) by the relative contribution of each circumstance variable.

Next, divide both sides of equation (8) by $var(ln(\hat{y}_i))$ to obtain the percentage contribution of each circumstance variable as

$$100\% = \sum_{j=1}^{k} S_j \quad (9)$$

Where $S_j = \frac{100 \times \hat{B}_j \, cov\left(x_{ij}, ln(\hat{y}i)\right)}{var(ln(\hat{y}i))}$ is the percentage contribution of the *j*th circumstance variable to the total 'inequality of opportunity'. The larger the value of S_j, the greater is the contribution of the circumstance variable to the total 'inequality of opportunity'. S_j is the net contribution of the *j*th circumstance variable after accounting for all interactions between circumstance variables

6. Findings and Discussion

This section presents the key findings from the cross-sectional 2008 RUMiC dataset. It examines these findings and its significance in relation to the paper's research question and more broadly to the existing literature. It also discusses the interpretation and its inherent limitations. Lastly, it makes suggestions for future research.

6.1 Descriptive Statistics

This subsection primarily provides a snapshot of the main personal and household characteristics of the analytical groups: rural migrant children and urban non-migrant children. It briefly explains how and why the samples were chosen and derived. Liang and Chen (2007) argue that comparative analyses of migrant outcomes only at destination risk the problem of migration selectivity. Instead, they propose that analyses should ideally also include a third social group: rural children who do not migrate with their parent(s) to the same cities but remain at origin. However, this approach is not adopted due to data constraints (on the *hukou* status and location of these children), the lack of comparable urban contexts, and the scope of the study.

Nevertheless, Appendix D documents the characteristics of this group, referred to as excluded rural migrant children. Although some lived in another locality, most of them (83.33%) remained in their rural hometowns. More than half (68.23%) cited that the main reason the child lived apart is due to the high cost and lack of access to education in the cities. A high percentage (93.37%) were in public schools. However, the average spending on remedial classes outside school in 2007 was minimal (51.17 yuan). Evidently, costs and education are among main considerations of whether a rural child migrates with their parent(s) to the cities, consistent with the existing literature (Hu, Xu & Chen, 2011). This implies that those who actually do migrate may be a more select group with greater familial socioeconomic resource. At the same time, these migrant children and their parent(s) may have certain unobservable characteristics (drive, aptitude, or personality) that make them more likely to obtain access to the cities' public schools, confounding the interpretation of the results.

Table 3 shows a comparative summary of the analytical groups' personal characteristics. About two-thirds (66.59%) of the rural migrant children held a non-local rural *hukou*, a status often associated with an increased vulnerability to institutional exclusion from the cities' public schools. Although about one-third (32.94%) held a local urban *hukou*, however there is a lack of data to establish how (whether by means of *hukou* transfers) and when did they obtain it. Nevertheless, the study consistently defines rural migrant children as individuals in the MHS as classified by the surveyors. Likewise, defines urban non-migrant children as individuals in the UHS. Conversely, 91.76% of the urban non-migrant children held a local urban *hukou*. Fewer rural migrant children were in public schools (86.16% vs. 93.65%) or in schools with quality

perceived to be better than average (37.71% vs. 69.04%). Furthermore, they made only about 14.6% of their counterparts' spending on remedial classes outside school in 2007. This comparison highlights plausible school enrollment, educational quality, and familial socioeconomic resource disparities that have implications for human opportunities.

Table 3: Descriptive statistics of analytical samples

	Rural Migrant Children (N=419)		Urban Non-Migrant Children (N=898)	
	N	**%**	**N**	**%**
Province				
Anhui	106	25.30	105	11.69
Chongqing	29	6.92	56	6.24
Guangdong	20	4.77	228	25.39
Henan	90	21.48	113	12.58
Hubei	45	10.74	47	5.23
Jiangsu	29	6.92	73	8.13
Shanghai	37	8.83	78	8.69
Sichuan	48	11.46	96	10.69
Zhejiang	15	3.58	102	11.36
Gender				
Male	236	56.32	465	51.78
Female	183	43.68	433	48.22
Ethnicity				
Han	414	98.81	885	98.55
Others	5	1.19	13	1.45
Current *hukou* status				
Local urban	138	32.94	824	91.76
Non-local urban	2	0.48	23	2.56
Local rural	-	-	21	2.34
Non-local rural	279	66.59	30	3.34
School type				
Public	361	86.16	841	93.65
Private or others	58	13.84	57	6.35
School quality				
Better than average	158	37.71	620	69.04
Average or worse	261	62.29	278	30.96

(continued)

	Rural Migrant Children (N=419)		Urban Non-Migrant Children (N=898)	
	Mean (SD)	**Min-Max**	**Mean (SD)**	**Min-Max**
Age	11.04 (2.67)	5-15	11.15 (2.56)	6-15
N	419		898	
Regular school fees in 2007 (yuan)	1452.82 (1583.33)	0-12600	1963.60 (2771.97)	0-20000
N	412		893	
School tuition fees in 2007 (yuan)	610.37 (761.16)	0-6500	565.90 (1231.95)	0-15000
N	411		879	
Remedial classes outside school in 2007 (yuan)	138.52 (463.15)	0-4000	947.96 (2004.03)	0-20000
N	410		889	

Source: 2008 RUMiC MHS and UHS

Table 4 is a comparative summary of the analytical groups' household characteristics. The rural migrant household heads on average received fewer years of formal schooling (8.16 vs. 11.83) and the majority were in wholesale and retail trade compared to their counterparts who were mainly in the services industry. Only 5.93% held permanent jobs, consistent with the literature on the segmentation in the urban labor market (Fan, 2002; Massey et al. 1993; Sert, 2016). They tended to be on average younger by 3.11 years. Although they worked on average 28.3 hours more per week, rural migrant households had only about 55.4% of the total monthly household income of urban non-migrant households. Notwithstanding the penalizing effects of not having a local urban *hukou*, differences in familial educational support (Jin, Liu, H. & Liu, L., 2017) are likely to aggravate disparities in human opportunities.

Table 4: Descriptive statistics of household head socioeconomic characteristics

	Rural Migrant (N=358)		Urban Non-Migrant (N=859)	
	N	**%**	**N**	**%**
Gender				
Male	260	72.63	565	65.77
Female	98	27.37	294	34.23
Current *hukou* status				
Local urban	7	1.96	786	91.50
Non-local urban	1	0.28	20	2.33
Local rural	99	27.65	22	2.56
Non-local rural	251	70.11	31	3.61
Highest level of education completed				
Tertiary or upper secondary	63	17.60	651	75.79
Lower secondary	195	54.47	172	20.02
Primary	64	17.88	26	3.03
Lower than primary	36	10.06	10	1.16
Industry of primary job				
Agriculture, forestry, and fishery	1	0.28	6	0.78
Construction	23	6.50	31	4.04
Finance, insurance, and real estate	8	2.26	30	3.91
Manufacturing	39	11.02	124	16.17
Mining	-	-	9	1.17
Services	89	25.14	341	44.46
Transportation, communications, electric gas, and sanitary services	20	5.65	139	18.12
Wholesale and retail trade	174	49.15	87	11.34
N	354		767	
Nature of primary job				
Contract	64	18.08	326	42.50
Temporary	43	12.15	56	7.30
Permanent	21	5.93	294	38.33
Unpaid family worker	5	1.41	-	-
Self-employed	221	62.43	91	11.86
N	354		767	

(continued)

