Rural-urban Disparities in Chinese Higher Education: Access and Experiences

Dissertation

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Abstract

China has witnessed unprecedented higher education expansion since the 1990s. The gross higher education enrollment rate— the percentage of student population of all ages enrolled in the higher education institutions relative to the total 18-22 population—has increased from 9.8% in 1998 to more than 40% in 2016. As the overall postsecondary education opportunities expand substantially, does this expansion promote equity? This dissertation provides conceptual analysis and empirical assessment to this question. Conceptually, I analyze the key contexts for investigating equity in Chinese higher education, adopting a comparative approach. The Chinese higher education system is characterized by its large scale, high differentiation, the dominance of public universities, and high completion rate. Moreover, structural forces (e.g., rural-urban divide and inter-provincial variations) play a critical role in driving educational stratification in China due to China's institutional arrangements that favor urban areas over rural areas, eastern provinces over central and western provinces.

The dissertation's empirical analyses comprise two parts. First, I examine how the rural-urban gap and interprovincial disparities in college enrollment have changed after the expansion policy in 1999. Drawing on representative data of five provinces from China Family Panel Studies (CFPS), I find that that the urban-rural inequality in college enrollment increased after the expansion policy was implemented. Also, the inter-provincial inequalities in college enrollment, particularly disparities between eastern coastal provinces, like Shanghai and Guangdong versus central provinces, like Henan, have widened. The findings suggest that those already advantaged groups, such as urban residents and individuals in wealthier provinces, benefit more from the expansion than disadvantaged groups.

Second, I investigate the rural-urban gap in academic performance in college. Drawing on data from students at a highly selective university in Beijing, I compare the differences in academic performance between students of rural and urban origins across fields of study and college years. Results demonstrate that the rural students academically lag behind their urban peers in arts and humanities, and STEM fields, but not in the field of social sciences. Significant rural-urban gap in academic performance exists among first- and second-year students, but not among third- and fourth-year students. Further analyses show that the rural-urban gap in academic performance at the early career of college can be more attributed to rural students' disadvantages in family backgrounds and the type of high school attended than the rural-urban differences in time use during college. The findings suggest that Chinese colleges and universities to some extent play a role in levelling the field by alleviating rural students' disadvantages associated with family backgrounds and K-12 education.

Taken together, the findings elaborate that significant rural-urban and interprovincial disparities in college enrollment persist in China, despite the dramatic enrollment expansion since the 1990s. Once rural students secure a seat in universities, they share the similar potential of academic success with their urban counterparts. This dissertation advances understanding of the equity consequences of the expansion policy and rural students' experiences and outcomes inside the college gate. Findings from this dissertation also hold important implications for policy-makers and university administrators.

Dedication

In dedication to my parents, whose enduring love and support have made me who I am today.

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The past four years in the Ph.D. program has been a transformative experience for me. There are many people who have helped me to be where I am today. First, I would like to thank my committee—Dr. Marc Johnston-Guerrero, Dr. Anne-Marie Nuñez and Dr. Claudia Buchmann. To Marc, my brilliant and supportive advisor: I am grateful to your guidance and tremendous support throughout the four years, from admission interviews to this dissertation. I cannot imagine where my Ph.D. journey would have taken me if I did not have you by my side as my advisor. I will miss the time and conversations we had when we worked on the Chinese/Americans and affirmative action project together. I also appreciate the Research Lab you led, a space and community where the members can trust and support each other. To Anne-Marie, thank you for the opportunities you have provided me to learn with you and from you, especially the summer research opportunity you offered me. To Claudia, I benefited so much from the two classes I have taken with you that I narrowed down my dissertation topic in your Sociology of Education class. Thanks for your guidance and encouragement throughout the dissertation project.

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Chapter 1: Introduction

It has been more than 40 years since China initiated the Reform and Opening-up policy in 1978. During this period China has experienced unprecedented socioeconomic transformation in almost every way imaginable. China has become the second-largest economy and holds one of the largest higher education systems in the world in terms of the number of institutions and students enrolled. The Reform and Opening-up program started with the economic sector, transferring from a centrally planned economy to a market-oriented economy, which led to and largely shaped the directions of the reforms in other sectors like education. As with other sectors in Chinese society, Chinese higher education has undergone radical changes over the past four decades.

Higher education was once a rare privilege enjoyed by a small, urban elite until the late 1990s. But everything changed in 1999 when the central government implemented an expansion policy to substantially enhance university attendance rates (Wang & Liu, 2011). Since then, Chinese higher education has expanded at a striking pace and scale. The number of regular higher education institutions (HEIs) has more than tripled in 1978-2006 from 598 to 1,867. In 2016, there were about 2,600 regular HEIs in China. The number of undergraduate enrollment at HEIs has increased steadily from 1978 to 1997 and rocketed after China implemented the expansion policy in 1999, rising from three million in 1997 to 27 million in 2016 (Chinese Ministry of Education, 2016).

A lot of problems emerged and stood out resulting from the dramatic higher education expansion, including the inequality in accessing higher education, declined quality of the college education, and postsecondary graduate unemployment (Shan & Guo, 2016; Wang, 2016). Under

this context, this dissertation intends to investigate the implications of the expansion for equity in Chinese higher education.

Purpose and Broad Research Questions

This dissertation focuses on the rural-urban divide and inter-provincial disparities—two key structural forces that drive social stratification in China (Xie & Zhou, 2014). These two lines of inequality in higher education have been examined separately in the literature. I combine the rural-urban divide and inter-provincial disparities and investigate them at the same time in my dissertation.

Significant urban-rural disparities in terms of income, health, and education have been one of the most fundamental characteristics in Chinese society (Whyte, 2010). China's household registration (*hukou*) system categorizes all Chinese citizens into rural and urban residents, under which rural *hukou* holders were treated as second-class citizens and were deprived from many social benefits (e.g., housing, education, and health insurance) that their urban counterparts could enjoy (Chan & Zhang, 1999). Though a variety of reforms to the *hukou* system have been adopted, China still struggles with the sharp urban-rural divide in almost every aspect of social life (Chan & Buckingham, 2008).

A college degree has increasingly become a stepping stone for many occupations and created opportunities that would not otherwise be available to most individuals. Research has observed the significant economic and non-economic benefits of higher education (Hu & Hibel, 2014; Xu & Xie, 2017). For individuals of rural origins, higher education is also the primary avenue to transfer their *hukou* from rural to urban (Wu & Treiman, 2004). Both rural and urban residents are much more likely to attend college than before because of the rapid higher education expansion over the last few decades in China. However, do rural and urban residents

equally benefit from the expansion? In other words, how does the rural-urban gap in college enrollment change in the context of rapid expansion? This is the first overarching research question addressed by this dissertation.

In addition to the persistent rural-urban gap in college enrollment, research has also highlighted the significant inter-provincial disparities in access to college. Students in Beijing, Shanghai, and Tianjin enjoy a significantly higher probability of attending college than students in other provinces (Fu, 2013; Li, 2017). The inter-provincial disparity has its institutional root in the college admission system in China, which I will elaborate on in Chapter 2. How the inter-provincial disparities in college enrollment changed as the overall access to higher education expanded substantially is the second primary research question of the dissertation.

The last broad research question focuses on rural students' experiences and academic performance in college. Rural students' transition to college is not only a geographical journey from their hometown to the metropolis where the universities usually locate, but also involves enormous psychosocial and cultural transitions (Liao & Wong, 2019; Yu, 2015). Due to a lack of economic and cultural capital, prior literature has consistently documented rural students' struggling to integrate to the campus life (Li, 2013; Yu, 2015). But it remains unclear whether these challenges in social lives translate into students' academic outcomes.

The purpose of this dissertation is to investigate the urban-rural disparities in college enrollment and experiences in college. As a whole, this dissertation focuses on rural students in Chinese higher education from access to experiences, and the findings together provide a comprehensive picture of the urban-rural disparities in contemporary Chinese higher education system and carry important implications for future research, policy, and practice.

Contributions of Research

Though urban-rural disparities in Chinese higher education have been a popular topic extensively explored in literature, this dissertation advances current research in several ways. First, this dissertation advances existing literature on the rural-urban gaps in higher education by examining this enduring issue at the provincial level. Prior literature often investigated this question at the national level (e.g., Li, 2010; Lu, Deng & Guo, 2016; Wu & Zhang, 2010). Results on how the rural-urban gap in college enrollment changes over time are mixed. This inconsistency in results may be related to the level of analysis. When examined at the national level, it is hard to separate the rural-urban gap from the regional variations (Lu et al., 2016). A common strategy used in literature to control for the regional variations is to divide the 31 provinces into three regions (i.e., eastern, western, and middle) according to their geographic locations. However, this approach is limited, given the significant inter-provincial variations within each region. More importantly, under China's admission system, students only compete with peers in the same province (rather than across the country) for college admission (Tam & Jiang, 2015). These special institutional arrangements justify the provincial-level analysis of the rural-urban gap in college enrollment. Thus, my dissertation not only shows how the rural-urban gaps in college enrollment changes in the era of expansion, but also illustrates inter-provincial variations in the rural-urban divide in college enrollment.

Second, adopting a cross-provincial assessment, this dissertation contributes to unpacking the regional heterogeneity in higher education inequalities. The Chinese government initiated a decentralization reform in the finance and administration of higher education in the 1980s, and the provincial governments now enjoy major authorities and responsibilities in the administration of higher education (Li, 2017). Considering the substantial inter-provincial variations in

socioeconomic development (Xie & Zhou, 2014), the will and fiscal capability to invest in higher education differ significantly across provinces. As a result, the level of higher education development and the landscape of higher education inequity likely also vary by provinces. However, compared to the rural-urban gap, regional disparities and inter-provincial variations in particular, receive relatively less attention in the literature. Additionally, existing research on regional inequality in college enrollment usually construct various indexes, based on aggregated indicators, such as the number of higher education institutions, the size of enrollment, and admission rate, to describe and compare the level of higher education development across provinces (e.g., Cao & Zhang, 2017; Yang, 2014). This study advances this line of research by focusing on how provinces shape individuals' opportunities to college from a micro perspective.

Third, by investigating the rural-urban gap in academic performance by fields of study and college years, this dissertation adds to existing literature on the academic performance of rural college students in general. In addition, relatively few studies have focused on the college experiences of rural students and participation in campus activities. By examining students' participation in study-abroad programs, leadership experiences, China's Communist Party membership, as well as their time use in college, this dissertation advances prior work toward a more comprehensive understanding of the experiences of rural students in selective universities. The dissertation further explores the relationships between pre-college characteristics, time use, and academic performance and uncovers the factors associated with the rural-urban gap in academic performance.

Last, my research on rural-urban disparities in access to and experiences in Chinese higher education also contributes to the international dialogue on longstanding questions in the literature. This dissertation tests the applicability of theories that are originated in western

contexts in the context of Chinese higher education, one of the largest and fastest-growing systems in the world. Empirical evidence from China thus has the potential to serve to refine and expand existing theories to increase their explanatory power, which is a primary goal of social research (Buchmann, 2011)

Organization of the Dissertation

This dissertation focuses on the rural-urban disparities in Chinese higher education, from access to postsecondary education and student experiences inside the college gate. The dissertation comprises a scholarly paper (Chapter 2) and two empirical studies (Chapter 3 and Chapter 4). Each chapter is designed to stand on its own as a manuscript. Given the non-traditional nature of this dissertation, some items that would be typically found in the introductory chapter (e.g., Key Terms and Definitions section) are incorporated into Chapter 2 and the individual study chapters, in order to reduce redundancy.

The organization of the chapters is as follows. Chapter 2 focuses on the critical contexts for examining equity in postsecondary education in China. Adopting a comparative approach, I highlight some characteristics of Chinese higher education that are distinct from U.S. higher education. Applicants can only receive an admission offer from only one institution though they can apply to multiple institutions under China's admission system. Once students get admitted into an institution, they are essentially guaranteed graduation given the more than 95% completion rate (Wu et al., 2016). Because of these characteristics, some terminologies that carry distinct connotations, such as admission versus enrollment, and access versus attainment, are generally used interchangeably in the context of Chinese higher education. This chapter also discusses in detail the institutional roots of two structural forces that shape China's educational stratification: the household registration system and the provincial quota system in college

admissions. I analyze how these institutional arrangements exacerbate or alleviate the inequality in college enrollment.

Chapter 3 is an empirical study that takes a cross-provincial approach to examine how the rural-urban gaps and inter-provincial disparities in college enrollment have changed after the higher education expansion policy in the late 1990s. I analyze data from the China Family Panel Studies (CFPS) 2010. The CFPS consists of a nationally representative sample, with a special sampling design that oversampled in five provinces: Liaoning, Gansu, Henan, Shanghai, and Guangdong, making data from these provinces representative at the provincial level. I decided to conduct my analysis at the provincial level and restrict my sample to individuals who lived in any of the five provinces mentioned above at age 12. I also limited the sample to individuals born between 1960-1985, ensuring that the oldest cohort attending college after the Cultural Revolution (1966-1976) and the youngest cohort having completed college at the time of the survey. Based on the year of birth, respondents are divided into four cohort groups, with the youngest cohort attending college after the expansion policy. I then examine how the effects of *hukou* type (rural versus urban) and province on college enrollment change across cohorts.

After investigating the inequalities in access to college, Chapter 4 is an empirical study investigating the time use and academic achievement of rural students, in comparison to their urban peers. With the overall enrollment expansion and special admission policies that aim to improve the representation of rural students in higher education, and especially at selective institutions, an increasing number of rural students now are entering selective universities that are usually located in metropolitan areas (Niu & Wan, 2018). Chapter 4 analyzes data from the Chinese College Student Experience Survey (CCSEQ) of undergraduate students at a highly selective university in Beijing. I examine the variations in the rural-urban gap in academic

performance by fields of study and college years. This Chapter further explores the differences in pre-college characteristics (e.g., family backgrounds and type of high school attended) and time use in college (e.g., time spent on off/on-campus work) between students of rural and urban origins, and how these differences are associated with the rural-urban gap in academic achievement.

The dissertation concludes with chapter 5, which summarize the major findings and elaborate on the policy implications for reducing the rural-urban disparities in Chinese higher education.

Summary of Chapter

This introductory chapter sets the stage for the dissertation. It first introduced the broad contexts and identified the overarching research questions guiding the dissertation. Then it elaborated the gap in current research and how this dissertation would add to existing literature, highlighting the scholarly contribution of the dissertation. The chapter concluded with an overview of the following chapters.

Chapter 2: Contexts for Examining Equity in Postsecondary Education in China: A Comparative Perspective

Before moving to the empirical studies, this chapter intends to present key data and discussion on the structure and context of postsecondary education in China. I write this chapter in a comparative approach by comparing China with western counties, and the U.S. in particular whenever possible. This chapter begins with an overview of Chinese higher education, highlighting some distinctive characteristics of China's higher education system. Then I shift the attention to the college admission system, demonstrating how the admission policies aggravate or alleviate the inequality of educational opportunities. Last, I go beyond the higher education system and look at some broader social contexts that matter for the educational equity. Specifically, I focus on the household registration system and the income and wealth inequality. By analyzing the similarities and differences between the China and U.S. contexts, this chapter reveals how and why the western-based concepts and ideas I focus on in the empirical studies can also make sense in the Chinese context.

An Overview of Chinese Higher Education

This section reviews some characteristics of the Chinese higher education system in comparison to the U.S. system. First, public higher education dominates China's higher education. The development of private higher education in China is strictly restricted by state policies. Second, the status of Chinses universities is largely designated by the government, through the selection of national academic excellence initiatives (e.g., Project 211 and Project 985). Third, Chinese universities are characterized by high graduation rates, such that access and attainment can be used interchangeably in the context of Chinese higher education.

Institutional Type and Control

In 2016, there were about 2,600 regular higher education institutions (HEIs) in China, comprising four-year institutions (1,237), higher vocational colleges (1,359), and other institutions (25). Although the number of regular HEIs in China has increased substantially over the past few decades, it still substantially lags behind the U.S., where there were 4,360 degree-granting postsecondary institutions in 2016 (see Figure 2.1). The higher vocational colleges, usually offering 2-3 year vocationally-oriented programs, can be compared to the community colleges in the U.S. However, unlike students in community colleges in the U.S., Chinese students in vocational colleges have no formal channel to transfer to four-year institutions. Usually, only low-achieving students who are not able to get admission by four-year institutions will choose the vocational higher education option (Tam & Jiang, 2015). Additionally, community colleges in the U.S. are often very cheap and sometimes even free, whereas many vocational higher colleges in China are more expensive than four-year institutions.

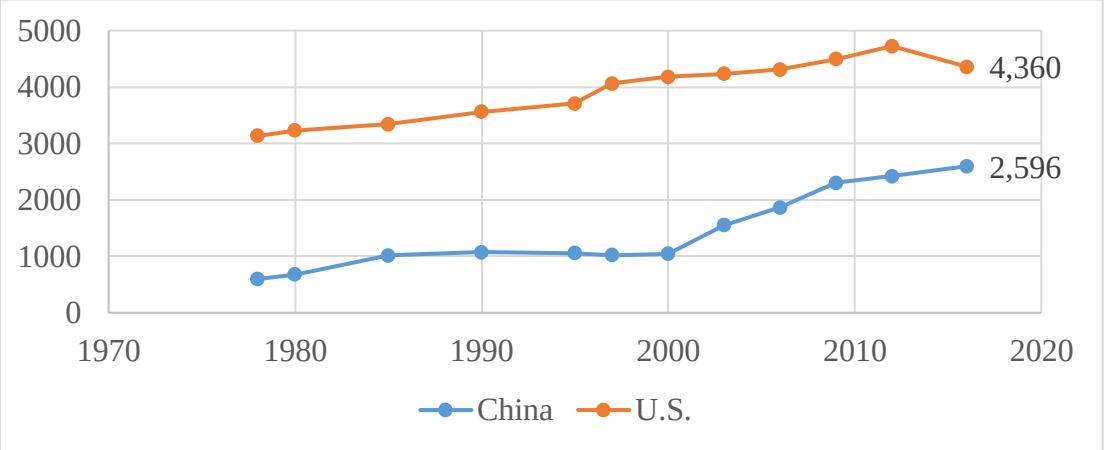

Figure 2.1 The number of higher education institutions in China and the U.S., 1978-2016

Source: China data come from Jacob and Hawkins (2013) and Chinese Ministry of Education, http://www.moe.gov.cn/s78/A03/moe_560/jytjsj_2016/; The U.S. data come from the *Digest of Education Statistics 2017* [Table 317.10]. https://nces.ed.gov/programs/digest/d17/tables/dt17_317.10.asp
Note: In China, the number of regular higher education institutions is reported, excluding adult higher education. In the U.S., the number of degree-granting postsecondary institutions is reported, not including non-degree-granting institutions.

According to the subordinate relations, there are three primary types of higher education institutions: 1) national colleges and universities, which are directly under the administration of central governmental departments; 2) local colleges and universities, which are affiliated with the provincial and local governments; and 3) private higher education institutions, which are run and funded by non-government entities. There were around 120 national college and universities in 2016. These universities are primarily research-oriented institutions and at the top of the pyramid of Chinese HEIs (Cai & Yan, 2015). Since the 1980s China has initiated a decentralized reform in terms of the administration and finance of HEIs and the majority of HEIs now are local colleges and universities (more than 1,500 in 2016). Private higher education was prohibited in

China from 1949 to 1978 but has expanded since the 1980s (Zha, 2011). There are around 730 private HEIs in 2016 (Jiang, 2017). Private institutions largely concentrate on vocational colleges or low-status four-year institutions, primarily engaging in teaching activities (Cai & Yan, 2015).

The most obvious difference between the U.S. and Chinese higher education is the public dominance in both quantity and quality in Chinese higher education. The Ivy League schools, arguably the most prestigious universities in the U.S., are all private. These universities are also the most expensive universities. On the contrary, since the most prestigious universities in China are national universities that are largely funded by the central government, they are the least expensive institutions in China. This structure can benefit high-achieving Chinese students from disadvantaged family backgrounds because they can attend first-tier institutions at affordable prices. However, the community college system in the U.S. offer opportunities for low-achieving students from varying family backgrounds to stay in the higher education system, whereas China, the vocational higher colleges are primary an option for low-achieving students from high-income families because these are often more expensive but less rewarded than four-year institutions (Tam & Jiang, 2015).