	Rural Migrant (N=358)		Urban Non-Migrant (N=859)	
	Mean (SD)	**Min-Max**	**Mean (SD)**	**Min-Max**
Age	37.00 (4.49)	28-53	40.11 (4.87)	27-63
N	358		859	
Years of formal education	8.16 (2.65)	0-15	11.83 (3.31)	0-23
N	358		859	
Average hours of work per week in primary job	72.88 (20.28)	12-126	44.57 (11.41)	2-119
N	353		759	
Average monthly income from primary job (yuan)	1903.46 (2056.83)	0-30000	2685.69 (2422.87)	0-30000
N	353		767	
Household characteristics				
Household Size	3.49 (0.76)	2-6	3.23 (0.62)	2-6
Total monthly household income (yuan)	2981.93 (2310.29)	450-30000	5381.04 (4508.25)	500-51000
Total monthly household consumption (yuan)	2073.51 (1083.25)	550-6275	3224.73 (1902.10)	341-14375

Source: 2008 RUMiC MHS and UHS

6.2 HOI Results

Table 5 presents the HOI for children age 6 to 15 for both groups by province. The overall results were comparable, where 59.61% of the opportunities were available and equitably allocated for rural migrant children and 59.56% for urban non-migrant children. However, a further disaggregation by province reveals a starkly different picture. Of the nine provinces, opportunities for rural migrant children were consistently the lowest and the least equitably allocated (indicated by the higher D-Indexes) in the coastal areas (Guangdong, Jiangsu, Shanghai, and Zhejiang). In particular, those in the Guangdong province were the most disadvantaged with a HOI of only 22.28, and where 36.33% of those with access needs to be redistributed. Comparatively, urban non-migrant children had greater opportunities in these coastal provinces.

The devolution of *hukou* management has granted substantial autonomy to local governments to shape the rules of selection and exclusion of migrants based on its vested interests; consequently,

cities vary widely in their barriers to entry for migrants (Zhang & Tao, 2012). Prominent areas like the Pearl River Delta and Yangtze River Delta in these coastal provinces are strategically designated centers of economic activity and growth poles under the state's 'reform and opening' directives (Shira et al. 2012; Tao & Lu, 2018). As such, they seek to attract mostly the highly-skilled and wealthy migrants to make *hukou* transfers into these cities (Chan & Buckingham, 2008; Montgomery, 2012; Zhang & Tao, 2012). These high barriers to entry also function to limit who can reap the benefits of the cities' development (Zhang & Tao, 2012). Unsurprisingly, given the pro-growth orientation of these coastal provinces, they experienced the fastest growth of *de jure* populations (holders of a local urban *hukou*) in the period 1998 to 2008 as shown in figure B2 (Appendix B). Although the population growth may arguably be attributable also to natural increases. However, either way, local governments face an increased fiscal strain to provide socioeconomic benefits for a larger *de jure* population. This is aggravated by the absence of fiscal support from the central government (Zhang, 2012). Therefore, there remain even fewer available resources and economic incentives, if any to provide public education for rural migrant children without a local urban *hukou*. Local *hukou* reforms have been the slowest in large cities (World Bank, 2013). Other plausible explanations may be that the perceptions of the urban-rural divide (thereby, institutional exclusion) are more pronounced in these coastal provinces with relatively higher urbanization rates as seen in figure B3 (Appendix B). Expectedly, even though coastal provinces had the highest disposable income per capita, consumption expenditure per capita were also the highest as illustrated in figures B4 and B5, respectively (Appendix B). These higher costs of living may aggravate the already fewer familial socioeconomic resource of rural migrant households. Consequently, opportunities were more adversely impacted.

On the other hand, migrant-sending inland provinces like Chongqing, Henan, and Hubei had the highest opportunities for rural migrant children. These findings concur with the existing literature that in smaller cities with relatively few migrants, local governments undertake *hukou* reform experiments to lower the barriers to entry for rural migrants (Young, 2013). Hence, in these smaller cities rural migrant children are mostly able to enroll in public schools; whereas in larger cities like Shanghai and Guangzhou (in Guangdong province), private migrant schools instead assume the central role of education for rural migrant children as public school places are restricted (Chen & Feng, 2017).

As earlier discussed, comparative analyses of educational outcomes only at destination poses the problem of migration selectivity (Liang & Chen, 2007). Tables 4 and D1 (Appendix D) show that households of rural migrant children who do not migrate with their parent(s) to the same cities had only about 79% of the total monthly household income of those who migrate. If indeed those who migrate to the coastal provinces are a positively select group with higher aspirations, greater socioeconomic resource, and social networks than those who do not, it implies that actual opportunities may be even lower for a typical rural migrant. However, these are only likely associations between the provincial levels of economic activity and opportunities. This is because the provincial sample sizes used in the calculation of the HOI were small disallows being conclusive.

Table 5: Inequality of opportunity in access to basic public education for children age 6 to 15 years by province

	Rural Migrant Children			Urban Non-Migrant Children		
Province	**Coverage**	**D-Index**	**HOI**	**Coverage**	**D-Index**	**HOI**
Overall	63.72	6.46	59.61	61.69	3.46	59.56
Anhui	59.43	10.33	53.30	60.00	7.70	55.38
Chongqing	72.41	13.57	62.59	58.93	8.55	53.89
Guangdong	35.00	36.33	22.28	64.04	3.97	61.49
Henan	74.44	9.71	67.22	62.83	7.69	58.00
Hubei	88.89	4.58	84.82	68.09	10.56	60.89
Jiangsu	41.38	27.09	30.17	67.12	12.28	58.88
Shanghai	56.76	18.68	46.16	67.95	8.47	62.19
Sichuan	60.42	18.13	49.46	62.50	7.54	57.79
Zhejiang	46.67	35.69	30.01	46.08	13.87	39.69

Source: Author's calculation based on 2008 RUMiC migrant and urban samples

Table 6 shows the HOI for both samples by age group. Those age 6 to 11 are at the elementary school stage, while those age 12 to 15 are at the junior middle school stage. Such a disaggregation by age group reveals differences in opportunities at the different stages of education. Although both samples fared similarly in terms of opportunities at either stage, these opportunities were less evenly distributed among rural migrant children than for urban non-migrant children. For elementary school, 6.46% of those rural migrants with access needs to be redistributed compared to 4.33% for their urban counterparts. Likewise, for junior middle school, 6.35% of those with access needs to be redistributed compared to 3.84%. However, what is striking is that opportunities for junior middle school fell considerably for both groups. For rural migrant children, it dropped from 67.42 to 50.87. While that for urban non-migrant children, from 65.51 to 51.87. This means that the likelihood of progression is lower. These findings that opportunities are lower beyond elementary school are consistent with the existing literature on the *hukou* system (Wei & Hou, 2010; Wu, 2010). Similar studies in other contexts like developing Asia and Tunisia have also found greater difficulties for children at the middle school stage to acquire opportunities than their younger peers (Jemmali & Amara, 2018; Son, 2013).

Yet, non-progression is a substantive concern regardless of the cause (*hukou* system or other socioeconomic circumstance). This pertains to the wider discourse on class formation and economic inequalities. In Weber's view, education is the basis for an individual's social status and consequently, the host of available life opportunities including well-paying jobs (Tsang, 2013). Similarly, Bourdieu relates class primarily to the possession of three forms of cultural capital: embodied, objectified, and institutionalized (Tsang, 2013). 'Embodied' refers to an individual's acquired education and skills, while 'institutionalized' refers to the educational credentials (Annen, 2018). Hence, if opportunities to access public education are restricted and exclusive only to individuals of certain social strata, particularly those households either by virtue of their *hukou* status or socioeconomic capabilities to invest and develop cultural capital for their children, will eventually lead to at least the preservation of class across generations

(Tsang, 2013; Wu, 2010; Xiong, 2015). On the other hand, those households unable to secure critical cultural capital like higher education for their children risk being trapped in the lower socioeconomic tiers and face diminished prospects of intergenerational social mobility (or even downward mobility). Consequently, this implies a widening class disparity for the Chinese society.

As earlier mentioned, Coleman (1975, p. 28) argues that effective public schooling 'leads in the direction of equal adult opportunities'. This refers to but is not limited to labor market processes and outcomes. Dabla-Norris et al. (2015) reason that education is of vital importance to reduce income inequality by expanding an individual's range of occupational opportunities and remuneration. Hence, if educational opportunities are unequally distributed, it will likely drive both income and wealth inequalities.

However, there is a caveat to draw a definitive conclusion that opportunities are lower at the junior middle school stage. This is because the study used a cross-sectional survey data. This follows that the individuals used in the calculation for both age groups were different. There may exist considerable cohort differences in characteristics and circumstances of the children and their households. Conversely, a longitudinal data that follows a child across a longer time period through their educational stages, provides a better understanding of how opportunities evolve beyond elementary school.

Table 6: Inequality of opportunity in access to basic public education by age group

	Rural Migrant Children			Urban Non-Migrant Children		
Age Group	**Coverage**	**D-Index**	**HOI**	**Coverage**	**D-Index**	**HOI**
6-11	72.07	6.46	67.42	68.48	4.33	65.51
12-15	54.31	6.35	50.87	53.94	3.84	51.87

Source: Author's calculation based on 2008 RUMiC migrant and urban samples

While estimates of opportunities are telling of the disparities that exist between social groups, a further decomposition of these estimates is informative. This is because it reveals the relative percentage contribution of each socioeconomic circumstance to the overall inequalities. This aids policy-makers to identify important penalizing factors and thereby allocate resources in a way that more effectively tackles persistent and unjust socioeconomic inequalities. Table 7 provides the results of this decomposition for both groups. Although earlier estimates revealed comparable overall opportunities, it is noteworthy that the socioeconomic circumstances from which these inequalities arise from differ between both groups.

For rural migrant children, *hukou* was the largest significant contributor as it accounted for 43.06% of the total inequality. This is expected given that the existing literature has recurrently underscored that the *hukou* system continues to differentiate and deny internal migrants' access based on their *hukou* statuses to an array of important socioeconomic entitlements like education

at destination cities (Chan & Buckingham, 2008; Dreger, Wang & Zhang, 2015; Pi & Zhang, 2016; Wu, 2015; Young, 2013; Zhang, 2018a). This finding also concurs with a previous study that instead used Gini coefficient to measure educational inequality in China, and found that *hukou* was the main contributor to the disparities (Yang, Huang & Liu, 2014).

Several critics acknowledge that while the series of repeated directives from the State Council on the education of rural migrant children at destination cities are well intentioned; however, it apparently conflicts with the vested interests of local governments for them to comply and implement on the ground in reality (Meng, 2012; Zhang, 2017; Zhou & Cheung, 2017). This is especially so since the 1985 policy decentralized educational finance to local governments to bear, without financial support from the central government (Chen & Feng, 2017; Tam & Jiang, 2015; Zhang, 2012). Others point out that on the one hand, decentralization has granted considerable flexibility to local governments' interpretation and circumvention of directives; on the other hand, there is an acute weakness in meting out penalties for deviant practices (Montgomery, 2012). While hordes of rural migrant children continue to be rejected by the cities' public schools, governments continue to clamp down on alternative school types like the low-quality private migrant schools (Montgomery, 2012). This underscores the vulnerability of rural migrant children in the Chinese cities.

Granted that ensuring opportunities to access basic public education is imperative, it is by no means an equalizer or achieved parity in treatment with local urban children. Even if rural migrant children are able to attend public schools, they are sequestered in different study spaces with poorer quality of educational resources and support than their urban peers (Liu & Laura, 2018; Zhang, 2017). They remain marginalized, discriminated, and labelled 'rural or peasant' in these so-called inclusive public schools (Li & Placier, 2015; Liu & Laura, 2018). Some note that the Chinese *hukou* system continues to be path-dependent with the preservation of the urban-rural divide to retain political legitimacy (Young, 2013). Others suggest that lasting institutional change occurs only when the underlying constraints (beliefs) shift or are no longer reproduced (Greif & Laitin, 2004; Shirley, 2008; Williamson, 2000). Hence, even if the distinction between *hukou* statuses are eventually abolished as advocates and existing research have repeatedly called for, without a corresponding shift in beliefs, the urban-rural divide is likely to linger on and impact educational opportunities for rural migrant children. In other words, while the removal of such a distinction is a necessary condition for greater equality, it may not be sufficient without other changes.

On the contrary, per capita household income was insignificant and contributed the least (5.31%) to the total inequality. One possible explanation is that those who migrate with their parent(s) to the same cities are a select group. As earlier mentioned, more than half of the rural migrant children (54.79%) who remained in their hometowns or lived in another locality from their parent(s) cited high cost in the city or of attending school. This implies that those who migrate have relatively greater financial capacities. This finding is in line with other research that *hukou* plays the predominant role for the educational outcomes of rural migrant children in the cities, while family background is of secondary importance (Wu, 2012; Zhang, 2017).

For urban non-migrant children, where 91.76% of the sample held a local urban *hukou*, per capita household income was the largest significant contributor as it accounted for 26.34% of the total inequality. Besides education and drive, an individual's social network relations and household wealth also play an important role in the social mobility game (Dabla-Norris et al. 2015). Tsang (2013) conducted a qualitative study on affluent middle-class families in the Guangdong province. She argues in particular how the old generation of the middle-class have amassed substantial economic and social capital during their tenure in urban work units with state affiliations in the pre-reform era. Besides a local urban *hukou*, these middle-class families leverage such acquired capital into privileged opportunities for their children to study at the best urban schools. Others similarly argue that despite the educational expansion and marketization in the 1990s, 'relative life chances of different students still largely depend on their family backgrounds' in favor of the urbanites and wealthier families (Qian & Walker, 2015, p. 6; Wu, 2010). In other words, among the urban non-migrant children, even though *hukou* statuses are largely identical, circumstance like family background is likely to be a significant marker of opportunities.

Conversely, at the junior middle school stage, the age of the household head was the largest significant contributor as it accounted for 45.34% of the total inequality. One possible explanation is that parents of different 'birth cohort[s] experience significant economic, social, and demographic events at different life stages. These shared experiences affect a wide range of behaviors and outcomes' (Keister, Benton & Moody, 2019, p. 1). This may shape how they value education for their children. For example, younger parents who are still participants in the labor force are kept up-to-date with its current developments and demands. Consequently, with the knowledge of an increasingly competitive and skill-biased labor market, they may value education more than older parents who are relatively distanced from the labor market.

Table 7: Percent contribution of circumstance variable to inequality of opportunity in access to basic public education by age group

	Rural Migrant Children			Urban Non-Migrant Children		
Circumstance	**Overall**	**6-11**	**12-15**	**Overall**	**6-11**	**12-15**
Gender of Child	8.66	3.33	19.91	0.94	1.95	13.20
Hukou Status (Urban/Rural)	43.06***	43.88**	37.11	8.11	0.33	21.65
Education of Household Head	22.38	18.40	7.05	14.33	9.86	3.71
Per Capita Household Income	5.31	13.48	2.08	26.34*	34.48**	7.28
Age of Household Head	8.09	1.04	21.82	40.21	40.72	45.34*
Gender of Household Head	6.76	8.69	8.41	4.35	3.31	6.82
Household Size	5.75	11.17	3.62	5.72	9.36	2.01

Note: ***, **, * represent statistical significance at 1%, 5%, and 10% level, respectively for the estimated coefficient in the logit regression model of the probability of school attendance for children in respective age group.
Source: Author's calculation based on 2008 RUMiC migrant and urban samples

6.3 Limitations and Future Research

While the aforementioned findings reveal the critical and pervasive disparities that are imperative to understand and correct for, there are several limitations. However, awareness of these limitations opens up possibilities for future research to advance our understanding of the inequality of opportunities in access to education among different social groups in contemporary China, under *hukou*. Firstly, the study used only a cross-sectional data from the year 2008 due to limited availability of survey waves and attrition. However, the cities' conditions and educational policies are likely to be evolving and different during the decade since the survey was conducted. Consequently, opportunities are also likely to be changing. For example, if local governments

more recently take an affirmative stance and better comply with the central directives to provide public education for rural migrant children, then greater and more equitably allocated opportunities become available than the findings suggest. Conversely, if they develop a more discriminatory stance and higher barriers to entry, implies even fewer opportunities than before.