Enrollment Trends

Undergraduate enrollment at HEIs has increased steadily from 1978 to 1997 and skyrocketed after China implemented the expansion policy in 1999. As figure 2.2 shows, in 1980, undergraduate enrollment was around 1.1 million in China, compared to 10 million in the U.S. China has outnumbered the U.S. in 2006 and continues to expand. In 2016, nearly 27 million undergraduates were enrolled in regular HEIs in China, compared to 17 million in the U.S. In other words, undergraduate enrollment increased much more quickly in China than in the U.S. However, despite the rapid expansion over the past few decades, China still significantly

lags with respect to the gross higher education enrollment rate (i.e., the rate of student population of all ages enrolled in the higher education institutions relative to the total 18-22 population in the country). According to data from the World Bank (2019), the gross tertiary education enrollment rate is 48.4% in 2016 in China, compared to 88.8% in the U.S. Although China's gross enrollment rate is much higher than it was in the 1990s, it is still fairly low compared to the western world.

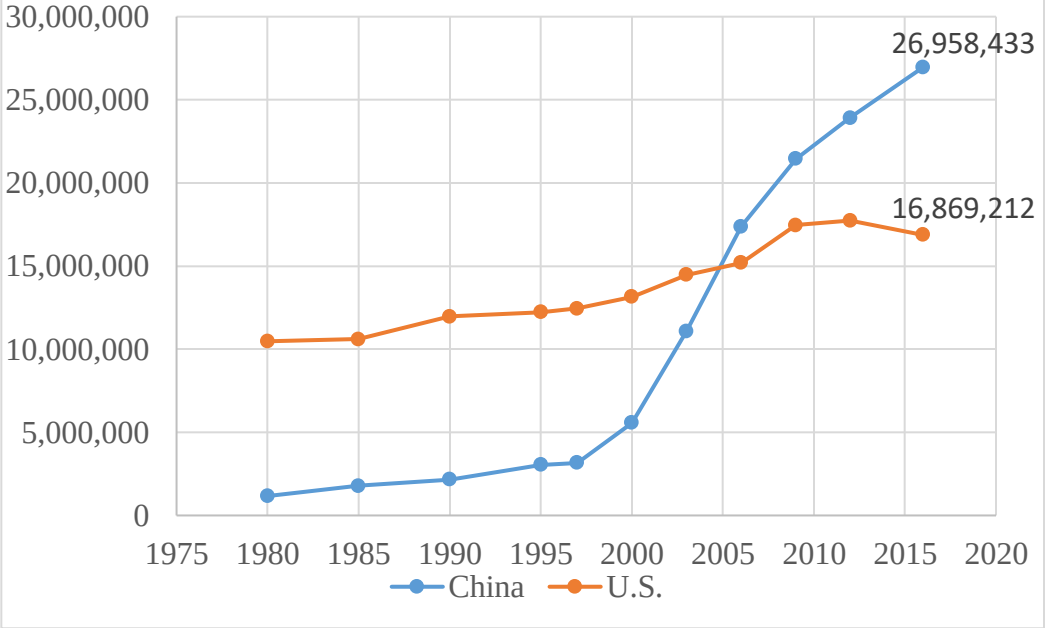

Figure 2.2 Total undergraduate enrollment in HEIs in China and U.S., 1980-2016

Source: China data come from Jacob and Hawkins (2013) and Chinese Ministry of Education, http://www.moe.gov.cn/s78/A03/moe_560/jytjsj_2016/; The U.S. data come from the *Digest of Education Statistics 2017* [Table 303.70]. https://nces.ed.gov/programs/digest/d17/tables/dt17_303.70.asp

Institutional Differentiation

China's higher education expansion has been accompanied by institutional differentiation and stratification. In addition to the obvious vertical stratification between technical or vocational colleges and four-year universities, there are also significant differences within the four-year universities in terms of research funding, student financial aid, teaching, residential facilities, and prestige (Luo & Yang, 2013). Aiming at building a number of world-class universities in China, the Chinese government has launched a few national academic excellence initiatives since the 1990s, such as Project 211 and Project 985. The primary purpose of these projects is to identify a selected of institutions and help them get better with extra funding from the central and local governments (Huang, 2015). Until 2011, 112 institutions have entered the Project 211, and 39 institutions have participated in the Project 985. All these participating institutions have received generous funding from the government and greatly benefited from these policies, especially in terms of research productivity and the performance on world university rankings (Huang, 2015).

Selection in these projects not only means extra funding and preferential policies but also represents a state-recognized prestige. Project 211 and Project 985 have become a privileged identity of the participating institutions, contributing to a widening gap between institutions that have been selected into those projects and other institutions (Allen, 2017; Zong & Zhang, 2019). Different postsecondary institutions constitute a pyramid based on their status and prestige. At the top of the pyramid stand Peking University and Tsinghua University and the other 37 elite universities followed (985 Project institutions). Below are more than 100 undergraduate institutions (211 Project institutions). Even below are large numbers of other ordinary four-year institutions, and the bottom are over 1300 junior colleges, most of which provide two-year

programs aimed at technical or vocational skills. Using data from the 2010 Chinese College Students Survey, Li and colleagues (2012) documented that the wage premium for attending a Project 211 institution can be as high as 10.7%, even after controlling for student ability, major, college location, individual and family characteristics.

Similar to China, U.S. higher education is also characterized by high institutional differentiation. However, how the status of an institution is constructed is different in the U.S. and China. In U.S. higher education research, institutional differentiation is usually operationalized as institutional selectivity, measured by the average SAT scores of the entering freshmen (see Alon & Tienda, 2005). The elite status of U.S. universities is usually associated with the institutional history, admission selectivity, and academic reputation. In contrast, the status of Chinese universities to a large extent, is designated by the government (Fu, 2018). Project 211 and Project 985 are both highly top-down national initiative led by the central government, as part of its national development strategy. Many non-academic factors, such as sectorial, regional, ethnical, and ideological considerations, shape the selection process of which institutions were selected in these projects (Chen, 2006). Regardless of the reasons, selected universities enjoy a higher status than those who have not been selected.

High Completion Rate

U.S. higher education suffers from a high dropout rate. Scholars and administrators have worked hard to improve students' persistence and retention rate. Only about 50 percent of students in four-year institutions completed their study within six years, compared to more than 96 percent of students in Chinese universities graduate within four years (Wu et al., 2016). Therefore, retention is not a major issue in Chinese higher education. Chinese high school students study long hours to prepare for the *gaokao*. Once they have secured a seat in college,

they are essentially guaranteed graduation. This stands in contrasts to U.S. students who usually have a lax high school experience but demanding college education (Ma, 2015).

This high completion rate of Chinese higher education has its root in the era of elite higher education when college admission was extremely competitive. However, as China has transformed from elite to mass higher education since the 1990s, low graduation requirements remained, which created serious problems in the quality of college education and the transition from college to the workplace (Ma, 2015). The public is concerned with the quality of Chinese higher education, and an increasing number of middle-class parents are sending their children to western countries (e.g., U.S., UK, and Canada) to pursue an overseas undergraduate education (Yang, 2015). The Chinese Ministry of Education attempted to address the disconnect between pre-college and college education. On the one hand, recent educational policies aimed to reduce the academic burden in elementary education by restricting the amount of homework and private tutoring services (Ma, 2015). On the other hand, colleges and universities are asked to increase the academic rigor of undergraduate education.

College Admission System

Despite the global higher education expansion, access to selective and prestigious universities is still a scarce resource across the world. How to allocate the limited slots among students from diverse backgrounds is a challenging issue for all countries. The college admission system reflects how the policy-makers in a country define merit and fairness, which has been a contested topic among scholars and the public as well. The following section focuses on China's college admission system, comprising the *gaokao* system and provincial quota system.

The *Gaokao* System

At the age of 15, after nine-year compulsory education (six-year primary education and three-year lower secondary education), Chinese teenagers proceed to senior high schools. In China, some senior high schools are designated as key-point schools at different levels of jurisdiction (e.g., county-level, prefectural-level, and provincial-level). Key-point high schools are usually equipped with better facilities and more qualified teachers. Prior studies have consistently demonstrate that attending key-point senior high schools is one of the most powerful predictors of college enrollment, particularly enrollment in selective institutions (Tang, 2016; Ye, 2015). Regardless of the type of high school attended, students who want to apply for Chinese universities have to take the National College Entrance Exam (NCEE, known as *gaokao*) at the end of the senior high school.

Gaokao is administered each June and lasts two days in most regions. The exam includes math, English, and Chinese for all exam-takers. Students usually choose between social-science-oriented track or natural-science-oriented track at the end of their first year of high school. Students who have selected the natural science track receive further testing in biology, physics, and chemistry in *gaokao*, while those who choose the social science track are tested in geography, history, and politics (a combination of civics, legal studies, and ideology from the Communist Party of China). Because *gaokao* is administered only once a year and it is almost the sole determinant of college admission, if students failed this exam, they have to wait and prepare for an entire year under great pressure and anxiety.

Gaokao is not a flawless exam. Instead, all the critiques to equivalent standardized tests such as SAT/ACT (Guinier, 2015) can also apply for *gaokao*. Significant opportunity gap in college enrollment persists between rural and urban areas (Hao, Hu & Lo, 2014; Wu, 2011; Wu

& Zhang, 2010). *Gaokao* score is not a useful predictor of students' academic success in college (Niu et al., 2018). Nevertheless, *gaokao* is considered by many ordinary people as the only relative fair (some even argue the fairest) competition in China (Howlett, 2017). Unlike many western universities, especially selective ones, that take a holistic review process to select which students to admit, Chinese universities have little autonomy in the admission process. The provincial-level educational authorities are responsible for matching students and universities via *gaokao* scores. As long as an individual has a higher *gaokao* score than the cut-off score set by the institution, the student will get admitted, regardless of their gender, ethnicity, family income, and so on. As You and Hu (2013, p. 312) put it, "the *gaokao* is not just a test but also an equivalent to college admissions per se." This simplicity and straightforwardness are rare and precise in a society dominated by particularistic ties (Howlett, 2017), and this is why people still perceive *gaokao* as a relatively fair vehicle of social mobility, despite the gross inequalities in educational opportunities.

In recent years, some provinces have initiated reforms that take more factors into account in admission decisions, such as co-curricular activities and academic performances in high school. There is also the so-called Independent Admission Policies (IAP) that grant selected universities autonomy in recruiting students (Wu et al., 2018) Overall, these reforms are small-scale, and the public is highly skeptical, fearing these reforms would erode the meritocracy of the *gaokao* system. These skepticisms have deep historical and cultural roots (Ma, 2015). China started to utilize examinations (known as *keju*) to select its governing officials as early as the Song dynasty (960-1279 CE), and it was not abolished until 1905. Many view g*aokao* as the cultural heir of the ancient civil examinations in the sense that *gaokao* provided access to higher

education and upward mobility as *keju* offered opportunities to become the state's political elites for individuals regardless of social origins (Howlett, 2017).

Deep down, the characteristics manifested in the Chinese and American college admission systems also reflect the individual and collective educational philosophy (Ma, 2015). Individual uniqueness and talents are more valued in the U.S. Accordingly, college admission decisions are made on an individual basis, adopting a holistic review approach in which the individual as a whole will be considered. In contrast, Chinese educators and parents believe that all students should and can reach common academic goals (Ma, 2015). Therefore, they use a single criterion (i.e., *gaokao* score) to evaluate all students. The recent debate over the race-conscious admission policies in US higher education to a large extent reflect the conflicts of these two approaches. A group of recent Chinese immigrants in the US actively mobilize to oppose the race-conscious admission policies and has drawn attention of the national media (e.g., Chang, 2018). Partly due to their experience of *gaokao* back in China, they believe that considering race, a trait that someone born with, overtly compromise the meritocracy principle (Johnston-Guerrero & Zhao, 2019).

The Provincial Quota System

To be clear, unlike the SAT or ACT in the U.S., *gaokao* is not a uniform, nationwide test. Instead, each province separately determines the content, administration, and grading of the college entrance exam (Chen & Kesten, 2017). Students have to take the *gaokao* in the province of their household registration. In other words, *Gaokao* is a competition within the province. Each province or municipality stands for a separate admission district (Tam & Jiang, 2015). Universities will make their recruitment plans and set the admission quotas for each province. The public is not informed about how the seemingly arbitrary quota is determined, but the local

protectionism is obvious in the distribution of the admission quotas (Liu, 2015). For example, Fu (2018) collected and analyzed enrollment data of Tsinghua University from 2006 to 2013. Tsinghua University is the top-ranked university in mainland China, located in Beijing. Fu (2018) found that local Beijing students are 30 times more likely to attend Tsinghua than their peers from neighboring Henan province.

Some argue that it is common for universities to favor local students in some extents, and therefore students theoretically enjoy the same home advantage. This is true in the U.S., where public universities in each state recruit disproportionately more in-state students, and in-state students pay cheaper tuition fees than out-of-state students. The key difference between the U.S. and Chinese public universities is that U.S. public universities receive appropriations from the state government rather than the federal government, whereas for Chinese public universities, especially those selected in Project 211, Project 985, and the Double World-class Project,[1] a large share of revenues comes from the central government (Fu, 2018; Li, 2017). Accordingly, these national colleges and universities (e.g., Tsinghua University) should bear more responsibility to admit students from the country.

Moreover, the geographic distribution of higher education resources is highly uneven. The total number of four-year institutions in a province is positively associated with the level of economic development in that province, measured by GDP per capita, whereas this association is not significant in the U.S. (Guo et al., 2018). The distribution of colleges in the U.S. largely

[1] The Double World-Class (DWC) Project represented the most recent efforts by the Chinese government to build world-class universities in China. The DWC project actually include two different projects: the world-class university (WCU) project and the world-class discipline (WCD) project42 institutions joined the WCU project and approximately 456 disciplines at 95 institutions participated in the WCD project.

depends on state population levels. When only elite colleges (i.e., ranking top 100 among all Chinese colleges) are considered, the association between the number of elite colleges in a province and the province's GDP per capita is even stronger, and provincial population levels do not matter for the distribution of elite colleges in China (Guo et al., 2018). Although there is evidence showing that place also matters in higher education opportunities in the U.S. (Cahalan, et al., 2018; Hillman, 2016), it is fair to say that the geographic inequality in access to higher education is more pronounced in China than in the U.S.

Figure 2.3 shows the geographic distribution of Project 211 universities, which are usually considered as first-tier universities. These universities are largely concentrated in eastern wealthier provinces. Beijing, Shanghai, and Jiangsu boast 26, 10, and 11 Project 211 institutions respectively, compared to only one Project 211 institution in many western and middle provinces. Because of this uneven distribution of Project 211 institutions across provinces, and the admission system largely favor local students, the chances to Project 211 universities vary significantly across provinces. In other words, an individual's province of household registration largely shapes his/her access to universities, and particularly to first-tier universities.

Figure 2.3 Distribution of Project 211 Universities (N=112) across provinces in mainland China

Note: Author's design using PowerPoint.
Data source: http://edu.sina.com.cn/gaokao/2011-03-31/1515290772.shtml

There is a fierce debate over the efficacy and equity of the provincial quota system. Qianfan Zhang, a law professor at Peking University, has written many op-ed articles opposing the quota system. Zhang (2016) argues that the quota system was rooted in the centrally-planned economy and should be abandoned as China moved to a market-oriented. More importantly, he believes that the quota system violates the equality principle of the China's Constitution by assigning more seats in national universities to some provinces than others. In Zhang's (2016) opinion, *gaokao* should return to a nationally uniform exam as it was in the 1980s and 1990s because the current provincial exams make the *gaokao* scores incomparable across provinces, thus legitimating the inter-provincial inequality in college admission.

While Zhang's (2016) arguments powerfully resonate with the public concern on the inter-provincial inequalities, some scholars supported the regional quota system. First of all, many people doubt that a nationally uniform *gaokao* is practically feasible, though the idea sounds appealing. Gaokao is arguably the largest high stakes examination in the world. More than nine million students around the country take *gaokao* every June. It is challenging to organize and administer such a large-scale paper-and-pencil examination in a nationally uniform manner when it comes to testing techniques.

Second, and more importantly, some consider the current provincial quota system fair and even an effective way to address the inter-provincial disparities in pre-college education. They argue that students in wealthier provinces (e.g., Beijing, Shanghai, and Tianjin) are more qualified than students in other regions because of their advantages in household economic and cultural capital, and access to better-quality pre-college education (Zhang & Li, 2019). Since the key of *gaokao* is to select the most potential candidate, it is not wrong for elite universities to allocate more quotas to economically developed provinces. Some even suggest that the provincial composition of the student body at elite universities would become more unbalanced if the provincial quota system were abandoned (Guo, Loyalka, & Ye, 2018; Zhang & Li, 2019). The reason is that students in impoverished provinces could not win the competition with students in developed areas if college admission became a free competitive market across the country that is solely based on merit.

Empirical evidence does not support this justification for the provincial quota system. Analyzing data on about 2,000 college freshmen from 36 universities in six provinces in China, Guo and colleagues (2018) simulated how the provincial composition of the student body at colleges would change if provinces of household registration were not taken into account in

admissions. Their results demonstrate that if college admission were solely based on academic ability, the share of students from Henan and Sichuan would increase by 125% and 60% respectively compared to current levels; the composition for Beijing students would decrease by 40% compared to current levels; and the share of Guangdong and Shaanxi students would be even lower. Findings from this study reject the claim that Beijing students deserve more seats in elite universities because they are better academically prepared than students in other provinces.

Broader Social Contexts

Higher education is embedded in the broader social and economic contexts. This section looks beyond the higher education system and examines the social systems that are associated with equity in higher education. Specifically, I focus on the household registration system and China's high levels of income and wealth inequality.

The Household Registration System

Scholars focusing on China have to specify which China they are studying: rural China versus urban China. Rural China and urban China are like two societies in one country (Whyte, 2010). Rural and urban residents differ substantially in social status, life opportunities, ways of life, and even basic citizenship claims (Chang & Zhang, 1999). Among the 20-24 age group, the average years of schooling for urban-hukou holders is 12.3 in 2005, compared to only 8.7 for rural-hukou holders (Wu & Zhang, 2010). The urban households earned on average 3.5 times as much as rural households in 2015 (Piketty et al., 2017). This sharp rural-urban divide is rooted in the household registration (*hukou*) system that was created in the 1950s.

The Chinese revolution led by the Chinese Community Party (CCP) started from the countryside, and the CCP leaders were not familiar with and had little experiences in urban management. When the CCP took power and established the People's Republic of China (PRC) in

1949, the new government was concerned about its capability to manage and control the cities, which had been controlled by the Kuomingtang (KMT) (Whyte, 2010). Free migration from the countryside into the cities was considered exacerbating the challenges of keeping turbulent cities under control. In response, a range of control institutions was initiated during 1953-1958, and a comprehensive household registration system aimed at restricting population migration was legally implemented in 1958. Although China has a long tradition of registering population and households, such a system did not serve as a comprehensive social and economic control institution until 1958 (Chan, 2019).

At birth, individuals inherited the *hukou* status from their parents (either father or mother) and were classified as agricultural (rural) or nonagricultural (urban). The distinction between rural and urban hukou status determined if individuals have access to state-provided resources between the early 1960s and the 1990s (Chan, 2019). Specifically, only urban-*hukou* holders were entitled to enjoy the state-provided housing, employment, education, and access to medical care. In addition to the type of hukou (i.e., rural versus urban), each citizen was also classified based on the location where he or she was registered for *hukou*. The registration location defines an individual's official and only permanent residential address. Depending on whether individuals hold a local *hukou* with respect to an administrative unit (such as a village, town or city), individuals can be classified as local-*hukou* versus non-local-*hukou* holders. According to the dual classifications of the *hukou* system, Table 2.1 shows the four possible statuses in a given location.