Closely related to the interpretation of findings from a cross-sectional data, is that the individuals used to calculate the HOI for the elementary and junior middle stages of education were different. There may exist considerable cohort differences in characteristics and circumstances of the children and their households. For example, school placements may be more competitive for a particular cohort due to a larger cohort size or fewer resource allocation by the local governments. As such, the findings are an understatement of actual opportunities. However, if the cohorts are generally similar in characteristics and circumstances, the findings highlight an important role for greater policy intervention at stages beyond elementary school to level the playing field. Future research with newer longitudinal data can explore the evolution of opportunities in relation to both policy changes (pre- and post-) and opportunities for a particular cohort at the different stages of education.

The second limitation is that the types of social groups analyzed were only the rural migrant children and urban non-migrant children at destination cities. However, several highlight that the group of internal migrants is very diverse based on their places of origin, migration intentions, personal attributes, and length of migration (Xu & Dronkers, 2016; Yang, Dijst & Helbich, 2018). Furthermore, migrants may originate both from outside or within the province (Su, Tesfazion & Zhao, 2018). Due to the lack of information on provincial origins, the study did not make a refined distinction between inter- and intra-provincial rural migrants. For example, rural migrants within the same province may have greater familiarity with the locality's systems and a stronger network of social relations than those from outside the province. If the study sample included disproportionately intra-provincial rural migrants, it may suggest greater opportunities than in actuality.

Another prominent social group not examined by the study is the urban migrants from other cities. Xu and Dronkers (2016) argue that *hukou* transfers are highly selective in nature and restricted largely to elite migrants. Those who obtained transfers to a local urban *hukou* in destination cities have the same rights to access education as the natives (by birth). Although some may not have transferred, these households are more likely to deploy their greater financial and social capital to gain educational opportunities for their children at destination. Similarly, the study did not make a refined distinction within the group of urban non-migrant children between those who are natives and those who were migrants but have successfully made a *hukou* transfer. This is because the positive selection of these transferred migrants implies a potential overstatement of opportunities for the urban non-migrant group. Hence, future research with larger detailed survey data can ideally consider provincial origins and distinguish the social groups finely (inter-provincial rural migrants, intra-provincial rural migrants, urban migrants without *hukou* transfers, urban migrants with *hukou* transfers, and natives). In addition, the analysis on the migrant group can be further subdivided (short-term vs. long-term) to explore the relationship between length of migration and opportunities.

The third limitation is that the HOI was calculated at an aggregate provincial level rather than at the underlying city level due to the lack of sufficient data. While cities may belong to the same province, there are likely to be heterogeneities of the opportunities available and equitably allocated, especially since *hukou* management was devolved to local governments implies considerable variability from this flexibility. Besides likely differences in the extent of institutional exclusion, cities may also vary widely in their socioeconomic conditions. For example, some local governments may have larger educational budgets to expend than others, boosting relative opportunities. Furthermore, cities' characteristics may also influence the number and types (qualities) of migrants it attracts (Su, Tesfazion & Zhao, 2018). For instance, larger cities with its scale of economic activities and perceived opportunities may systematically attract aspirant rural migrants with substantial economic and social capital.

Although the data used was randomly sampled to bear representative income and population levels (Akgüç, Giulietti & Zimmermann, 2013), migration selectivity may not be effectively controlled for in the study. It may be possible that those who remain in the cities are precisely because they obtained enrollment in public schools, while those who were not able to may have returned to their places of origin. This is because individuals make micro-decisions to migrate only when the expected benefits outweigh the costs (Massey et al. 1993). Nevertheless, such an assumed positive selection implies that actual opportunities may be even lower for a typical rural migrant than the findings suggest. Furthermore, sample weights were not provided and hence, not used in the calculation of the HOI. Closely related to the issue of representativeness is that the analytical sample sizes were quite small to draw strong inferences or conclusions from the findings. Future research with larger data to disaggregate analysis by city level, and information to trace return migration can provide a more informative understanding of opportunities than this present study.

The fourth limitation is that the study was limited to children age from 6 to 15, a range within the obligatory nine-year compulsory basic education. However, findings from previous studies have observed widening urban-rural educational disparities especially at the senior middle school stage and beyond as educational expansion and school transitions in China have been typically urban-biased (Li & Placier, 2015; Tam & Jiang, 2015; Wu, 2010; Wu & Zhang, 2010). This implies that opportunities for rural migrant children may be even bleaker at these higher stages. Future research can encompass a wider age range of children to understand opportunities at different stages. However, the interpretation of such studies on older children may be confounded by conscious choices. The use of the 'equality of opportunity' framework for analysis may have limited efficacy. As earlier mentioned, a child is defined as an individual age 0 to 16, an age where conscious choice is unlikely to be of any significance and thus addresses the inseparability problem of 'choice' and 'circumstance' (Vega et al. 2012). However, a child at the tertiary stage may independently weigh opportunity costs and voluntarily decide not to further his or her education in spite of an offer of admission to a university. As a result, opportunities may be misinterpreted.

The fifth limitation is that the quality of the schools was not considered due to the lack of detailed information other than one survey question on the parents' self-perceived quality of their

child's received education. Yet, educational quality is important to ensure a minimum level of outcomes; in other words, not mere access per se but rather an effective access (Vega et al. 2012). As previously mentioned, effective public schooling 'leads in the direction of equal adult opportunities' (Coleman, 1975, p. 28). This is important both for human capital accumulation and labor market outcomes. Even if rural migrant children have comparable opportunities as urban non-migrant children, however, the public schools available to them are consistently of lower quality is counterproductive to tackle persistent outcome inequalities. Prieto et al. (2018) applied the HOI methodology to study opportunities to access quality basic education in Florida, US. Besides enrollment and school offer of admission data, they utilized also school grades to proxy school quality. Future research with such school micro-data can add the educational quality dimension to the analysis.

Lastly, the seven socioeconomic circumstances selected to calculate the HOI were based on those used in similar studies in other contexts like developing Asia, LAC, and Tunisia (Jemmali & Amara, 2018; Son, 2013; Vega et al. 2012). However, with an exception of the *hukou* status which was modified to fit the Chinese context. The limitation is that not only are these circumstances by no means exhaustive, there may be other significant or more appropriate circumstances unique to the Chinese context that were overlooked and excluded. This implies that the decomposition findings may have overstated the relative contribution of the *hukou* system. Future research can benefit from collaboration with local educators' expertise and knowledge of the cities' educational landscapes to identify significant circumstances appropriate for the analysis.

7. Conclusion and Policy Implications

After nearly two centuries in the periphery of the world economy, China has reignited global interest with phenomenally high and sustained economic growth since its 'reform and opening' in the late 1970s. However, it has also been subjected to much scrutiny if such growth is equitable and inclusive after all. In contrast to its spectacular economic rebound, institutional legacies like the *hukou* system exhibits strong persistence, where reforms have mostly been marginal and path-dependent. *Hukou* is not a mere population census, it is also associated with an individual's rights to an array of important socioeconomic entitlements. Consequently, this has far-reaching implications for Chinese internal migrants' settlement decisions and life opportunities. It has effectively created a highly stratified, segregated, and exclusive Chinese society. Without resolve to reform the inequitable *hukou* system, China's vision of a 'harmonious society' by 2030 is contentious.

The paper set out to quantify and compare the available and equitably allocated opportunities to access basic public education in Chinese cities between rural migrant children and urban non-migrant children, under *hukou*. It used an 'equality of opportunity' framework that is no longer confined to the realms of philosophy, but evidently has practical applications to the wider field of social science research. Such a framework allows us to trace and correct for the inequities and inequalities that may already exist at the start during childhood, which have penalizing effects on life opportunities.

The main findings of the study indicated that overall opportunities for children age 6 to 15 of both groups were comparable. However, a further disaggregation by province reveals worrying disparities. In particular, opportunities for rural migrant children were consistently the lowest and the least equitably allocated in the coastal areas (Guangdong, Jiangsu, Shanghai, and Zhejiang). Comparatively, urban non-migrant children had greater opportunities in these coastal provinces. This is plausibly due to the higher barriers to entry and limits on who can reap the benefits of the cities' development in these pro-growth oriented coastal provinces. This problem of inequity is further compounded by the lack of fiscal support from the central government. As such, private migrant schools instead play a central role of education for rural migrant children in such larger cities. Conversely, migrant-sending inland provinces undertake relatively greater *hukou* reform experiments to lower the barriers to entry for rural migrants. Hence, public schools in these smaller cities tend to absorb rural migrant children. When opportunities were analyzed by age group, those age 12 to 15 at the junior middle school stage for both groups were relatively disadvantaged compared to their younger peers.

Decomposition results of the total inequalities showed that *hukou* status was the largest significant penalizing circumstance for rural migrant children. On the other hand, it was per capita household income for urban non-migrant children. These findings reiterate the vulnerability of rural migrant children and highlight the imperative to take affirmative action on their education at destination cities. In addition, non-progression of both groups is a substantive concern regardless of the cause (*hukou* system or other socioeconomic circumstance) as it

pertains to the wider discourse on class formation and economic inequalities. The lower opportunities for older age groups emphasize an important role for greater policy intervention at stages beyond elementary school to level the playing field.

Despite the aforementioned limitations of the scope, approach, interpretation and generalizability of the findings, the paper nevertheless, contributes to an important understanding of the lingering educational inequities for rural migrant children under the Chinese *hukou* system from a human opportunities perspective. Much of the existing research have based their criticism of the *hukou* system on outcome inequalities, while less attention is given to understand the distributional asymmetries of important educational opportunities. Hence, the paper serves to augment with an alternative perspective of inequalities at origin. This complementarity of both perspectives may present a more compelling argument for further institutional progress. The paper presents an initial effort to incorporate the *hukou* institution into an 'equality of opportunity' framework and operationalized using the World Bank's Human Opportunity Index (HOI) methodology, which is to the best of its knowledge, yet to be applied in existing research on the Chinese *hukou*.

The HOI not only provides a quantification of available opportunities for different social groups, but also factors in its equitable allocation. Furthermore, decomposition of the total inequalities provides invaluable insights on the relative percentage contribution of each socioeconomic circumstance. This aids policy-makers to identify important penalizing factors and thereby allocate resources in a way that more effectively tackles persistent and unjust socioeconomic inequalities.

Clearly, the ramifications of not reforming the Chinese *hukou* system are costly and manifold. Disconnecting parts of the population from partaking in and sharing the fruits of China's remarkable growth are likely to have long-term consequences at the macro-, meso-, and micro-levels of its economy and society. At the micro-household level, it undermines the accumulation of human capital and thereby, diminishes prospects of social mobility. Furthermore, the institutional exclusion from socioeconomic entitlements for these internal migrants ratchet up rates of precautionary savings. These micro-decisions left uncorrected for, are likely to have more serious repercussions for the aggregate levels of the economy. The smaller stock of available human capital negatively affects the pool of skilled labor relative to its demand as the economy structurally transforms. This is likely to impact productivity and economic growth on the supply side. Furthermore, the substantial amounts of precautionary savings suppress the much-needed Chinese consumption, and is likely to dampen the demand side of economic growth. As for the social costs, rising tensions and instability related to perceptions of social justice and equity among groups may emerge and critically question China's promise of a 'harmonious society' by 2030.

Advocates and existing research have repeatedly called for *hukou* system reforms. However, it is noteworthy that while such changes are necessary for greater equality, it is by no means sufficient. It also requires other changes that involve the concerted action from different actors. On the one hand, the central government directives need to be better aligned with local governments' actual practices. This necessitates review of public finance structures to incentivize local governments to take affirmative action in the education of rural migrant children. Also,

institute stronger checks and balances to curb deviant practices. On the other hand, members of the Chinese society need to exhibit greater tolerance. This is because even if formal distinction of *hukou* statuses ceases, continued perceptions of an urban-rural divide are likely to still penalize internal migrants, especially those of rural origins. In specific relation to education, schools need to undertake to deliver quality teaching and resources. This hopefully expands and equalizes life opportunities like labor market processes and outcomes.

As its model of growth loses vigor, China may find itself ill-prepared for the next phase of development. Once again, return to the periphery of the world economy. On the other hand, the research community is likely to sustain interest in its *hukou* system.

Appendix A: RUMiC[15]

This appendix provides the RUMiC's sampling design, coverage, and attrition.

A.1 Sampling Design

The UHS and RHS were randomly sampled from annual household income and expenditure surveys conducted in the urban cities and rural villages. The sampling process was designed to ensure the urban and rural coverage areas bear representative income and population levels. As migrants are typically transitory in nature without a registered place of permanent residence (they usually reside in clusters around dormitories near their workplaces), there were no existing sampling frame for the MHS. However, the RUMiC team developed an innovative multi-step sampling frame to ensure representativeness of the migrant population. Firstly, based on pre-survey census collected from randomly selected blocks in which the cities were divided into, a list of migrants and workplaces was generated to estimate the size of the migrant population in each city. Secondly, based on the generated list data, a sampling frame based on workplaces (rather than residences) was created. The workplaces also included street vendors. Lastly, the sample of migrant workers in each city was randomly selected within each workplace, based on their birth month.

A.2 Coverage

RUMiC covers key migrant sending and receiving provinces. The RHS covers villages in nine provinces. The UHS and MHS covers nineteen and fifteen cities, respectively. The cities in the UHS and MHS share eight provinces with the RHS (Anhui, Chongqing, Guangdong, Henan, Hubei, Jiangsu, Sichuan, and Zhejiang). The dissimilarity is the ninth province, which is Shanghai for the UHS and MHS, and Hebei for the RHS. Based on the 2000 population census, two-thirds of all internal migrants are located in the coastal provinces of Guangdong, Jiangsu, Shanghai, and Zhejiang. While almost half the migrants originate from the inland provinces of Anhui, Chongqing, Henan, Hubei, and Sichuan. Table A1 provides a detailed spatial coverage breakdown by household survey.

[15] All related discussions in this appendix refer to Akgüç, Giulietti & Zimmermann (2013).

Table A1: RUMiC spatial coverage by household survey

	Rural	Urban	Migrant
Spatial coverage[16]	Anhui	Anyang	Bengbu
	Chongqing	Bengbu	Chengdu
	Guangdong	Chengdu	Chongqing
	Hebei	Chongqing	Dongguan
	Henan	Dongguan	Guangzhou
	Hubei	Guangzhou	Hangzhou
	Jiangsu	Hangzhou	Hefei
	Sichuan	Hefei	Luoyang
	Zhejiang	Jiande	Nanjing
		Leshan	Ningbo
		Luoyang	Shanghai
		Mianyang	Shenzhen
		Nanjing	Wuhan
		Ningbo	Wuxi
		Shanghai	Zhengzhou
		Shenzhen	
		Wuhan	
		Wuxi	
		Zhengzhou	

Source: Akgüç, Giulietti & Zimmermann (2013)

A.3 Attrition

Characteristic of any longitudinal (panel) studies, is the problem of attrition between waves. If the attrition is non-random, but systematically of individuals with particular characteristics, poses a considerable threat to a study's internal validity to draw inferences and conclusions from the findings. Table A2 records the number of households and individuals for both waves 1 and 2 (2008-2009) by household survey. For wave 2, it additionally provides a breakdown of the numbers tracked and the calculated attrition rate. The attrition rates for rural and urban households were 0.1% and 5.4%, respectively. However, the attrition rate for migrant households was substantial at 63.6%. The attrition can be attributed generally to two main reasons. Firstly, migrant workers are highly transitory. Secondly, the aftermath of the global financial crisis in 2008 impacted demand negatively from China's export-oriented sectors, in which migrants tend to work in.