Table 2.1 Four types of *hukou* status in a given location

	Agricultural *hukou*	Non-agricultural *hukou*
Living in a place the same as *hukou* location	Local agricultural *hukou*	Local non-agricultural *hukou*
Living in a place different from *hukou* location	Non-local agricultural *hukou*	Non-local non-agricultural *hukou*

Source: Song (2014)

In terms of rights and eligibility for public goods and services, the relative significance of the two classifications of the *hukou* system changed over time. The rural versus urban categorization was more important during the Mao's era (1949-1977). During that time, population migration was limited because of strict controls (Chan, 2019). Almost all citizens remained in the same place as indicated in their *hukou* records, and all urban-hukou *holders* enjoyed certain state-funded benefits, regardless of their registration place. As the migrant population started to increase in the 1980s and reached 253 million in 2014 (Chan, 2019), the distinction between local versus non-local *hukou* becomes increasingly important. Individuals who live in another city or province different from their hometown, usually referred to as migrant population in China, cannot have access to public services provided by the local government without a local *hukou*.

Recent reforms known as the unification of agricultural and nonagricultural in some provinces have completely abandoned the distinction between rural versus urban hukou status (Song, 2014). However, this reform has few practical influences for the vast majority of migrant workers because they do not have a local *hukou*. The type of hukou and registration location cannot be changed unless the individual went through a formal hukou conversion process. Along

with the decentralization of services and hukou management, the hukou conversion approval has been now fully controlled by the local government who has the power to determine the criteria for granting local hukou (Chan, 2019). These criteria vary significantly across different cities. Zhang and Tao (2012) constructed a city's entry barrier index to rank the degree of difficulty of obtaining local hukou for forty-five major cities in China, and Shanghai, Shenzhen, and Beijing rank the top 3. Generally, a more developed city (with regards to a higher level of income, better infrastructure, higher living standards, etc.) tends to set a higher entry bar.

From an economic perspective, the *hukou* system had significantly contributed to China's tremendous economic growth (Lin, Cai & Li, 2003). During the Mao's era, to support the industrial development of the newly established country, rural residents were bound to the soil and the countryside primarily serve as "a source of low-cost agricultural products to feed the urban population, with a portion also destined to export to earn foreign currency to finance technological acquisitions and other key activities" (Whyte, 2010, p. 9). Since 1978 when China gradually moved to a market-oriented economy, the government loosened the migration restrictions, allowing rural adults to seek opportunities elsewhere to address the increasing demands for cheap labor force in factories primarily located in the cities. Rural-to-urban migrant workers usually concentrated in low-paying jobs, working long hours and sometimes under poor conditions (e.g., construction, hauling and domestic services). Whyte (2010) noted that China's economic revitalization would not have been possible without the large-scale rural-to-urban migrant workers (also see Chan, 2019).

However, despite the significant contribution to the cities' functioning and development, migrant workers were deprived of the right to settle in cities and to access most of the welfare and public services that urban residents enjoy due to the lack of a local *hukou* (Chan &

Buckingham, 2008). In other words, although China's economic achievements during the past few decades to some extent benefit from the hukou system, it is unjust to treat more than half of the country's population as second citizens (Chan & Buckingham, 2008). Moreover, this rural-urban dual system has caused and sustained severe social and spatial stratification. In effect, the *hukou* system is a system of urban privileges and rural discriminations (Whyte, 2010). In addition to the differential access to public resources, rural/urban origins have increasingly become a status or social identity associated with certain privileges and stereotypes. As Liao and Wong (2019) have observed, "despite its positive connotation of being hardworking and honest, the negative connotation of the rural being unhygienic, ignorant, socially backward and even uncivilized seem more dominantly upheld by the public" (p. 4).

The discriminatory experiences and unequal treatment faced by rural migrants in China's cities is similar to the ones encountered by undocumented immigrants in the U.S. (Whyte, 2010). Ironically, while it might be common for international immigrants who work in foreign countries without local citizenship, it is rare for a country to apply such a system to its own citizens (Chan, 2019). Because of the unfairness of the hukou system, it has been continuously modified to accommodate the changes brought by socioeconomic developments over the past 60 years. The restrictions to hukou migration in small cities and town have largely been removed. However, the hukou door remains closed in first- and second-tier cities where a large number of migrant population concentrate (Chan, 2019). In all, *hukou* still matters a lot in China.

Income and Wealth Inequality

China witnessed dramatic economic growth over the last few decades and passed Japan as the second-largest economy in 2010. Accompanied by this enormous growth is the rise in

income and wealth inequality. Analyzing data from natural accounts, household surveys, and recently released tax data, Piketty, Li, and Zucman (2017) investigated the accumulation and distribution of income and wealth in China between 1978 and 2015. Their results demonstrate that top 10% earns about 41% of total income in 2015, increasing from 27% in 1978, while bottom 50% share dropped from 27% to 15% (see Table 2.2). Comparing China with western countries, Piketty and colleagues (2017) concluded that, "China's inequality levels used to be less than European average levels in the late 1970s—close to those observed in the most egalitarian Nordic counties—while they are now approaching U.S. levels" (p. 34).

Table 2.2 Income inequality in China, U.S., and France, 1978-2015

	Top 10% share		Bottom 50% share	
	1978	2015	1978	2015
China	27%	41%	27%	15%
U.S.	35%	47%	NA	12%
France	31%	33%	NA	22%

Source: Piketty, Li & Zucman (2017)
Note: NA indicates data not available

Like in other countries, wealth is more unequally distributed among the Chinese population than income. Drawing on data from the China Family Panel Studies, Xie and Jin (2015) estimated that top 1% owned more than one-third of the total national household wealth, while less than 2% went to the bottom 25% in 2015. Combing data from household surveys with data from the annual *Hurun* rankings that cover the richest Chinese households, Piketty and colleagues (2017) found that the top 10% wealth share is 67% in 2015. The Chinese top 10%

wealth share is close to that of the US (72%) and is higher than in France (50%). (Piketty, et al., 2017).

Although China and the U.S. now share similarly high levels of income and wealth inequalities, the driving forces are markedly different. Using comparable data sets, Xie and Zhou (2014) compared the contributing factors of income inequality in China and U.S. Specifically, for each country, they investigated the extent to which five explanatory variables contributed to family income inequality: 1) region (province in China and state in the U.S.); 2) area type (rural/urban in China and metropolitan, non-metropolitan and not identified in the U.S.); 3) education (six categories for both countries) 4) race/ethnicity (23 categories for China and 38 categories for the U.S.); 5) family structure (five categories for both countries, e.g., primary-individual family and single-parent family).

Their findings are as follows. Educational level of the family head plays a similarly important role in generating the income inequality in both China and the U.S. However, compared with the U.S., income inequality in China is largely driven by the rural-urban divide and the regional variations. Compared with China, family income inequality is more affected by race/ethnicity of the family head in the U.S. (Xie & Zhou, 2014). As Zhou and colleagues (1998) noted,

> A salient feature of institutional arrangements in China is the monopoly of almost all resources in the hands of the centralized state. This centralization allows the state to transfer resources among different economic sectors, localities, and social groups on a much larger scale and at a much faster pace than market economies can do. (p. 201)

China's national policies generally favor urban areas over rural areas, big cities over small cities, and coastal provinces over inland provinces (Whyte, 2010; Xie, 2016; Xie & Hannum, 1996).

Accordingly, the effects of structural forces (i.e., rural-urban gap and regional disparities) on income inequality are much stronger in China than in the U.S. where individual-level and family-level factors tend to be more important (Xie & Zhou, 2014).

Summary of Chapter

This chapter elaborated on the essential contexts for examining equality in postsecondary education in China. By comparing China and the U.S., this chapter highlights some characteristics of Chinese higher education and the Chinese society in general. Because of China's college admission system in which provincial-level authorities play a central role, admission and enrollment generally mean the same thing since an individual can receive only one admission offer. Moreover, given the high completion rates of Chinese college students, access and attainment are usually used interchangeably in the context of Chinese higher education.

Chinese higher education has witnessed an unprecedented expansion over the past decades. The overall access to higher education has been improved substantially. However, significant inequalities persist. Because of the provincial quota system and the *hukou* system, Chinese higher education inequality fall largely along the lines of registration place (i.e., province) and *hukou status*. Given these contexts, the next empirical chapter focuses on how the inequalities in college enrollment based on registration place and *hukou* status change in the era of rapid enrollment expansion.

Chapter 3: Does Higher Education Expansion Close the Rural-urban Gap in College Enrollment in China? New Evidence from a Cross-provincial Assessment

Introduction

The Chinese higher education system has experienced rapid expansion over the past few decades. Annual college enrollment grew from 1.1 million in 1998 to 7.4 million in 2015, such that the gross higher education enrollment rate (i.e., the percentage of people who enroll in college among the 18-22 population) increased from 9.8% to 40% during the same period (Ministry of Education, 2016). Although the overall higher education participation has improved substantially, whether the expansion has made access to higher education between people of rural and urban origins more equitable remains unclear. The sharp rural-urban divide in China has been descried as "one country, two societies" to highlight the tremendous differences in almost every aspect of economic and social life between rural and urban China, such as income, access to education and medical care, and housing quality (Whyte, 2010).

While rural-urban disparities in socio-economic development are common in many societies, a distinguishing feature of China is the Chinese household registration *(hukou*) system, which legally classifies the population into agricultural (rural) and nonagricultural (urban) types, with substantial variations in rights and opportunities in life. The *hukou* system has historically always favored the urban-*hukou* population in public resources allocation, including access to good jobs, education, housing and health care (Chang & Zhang, 1999). Due to the *hukou* system and the resulting disparities in parental resources and quality of pre-college education between rural and urban residents, rural students are significantly less likely to attend college compared to their urban peers (Li, 2010; Wu & Zhang, 2010). Importantly, the issue under consideration in

this study is whether the higher education expansion has helped to close the rural-urban gap in college enrollment. Prior studies have examined this issue at the national level, and the results are inconsistent (Li, 2010; Lu, Deng & Guo, 2016; Wu & Zhang, 2010). One problem with extant studies investigating the rural-urban gap at the national level lies in their failure to carefully consider the regional disparities in access to higher education, especially given China's provincial quota system in college admission, under which each of the 31 provinces in mainland China constitutes a separate admission district (Tam & Jiang, 2015).

This study separates the rural-urban gap from the inter-provincial disparity in college enrollment by adopting a cross-provincial assessment approach and examining the rural-urban gap within five diverse provinces. Using provincially representative data from China Family Panel Studies (CFPS) collected in 2010, this study will advance existing research on the relationship between educational expansion and rural-urban gap by providing evidence at the provincial level and highlighting the necessity of provinces as the unit of analysis in the studies of access to Chinese higher education. Moreover, the cross-provincial comparison approach provides the opportunity to explore how the inter-provincial disparities in college enrollment change over time. Therefore, this study will contribute to a deeper understanding of the regional or geographic inequalities in Chinese higher education, a topic that is important yet understudied in the literature, particularly at the individual level (Cao & Zhang, 2016; Liu, 2015).

Additionally, the relationship between educational expansion and equality has been a critical topic in the sociology of education. To date, two edited books on this topic have been published, comprising empirical studies conducted in various national contexts (Shavit & Blossfeld, 1993; Shavit, Arum & Gamoran, 2007). Unfortunately, neither of these books has covered the Chinese system, one of the largest and fastest-growing higher education systems in

the world. Evidence from contemporary China where rapid and radical social transformations are taking place will add to the growing international discussions on global educational expansion and socio-economic development (Hannum & Buchmann, 2005).

Review of Literature

Hukou System and Its Educational Impacts

The deep rural-urban divide in China is rooted in its *hukou* system, which divides every Chinese citizen into agricultural and non-agricultural and further determines the public benefits and recourses one can enjoy. *Hukou* system is a discriminatory institution under which rural residents are treated as second-class citizens deprived of the right to settle in cities and access to most of the welfare and public services enjoyed by urban people (Chan & Buckingham, 2008). It was legally established in 1958, with an initial purpose of maintaining social order and control (see Chang & Zhang, 1999, for a detailed discussion). There are two related classifications in the *hukou* system. The first classification is the type or status of *hukou* registration, referred to as "agricultural" (rural) and "non-agricultural" (urban) *hukou*. This classification was initially related to occupational division (agricultural vs industry) in the centrally-planned economic system in the 1950s. As the system evolved, this classification says little about the actual occupation of the holders, yet still determines one's access to goods and services, such as housing, employment, education and other benefits (Chan & Zhang, 1999).

The second classification of hukou is the location of registration. The local *hukou* registration concerning an administrative unit (such as a village or county) defined one's rights for public benefits in the place of current residence (Chan & Zhang, 1999). Although rural people have been allowed to work in cities since the 1980s, they are not eligible for urban services and welfare without local citizenship. Accordingly, migrant children have to attend

private migrant schools which are usually equipped with inadequate facilities and less qualified teachers since they do not have a local *hukou* which is required for public schools (Xiong, 2015). Moreover, the eligibility for attending the national college entrance exam (*gaokao*) was also tightly controlled by the *hukou* system. Before a recent reform in 2012, which conditionally allows migrant children to take *gaokao* locally, migrant children without a local *hukou* were not eligible to take *gaokao* in the place where they live and study. Even after the policy implemented in 2012, it is still very challenging, if not impossible, for migrant children in cities with a huge migrating population like Beijing, Shanghai, and Guangzhou, to take *gaokao* locally due to the high threshold for the working and living conditions of their parents.

Given the institutional exclusion of the *hukou* system, significant educational disparities between rural and urban *hukou* holders have been well documented (Hao, Hu & Lo, 2014; Wu, 2011; Wu & Zhang, 2010). According to the China General Social Survey (CGSS) 2005, the average years of schooling of rural hukou holders ages 18 or above is 5.96, compared to 10.25 for urban hukou holders (Wu, 2011). The rural-urban divide in educational attainment can be partly attributed to the effect of residential location, with urban people usually residing in cities while rural hukou tended to live in villages. Given that educational resources, especially at the level of upper secondary and higher education, are primarily concentrated in large cities and urban areas, studies have consistently linked educational stratification to residential location (Wu, 2011; Zhou, Moen & Tuma, 1998). Additionally, *hukou* status is highly correlated with family socioeconomic conditions, which also contribute to the rural-urban education gap (Wu, 2011). Moreover, even after controlling for the impacts of place of residence, parental education and father's occupation, rural *hukou* status at age 14 still poses obstacles on educational

attainment, partly due to discriminatory admission policies against students who lack a local urban *hukou* (Wu & Treiman, 2004).

In terms of the trends in the rural-urban gap in college enrollment, results of existing studies are mixed. Wu and Zhang (2010) analyzed the sample data from population censuses in 1990 and 2000 and the mini-census in 2005 to examine the gender and hukou-based educational inequality in the context of educational expansion. Their results demonstrated that the rural-urban gap was widened in the 1990s, and females and urban residents benefited more from the educational expansion (also see Li, 2010). Using data from CGSS 2008, Wu (2013) investigated the changing effects of *hukou* status on school transitions between 1978 and 2008. His results also showed increasing rural-urban disparities in the transition from senior high school to college, particularly after the expansion policy (also see Li, 2015).

Using data from China Family Panel Study (CFPS) 2010, Lu, Deng, and Guo (2016) also documented an increasing rural-urban gap in college enrollment with the educational expansion when they employed a similar analytical approach that has been commonly used in prior literature. For example, previous studies often control the regional variations by dividing the 31 provinces into eastern, middle, and western regions based on their geographical locations. However, Lu and colleagues (2016) argued that this approach neglected the inter-provincial differences in educational attainment within each region, particularly given that each province constitutes a separate admission district in college admissions (Tam & Jiang, 2015). In response, they used hierarchal models to control for the fixed effects of provinces and found no evidence supporting that rural-urban disparities in college enrollment were enlarged after expansion.

All the studies above examined the urban-rural disparity in college enrollment at the national level. As Lu and colleagues (2016) correctly pointed out, most of these studies failed to

adequately consider the inter-provincial differences in postsecondary education attainment, raising questions about the accuracy of their results on rural-urban inequalities. Although Lu and colleagues (2016) have addressed this issue by adjusting for the effects of provinces, their using of a nationally represented sample restrict them from interprovincial comparisons because their data are not representative at the provincial level. This study advances this line of research by examining the rural-urban education gap more specifically at the provincial level by using the province as the unit of analysis and capturing inter-provincial differences. Now I turn to discuss why this cross-provincial approach is necessary and meaningful, starting with introducing the college admission system in China.

Provincial Admission Quota System and Inter-provincial Inequality

In China, all universities recruit students based on their score on the National College Entrance Exam (NCEE), known as *gaokao* in Chinese. The admission system in China is tricky. Each province or municipality comprises a separate admission district (Tam & Jiang, 2015). The Department of Education in each admission district determines two cut-off scores, based on the supply of university places and the number of applicants in that year. One is for elite universities, and the other cutoff is the minimum required score for admission into any four-year college or university. Students above the specific cutoff scores are eligible to apply for the corresponding type of institutions. Based on the cutoff scores of each province, institutions then set their cutoff scores for applicants from different provinces and determine admission quotas for each province.

Under this admission system, the probability of enrolling in universities varies substantially across provinces. For example, Peking University and Tsinghua University, two top universities in China, both located in Beijing, collectively recruited 84 students out of every 10,000 applicants in Beijing in 2013; 14 students from every 10,000 applicants in Tianjin,

compared to only 3 per 10,000 candidates from Anhui and 2 per 10,000 candidates in Guangdong (Fu, 2013). China initiated decentralized educational reform since the 1980s in the context of rapid economic growth and increasing regional economic disparities. The reforms have intensified the role of provincial governments in higher education finance and administration, resulting in institutions admitting disproportionately more local students (Li, 2017). This admission pattern of favoring local students is even true for Peking University that receives a large part of its funding from the central government, let alone universities that are primarily funded by local authorities (Tam & Jiang, 2015).

What makes the situation worse is the highly uneven spatial distribution of higher education resources. In 1998, the Chinese government announced a national academic excellence initiative, named Project 985, aiming at building a number of world-class universities in China through extensive funding for selective universities (Huang, 2015). The 39 universities selected in Project 985 are generally considered to be elite universities in China. Among the 39 institutions, 8 of them are located in Beijing and 4 located in Shanghai, while no institution has participated in Project 985 in 13 other provinces, all of which are western or central provinces. Hillman and Weichman (2016) coined the term "education deserts" to highlight the role of geography plays in shaping access to college in the U.S.. Given the fact that the majority of students attending public four-year universities in the U.S. enroll within 50 miles from their permanent home, students living in "education deserts" have few postsecondary options from which they can choose (Hillman & Weichman, 2016). This argument also holds in China where 80% to 85% of Chinese students attended college in their home provinces from 1990 to 2005 (Wu & Zhang, 2010). Importantly, this is not only because of students' self-choice, but also due to the admission policies that favors local students. The uneven distribution of higher education

resources, combined with the provincial quota system that favor locals students, result in great inter-provincial differences in postsecondary opportunities.

Overall, although geography has been highlighted as a significant educational stratifier in China (Hannum & Wang, 2006), inter-provincial inequalities are understudied in the field of educational inequality, compared to the ample studies on inequalities by gender, class and *hukou* status. Prior studies on the geographic or regional inequalities in Chinese higher education usually use aggregate indicators to demonstrate the variations in the number of higher education institutions and admission rates across provinces (Cao & Zhang, 2016; Liu, 2015). These studies help uncover the geographically unbalanced distribution of higher education resources across provinces at a macro level, but how the provinces individuals located shape their opportunities to college remains unclear.

Theoretical Considerations: Maximally Maintained Inequality

Scholars have proposed multiple and even contradicting theoretical perspectives regarding the trends in inequality of educational opportunity. From a modernization perspective, economic development and educational expansion should contribute to closing and even eliminating disparities in educational attainment according to social origins, because merit-based selection processes are viewed as the most efficient ways to a well-functioning economy (Treiman, 1970). Consequently, as a society becomes more modernized and industrialized, the role of ascribed characteristics, including gender, race/ethnicity, and social origins, will become less and less important in educational attainment and at the same time, education will play an increasingly important role in occupational attainment (Treiman, 1970).