[16] The spatial coverage for the RHS is recorded as provinces, while that of the UHS and the MHS are recorded as the underlying cities.

Table A2: Attrition rates between waves 1 and 2 by household survey

	RHS		UHS		MHS	
	Households	Individuals	Households	Individuals	Households	Individuals
Wave 1	8,000	31,791	5,005	14,695	5,007	8,446
Wave 2	7,992	32,171	4,735	14,859		
Tracked	7,992	31,652	4,735	13,841	1,821	3,512
Attrition Rate (%)	0.1	0.4	5.4	5.8	63.6	58.4

Source: Akgüç, Giulietti & Zimmermann (2013)

Appendix B: NBS Macro-Indicators

This appendix provides a discussion on the use of key macro-indicators from the official source of Chinese statistics, the National Bureau of Statistics (NBS). These official data are generally calculated and published annually. However, they are often presented in aggregate terms either at the national or provincial level. Over the years, the official Chinese statistics has been subjected to scrutiny and questioning by skeptics about its reliability and validity with allegations of falsification, especially of its Gross Domestic Product (GDP) figures (Chow, 2006; Holz, 2014). Some cite the inherent difficulties to collect accurate data in transition economies like China (Holz, 2014). Others argue that in spite of instances of inconsistencies, the official data remains generally reliable and continues to be used in published and refereed journal articles; nevertheless, it remains the responsibility of the end-user to 'exercise caution' to ensure that the data is sound and fit for the research's purpose (Chow, 2006, p. 412).

Besides the controversy surrounding the Chinese GDP figures, others have drawn attention to misconceptions about Chinese population statistics. Chan (2007) highlights the complexities created by the Chinese *hukou* system in cities' regular local population counts. The problem is twofold. On the one hand, the registration count includes persons with a local *hukou* (*de jure*), but who may no longer reside in a given locality. On the other hand, it excludes persons without a local *hukou* (*de facto*), yet who actually resides in a given locality. This disparity in counts were unlikely to be significant during Mao's era of limited labor mobility (1949-1978). However, in the post-Mao era, where labor mobility is no longer outright restricted, the divergence between the *de jure* and *de facto* counts is likely to be substantial. In popular migrant cities, the *de facto* counts are likely to far exceed *de jure* counts. Figure B1 illustrates this increasing divergence since the late 1970s.

He argues that the indiscriminate use of Chinese population statistics can undermine obtaining meaningful numbers and conclusions. One obvious implication is the GDP per capita indicator. When the GDP per capita is derived by dividing GDP by the *de jure* population count instead of the *de facto* population actually residing in a given locality, results in an overstatement of economic prosperity. Hence, given the aforementioned two considerations, the paper's findings suggest only likely associations between the provincial levels of economic activity and opportunities. Yet, it does not attempt to draw any strong conclusions.

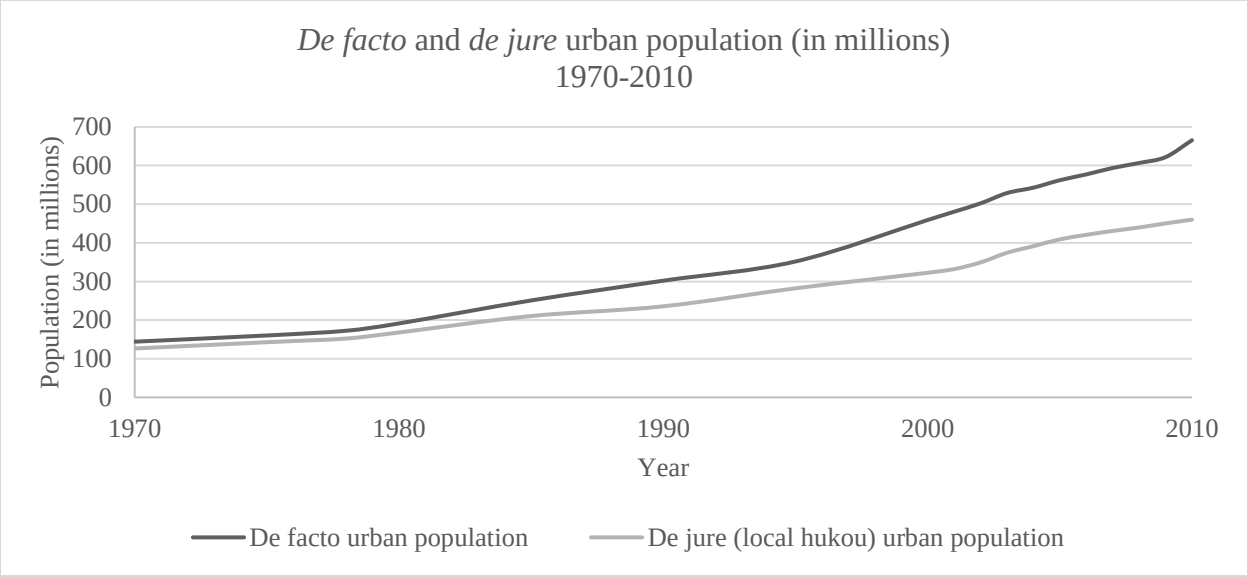

Figure B1: *De facto* and *de jure* urban population (in millions) 1970-2010
Source: Adapted from Chan (2012)

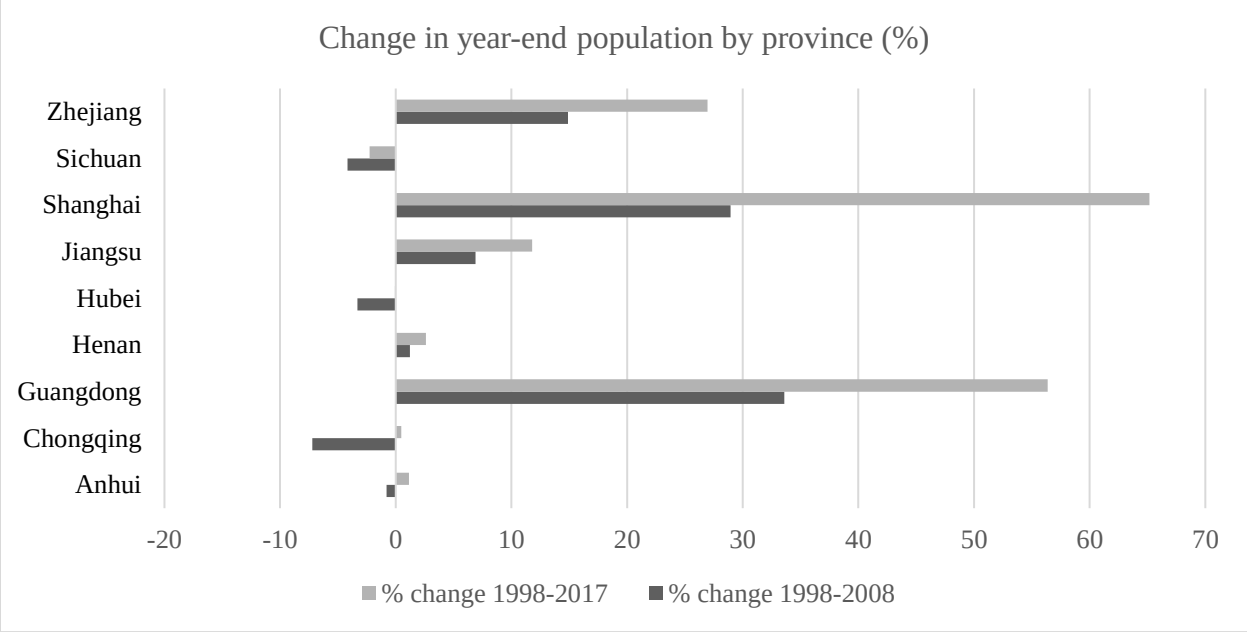

Figure B2: Change in year-end population by province (%)
Source: Compiled by the author from NBS, China Statistical Yearbook, 1999, 2009, and 2018