However, empirical evidence did not consistently support the modernization thesis. The comparative research project coordinated by Shavit and Blossfeld (1993) documented “persistent

inequality" in educational attainment based on parental socioeconomic status in 11 of 13 industrialized counties over much of the 20th century. Despite substantial educational expansion during this century, particularly at the lower secondary level, only 2 of 13 countries examined—Sweden and the Netherland—witnessed a weakening association between social origins and educational attainment (Shavit & Blossfeld, 1993). These results were further confirmed by subsequent analyses (e.g., Hout & Janus, 2011; Pfeffer, 2008).

However, this persistent inequality thesis was also challenged by recent studies. Breen and colleagues (2009) have analyzed educational inequality in eight European countries throughout the 20th Century and reported evidence of declining inequality in educational attainment for women in all eight countries and men in all but two countries (Italy and Ireland). Breen and colleagues (2009) attributed the declining inequality to the substantial improvement of general living conditions in the context of rapid economic growth and welfare-state expansion during the post-war decades, as well as structural changes within the educational institution, such as the decreasing costs of education and the expanded length of compulsory schooling. Barone and Ruggera (2018) replicated and extended Breen and colleagues' (2009) study to a larger set of countries and more recent cohorts. Their analysis further supported the declining inequality thesis, concluding that "virtually all European countries have experienced some educational equalization between the first two birth cohorts (1930-1944 and 1945-1954)" (p. 21), although this equalization trend weakened or even stalled in the subsequent cohorts (1955-1964 and 1965-1980).

While Breen and colleagues (2009) have identified the sample size as an important source of the discrepancy between their results and those of Shavit and Blossfeld (1993), the persistent inequality thesis and declining inequality thesis may not contradict each other in some

sense, depending on the level of education under examination. Breen and colleagues (2009) found that the declining educational inequality in all countries studied was largely driven by "the substantial reduction in class origin effects at the transition to secondary education", while "inequalities in the transition to tertiary education remained unchanged" (p. 1514). This pattern is exactly consistent with what the Maximally Maintained Inequality (MMI) thesis has predicted (Raftery & Hout, 1993).

The MMI hypothesis argues that class-based inequality in access to a given level of education will not diminish until the entire affluent class has reached a saturation point at a certain level of education (Raftery & Hout, 1993). Saturation at a specific educational level is defined as the point at which almost all children from the high-status group have attained that educational level. Until that point, the privileged group is better prepared to seize any new opportunities caused by educational expansion, and inequality will maintain or even increase despite the expansion. As secondary education gradually became universal in European countries in the post-war era, MMI predicts the inequality in secondary education attainment would decrease, which is supported by empirical evidence (Barone & Ruggera, 2018; Breen et al. 2009). However, educational inequality still manifested at the postsecondary level, which is far away from the saturation point. Accordingly, this study specifically examines the trends in rural-urban gap in the college enrollment and attests the applicability of MMI in the context of Chinese higher education. Given the extremely low participation in higher education before the expansion in the 1980s (Yeung, 2013), I hypothesize that urban people and residents in economically developed provinces benefit more from the expansion, resulting in an increasing rural-urban and inter-provincial inequalities in college enrollment.

Methods

Data and Sample

I used provincially representative data of five diverse provinces from the baseline survey of China Family Panel Studies (CFPS) in 2010. The CFPS is a national and longitudinal survey of Chinese society conducted annually from 2010 (Xie & Hu, 2014). The 2010 baseline survey of CFPS collected data from 14,960 households and 42,590 individuals living in these households, covering 25 of 31 provinces in mainland China and representing 94.5 percent of the total population. Therefore, it is considered a nationally representative sample (Xie & Lu, 2015). A unique sampling strategy of CFPS is its decision to oversample populations in five selected provinces: Liaoning (LN), Shanghai (SH), Henan (HN), Guangdong (GD), and Gansu (GS), resulting in the subsamples of these five provinces representative at the provincial level. The provincially representative data available is the primary reason I chose CFPS for this study. The five "large" provinces included in CFPS are typical regions in China. Shanghai is the biggest municipality and arguably the most economically developed region in China. Guangdong is also an economically developed province located in South China, in contrast with Gansu, a poor province located in the west (see Figure 3.1). Liaoning is located in the northeast of China and Henan is the province holding the biggest population and located in the middle of China (see Figure 4). As a whole, these five provinces represent geographically and socioeconomically diverse regions of China.

Figure 3.1 The geographic location of the five provinces examined
Note: Author's design using PowerPoint

One of the biggest challenges to study inter-provincial educational inequality at the micro level is to trace individuals' home admission districts. This is challenging because of the large number of migrants residing in a place that is different from their place of *hukou* (Liang, Li & Ma, 2014). These internal migrants are likely a selected group of people with regards to educational attainment, either positively or negatively. Therefore, it is critical to identify individuals' home provinces (i.e., admission districts) when they applied to college. I utilized the residence province when individuals were 12 as the criterion to select my sample. Based on respondents' residence province when they were 12, I restricted my sample to those who lived in any of the five provinces: Liaoning, Shanghai, Henan, Guangdong, and Gansu (N=15,672). Additionally, I also limited the sample to individuals born between 1960-1985 (N=7,267),

ensuring that the oldest cohort attending college after the Cultural Revolution (1966-1976) and the youngest cohort having completed college at the time of the survey. Finally, after excluding observations of missing data on the variables used in logistics regression analysis (5.5 percent of missing values for parental education and less than 1.1 percent for all other variables), I obtained a final sample of 6,762 individuals.

Variables

The dependent variable in this study is higher education attainment. The CFPS asked the highest educational attainment respondents completed, including multiple categories from illiteracy to PhD I recoded the variable into a dummy variable, indicating whether or not an individual has any higher education attainment.

One key independent variable is the type of *hukou*. The CFPS asked respondents' current type of *hukou*, as well as the type of *hukou* when they were born and at age 12. Given that higher education is a primary avenue for individuals to transfer their hukou status from rural to urban (Wu & Treiman, 2004), I used the type of hukou individuals had when they were 12 to capture their *hukou* status before college. It is a dichotomous variable and coded as 0 for urban *hukou* and 1 for rural *hukou*. Another important independent variable is the birth cohort. Based on the year of birth, I divided the sample into four cohorts: 1960-1968, 1968-1974, 1974-1980 and 1981-1985 (Li, 2010).

In addition, I included several control variables that are associated with individuals' educational attainment reported in prior literature. I first control for the effects of gender (Yeung, 2013). It is coded as 0 for male and 1 for female. I also created a continuous variable for the number of siblings, controlling for the effects of family size on educational attainment (Wu, 2013). Individuals' ethnicity is also controlled (Hannum, 2002). Given that more than 90 percent

of the population is Han in China, this variable is coded as 0 for Han and 1 for all the ethnic minorities. Finally, I created a continuous variable for parents' highest year of schooling (ranging from 0 to 22) to control for the effects of family background (Li, 2010; Wu, 2013).

Analytic Strategy

Given that the dependent variable in the study is a dichotomous variable, I employ logit regression to model the probability of college enrollment, with a particular focus on the effects of *hukou* status. First, to capture the temporal variations, I run separate logit regression models for each cohort in the pooled sample of five provinces. Second, to investigate the inter-provincial differences in the effects of *hukou* status, I run separate logit regression model for each province. A primary goal of the study is to compare the effects of *hukou* status across cohorts and provinces. A methodological issue for group comparisons in logit regression models is that log-odds ratios or odds ratios for similar models across groups with different independent variables in a sample cannot be directly compared, due to unobserved heterogeneity (Mood, 2010). Following Mood's (2010) suggestions, I calculate the predicted probabilities and average marginal effect to conduct comparisons across cohorts and provinces correctly.

Results

Descriptive Characteristics of the Pooled Sample

Table 3.1 presents the descriptive statistics for the variables used in the analysis by cohort. In the pooled sample of people born between 1960-1985 who lived in LN, SH, HN, GD or GS when 12 years old, there is a marked increase in higher education attainment over time, with the percentage of people who completed college increasing from only 5% in the oldest cohort (born between 1960-1968) to 26% in the youngest cohort (born between 1981-1985). Parents' highest year of schooling also demonstrates the increasing trends in educational

attainment in China, the average highest year of schooling completed by parents of the oldest cohort is less than four years, compared to nearly eight years by parents of the youngest cohort.

In terms of the type of *hukou* when 12 years old, the proportion of individuals with rural *hukou* origins declined from 83% in the oldest to 75% in the youngest cohort. Considering the rapid urbanization process China has experienced over the past decades, it seems a high percentage that even in the youngest cohort, still, 75% of individuals had a rural *hukou*. Recall that I used the type of *hukou* when 12 years old and the youngest cohort reached age 12 during 1992-1997. Estimates based on data of 2000 China Population Census demonstrated that as of 2000, about 75.2% of the total population had a rural *hukou*, although nearly 15% of rural *hukou* holders migrated and actually resided in urban areas (Wu & Zhang, 2010).

Additionally, Table 3.1 also shows an apparent decrease in the average number of siblings, from 3.67 in the oldest to 1.38 in the youngest cohort. This pattern is consistent with the drastic decline in fertility rate in China, largely due to socioeconomic developments and the one-child policy since the 1980s (Zhao & Zhang, 2018). Next, I employ logit regression models to examine the effects of rural *hukou* origin in higher education attainment across different cohorts.

Table 3.1 Descriptive statistics of variables, by cohort (Pooled sample, N=7,267)

	1960-1968	1969-1974	1975-1980	1981-1985
Higher Education Attainment	0.05	0.09	0.17	0.26
Parents' highest year of school	3.67	4.96	6.28	7.87
	(4.44)	(4.54)	(4.43)	(4.15)
Rural *hukou*	0.83	0.85	0.81	0.75
Number of siblings	3.56	2.89	1.85	1.38
	(1.82)	(1.60)	(1.40)	(1.28)
Female	0.52	0.54	0.49	0.53
Ethnic Minority	0.04	0.04	0.05	0.03
Liaoning	0.42	0.29	0.16	0.14
Shanghai	0.46	0.16	0.18	0.19
Henan	0.41	0.27	0.18	0.14
Guangdong	0.43	0.25	0.16	0.16
Gansu	0.42	0.29	0.17	0.12
N	3,090	1,918	1,223	1,036

Notes: Mean or percentage are reported in the table. Numbers in parentheses are standard deviations. Data are not weighted.

Changing Rural-urban Gap in College Enrollment over Time

The central goal of this study was to investigate whether and how the role of rural *hukou* origin in college enrollment has changed over time. To answer this question, I divided the pooled sample of five provinces into four birth cohorts and ran logit regression models predicting the probability of access to college for each cohort. Specifically, I ran two models for each cohort, the first model includes rural *hukou* origin and other control variables, and the second model adds provinces into the first model to control for the fixed effects of provinces. I presented these results in Table 3.2

Rural *hukou* origin is significantly and negatively associated with probabilities of college access across all four cohorts, and this pattern remain relatively stable after accounting for the fixed effects of provincial characteristics. Among the oldest cohort, rural *hukou* holders were 73.9% (0.261-1=-0.739, Model 2) less likely to go to college than their urban counterparts. Rural *hukou* holders in the youngest cohort were 75.2% less likely to attend college than their urban peers (0.248-1=-0.752, Model 8). To compare the effects of rural hukou origins across cohorts, I calculated the predicted probabilities of college enrollment by type of hukou, holding all other covariates at the means. Figure 3.2 shows that although the probabilities of college enrollment increased substantially for both rural and urban residents, urban *hukou* holders are consistently more likely to attend college than their rural counterparts throughout the time studied. Moreover, this rural-urban gap in college enrollment increased, particularly from the third cohort (1975-1980) to the youngest cohort (1981-1985), who attended college after the expansion policy. Among the 1960-1978 cohort, the rural-urban gap in the predicted probabilities of college enrollment is 0.054 (0.075-0.021=0.054); however, this gap has increased to 0.265 (0.414-0.149=0.265) among the 1981-1985 cohort.

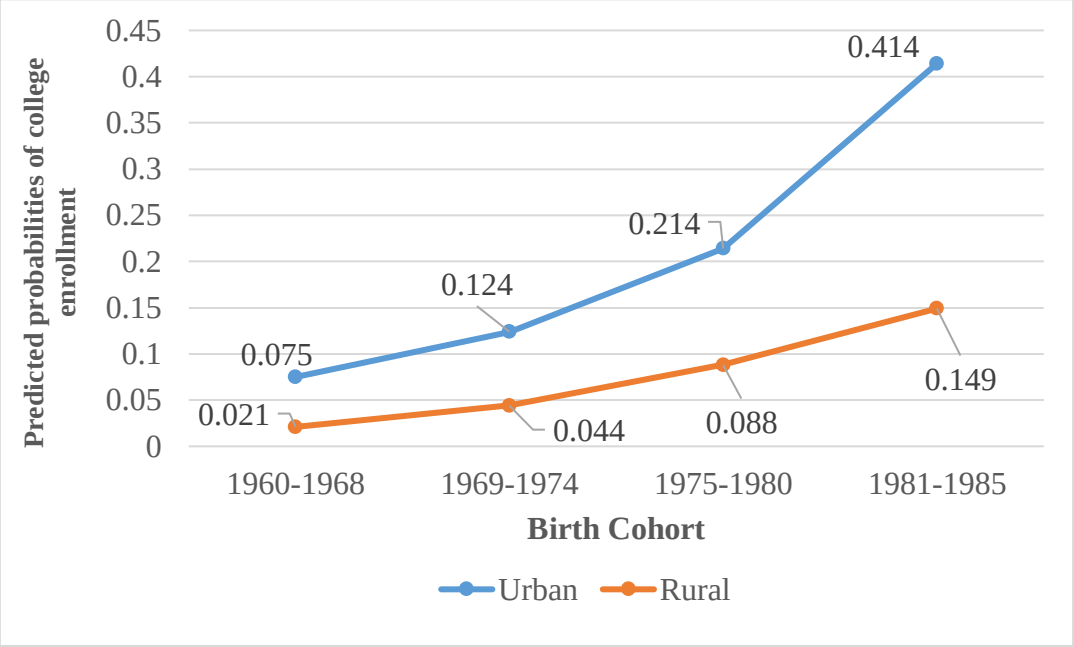

Figure 3.2 Predicted probabilities of college enrollment, based on Model 2, 4, 6, and 8 in Table 3.2, by type of *hukou* *Notes:* Variables other than province and cohort are set at their means.

Results in Table 3.2 also show that parents' education matters for children's higher education attainment across all cohorts and the effects hold after adjusting for the fixed effects of provinces. Among the oldest cohort, with every one-unit increase in parents' highest year of schooling, the probability of attending college increases by 17.8% (1.178-1=.178, Model 2). Similarly, the probability of attending college increases by 22.3% (1.223-1=.223, Model 8) with every one-unit increase parents' highest year of schooling among the youngest cohort. Although it is not the focus of this study, results documented a similar trend in gender differences in college enrollment over time with Yeung's (2013) study. Whereas females are 44.6% (.554-1=-.446, Model 2) less likely than males to attend college among the oldest cohort, this gender disparity disappeared in the following cohorts. Females are even 6% more likely than males to attend college among the youngest cohort (1.060-1=.070, Model 8), although this female

advantage is not statistically significant. There is no significant ethnic difference in college enrollment in any cohorts.

Last, in terms of the impacts of siblings, Table 4 shows that the number of siblings is significantly and negatively associated the probability of attending college across all cohorts. For instance, with one more sibling, the probability of attending college declines by 16.5% among the oldest cohort (0.835-1=-0.165, Model 2). Similarly, with one more sibling, the probability of attending college declines by 33.2% among the youngest cohort (0.668-1=-0.332, Model 8). Now I turn to the inter-provincial differences in higher education attainment by focusing on the coefficients of provinces in Model 2, Model 4, Model 6, and Model 8 in Table 3.2.

Table 3.2 Logit Regression Models of College Enrollment, by cohort

	1960-1968		1969-1974		1975-1980		1981-1985	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Rural *hukou*	.276***	.261***	.312***	.328***	.362***	.356***	.246***	.248***
	(.200)	(.212)	(.201)	(.203)	(.206)	(.209)	(.196)	(.204)
Parents' highest year of school	1.177***	1.178***	1.194***	1.204***	1.249***	1.244***	1.136***	1.123***
	(.020)	(.021)	(.023)	(.023)	(.027)	(.027)	(.027)	(.027)
Female	.553**	.554**	.823	.814	.942	.976	1.094	1.060
	(.191)	(.191)	(.182)	(.183)	(.183)	(.183)	(.169)	(.174)
Number of siblings	.839**	.835**	.836*	.868+	.752***	.769**	.656***	.668***
	(.061)	(.063)	(.070)	(.072)	(.081)	(.091)	(.095)	(.106)
Ethnic minority (Ref: Han)	.498	.495	1.204	1.464	.558	.770	.873	1.537
	(.346)	(.748)	(.438)	(.450)	(.452)	(.473)	(.545)	(.546)
Province (Ref: LN)								
Shanghai		1.055		2.085*		3.108***		4.579***
		(.288)		(.311)		(.302)		(.279)
Henan		1.213		1.011		2.171**		1.675
		(.274)		(.267)		(.292)		(.297)
Guangdong		.917		1.667		1.869+		3.018***
		(.349)		(.299)		(.327)		(.297)
Gansu		1.412		.965		1.733+		2.258**
		(.296)		(.282)		(.328)		(.312)
Constant	-2.18***	-2.26***	-2.16***	-2.51***	-2.12***	-2.77***	-.788*	-1.50***
	(.286)	(.342)	(.323)	(.375)	(.321)	(.380)	(.321)	(.356)
Pseudo R-square	.195	.197	.185	.193	.220	.235	.211	.243
Log-likelihood	-442.65	-441.55	-434.61	-429.94	-408.41	-400.50	-449.05	-430.65
Model chi-square	214.68	216.87	196.61	205.95	230.62	246.45	240.15	276.95
N	2,801	2,801	1,800	1,800	1,160	1,160	1,001	1,001

Notes: Ref=reference group; LN=Liaoning; +p<.1; *p<.05; **p<.01; ***p<.001;
Odds ratios reported in the table. Numbers in parentheses are standard deviations.

Inter-provincial Differences in College Enrollment over Time

As shown in Table 3.2, across all cohorts, adding dummy variables to control for the fixed effects of provinces did not substantially change the effects of other variables, either in terms of the magnitude or the significance level. However, the effects of provinces in college

enrollment differed significantly between cohorts. Generally, the inter-provincial disparities increased from non-significant to significant over time. To facilitate interpretation, I calculate the predicted probabilities of attending college by provinces and cohorts, with other covariates set at their means. The results are presented in Figure 3.3

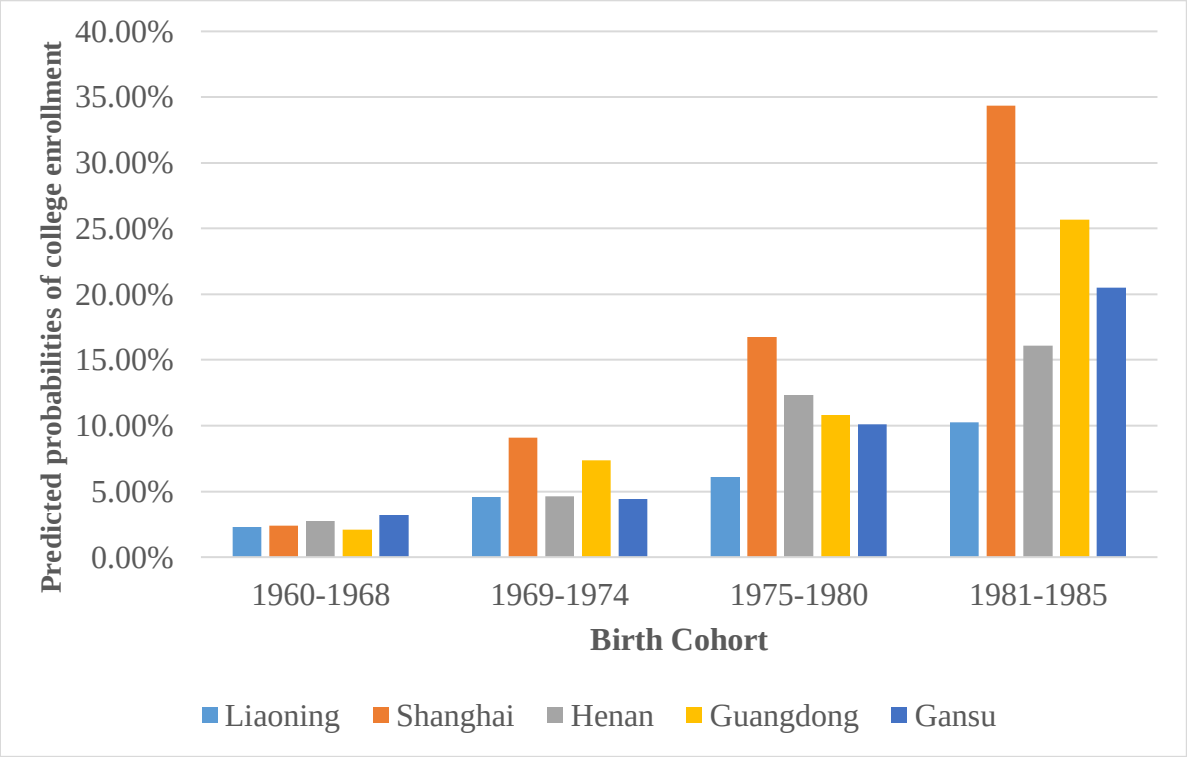

Figure 3.3 Predicted probabilities of college enrollment, based on Model 2, 4, 6, and 8 in Table 3.2, by province and cohort.
Notes: Variables other than province and cohort are set at their means.