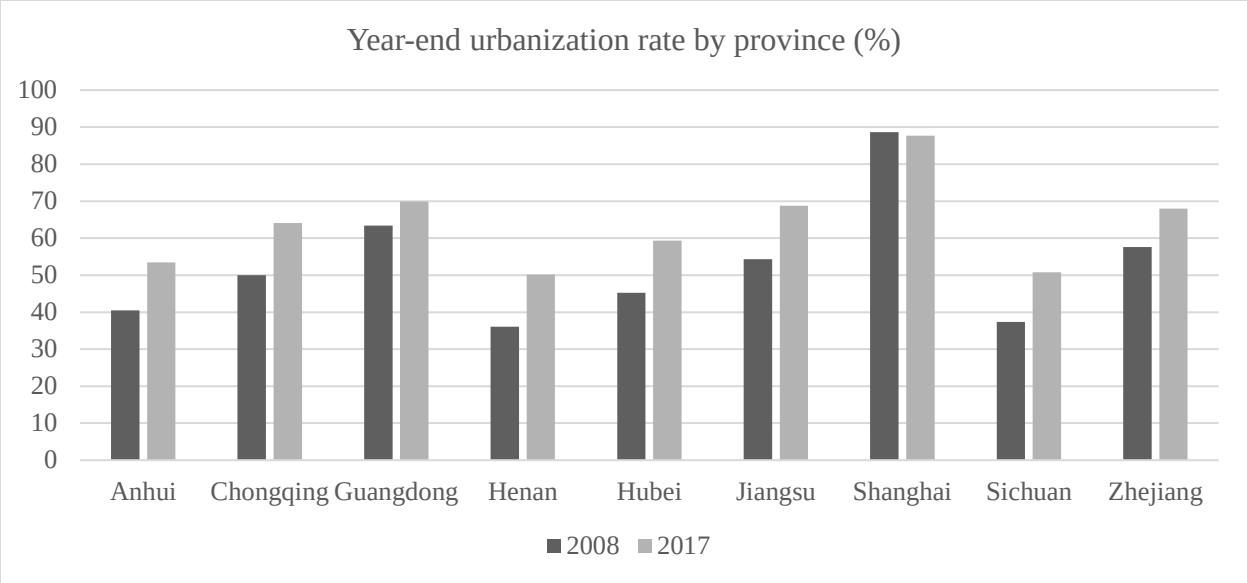

Figure B3: Year-end urbanization rate by province (%)
Source: Compiled by the author from NBS, China Statistical Yearbook, 2014, and 2018

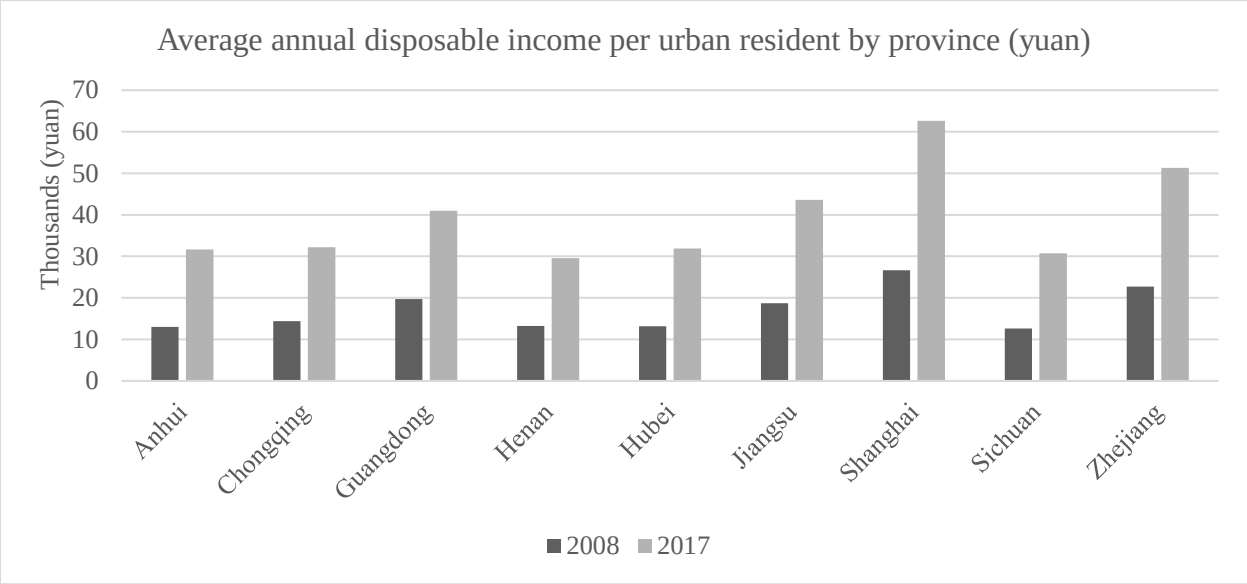

Figure B4: Average annual disposable income per urban resident by province (yuan)
Source: Compiled by the author from NBS, China Statistical Yearbook, 2009, and 2018

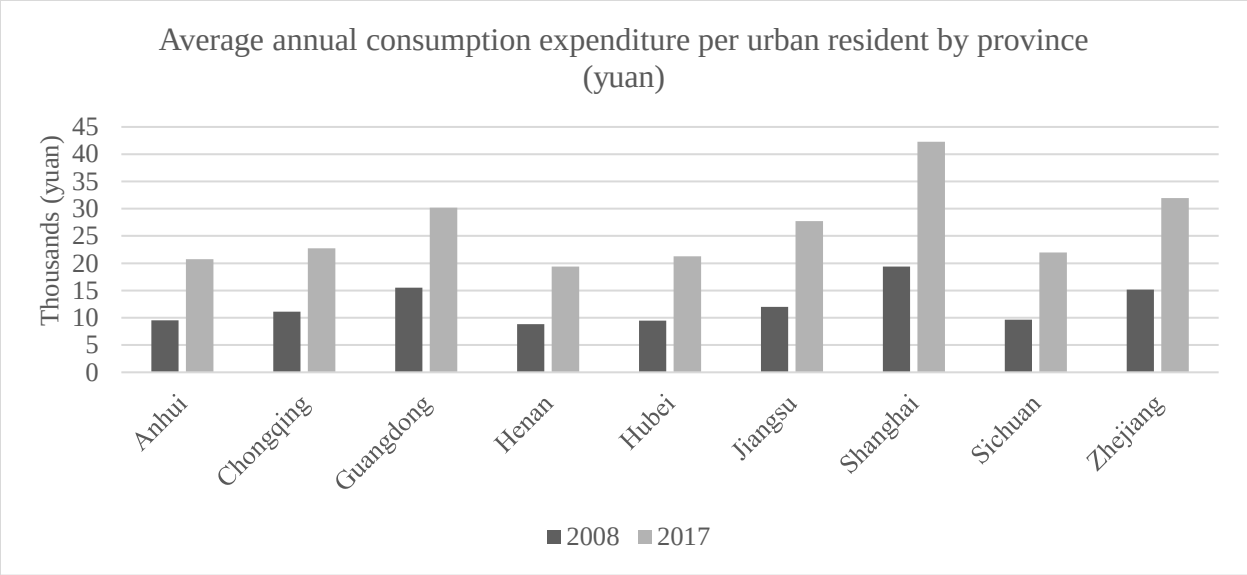

Figure B5: Average annual consumption expenditure per urban resident by province (yuan)
Source: Compiled by the author from NBS, China Statistical Yearbook, 2009, and 2018

Appendix C: Graphical Illustration of HOI

Scenario One: The allocation of opportunities is independent of circumstances. Each circumstance group has the same group-specific coverage rate as the overall average coverage rate of 50%. This is a situation where 'equality of opportunity' prevails.