As shown in Figure 3.3, the predicted probabilities of attending college are very low across all five provinces (2.09% in Guangdong to 3.19% in Gansu) among the oldest cohort, and there is no significant inter-provincial difference between any of the five provinces. Adding the province variables in Model 2 did not significantly improve the model fit over Model 1 (LR chi-

square=2.19, p=.701). The overall predicted probabilities of attending college are higher in the 1969-1974 cohort than the oldest cohort (4.42% in Gansu to 9.08% in Shanghai). Controlling for the fixed effects of provinces in Model 4 again did not significantly improve model fit over Model 3 (LR chi-square=9.34, p=.053). However, the probability of attending college in Shanghai (9.08%) is significantly higher than those in Liaoning (4.58%, p<.05), Henan (4.62%, p<.05), and Gansu (4.42%, p<.05).

Inter-provincial disparities in college enrollment become more salient among the two young cohorts. As Table 3.2 shows, more coefficients of provinces in Model 6 and Model 8 become significant and adding provinces variables in Model 6 and Model 8 significantly improve the model fit than Model 5 (LR chi-square=15.83, p<.01) and Model 7 (LR chi-square=36.80, p<.001), respectively. Among the 1975-1980 cohort, the predicted probabilities of attending college range from 6.08% in Liaoning province to 16.75% in Shanghai. Pairwise comparison results (not shown here) demonstrate that probabilities of attending college in either Shanghai or Henan are significantly higher than those in Liaoning.

Attending college after the expansion policy, the youngest cohort experienced substantial increases in the predicted probabilities of attending college in all five provinces, but the growth rates vary across provinces, which contributes to increasing inter-provincial disparities. Predicted probabilities of attending college range from 10.26% in Liaoning and 16.09% in Henan to 20.51% in Gansu, 25.65% in Guangdong, and 34.35% in Shanghai. Pairwise comparison results (not shown here) demonstrate that probabilities of college enrollment in either of Shanghai, Guangdong, or Gansu are higher than those of Liaoning; probabilities of college enrollment in either Shanghai or Guangdong are higher than those of Henan; probabilities of attending college in Shanghai are higher than those of Gansu.

Overall, results suggest increasing inter-provincial disparities over time. Eastern coastal provinces, such as Shanghai and Guangdong which are also economically developed regions, benefit more from the expansion policy, while Liaoning located in the northeastern and Henan in the central are disadvantaged in terms of higher education attainment over the past decades. To sum, the above results document both widening rural-urban gaps and rising inter-provincial disparities in college enrollment, particularly after the expansion policy. I now turn to compare the effects of rural *hukou* origins in college enrollment across five provinces.

Inter-provincial Variations in the Rural-urban Gap in College Enrollment

Given the provincial admission quotas, students only compete with their peers in their home admission districts for college slots rather than compete nationally. Therefore, in order to further investigate the effects of *hukou* type (rural versus urban) on college attainment in different admission districts (i.e., provinces), I run logit models predicting the probability of attending college separately for each of the five provinces. Specifically, I run two models for each province: the first model only includes the type of *hukou* as independent variable and the second model adds the control variables. Results are presented in Table 3.3.

In all five provinces, rural *hukou* origins are significantly and negatively associated with the probability of college enrollment. The negative effects of rural *hukou* origins on the probability of access to college become smaller after the adding of parental education, number of siblings, gender, and cohort variables. For the province of Liaoning, rural *hukou* holders are 87.6% (.124-1=.876, Model 9) less likely to enroll in college than their urban counterparts. After controlling for the effects of covariates, rural *hukou* holders are 79.1% (.199-1=.791, Model 10) less likely to go to college than urban peers. In other words, rural-urban disparities can be partly

explained by the variations in parental education and number of siblings between urban and rural *hukou* holders. This pattern holds in all other provinces too.

In terms of control variables, there are no significant gender differences in college enrollment in all but Gansu province, where females are 50.5% less likely than males to go to college. Yeung's (2013) analyzed data from the Chinese General Social Survey (CGSS) and found that "the gender gap in college enrollment disappears and even reverse itself" (p. 54). Results in Table 3.2 partly support her findings. However, these results at the national level mask the potential heterogeneity among different provinces. As Table 3.3 shows, females in Gansu province still significantly lag behind males in terms of college enrollment. Additionally, parental education positively influences children's access to college in all five provinces. For instance, in Henan province, with a one-unit increase in the highest year of schooling completed by parents, the probability of attending college increases by 14.8% (1.148-1=.148, Model 14). The number of siblings is significantly and negatively associated with the probabilities of college enrollment in all but Guangdong province. In Shanghai, for example, with one more sibling, the probability of attending college decreases by 27.7% (.723-1=-.277, Model 12). There is no significant ethnic difference in college enrollment within any of the five provinces.

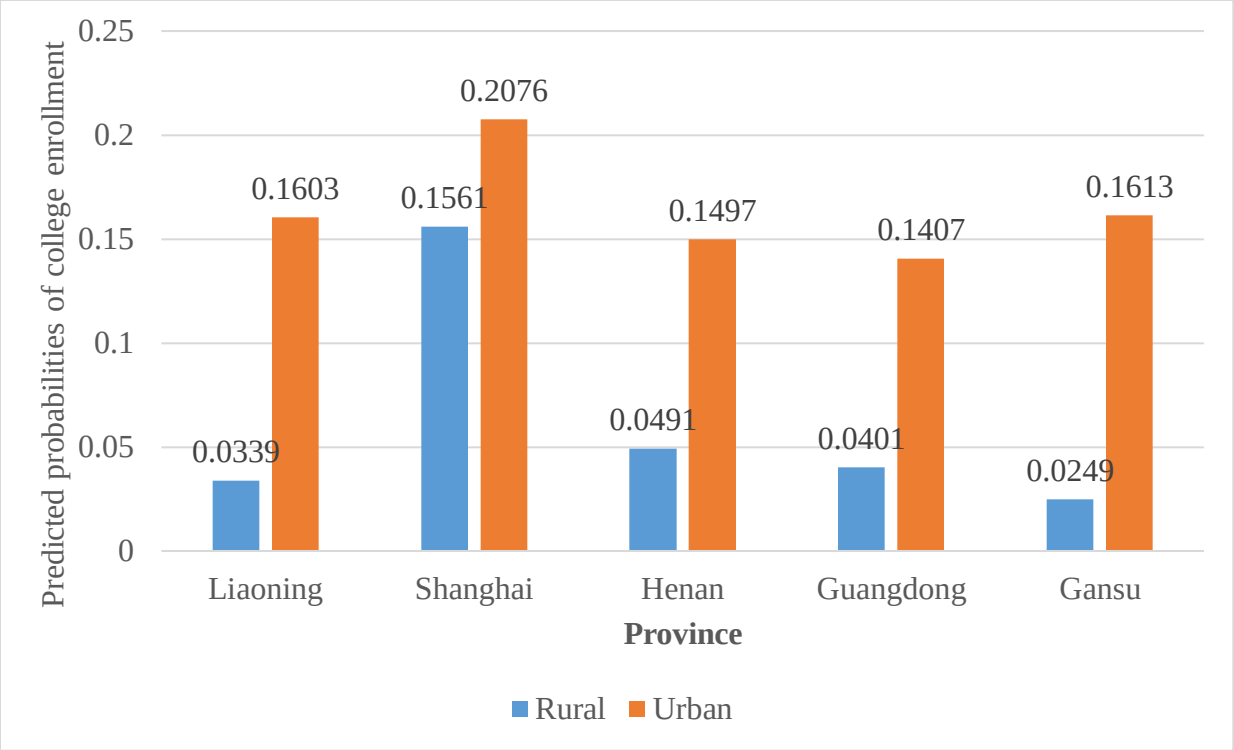

Figure 3.4 Predicted probabilities of college enrollment, based on Model 10, 12, 14, 16 and 18 in Table 3.3, by province and *hukou*. *Notes:* Variables other than province are set at their means.

To compare the effect sizes of rural hukou on college enrollment across five provinces, I calculate the predicted probabilities of college enrollment for rural and urban residents, holding other covariates at their means. As shown in Figure 3.4, the size of the rural-urban gap in college enrollment differs substantially across five provinces. In Liaoning province, holding all covariates at their average values, the predicted probabilities of college enrollment for urban *hukou* holders is 0.126 (0.160-0.034=0.126) greater than their rural peers. Similarly calculated, the urban-rural gap in the predicted probabilities of college enrollment is 0.052 in Shanghai, 0.101 in Henan and Guangdong, and 0.136 in Gansu. To sum, *hukou* origins play significant roles in individuals' higher education attainment across all five provinces, but the magnitude of this effect is greater in Gansu than in Shanghai. These results demonstrate the different level of

rural-urban disparities in college enrollment and highlight the value of analyzing educational inequality at the provincial level.

Table 3.3 Logit Regression Models of College Enrollment, by province

	LN (N=1,318)		SH (N=745)		HN (N=1,690)		GD (N=1,246)		GS (N=1,763)	
	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model16	Model 17	Model18
Rural *hukou*	.124***	.199***	.322***	.636*	.177***	.306***	.161***	.251***	.058***	.127***
	(.194)	(.219)	(.169)	(.215)	(.181)	(.210)	(.211)	(.243)	(234)	(.283)
Parents' highest year of school		1.174***		1.228***		1.148***		1.183***		1.204***
		(.029)		(.029)		(.024)		(.028)		(.026)
Female		1.076		1.207		.711+		.821		.483**
		(.201)		(.201)		(.181)		(.220)		(.231)
Number of siblings		.817*		.723*		.820**		.892		.773**
		(.089)		(.137)		(.074)		(.080)		(.088)
Ethnic minority (Ref: Han)		1.417		Omitted		.769		Omitted		.297
		(.332)				(.655)				(.831)
Cohort (Ref: 1960-1968)										
1969-1974		1.518		2.089*		1.204		2.549**		.973
		(.274)		(.322)		(.265)		(.359)		(.320)
1975-1980		1.358		2.979**		2.437**		2.742**		1.461
		(.330)		(.333)		(.265)		(.368)		(.342)
1981-1985		1.715		4.842***		1.838*		4.547***		2.147*
		(.338)		(.337)		(.293)		(.360)		(.347)
Constant	-.939***	-2.46***	-.381**	-2.96***	-.925***	-2.03***	-.862***	-2.71***	-.276	-1.23**
	(.120)	(.428)	(.111)	(.447)	(.147)	(.381)	(.170)	(.442)	(.200)	(.438)
Pseudo R-square	.140	.229	.053	.303	.077	.178	.086	.239	.148	.290
Log-likelihood	-387.21	-347.14	-419.82	-308.87	-490.75	-437.22	-356.97	-297.16	-359.91	-299.76
Model chi-square	126.47	206.60	46.49	268.39	81.71	188.77	66.77	186.40	125.04	245.33

Notes: LN=Liaoning; SH=Shanghai; HN=Henan; GD=Guangdong; GS=Gansu; +p<.1; *p<.05; **p<.01; ***p<.001;
Odds ratios reported in the table. Numbers in parentheses are standard deviations. Variables indicating ethnic minorities are omitted in models of Shanghai and Guangdong because of too small sample size of ethnic minorities in these two provinces (N=2 and 4, respectively).

Discussion

This study documented a widening rural-urban gap in college enrollment over 1980-2003 within five provinces in China, consistent with some studies examining the national level (Li, 2010; Wu & Zhang, 2010). The low participation rate of higher education before the expansion policy in China was very low (Yeoung, 2013), which was far away from the saturation point predicted by MMI. Urban residents were in a better position to catch the newly expanded opportunities to college because of the expansion policy, enlarging the rural-urban gap in college enrollment. The past 15 years witnessed a continuing expansion in higher education enrollment, and the gross higher education rate in China reached about 47% in 2017, a point that might be close to or even exceeds the saturation point. Moreover, in response to the growing rural-urban inequality in access to college, the central government has launched specific admission programs specifically towards high-achieving students in poor rural areas (Niu, 2017). Given all these changes happened after 2003, future research can utilize more recent data to capture the latest status of the rural-urban gap in postsecondary enrollment after 2003.

This study also contributed to a deeper understanding of inter-provincial disparities in college enrollment, a topic that is important yet understudied in existing literature. The decentralization reforms since the 1980s resulted in the provincial government playing a more important role in higher education administration and finance (Li, 2017). Consequently, economically developed provinces, such as eastern coastal provinces Guangdong and Shanghai, are more financially capable of building new institutions and enlarging enrollment of the existing institutions. Given the provincial quota system that largely favors local students, this study found that local people in Shanghai and Guangdong benefited more from the expansion than those in

Liaoning and Henan, contributing to increasing inter-provincial disparities in college enrollment. By comparing the variations in the opportunities to attend college between five provinces, this study highlights the essential role of the province of one's *hukou* in college enrollment. More research can be done to further explore the inter-provincial inequalities besides the five provinces examined in this study.

The size of the rural-urban gap in college enrollment varies substantially across the five provinces, with Shanghai having the smallest rural-urban gap while Gansu had the biggest. These results further highlight the necessity and merit of incorporating provinces in research on educational inequalities in Chinese higher education. The relative importance of factors associated with higher education opportunities varies across provinces. For example, females in Gansu still significantly lag behind males, while no gender differences were found in the other four provinces. This result holds important practical implications for policy-makers. Different provinces should have more specific policies to address the inequalities in the province. It is worth noting that rural-urban gap in higher education is certainly embedded in the broader socio-economic inequalities of the society, but higher education policies also shape who get access to college, such as the special admission policies that targeted at ethnic minority students and poor students from western, rural areas (Niu, 2017). Because of these policies, this study found that Gansu, one of China's poorest provinces, did a better job than Henan and Liaoning in terms of access to higher education.

One limitation of the study is that it looked at whether or not student enroll college, neglecting the qualitative difference in the type of college students attended. The CFPS data actually differentiate the two-year vocational or technical college from four-year universities.

However, the small sample size restricts me from doing such analyses.[2] Because of a number of national academic excellence initiatives since the 1990s, the Chinese higher education system constitutes a hierarchy within which institutions at different positions enjoy significantly different funding and prestige in terms of reputation in the labor markets (Huang, 2015). The inequalities in the type of universities might become more salient as the overall opportunities to college increased substantially, which merit more future research.

[2] Among those who enrolled in postsecondary education, 57.70% of urban-*hukou* holders (N=397) enrolled in higher vocational colleges, compared to 68.48% of rural-*hukou* holders (N=365). 42.30% of urban-hukou holders (N=291) enrolled in four-year institutions, compared to 31.52% of rural-hukou holders (N=168) ($p<.001$). These bivariate relationships suggest that urban-*hukou* holders are more likely to enroll in four-year institutions than rural-*hukou* holders.

Chapter 4: Rural-urban Gap in Academic Performance at a Highly Selective Chinese University: Variations and Determinants

Introduction

The Chinese postsecondary system witnessed a tremendous expansion over the last few decades. Since 1978, the gross enrollment rate of higher education (i.e., the percentage of student population in the higher education institutions relative to the total 18-22 population) has increased from 1.55-42.7% and the number of colleges and universities has increased from about 600 to almost 2,600 during 1978-2016 (Ministry of Education [MOE], 2016). Higher education is commonly viewed as the ticket for the managerial and professional job opportunities and the primary way for rural youth in China to achieve upward social mobility (Wu & Treiman, 2004). However, significant rural-urban gaps remain, and rural students continue to be underrepresented in four-year colleges and universities, especially at highly selective institutions (Wu, 2017).

Contemporary China is characterized by its sharp rural-urban divide in nearly all aspects of making a successful life in the society, such as income, education and health (Whyte, 2010). An extensive literature has highlighted the negative impacts of rural origins on college enrollment (Li, 2010; Wu & Zhang, 2010). In response to the growing public concern on educational inequality and social justice, the central Chinese government has implemented a number of polices to improve access to higher education institutions for rural students since 2008 (Niu, 2017). Access to college is just the first step toward upward social mobility for rural students. Academic success of rural students at urban universities requires more attention as it relates to students' success in college and later life outcomes, such as merit-based awards, fellowships, and likelihood of attending graduate schools, although Chinese higher education is

characterized by high completion rate, with more than 96 percent of students graduating within four years (Wu et al., 2016).

The current literature consistently documents the challenges and difficulties rural students face in social integration/adaptation, due to a lack of economic and cultural capital (Li, 2013; Xie, 2016). Rural students often find it difficult to socially integrate into the campus life that is dominated by the urban middle-class culture, and some of them even feel ashamed and inferior about their rural origins (Liao & Wong, 2019). However, when it comes to the rural-urban differences in academic performances, the results are mixed. (Gao, Liu & Fang, 2015; Postiglione et al, 2017; Quan & Bian, 2017). This study adds to the existing literature by specifically focusing on the variations in rural-urban gap in academic performance by fields of study and year of college.

Although there are a few studies have compared the academic outcomes between students of rural and urban origins, little is known about the potential rural-urban differences in participation in college campuses that are likely associated with students' academic performance. Research in the US higher education supports the view that students from different social class report different types and levels of academic and social engagement (Pike & Kuh, 2005; Yee, 2016). Compared to dominant class students, students from middle and subordinate class are more likely to have a part-time job and spend less time on social and recreational activities (Martin, 2012). In light of these studies in the US, this study also examines the time allocation of rural and urban students at a highly selective Chinese university and investigate the extent to which differences in time use contribute to the rural-urban gap in academic performance.

Literature Review and Hypotheses

Rural Students' Cultural Adaptation of Urban University Life

The rural-urban divide is a key force behind the social and educational stratification in China (Hao, Hu & Lo, 2014; Whyte, 2010). Though urban-rural disparities are common in many societies, the problem is most acute in China because of the Chinese household registration (*hukou*) system, which legally classifies the population into agricultural (rural) and nonagricultural (urban) types, with substantial variations in rights and privileges. The *hukou* system has historically always benefited urban-*hukou* population in public resources allocation, including access to good jobs, education, housing and health care (Chang & Zhang, 1999). For example, before a recent reform in 2012, which conditionally allows migrant children to take the national college entrance exam (*gaokao*) locally, the eligibility of attending public schools and *gaokao* was tightly controlled by the *hukou* system (Tam & Jiang, 2015). Migrant children without a local *hukou* were not eligible to take *gaokao* near where they live and study.

In response to an ever-increasing rural-to-urban migrant population, many reforms have been conducted since the *hukou* system was initiated in the 1950s, aimed at weakening the association between the type of *hukou* individuals hold and the social benefits they can enjoy. However, the dual urban-rural social structure this system has created will remain effective in the foreseeable future. One critical consequence is the urban-rural distinction in cultures, with rural culture representing an agricultural civilization while urban culture is characterized as an industrialized civilization (Hu, 2015). Urban culture is generally constructed as more advanced and superior while rural culture is considered backwards, rustic and outdated (Yu, 2015).

Cultural capital, or socially valued knowledge, skills or tastes, is a useful concept to analyze how social inequality is reproduced in college. Higher education institutions are never culturally neutral institutions and urban middle-class culture is transmitted and rewarded by

current Chinese universities (Hu, 2015). From a cultural capital perspective, individuals living in rural communities and educated in rural schools have less access to cultural resources rewarded by dominant institutions, such as universities mostly located in urban cities (Yu, 2015).

Drawing on Bourdieu's theories, Li (2013) investigated rural students' college experiences in an elite Chinese university and found rural students tended to experience high levels of anxiety and stress in their early university career, resulting from misfits between exiting habitus fostered in their earlier socialization and the elite institutional context. Because of the sharp cultural distinction between urban and rural communities with regard to dressing style, language used, interests and values, many studies demonstrated that students who were raised in rural areas had a hard time integrating into campus life upon college (Li, 2013; Liao & Wong, 2019; Yu, 2015).

Fields of Study and Rural-urban Gap in Academic Performance

Although cultural capital is a useful concept understanding rural students' cultural adaption to urban university life, the association between cultural capital and academic performance is not clear. In fact, international studies in Japan and South Korea showed how the effects of cultural capital on academic achievement looked differently from those in the U.S., primarily due to the extreme focus on standardized tests and curriculum in East Asian countries (Byun et al., 2012; Yamamoto & Brinton, 2010). The Chinese K-12 educational system is also featured with high levels of standardization and exam-oriented curricula. The evaluation criterion is primarily based on scores on standardized exams. Evidence even suggested that in South Korea, children's embodied cultural capital (measured by home participation in cultural activities and reading by parents) hurt academic achievement. Zhu (2018) contended that the role of cultural capital largely depends on the level of standardization and objectivity of the evaluation

criteria, as more standardized and objective the evaluation criteria were, the less important cultural capital would be.

Research shows that the degree of difference in academic achievement between urban and rural college students differed by fields of study. In a qualitative study, Wang and Li (2007) found rural students in fields that required extensive prior knowledge accumulation before college, such as Chinese, History and Engineering particularly lagged behind their urban peers. Rural students were found to be less adequately prepared for university study and performed lower than urban students in their first year of college, especially among students in engineering and technology fields (Niu, 2017). To sum, rural students seem to particularly lag behind than their urban peers in two fields of study. One is the humanities and arts, featuring diverse standards and subjective evaluations, and cultural capital exerts great effects on students' grade in these fields (DiMaggio, 1982). The other fields that rural students are more likely to underperform in are STEM fields, where knowledge is usually cumulative and sequential, and higher levels of academic preparations are required. Rural college students are found to be less well prepared for college-level studies than urban students, due to the significant variations in funding, facilities and quality of teachers between rural and urban K-12 schools (Hao, Hu, & Lo, 2014; Niu, 2017). Drawing on this body of research, I hypothesize that:

Hypothesis 1: The rural-urban gap in academic performance (defined by courses grades) differs significantly across fields of study, with more salient gaps in humanities and arts, and STEM than in other fields.

Rural-urban Gap in Academic Performance over the College Career

The extent of urban-rural differences in academic achievement depends on when in their college careers they are compared. For example, many studies found that although students from

western, rural areas or low-income families lagged behind their urban counterparts in their freshmen year, the gap became smaller the over college years (Niu,2017; Xiong & Yu, 2015). Analyzing administrative data on academic records of the 2004-2011 freshman cohorts, Niu (2018) found there were significant performance gaps between students from different regions in the early stage of university study, but much of these regional differences disappear by the end of the third year. There is also qualitative evidence showing that rural college students actively take advantage of various college experiences and accumulated cultural capital in college beneficial for their future development (Liao, 2017). These findings highlighted the essential role of college education in relieving the deficiency of rural students' disadvantages at their early career of college.

Using a five-year longitudinal data set of over 5,000 college students from fifteen institutions in Beijing, Xu (2018) confirmed an equalization effect of higher education in terms of reducing the gap in non-cognitive skills (e.g., self-efficacy and self-esteem) between poor and non-poor students. Her study found that while students of low-status origins lagged significantly behind in terms of non-cognitive skills at matriculation, compared to students of high-status origins, they grew more rapidly during college years. The disparity between these two groups narrowed over time and eventually disappeared by graduation (Xu, 2018). I draw on this literature to hypothesize that:

Hypothesis 2: There is a significant rural-urban gap in academic performance among first- and second-year students, and this gap becomes smaller or even disappear among third- and fourth-year students.

Astin's I-E-O Model

I draw on Astin's (1993) inputs-environment-outcome (I-E-O) model of change to further explore the origins of the variations in academic performance for rural and urban students. According to the model, student outcomes (e.g., academic performance) are influenced by factors including inputs (e.g., pre-college traits) and environment (e.g., collegiate experiences). Students do not come to college as a blank slate. Instead, they come to college with different aspirations and backgrounds, and these entry characteristics continue to affect students' participation in campus activities and learning outcomes. Extensive literature in the US has shown how race, gender, and class shape students college experiences and outcomes (e.g., Armstrong & Hamilton, 2013; Stuber, 2011). Given the long-standing rural-urban divide in the Chinese society, I hypothesize that

Hypothesis 3a: even studying at the same institution, rural and urban students differ significantly in their entry characteristics, such as family backgrounds and academic preparedness, and

Hypothesis 3b: These differences in entry characteristics are significantly associated with the rural-urban gap in academic performance.

In terms of the collegiate experiences that are associated with student outcomes, Astin (1984) used the term "student involvement" to refer "the amount of physical and psychosocial energy that the student devotes to the academic experiences" (p.518). Accordingly, the extent to which students can achieve certain developmental goals is directly influenced by the time and effort they devote to activities designed. In this sense, Astin (1984) noted that student time was the most precious institutional resource. College students have a lot to do on campus, such as

classes, clubs, parties, part-time jobs, etc. Time spent on different activities has different and sometimes contrasting effects on student learning outcomes. For example, the amount of spent working on campus is positively related to retention and academic learning. However, the amount of time spent working off campus often lead to negative outcomes (Astin, 1984; Arum & Roksa, 2011).

Students' time use is constrained by contextual factors. Although students want to engage in educationally beneficial activities (e.g., study-abroad programs), students from disadvantaged family backgrounds have difficulties affording these activities. Also, students without any financial support from their families are likely to spend more time on part-time employment to make ends meet, which takes their time and energy from activities that may be more helpful for their development. Analyzing data on more than 2,000 students across 24 American four-year colleges and universities, Arum and Roksa (2011) have shown students' time use is highly stratified by family income and race. In China's context, Zhu's (2018) analysis of college students from 15 colleges and universities in Beijing demonstrated that students from upper or middle-class families spent more time in social activities and less time in academic studies than working-class students. In light of these findings, I hypothesize that:

Hypothesis 4a: Rural and urban students differ significantly in their time use in college, and

Hypothesis 4b: These differences in time use are significantly associated with the rural-urban gap in academic performance.

Methods

Data and Sample

Data for this study came from the Chinese College Student Experiences Questionnaire (CCSEQ) survey of undergraduate students who enrolled in a highly selective university in Beijing in May 2018. CCSEQ was translated and adapted from the College Student Experiences Questionnaire (CSEQ), developed by Pace and Kuh (1998). Around 4,000 students were randomly selected and invited to participated in the survey. More than 3,500 students completed the CCSEQ survey, accounting for about 40% of the total undergraduate students in the institution. Given the focus of the study is to explore the rural-urban gap in academic performance in the context of mainland China, students from regions other than mainland China (e.g., Hong Kong, Macau, Taiwan, foreign countries) are excluded from the sample (N=62). Additionally, after excluding observations with missing data on the variables used in the analysis (N=61, less than 0.5 per cent of missing values for all variables), I obtain a final sample of 3,421 students studying at the highly selective institution in Beijing.

Variables

The dependent variable measured students' academic achievement up to the time they took the survey. Note that many Chinese universities still tend to use the original scores to evaluate students' academic performances, rather than converting them into different categories (e.g., A, A-, B+). The questionnaire asked: "What have most of your grades been up to now at this institution?" The answers range from "Below 60" to "90 or above". Because only 0.35% of the students choose the "Below 60", I combine it with the category of "60-69", resulting in a

four-category outcome variable: below 69, 70-79, 80-89, and 90 or above coded as 1 to 4 respectively.

A key independent variable is the rural/urban status before college, measured by students' residence place. Because China's redistributive policies generally favor large cities over small cities, urban areas over rural areas, residence location has become a critical factor driving educational stratification in China (Wu, 2011; Zhou et al. 1998). The questionnaire asked the residence place of individuals before college, with six categories: municipalities, provincial capital cities, prefecture-level cities or counties, towns, villages, and overseas. The rest five categories were recoded into two groups. Those who lived in municipalities, provincial capital cities, prefecture-level cities or counties were coded as urban. Those who lived in villages or towns were coded as rural (Hannum, 1999). Urban residents served as the reference group.

Another set of independent variables are related to students' time allocation in college. First, the CCSEQ asked students whether or not they worked on campus or off campus separately, and if so, how many hours they worked on campus or off campus every week. Both variables were originally measured as six-category variables, from "Do not work on campus/off campus", less than five hours, to more than 30 hours. The distribution of students' response shows that the majority of students (more than 70%) do not work on campus or off campus, and only a few students work more than five hours every week. Given that, the variables were recoded into three categories: Don't work on/off campus, work less than five hours, and work more than five hours. "Don't work on/off campus" serve as the reference group. Note that 9.21% of observations have missing values on the work on campus variable, and 14.03% missing value on work off campus variable. Considering that most of these observations with missing values on work on/off campus do not miss on other variables, to make the most use of the data available,

as is commonly done in literature (e.g., Niu & Wan, 2018), I coded those observations with missing values as a separate category, along with the three categories described above.

The CCSEQ also asked students how long the spent on academic activities outside of class (e.g., studying, writing, reading, lab work) and social activities (e.g., entertainment, clubs and organizations, social media) every week. Both variables were originally measured as six-category variables, ranging from *"5 hours or few"* to *"more than 30 hours".* After checking the distribution of responses, the variables were recoded into three categories: 0-10 hours (reference group), 11-25 hours, and more than 25 hours. Besides, there is an item in the CCSEQ specifically focusing on the time on interaction with faculty outside the classroom every week, originally measured as a five-category variable, ranging from less than one hour to more than eight hours. Again, given the distribution of responses, I recoded the variable into three categories: 1 hour or less (reference group), two-three hours, and more than three hours. Last, there is also information on students' sleep time every day, coded into three categories: less than six hours (reference groups), six to eight hours, and more than eight hours.

Prior literature suggests that participation in study-abroad, leadership experiences, and CCP membership are valuable accumulation of human capital during college (Ku, 2008; Xie, 2016; Xie & Zhang, 2016). Accordingly, in addition to time use, I also examined students' participation in study-abroad programs, assuming any kinds of leadership positions, and CCP membership for providing more information on what is happening for rural and urban student population. Because the relationship between these experiences and academic performance is unclear and not the focus of the study, variables on study-abroad participation, leadership positions and CCP membership are not included in the regression models predicting students' academic performance. In order to examine the variation of rural-urban gap in academic

performance by fields of study, fields of study are categorized into three groups: arts and humanities (reference group), STEM, social sciences and law (Hu & Wu, 2019).[3] I also include a variable indicating students' year of college, with first-year students as the reference group.

Finally, student entry characteristics are controlled, including gender, ethnicity, the type of high school attended, first-generation status, and parental occupation. Ethnicity is a dichotomous variable and Han serves as the reference group, in comparison to ethnic minorities. Males serve as the reference group, in comparison to females. The institution studied specializes in social sciences, and humanities and arts, although it also offer STEM programs. About 70% of students in this institution are females. Given that the type of high school attended is considered a powerful predictor of college access and in some degree can reflect students' academic preparedness before college (Ye, 2015), I distinguish three types of high schools: provincial-level key-point high school (reference group), district-level key-point high school, and regular and other high schools.

Based on information on parental education, I constructed a dichotomous variable indicating whether or not students are first-generation college students. This variable is coded as one if neither of the parents had a college degree and coded as 0 otherwise. Similarly, I crated a variable as proxy for family socioeconomic status (SES) according to information on parental occupation. This variable is coded as 1 (low SES) if neither of the parents is in managerial or professional positions (reference group), coded as 2 (middle SES) if either father or mother in managerial or professional occupations, and coded as 3 (high SES) if both parents are in

[3] Chinese students often have to decide their majors (or at least fields of study) when they apply for college. It is very difficult to change major once they are enrolled. Among those who have changed their major, it is more likely to change majors within the same fields (e.g., STEM) than change to a different fields of study.

managerial or professional positions. Note that the labels, low-, middle-, and high-SES, given to these categories may not reflect their accurate class positions in the society, rather, this variable reflects the relative positions of students at the institution.

Analytic Strategy

The analysis began with comparing the means of variables measuring students' entry characteristics, college experiences between rural and urban students. I then turned to the core of the analyses, which focus on students' academic performances. First, to examine the rural-urban differences in academic performances by fields of study and year of college, I compared the academic achievement for rural and urban students across fields of study and year of college. Given the ordered nature of outcome variable (i.e., academic performance), I then ran ordered logistic regression analyses to explore the extent to which rural-urban differences in academic performances are explained by associated background characteristics and time use during college. I present these findings as odds ratios (OR) with values greater than one associated with getting higher levels of academic performances.

Limitations

Before presenting the results, I want to remind the readers of the limitations of the analysis. First, this study attempts to compare the pattern of time use between rural and urban students and explore its link to academic performance. Although the CCESQ does include an item specifically focusing on time spent on interaction with faculty outside the classroom, some measures of students' time use are very broad. For example, the item related to time spent on social activities includes entertainment, participation in clubs and organizations, as well as time on social media. This broad categorization of students' time allocation might mask potential

variations between rural and urban students. Future research can adopt the time-diary methods (O'Meara et al., 2017) to further explore the rural-urban differences in time use.

Second, one of the central goals of the study is to examine the changes in the effects of rural/urban origins on academic performance over time. Due to the cross-sectional nature of the data, I can only compare the rural-urban gap in academic performance across years of college. Longitudinal research would be the ideal design given this research purpose, but I have to leave it for future studies. Finally, this is a single-institution study. Findings from this highly selective institutions located in Beijing will not be able to generalize to other types of institutions. The institution studied specialize in arts and humanities, and social sciences fields, and the majority of undergraduate students (around 70%) are females. Findings from this study may offer insights on rural students at selective universities which also specialize in arts and humanities and social sciences. Studies using data from multiple institutions are needed to explore how the institutional characteristics (e.g., selectivity, the percentage of rural students) might shape rural students' experiences and outcomes.

Results

Baseline Inequalities: Rural Students versus Urban Students

Table 4.1 compares rural and urban means across variables of entry characteristics. There are significant differences in family backgrounds. 83.50% of rural students are first-generation students, whereas only 27.15% of urban students are first-generation ($p<.001$). Socioeconomic status also notably differs between rural and urban students, advantaging the latter. 44.92% of urban students come from high-SES families (both parents have a managerial or professional occupation), compared to only 5.34% of rural students do ($p<.001$). In contrast, nearly 85% of

rural students in the sample come from low-SES families (neither parent has a managerial or professional occupation).

As mentioned above, the type of high school attended may play a role in shaping college readiness. Table 6 shows that urban students are more likely to attend provincial-level key-point high schools than their rural peers (59.34% versus 32.69%, p<.001), whereas rural students are more likely to graduate from regular or non-key-point high schools relative to their urban counterparts (27.02% versus 10.17%, p<.001). Additionally, there is a higher percentage of ethnic minority students in the rural sample than in the urban sample. There is no significant difference in the gender distribution among rural and urban students. 76.26% of students in the sample are female, which is consistent with the overall gender ratio of the institution. Overall, hypothesis 3a is supported: rural and urban students differ significantly in their entry characteristics, including family backgrounds and type of high school attended.

Table 4.1 Students' pre-college characteristics (percentages), by rural/urban origins

	Urban	Rural	Total
Female	76.81%	73.79%	76.26%
Ethnic Minority***	8.95%	17.31%	10.46%
First Generation***	27.15%	83.50%	37.33%
Family SES***			
Low	31.32%	84.79%	40.98%
Middle	23.76%	9.87%	21.25%
High	44.92%	5.34%	37.77%
Type of High School Attended***			
Provincial-level Key-point school	59.54%	32.69%	54.69%
Prefectural-level or County-level Key-point school	30.29%	40.29%	32.10%
Regular or other school	10.17%	27.02%	13.21%
N	2,803	618	3,421

Note: Significant intergroup differences are noted as ***p<.001; **p<.01; *<.05 (two-tailed tests)

Table 4.2 presents variables on college experiences for rural and urban students. Patterns of major choice and aspirations reflect the rural-urban differences in pre-college characteristics. Fields of study have received increasing scholarly attention as a mechanism of horizontal stratification of higher education given the worldwide higher education expansion (Marginson, 2016). Hu and Wu (2019), analyzing data from the Beijing College Students Panel Survey (BCSPS), found that students from socio-economically advantaged families were more likely to major in liberal arts fields rather than STEM fields. Partly in line with this recent study, in comparison to urban students, rural students in the sample were more likely to major in STEM fields and less likely to major in social sciences and law. However, almost the same percentage of rural and urban students major in humanities and arts fields. This pattern of major choice is far different from the case in the US where racial minorities and low-income students are less likely to major in STEM than other American students (Ma, 2015). Given the higher economic returns of STEM than other fields, rural students' higher tendency to major in STEM will contribute to alleviating the intergenerational income disparities (Hu & Wu, 2019).

In terms of participation in college activities, there are no significant differences in the likelihood of assuming any kind of leadership position between rural and urban students. Note that there is evidence showing the distinction between participation in student organizations (e.g., Student Union or Youth League) and interest-based clubs. Evidence suggested that rural students were less likely to participate in Student Union than urban students (Xie, 2016; Zhu, Shi, & Dong, 2015), whereas there is no significant difference in the participation in interest-based clubs or organizations (Xie, 2016). The item in CCSEQ does not differentiate these two types of organizations.

Participation in study abroad significantly differs between rural and urban students. 24.58% of urban students participated in study-abroad programs, compared to only 12.46% of rural students. Study abroad is one of the so-called high-impact educational practices that is believed to be associated with positive student learning outcomes (Kuh, 2008). However, research has established a link between students' social backgrounds with access to study-abroad opportunities (Netz & Finger, 2016). This pattern makes sense considering the economic and non-economic costs associated with studying abroad. Study-abroad destinations for Chinese students are usually western developed countries where the living expenses are much more expensive than in China. Students have to pay for the international travel and living expenses in foreign countries by themselves or their families, although there may be some grants by the institution that will cover a portion of the fees.

Chinese Communist Party (CCP) membership is viewed as an important political capital that brings monetary rewards (Appleton et al., 2009), and universities have become the primary Communist recruiting ground (McMorrow, 2015). Table 4.2 shows that in the sample, 31.72% of rural students are CCP members, compared to only 25.65% of urban students ($p<.01$). Analyzing data from a cohort of students who entered college in 2008 at 15 higher education institutions in Beijing, Xie and Zhang (2017) found that 65% of the students in their sample (N=2,223) applied for joining the Party during the first year of their college, and 75% of the students have ever applied during the four-year college career. Their analyses also indicated variations in who applied and who get accepted across personal and institutional characteristics. In general, rural students are more likely to apply for CCP membership, and they are also more likely to get accepted among those who apply compared to urban students. Interestingly, students in higher-status universities are less likely to apply for CCP membership, but they enjoy a much higher

acceptance rate once they apply, in comparison to students from low-status colleges or universities (Xie & Zhang, 2016).