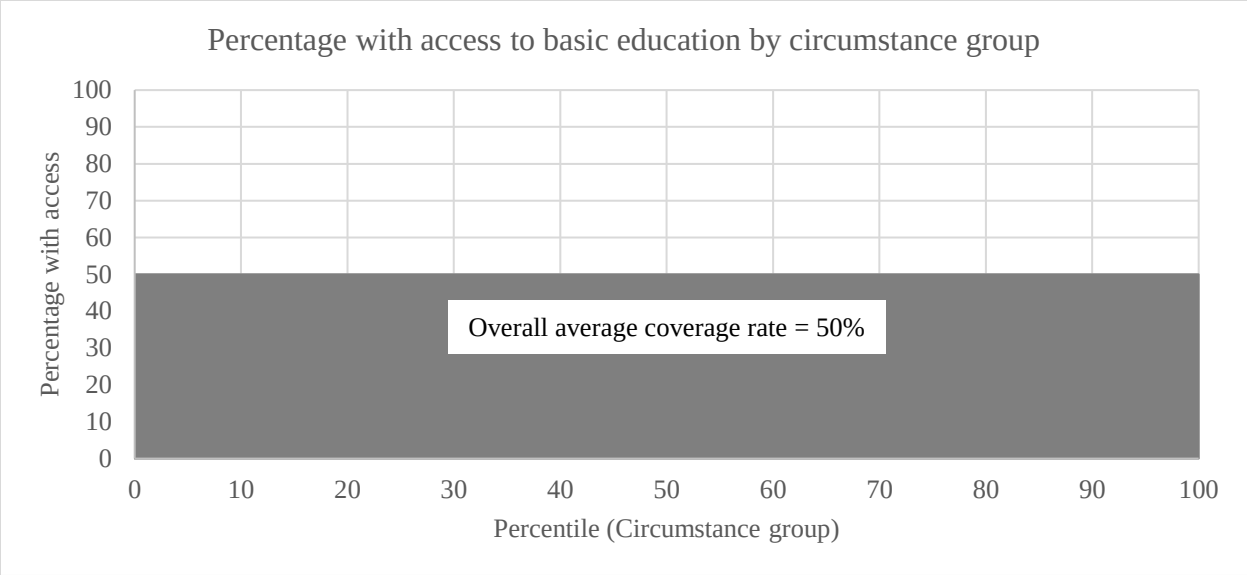

Figure C1: Equality of Opportunity
Source: Adapted from Vega et al. (2012)

Scenario 2: The allocation of opportunities is related to circumstances. The circumstance groups to the left of the vertical line have group-specific coverage rates lower than the overall average coverage rate, these groups are referred to as ‘opportunity-vulnerable’ groups. Those to the right of the vertical line have group-specific coverage rates higher than the overall average coverage rate. As such, HOI discounts the overall coverage rate by a penalty for the ‘inequality of opportunity’, where the penalty is the percentage of all people who have access to the good or service that would need to be reassigned to the ‘opportunity-vulnerable’ groups.

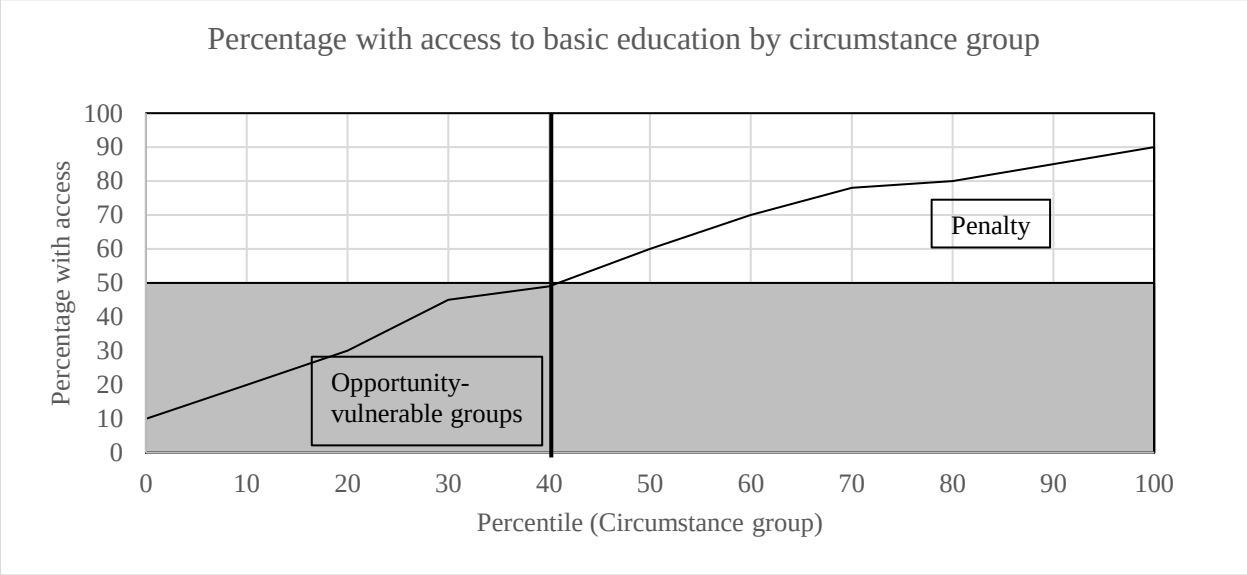

Figure C2: Inequality of Opportunity
Source: Adapted from Vega et al. (2012)

Appendix D: Excluded Rural Migrant Children

Table D1: Descriptive statistics of excluded rural migrant children

	N=1086	%
Province		
Anhui	115	10.59
Chongqing	103	9.48
Guangdong	209	19.24
Henan	101	9.30
Hubei	61	5.62
Jiangsu	99	9.12
Shanghai	132	12.15
Sichuan	94	8.66
Zhejiang	172	15.84
Gender		
Male	612	56.35
Female	474	43.65
Primary residence of child in 2007		
Rural hometown	905	83.33
Other village/township/city/county	181	16.67
Main reason child lives apart		
High cost in city or of attending school	595	54.79
Lack of access to (quality) education	146	13.44
Lack of childcare	156	14.36
Others	189	17.40
School type		
Public	1014	93.37
Private or others	72	6.63
School quality		
Better than average	431	39.69
Average or worse	655	60.31

(continued)

	Mean (SD)	Min-Max
Age	13.13	5-25
	(4.09)	
N	1086	
Regular school fees in 2007 (yuan)	2412.44	0-20000
	(3349.35)	
N	1062	
School tuition fees in 2007 (yuan)	1053.77	0-10000
	(1700.57)	
N	1057	
Remedial classes outside school in 2007 (yuan)	51.17	0-4000
	(280.20)	
N	1076	
Household characteristics (N=881)		
Total monthly household income (yuan)	2356.11	450-25000
	(1797.80)	
Total monthly household consumption (yuan)	1270.08	5-11447.50
	(920.20)	

Source: 2008 RUMiC MHS

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