Rural and urban students also differ significantly with regards to their aspiration after graduation. Overall, 92.66% of the students in the sample aspire to go to graduate school. Consistent with previous research (Quan & Bian, 2017), this aspiration also differs significantly between rural and urban students. Higher percentage of urban students aspire to attend graduate schools compared to rural students (93.47 versus 89.00%, $p<.001$). This rural-urban gap is even larger in the aspiration for overseas graduate schools (68.50% for urban versus 59.87% for rural, $p<.001$). Note that this is the aspiration for advancing their study after graduation rather than what happens in reality. In general, the majority of university graduates at highly selective institutions in China, like the one studied in this study, choose to go to graduate schools. According to the institutional annual report on graduates placement, 62.16% of the undergraduate graduate students in 2018 (N=2,048) have been admitted to domestic (43.31%) and overseas (18.85%) graduate schools.

Table 4.2 Students' college experiences (percentages), by rural/urban origins

	Urban	Rural	Total
Year in college			
Freshmen	23.12%	21.68%	22.86%
Sophomore	26.97%	29.61%	27.45%
Junior	28.61%	26.38%	28.21%
Senior	21.30%	22.33%	21.48%
Major***			
Humanities and Arts	30.43%	31.23%	30.58%
STEM	34.25%	43.37%	35.90%
Social Sciences and Law	35.42%	25.40%	33.53%
Leadership Position	43.67%	42.07%	43.38%
Communist Party Membership**	25.65%	31.72%	26.75%
Studied Abroad***	24.58%	12.46%	22.39%
Aspired to graduate school***	93.47%	89.00%	92.66%
Aspired to graduate school overseas***	68.50%	59.87%	66.94%

Note: Significant intergroup differences are noted as ***p<.001; **p<.01; *<.05 (two-tailed tests)

Figure 4.1 compares the funding sources of college expenses for rural and urban students. According to information on the institution's website, the annual tuition fees for art majors in 2017 is 8000-10,000 Chinese yuan (or 1,187-1,484 US dollars), 6000 Chinese *yuan* for foreign language majors and 4800-5400 Chinese *yuan*) for all other majors. To put these figures in context, the average annual disposable income of rural and urban households is 13,434 and 36,396 yuan, respectively.[4] In other words, the typical annual tuition fees (say 5000 *yuan*) accounts for 37.2% of the disposable income of an average rural household and 13.7% of the disposable income of an average urban household.

[4] The data can be found at https://www.statista.com/statistics/259451/annual-per-capita-disposable-income-of-rural-and-urban-households-in-china/

The CCSEQ provided information on how students met their college expenses. The item asked students the amount of support from the following sources: self (job, saving, etc.), parents, spouse or relatives, company support, fellowship or assistantship, students loans, and other sources. Figure 4.1 presented the percentage of students choosing "more than half" or "all or almost of all" on the above sources. 84.05% of urban students indicated that "more than half" or "all or almost of all" of their college expenses are supported by their parents, compared to only 55.50% of rural students ($p<.001$). In comparison to urban students, rural students are more likely to depend on themselves (9.54% vs. 3.56%, $p<.001$), fellowship or assistantship (11.81% versus 5.39%, $p<.001$), and student loans (5.67% versus 1.64%, $p<.001$) to cover most of their college expenses. These differences in how college expenses are met will likely influence the time use of rural and urban students. Now I turn to compare the time allocation in college.

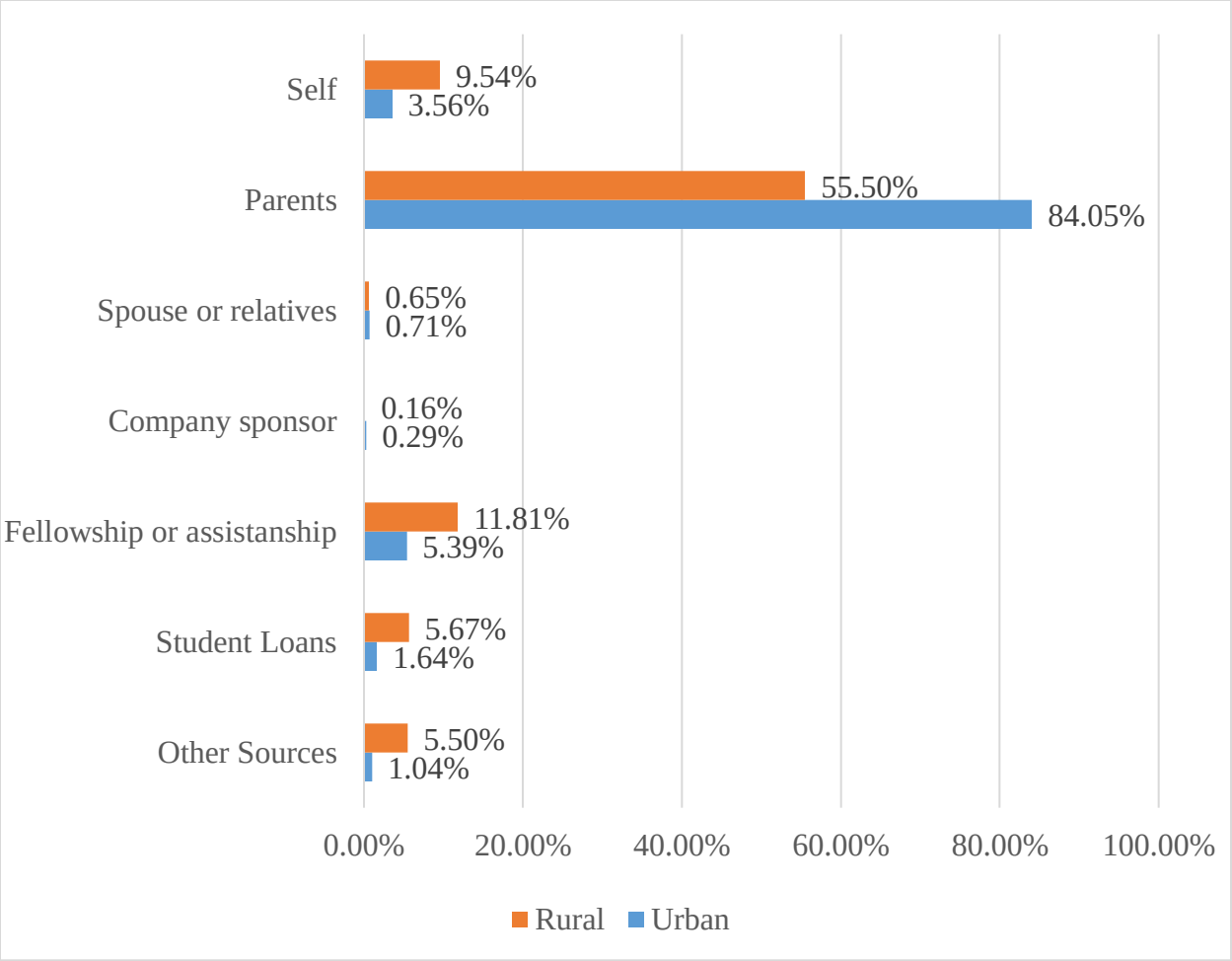

Figure 4.1 Percentage of students indicating that "more than half" or "all or almost all" of the college expenses come from various sources, by rural/urban origins

Table 4.3 presents students' time use in college. Rural and urban students differ significantly in the likelihood to work on campus and off campus. As Table 4.3 shows, 77.07% of urban students do not work on campus, compared to only 58.91% of rural students. Among those who work on campus, 15.09% of rural students work more than five hours weekly, compared to only 7.36% of rural students ($p<.001$). Similarly, in comparison to urban students, rural students are more likely to work off campus and tend to work longer hours. There is no significant difference in the weekly time spent on academic activities outside of class (e.g.,

studying, writing, reading, lab work) between rural and urban students. With regards to weekly time spent on social activities, there is also no significant difference. Social activities are defined very broadly in the CCSEQ, including making friends, entertainment, participating in clubs, as well as time on social media. Considering the well-established positive effects of student-faculty interaction on student development, CCSEQ has a question specifically focusing on the hours spent on interaction with faculty outside the classroom every week. Table 8 shows that urban students spent longer hours with faculty outside the classroom than their rural peers ($p<.001$). These results lend support to hypothesis 4a that rural and urban students differ significantly in their time use in college. Given these distinctions in entry characteristics and college experiences between rural and urban students, I now shift the focus to the academic achievement.

Table 4.3 Students' time use in college, by rural/urban origins

	Urban	Rural	Total
Work on campus***			
Don't work on campus	77.07%	58.91%	73.96%
Work on campus less than 5 hours weekly	15.57%	26.00%	17.42%
Work on campus more than 5 hours weekly	7.36%	15.09%	8.73%
Work off campus***			
Don't work off campus	77.35%	59.60%	74.36%
Work off campus less than 5 hours weekly	16.35%	25.86%	17.95%
Work off campus more than 5 hours weekly	6.30%	14.55%	7.68%
Time spent on academic activities every week			
0-10 hours	32.39%	32.36%	32.39%
11-25 hours	39.89%	42.72%	40.40%
More than 25 hours	27.72%	24.92%	27.21%
Time spent on social activities every week			
0-10 hours	24.05%	23.62%	23.98%
11-25 hours	45.32%	45.15%	45.29%
More than 25 hours	30.62%	31.23%	30.73%
Time spent on interaction with faculty every week***			
1 hour or less	66.18%	74.60%	67.70%
2-3 hours	21.33%	16.34%	20.43%
More than 3 hours	12.49%	9.06%	11.87%
Time spent on sleep every day			
Less than 6 hours	11.34%	8.90%	10.90%
6-8 hours	81.16%	83.82%	81.64%
More than 8 hours	7.49%	7.28%	7.45%

Note: Significant intergroup differences are noted as $^{***}p<.001$; $^{**}p<.01$; $^{*}<.05$ (two-tailed tests)

Rural-urban Gap in Academic Achievement by Fields of Study

To test hypothesis 1, I compared the rural-urban gap in academic achievement across fields of study. Table 4.4 shows that rural students in humanities and arts, and STEM fields lag their urban peers academically, whereas rural students in social sciences and law fields do as well as urban students. Overall, Hypothesis 1 is partially supported. As expected, in fields of humanities and arts where cultural capital assumes a stronger role, urban students perform

significantly better than rural students ($p<.01$). 96% of urban students majoring in humanities and arts receive 80 or above grades, compared to 90% of rural students.

However, contrary to Hypothesis 1, rural students also perform less well academically than their urban peers in the STEM fields. Cramer's V is a measure of the strength of association between rural/urban origins and academic achievement. The Cramer's V in STEM is even bigger than in humanity and arts, suggesting a bigger rural-urban gap in academic performances in STEM than in humanity and arts. In the total sample, only 72% of students have grades of 80 or above in STEM, compared to 95% in humanities and arts and 93% in social sciences and law. In other words, it is harder for STEM-majored students to get 80 or above grades than students in other fields. STEM programs usually have a relatively more standardized and rigid curriculum. Success college-level STEM courses depend more on student high school academic preparation (particularly in mathematics) than do other majors. Evidence suggests that even in the same university, rural students are less prepared for university study than their urban counterparts, which contribute to their disadvantages in STEM fields (Niu, 2017).

Table 4.4 Students' academic achievement, by rural/urban origins and fields of study

	Urban	Rural	Total	Chi2	P	Cramer's V
Humanity & Arts				15.209	0.002	0.121
69 or Below	0.35%	0.52%	0.38%			
70-79	3.28%	8.29%	4.21%			
80-89	77.02%	79.79%	77.53%			
90 or above	19.34%	11.40%	17.88%			
N	853	193	1,046			
Social Sciences and Law				1.778	0.62	0.039
69 or Below	0.71%	0.00%	0.61%			
70-79	6.26%	7.64%	6.45%			
80-89	73.33%	74.52%	73.50%			
90 or above	19.70%	17.83%	19.44%			
N	990	157	1,147			
STEM				28.771	<.001	0.153
69 or Below	5.10%	7.46%	5.62%			
70-79	18.96%	32.09%	21.82%			
80-89	62.69%	53.36%	60.34%			
90 or above	13.65%	7.09%	12.21%			
N	960	268	1,228			

Rural-urban Gap in Academic Performance by the Year of College

In addition to fields of study, the rural-urban gap in academic performance also vary significantly across the year of college. As Table 4.5 shows, among the first-year students, in comparison to urban students, rural students are more likely to get "69 or below " or "70-79", and less likely to get "80-89" or "90 or above" ($p<.001$). This significant rural-urban gap persists among the second-year students ($p<.001$), although the strength of the association between rural/urban origins and academic performance decreased, as indicated by the Cramer's V. However, the rural-urban gap in academic performance becomes non-significant among the third-year ($p=.072$) and fourth-year students ($p=.557$). These results support hypothesis 2 that

there is a significant rural-urban gap in academic performance among first- and second-year students and this gap becomes smaller or even disappear among third- and fourth-year students.

Table 4.5 Students' academic achievement, by rural/urban origins and college years

	Urban	Rural	Total	Chi2	P	Cramer's V
Year 1				37.5	<.001	0.219
69 or Below	2.16%	3.73%	2.43%			
70-79	10.65%	28.36%	13.68%			
80-89	70.52%	62.69%	69.18%			
90 or above	16.67%	5.22%	14.71%			
N	648	134	782			
Year 2				19.6	<.001	0.144
69 or Below	3.17%	4.37%	3.41%			
70-79	10.98%	21.31%	12.99%			
80-89	68.78%	65.57%	68.16%			
90 or above	17.06%	8.74%	15.44%			
N	756	183	939			
Year 3				7.01	0.072	0.085
69 or Below	1.75%	3.07%	1.97%			
70-79	8.85%	13.50%	9.64%			
80-89	71.20%	71.17%	71.19%			
90 or above	18.20%	12.27%	17.20%			
N	802	163	965			
Year 4				2.08	0.557	0.053
69 or Below	1.17%	2.17%	1.36%			
70-79	8.21%	10.87%	8.71%			
80-89	72.53%	68.12%	71.70%			
90 or above	18.90%	18.84%	18.23%			
N	597	138	735			

Pre-college Characteristics, Time Use, and Academic Performance

Since the results above show that first- and second-year rural students significantly lag behind their urban counterparts when it comes to academic performance, it is important to know

the extent to which this rural-urban gap can be attributed to their variations in pre-college characteristics and time use. Next, I turn to the determinants of students' academic achievement. I use ordered logistic regression to predict academic performance separately for first- and second-year students (Table 4.6), and third- and fourth-year students (Table 4.7).

In Model 1 of Table 4.6, there is a significant rural-urban gap in academic performance among the first- and second-year students (OR=.428, p<.001), controlling for the effects of fields of study. This rural-urban gap becomes non-significant (OR=.781, p>.05) when students' pre-college characteristics are added in Model 2. Students' pre-college characteristics are significantly associated with academic performance. Female students significantly outperform male students (OR=1.567, p<.001). Ethnic minority students significantly lag behind Han students (OR=.418, p<.001). Students from regular or other high schools lag behind students from provincial-level key-point high schools (OR=.460, p<.001). Students from high-SES families significantly outperform students from low-SES families (OR=1.476, p<.05). First-generation students significantly lag behind their non-first-generation peers (OR=.712, p<.05).

After adding variables on time use, but not controlling for pre-college characteristics, the rural-urban gap in academic performance persists in Model 3 (OR=.466, p<.001). Weekly time spent on off-campus work, social activities and sleep is not significantly associated with academic performance. Compared to students who do not work on campus, working less than 5 hours a week is associated with lower grades of academic performance (OR=.732, p<.05). There is no significant difference between students who do not work on campus and those who work more than 5 hours on campus. Students who study 11-25 hours (OR=1.524, p<.001) or more than 25 hours (OR= 2.788, p<.001) tend to have higher academic performance compared to students who study less than 10 hours every week. Finally, students who spend 2-3 hours interacting with

faculty outside the class tend to have higher academic performance than students who spent less than 1 hour interacting with faculty outside the class.

Variables on both pre-college characteristics and time use are added in Model 4 of Table 4.6. Urban/rural origin is not significantly associated with academic performance (OR=.797, p>.05). The entry characteristics that are significant in Model 2, including gender, ethnicity, type of high school, family socioeconomic status and first-generation status, remain significant in Model 4 after adding variables on time use. Except for time spent on on-campus work, all the time use variables that are significant in Model 3, including time spent on academic activities and time spent on interaction with faculty outside the class, remain significant in Model 4.

Considering these results together, rural-urban gaps in academic performance disappear when pre-college characteristics are controlled but remain significant when only the time use variables are controlled. This pattern suggests that the rural-urban gaps in academic performance at the early stage of college can be largely attributed to differences in pre-college characteristics rather than college experiences. Overall, hypotheses 3b is supported: disadvantages in entry characteristics of rural students are associated with their poorer academic performance compared to urban students. However, hypothesis 4b is rejected that although rural and students differ significantly in their time use (Hypothesis 4a), these differences are not the major reason contributing to the rural-urban gap in academic performance.

Table 4.6 Predicting the academic performances of first- and second-year students

	Model 1	Model 2	Model 3	Model 4
Rural	0.428***	0.781	0.466***	0.797
	(0.056)	(0.121)	(0.0633)	(0.125)
Major (Ref: Arts & Humanity)				
STEM	0.351***	0.366***	0.344***	0.366***
	(0.046)	(0.049)	(0.046)	(0.050)
Social Sciences and Law	0.877	0.837	0.903	0.872
	(0.112)	(0.109)	(0.118)	(0.116)
Female		1.567***		1.561***
		(0.191)		(0.192)
Ethnic Minority		0.418***		0.416***
		(0.070)		(0.071)
High School Type (Ref: Provincial-level key-point)				
County-level or Prefecture-level Key-point		0.807		0.810
		(0.095)		(0.096)
Regular or other		0.460***		0.475***
		(0.075)		(0.078)
Family SES (Ref: Low)				
Middle SES		1.130		1.153
		(0.180)		(0.186)
High SES		1.476*		1.425*
		(0.224)		(0.218)
First-Generation		0.712*		0.730*
		(0.103)		(0.108)
Work on Campus (Ref: Not work)				
Less than 5 hours			0.732*	0.785
			(0.115)	(0.125)
More than 5 hours			1.112	1.246
			(0.288)	(0.320)
Missing			0.914	0.910
			(0.236)	(0.239)
Work off Campus (Ref: Not work)				
Less than 5 hours			0.853	0.889
			(0.155)	(0.164)
More than 5 hours			0.878	1.100

			(0.268)	(0.339)
Missing			0.979	1.044
			(0.168)	(0.181)
Academic Time (Ref: 0-10 hours)				
11-25 hours			1.524***	1.550***
			(0.184)	(0.189)
More than 25 hours			2.788***	2.605***
			(0.402)	(0.379)
Social Time (Ref: 0-10 hours)				
11-25 hours			1.017	0.994
			(0.134)	(0.132)
More than 25 hours			0.801	0.781
			(0.115)	(0.113)
Time with Faculty outside classroom (Ref: 1 or less than 1 hour)				
2-3 hours			1.611***	1.548**
			(0.215)	(0.209)
More than 3 hours			1.101	1.210
			(0.202)	(0.221)
Sleep Time (Ref: Less than 6 hours)				
6-8 hours			1.040	1.064
			(0.162)	(0.167)
More than 8 hours			0.660	0.712
			(0.199)	(0.213)
N	1,721	1,721	1,721	1,721

Note: Odds ratios are presented; Standard errors in parentheses; Ref represents reference group; *p<.05, **p<.01, ***p<.001.

Next, I turn to determinants of academic performance for third- and fourth-year students. There is no significant rural-urban gap in academic performance for third- and four-year students. Moreover, as Model 2 and Model 4 demonstrates, there are also no significant gender and ethnic differences in academic performance. First-generation status is also not significantly associated with academic performance. Recall that these entry characteristics are significant predictors of first- and second-year students' academic performance. These results seem to

suggest that as students advance in their college career, the role of pre-college characteristics decreases. However, students' family socioeconomic status and type of high school attended are still significantly associated with third- and fourth-year students' academic performance.

More time uses variables are significant for third- fourth-year students than for first- and second-year students. For example, in Model 4 of Table 4.6, time spent on on-campus work is not significantly associated with academic performance for first- and second-year students. However, in Model 4 of Table 4.7, students who work less than 5 hours significantly lag behind students who do not work on campus in terms of academic performance. Also, for first- and second-year students, there is no significant difference in academic performance between students who spend more than 3 hours interacting with faculty outside the class every week and those who spend less than 1 hour. But for third- and fourth-year students, students who spend more than 3 hours interacting with faculty outside the class significantly outperform students who spend less than 1 hour.

There are also some predictors that are significant for all students across the college years. Attending provincial-level key-point high schools, raised in high-SES families, and more time spent in academic activities are associated with a higher level of academic performance.

Table 4.7 Predicting the academic performances of third- and fourth-year students

	Model 1	Model 2	Model 3	Model 4
Rural	0.803	1.213	0.860	1.209
	(0.113)	(0.198)	(0.126)	(0.201)
Major (Ref: Arts & Humanity)				
STEM	0.243***	0.227***	0.221***	0.212***
	(0.035)	(0.034)	(0.033)	(0.032)
Social Sciences and Law	1.026	0.936	0.990	0.923
	(0.134)	(0.124)	(0.132)	(0.125)
Female		0.987		1.061
		(0.135)		(0.149)
Ethnic Minority		0.722		0.710
		(0.127)		(0.126)
High School Type (Ref: Provincial-level key-point)				
County-Level or Prefecture-level Key-point		0.685**		0.744*
		(0.084)		(0.093)
Regular or Other		0.478***		0.508***
		(0.082)		(0.088)
Family SES (Ref: Low)				
Middle SES		1.037		1.047
High SES		1.704***		1.620**
		(0.273)		(0.264)
First-Generation		0.962		0.979
		(0.141)		(0.146)
Work on Campus (Ref: Not work)				
Less than 5 hours			0.651*	0.702*
			(0.109)	(0.118)
More than 5 hours			0.790	0.865
			(0.153)	(0.170)
Missing			0.562**	0.582*
			(0.118)	(0.123)
Work off Campus (Ref: Not work)				
Less than 5 hours			0.958	1.019
			(0.166)	(0.178)
More than 5 hours			1.398	1.495
			(0.293)	(0.317)
Missing			1.008	1.037

			(0.181)	(0.188)
Academic Time (Ref: 0-10 hours)				
11-25 hours			1.420*	1.360*
			(0.195)	(0.188)
More than 25 hours			2.665***	2.561***
			(0.388)	(0.376)
Social Time (Ref: 0-10 hours)				
11-25 hours			0.976	0.981
			(0.136)	(0.138)
More than 25 hours			0.834	0.840
			(0.125)	(0.127)
Time with Faculty outside classroom (Ref: 1 or less than 1 hour)				
2-3 hours			1.617***	1.569***
			(0.218)	(0.214)
More than 3 hours			1.523**	1.459*
			(0.241)	(0.234)
Sleep Time (Ref: Less than 6 hours)				
6-8 hours			0.899	0.852
			(0.176)	(0.168)
More than 8 hours			0.836	0.799
			(0.209)	(0.201)
N	1,700	1,700	1,700	1,700

Note: Odds ratios are presented; Standard errors in parentheses; Ref represents reference group; *p<.05, **p<.01, ***p<.001.

Discussion

Academic success is of particular importance for rural students in college. Due to the disadvantages in social activities, one of the coping strategies that many rural students adopt is to focus more on their studies in order to gain confidence (also see Qin & Li, 2014). Rural students usually attach great significance to academic success in college and establish the link between academic success to future upward mobility (Liao & Wong, 2019). Yet, the results of research on rural students' academic performance are inconsistent. Postiglione and colleagues (2017) found no significant difference in academic achievement acquired by rural and urban students in an

elite Chinese university with respect to average grade points over four years. Also focusing on students at an elite university in China, Quan and Bian's (2017) study even documented that rural students outperformed urban students academically.

Drawing on data of undergraduate students at a highly selective university in Beijing, this study advances this line of research in two important ways. First, by investigating variations of the rural-urban gap in academic performance by field of study and year of college, this study sheds light on the heterogeneity among rural students. Results show that rural students academically lag behind their urban counterparts in humanities and arts, and STEM, but not in social sciences. Lack of cultural capital and poor academic preparedness are believed to contribute to rural students' disadvantage in humanities and arts, and STEM (Niu, 2017; Wang & Li, 2007). Moreover, while there is a significant rural-urban gap in academic performance among first- and second-year students, this gap disappears among third- and fourth-year students. The results are consistent with findings from longitudinal research on a cohort of college students (Xu, 2018).

Second, this study adds to the current literature by examining the determinants of the rural-urban gap in academic performance. Drawing on Austin's (1993) IEO, I compared the differences in entry characteristics and time use between rural and urban students. Results demonstrated that in comparison to urban students, rural students were disadvantaged in family backgrounds, and were less likely to attend key-point senior high schools. In terms of time use, rural students spend more time on part-time employment in on- and/or off-campus job than urban students, partly due to the financial constraints, as evidenced by the significant variations in funding sources between rural and urban students. In addition, rural students spend less time interacting with faculty outside the classroom compared to their urban peers.

The rural-urban gap in academic performance among first- and second-year students can be more explained by students' variations in entry characteristics than differences in time use between rural and urban students. After controlling for students' entry traits, particularly family backgrounds and type of high school attended, the effects of rural/urban origins on academic performance become non-significant. These results suggest that rural students' academic disadvantages at the early career of their college to a large extent just reflect the rural-urban inequalities in socioeconomic status and access to key-point senior high schools. Notably, the effects of many pre-college variables on academic performance, including rural/urban origins, gender, ethnicity, and first-generation status, become non-significant among third- and fourth-year students.

For many students raised in rural communities, attending college provides them with the opportunity to move to the urban cities and offers access to various educational and cultural resources that would not be available otherwise. Unlike college students in the US who are only required to live on campus for the first few semesters, Chinese college students usually live in the assigned dormitory with the same group of roommates for four years (4 to 8 students share a room). When exposed to the same environment, rural students gradually catch up with their urban counterparts (Liao, 2017; Xu, 2018). In this sense, Chinese colleges and universities play a role in levelling the field by alleviating rural students' disadvantages associated with family backgrounds and K-12 education, but this equalization effect may be limited to the few fortunate rural students who successfully secure a place in universities.

Implications

One important implication of the results for college educators is to pay special attention to rural students' transition to college. It is not only a geographical journey from their hometown to the metropolis where the universities usually locate, but also involves enormous psychosocial and cultural transitions (Liao & Wong, 2019; Yu, 2015). It is common in U.S. colleges and universities to have first-year seminars and other programs specially targeted historically underrepresented first-year students to help them finish the transition process. However, as far as I know, such practices are not widely accessible in Chinese higher education institutions. Although the Chinese government and universities have launched special admission policies to address the underrepresentation of rural students in higher education (Niu & Wan, 2018), not enough attention has been paid to rural students experiences inside the college gates. This study also highlights the heterogeneous experiences of rural students at different stages of their college career and across various fields of study, which will require different kinds of support from the institution.

Although due to data limitation, this study does not specifically focus on rural students who get admitted through the special admission policies, the findings might shed light on the debate over these policies. While the public generally agree to give some preferential treatments for rural students from impoverished areas in selective college admissions, some doubt that the students who get admission because of the preferential treatment will succeed in selective universities. Findings from this study partly address this concern in the sense that students from disadvantaged backgrounds can benefit more from college experiences (Brand & Xie, 2010) and catch up quickly with their peers from more advantaged social origins.

Chapter 5: Overall Discussion and Conclusion

In the past two decades, like many other countries, China has witnessed a dramatic expansion of its postsecondary education system. China's expansion of higher education occurred very rapidly and was primarily driven by the expansion policy. In 1999, the central government decided to enlarge tertiary education, with the intent to reach a gross enrollment rate of 15 percent by 2010[5]. The expansion policy was proposed during the Asian financial crisis to promote economic growth, with the purposes of facilitating domestic consumption on tuition and industries related to an enlarging higher education system and providing a more skilled labor force (Yeung, 2013). The policy has resulted in a great leap in Chinese higher education. Annual college enrollment grew from 1.1 million in 1998 to 7.4 million in 2015 (Ministry of Education, 2016), such that the gross higher education enrollment rate increased from 9.8% in 1998 to 40% in 2015 (Ministry of Education, 2016).

This radical expansion has far-reaching consequences on Chinese higher education and society in general with regard to quality of undergraduate education, university graduate unemployment, and China's economic growth (Shan & Guo, 2016; Wang, 2016; Wang & Liu, 2011). This dissertation examines the implications of the expansion for equity in college enrollment across different social groups. With the college expansion policy in 1999, the overall opportunity for higher education has substantially increased for all students. However, students do not benefit from this policy homogeneously with regard to the increase in opportunity to higher education. Students from certain social groups may benefit more from the expansion than other students do.

[5] In China, the gross enrollment rate of higher education refers to the percentage of people who are currently enrolled in higher education institutions among the 18-22 population.

Summary of Findings

Findings from Chapter 3 shows that the rural-urban gap in college enrollment within five provinces (i.e., Liaoning, Gansu, Henan, Shanghai, and Guangdong) widened over 1980-2003, particularly after the expansion policy was implemented in 1999. The findings suggest that urban residents who had enjoyed more opportunities for higher education benefited more from the expansion policy, contributing to a widening rural-urban gap. Tam and Jiang (2015) attributed this increasing rural-urban gap to the urban-biased expansion process. They pointed out that much of the enrollment expansion has been absorbed by the higher vocal colleges, which largely concentrated in urban areas. Because vocational higher education colleges are often more expensive but less rewarded than four-year institutions, they are primarily the option for low-achieving urban students who can afford it (Tam & Jiang, 2015; Li, 2019). Therefore, lower-achieving urban students benefit most from the expansion of the vocational colleges who would have no access to higher education without the expansion.

Chapter 3 also documents increasing inter-provincial disparities in college enrollment after the expansion policy. Local residents in Shanghai and Guangdong benefited more from the expansion than those in Liaoning and Henan. China began to establish Special Economic Zones (SEZs) along the eastern coastal provinces in 1979 when it re-opened the door to the world. These SEZs quickly grew into major urban centers, which led to a growing regional economic inequality between the eastern provinces and central and western provinces (Whyte, 2010). Along with the enrollment expansion since the late 1990s, China's higher education moved from a highly centralized system to a decentralized system, where the provincial governments have enjoyed greater authority and responsibility in the administration of HEIs. Consequently, economically developed provinces, such as eastern coastal provinces Guangdong and Shanghai,

are more financially capable of building new institutions and enlarging enrollment of the existing institutions (Li, 2017).

One distinguishing feature of Chinese higher education expansion is that it happened before the senior high school expanded significantly (Wu & Zhang, 2010). In 1999, the rate of progression from milled school to high school was 50.0%, whereas the rate of transition from high school to college achieved 63.8%. Given that, it is not surprising that as existing studies focusing consistently find that the biggest inequality happens at the transition from middle school to high school rather than the transition from high school to college (Tang, 2016; Pang, 2016). After completing the nine-year compulsory education, many rural students in western provinces drop out of school after middle school graduation and others attend vocational high school, which is primarily designed for technical and vocational training, with low probabilities of enrolling into college. For those who attend academic high schools, the distinction between key-point high schools versus ordinary high schools also matters for the chance of going to college (Tang, 2016; Pang, 2016).

The key-point high schools are usually located in urban areas, recruiting best graduates from middle schools in that districts it located, equipping with better and rich educational resources, such as qualified teachers, books, computer labs, etc. Many studies (e.g., Wu, 2013; Tang, 2016) have shown the important role of key-point high schools in Chinese higher education stratification. Entering key-point high schools means a significantly greater chance of getting enrollment in colleges. Tang (2016) named this phenomenon as "lost at the starting point," suggesting that the inequality in higher education is actually a cumulative effect of the inequality in from elementary school to high school.

The impacts of attending key-point high schools continued inside the college gate. Findings from Chapter 4 show that the type of high schools attended is significantly associated with students' academic performance across students at different stages of college. Rural students are significantly less likely to attend provincial-level key-point high schools. This difference in high school education, combined with rural students' disadvantages in family backgrounds, leads to a significant rural-urban gap in academic performance among the first- and second-year students. This rural-urban gap in academic performance, however, does not exist among the third- and fourth-year students. These findings echo the evidence form longitudinal research showing that students from disadvantaged backgrounds grew much more quickly during college years and benefit more from college experiences (Brand & Xie, 2010; Xu, 2018).

Findings from Chapter 4 highlight the importance of the first-year and transitions experiences of rural students. Attending college is not only a geographical travel from rural communities they had lived to the cities, but also a travel across the cultural and class boundaries. Rural students' disadvantages in academic performance at the early career of college can be largely attributed to the pre-college characteristics, particularly family backgrounds and the type of high school attended. Higher education educators in China should provide more support to facilitate rural students' transition to college. Chapter 4 also documented that the rural-urban gap in academic performance differed significantly across fields of study, suggesting that rural students in different fields may face different challenges and therefore need various supports.

Implications

Given the increasingly important role of a college education in securing a middle-class occupation in the modern society, getting access to universities is not only critical to rural

students themselves and their families to move socially upward, but also vital for the social justice as a whole. The notion "impoverished families can hardly nurture rich sons" has raised hot debate in public opinions (Xu, 2018). The government has realized these concerns and initiated a lot of programs to close the urban-rural gap in postsecondary education access and attainment. Drawing on prior studies and policy initiatives, this section discusses policies that hold the potential to reduce the barriers facing rural students in getting a college degree in China.

Popularizing High School Education

One unique context of China's higher education expansion is that it happened when the high school education was far from saturation. In 1999, when the expansion policy was initiated, only half of the middle school graduates could successfully proceed to high school, whereas more than 60% of high school graduates could attend college, increasing from 46.1% in 1998 (Wu & Zhang, 2010). Studies looking at various stages of educational transition have consistently documented that progression from middle school to high school witnessed the largest gap between groups with different *hukou* origin. In other words, if a rural student could make it to high school, they would enjoy a high probability of going to college.

Some have advocated for extending the nine years of compulsory education to 12 years. China implemented the Compulsory Education Law in 1986, which guaranteed school-age children the right to attain at least nine years of education, including six-year primary education and three-year secondary education. Considering the remarkable social transformations in China over the past three decades, many people think it is the time to extend the year of compulsory education. Yeoung (2013) maintained that "making high school education free and compulsory will be a critical step in equalizing access to tertiary education in China in the long run" (p. 75).

At the end of 2017, the MOE made a statement in response to the rumors that implied China was set to extend the years of compulsory education, stating that "it is not the right moment to include senior high school with the nine-year compulsory education. The primary mission of senior high school education is to speed up its popularity" (Global Times, Dec 2017). Promoting universal access to high school is indeed critically important to facilitate rural students' pathway to college, not necessarily through making high school education compulsory. Many special admission programs have been launched to improve the access to first-tier universities for students from poor, rural areas. In 2012, 10,000 slots for China's first-tier national universities were saved exclusively for applicants from poor rural areas, and this figure jumped to 50,000 every year in 2014 afterwards (Zha, 2015). However, the fact that a large number of rural students dropped out from high school will limit the effects of these programs. More efforts should be made to help rural students get access to and succeed in high school. Therefore, making the opportunity to senior high schools more equitable will be a critical step to close the opportunity gap in higher education between people of rural and urban origins, and living in different provinces.

Equalizing the Distribution of Educational Resources

The geographic disparity in the distribution of educational resources has been noted in China for a long time (Hannum & Wang, 2006; Liu, 2015; Zhang & Karbur, 2005). China is characterized by sharp urban-rural and regional inequalities in a host of economic and human development indicators (Zhang & Karbur, 2005). In education, economically developed provinces, mostly located in the eastern coast, have universalized nine years of compulsory education in 2000, whereas nearly 1 in 10 primary school graduates failed to proceed to secondary school in many poor western provinces (Hannum & Wang, 2006). Using a subsample

from the 2000 China census data, Hannum and Wang (2006) confirmed a significant association between the province of birth and years of schooling, with western provinces being most disadvantaged, such as Qinghai, Guizhou, Yunnan, Gansu, Ningxia, and Tibet. Among the 20-24 age group at the census time, the gap in the years of schooling between people from Beijing and Qinghai was more than five years. The administrative and financial decentralization reforms in school systems from the 1980s contributes to increasing regional disparities in funding for schools as it is more closely associated with local economic conditions (Hannum & Wang, 2006; Zhang & Karbur, 2005).

At the postsecondary level, the distribution of higher education institutions, including the Project 211 and Project 985 institutions is highly skewed. The predominantly majority of these elite institutions were located in Beijing, Shanghai, and other eastern provinces. Beijing accounted for 25% of all the Project 985 institutions and Shanghai accounted for another 13%, whereas there were no institutions listed in Project 985 in western provinces like Qinghai, Ningxia, Xinjiang, Guangxi, Guizhou, Yunnan, and Tibet. Moreover, in 2011, nearly 80% of the Project 211 institutions and more than 77% of all higher education institutions that provide four-year undergraduate programs were concentrated in eastern provinces (Liu, 2015).

Considering that most of the Project 985 institutions are national universities, which are directly under the Ministry of Education and other central-government Ministries or Commissions, they ought to allocate their admission quotas equally to applicants across the country. However, this is not the case in reality. On the contrary, elite universities, like other regular higher education institutions, recruit disproportionate number of students from home provinces as they receive funding from both central and local governments. For example,

out of the 1519 freshmen of Peking University in 2009, 272 of them from Beijing, 91 from Shandong, and 65 from Shanghai, compared to 18 from Qinghai, 17 from Ningxia, and 5 from Tibet (Liu, 2015). Research has provided evidence on a systematic pattern of hometown-based admission and harsh discrimination against out-of-province college applicants (Li, 2017).

The uneven distribution of higher education institutions, combined with the tendency of institutions recruiting more student from home provinces, resulted in the big gaps in the opportunity of attending college across provinces. In response, first and foremost, facilitating the development of higher education in western provinces, including building some new institutions and improving the national competitiveness of existing institutions, would be a critical step in improving access to college for student in western rural areas. Since 2001, the government has initiated the counterpart support programs that link the elite universities in eastern provinces with the universities in western areas, facilitating their collaboration between student training, and research, and faculty development (The Paper, 2018). Thirteen central and western provinces host no national universities, and in 2018, the Ministry of Education decided to jointly build and fund one university with local government in each of the 13 provinces (The paper, 2018). In addition, as mentioned above, a number of special admission programs have been launched to help students from improvised provinces get into elite colleges (Zha, 2015).

Creating Second Chances

Community colleges in the U.S. are often considered as a "second-chance" institution for "students who have failed in previous educational endeavors or who have stopped short of reaching a desired level of educational attainment" (Quinely & Quinley, 1998, p.8). However, such a second chance does not exist in the Chinese higher education system. China's short-cycle and technical colleges are to some degree equivalent to American's community college in that

both of them provide programs that are usually shorter than a four-year undergraduate program and more focused on vocational and technical training.

Community colleges host a large number of college students in the U.S. and keep students in the educational system, with the potential of transitioning to a four-year institution, although the success rate is not as high as many people have expected (Goldrick-Rab, 2010). In China, no such transfer channel exists between short-cycle and technical colleges and four-year institutions. Considering the relatively lower economic returns to technical colleges relative to a bachelor's degree (Zhang et al., 2005), many high school graduates in China who failed in *gaokao* were not willing to attend a short-cycle or technical college if they could not attend a four-year college. Therefore, many of them might just leave school and find a job. Creating a second chance and establish the transfer opportunity will not only maintain more students in the school system but also have the potential to reduce the high pressure associated with *gaokao*. Higher vocational colleges can proactively seek partnership relationships with four-year institutions to establish the transfer channel. Four-year institutions should also be open to transfer students from higher vocational colleges who demonstrate great potential for academic success.

Summary of Chapter

This concluding chapter revisited the major findings from the two empirical studies of the dissertation. Despite the rapid expansion, rural-urban gaps and inter-provincial disparities in college enrollment persist, and even widened during the periods examined in the dissertation. Drawing on prior literature, this chapter also provided potential explanations for the increasing inequalities between rural versus urban residents, and people in different provinces. Finally, this chapter touched upon the policy implications of the findings, focusing on the possible ways to reducing the enduring inequalities of opportunity in Chinese higher education.

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