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**China's Higher Education Expansion  
and Social Stratification**

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## China's Higher Education Expansion and Social Stratification

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### ABSTRACT

This paper explores the extent to which the impact of family background and gender on one's access to college education changed after the 1999 college expansion policy in China. The analysis is based on data from the Chinese General Social Survey (CGSS) collected between 2005 and 2008. Results show that, although the expansion has been an equalizing force in that it allows more youths of different characteristics to attain college education than in pre-reform regime, intergenerational inequality persisted. Youth from more socioeconomically advantaged families maintain their edge by obtaining more and higher quality education than others. The influence of family background, as indicated by parents' education, becomes stronger on youths' access to academic colleges after the college expansion policy. These findings support the Maximum Maintained Inequality (MMI) and Effectively Maintained Inequality (EMI) hypotheses. In the Chinese context, access to high school education imposes a severe bottleneck for attaining a college education. However, the gender gap in college attendance disappears, and even reverses. The female advantage is greater in attending short cycle-program colleges than in academic colleges.

## CHINA'S HIGHER EDUCATION EXPANSION AND SOCIAL STRATIFICATION

Reforms of the education system have been an important part of national developmental strategies to stimulate and sustain economic growth in China. Higher education policies, in particular, have played a special role in China's path to modernization. In the early years of the Chinese communist regime, higher education was clearly specified by Mao Zedong that it "must serve proletarian politics and be combined with productive labor" (Hayhoe, 1989, p.72). During the Cultural Revolution, intellectuals were denounced, colleges were closed (Tsang, 2000). After this dramatic disruption, Deng Xiaoping reinstated National College Entrance Examination (NCEE) in 1978 and college admission became primarily merit-based. Deng reiterated the importance of higher education as a corner stone in developing China into a global economic power. Since then, many reforms to higher education system have occurred and the number of different types of colleges increased dramatically (Liu, 2004). Much effort in the 1990s was targeted at improving education in the elite universities including the "211 Higher Education Development Project" in 1994 that set a priority to improve about 100 higher education institutions and the "985 Project" in 1998 which allocated 30 billion RMB to China's top ten leading universities (Wang 2002; Ma 2009). By 1998, there were 1,022 universities and colleges in China (China Statistical Yearbook, 1999).

In 1999, the Chinese government announced an important policy targeted at expanding tertiary education dramatically to reach an enrollment ratio of 15 percent, a level often defined as "mass higher education" (Trow, 1973). The annual college enrolment increased from one million in 1998 to 6.3 million in 2009. This expansion was proposed as part of the stimulus package in the Asian financial crisis and this economic driven policy may have some unintended social consequences for the population. As a tertiary education holds the key for professional, managerial, and government positions, access to higher education has profound long-term implications for an individual's life chances and intergenerational mobility in a society. In particular, in China, higher education is "a golden ticket" for rural youth to gain an urban hukou status. Social scientists and public policy makers alike are concerned about whether the college expansion policy has served as "a great equalizer" by providing more upward mobility opportunities for youth who had been more disadvantaged before the reform or has exacerbated inequality by improving access to higher education disproportionately for those who are already privileged.

This paper compares education stratification before and after the 1999 college expansion based on data from the Chinese General Social Survey collected in 2005, 2006 and 2008. Results from this study will contribute to our understanding of how access to higher education has changed after more than a decade of college expansion. It will also contribute to the growing international comparative research on higher education expansion and social stratification (Shavit, Arum, and Gamoran, 2007).

## HIGHER EDUCATION IN CHINA

Historically, China's higher education system has been largely centrally planned, administered, and financed. China's higher education system is a binary model, with the two or three year short-cycle (or specialized program) colleges focusing on vocational skills and the regular four-year (or full program) academic colleges and universities. All students need to take a standardized and highly competitive National College Entrance Examination, the "gaokao", to gain a place in a college. In 1977, the admission rate was only about 4.7 percent. This increased over time to 20 percent in 1990 and to 34 percent in 1998<sup>1</sup>. Admission to prestigious universities is particularly competitive. Another

<sup>1</sup> <http://edu.people.com.cn/GB/116076/14545024.html>

relevant context in China is that students must take the entrance examination where his or her hukou is located. Migrants to the cities must return to their home town to take the examination. Formal quotas of admissions to colleges are set by the central government for each province with more places reserved for students with local hukou than for those with hukou elsewhere. As most universities are in cities or townships, there are significantly fewer places for students in rural areas.

### College Expansion in the Late 1990s

In 1999, the State Council approved The Plan of Revitalizing Education in the 21st Century proposed by the Ministry of Education to expand college enrollment. This was done as a part of the 11<sup>th</sup> five-year plan which stressed the importance of prosperity for all and the need to create a “harmonious society”. The plan included various strategies to encourage colleges to set up multiple campuses, and instituting a private college system and calls for an increase in public education expenditures, especially in tertiary education. A target was set in the plan for China to reach, by 2010, a tertiary enrollment ratio of 15 percent, defined as “mass higher education” by Martin Trow (1973). This policy was proposed during the Asian financial crisis as part of an economic stimulus package by Tang Min, the chief economist of the Asian Development Bank Mission in China at that time. Although the immediate driver of college expansion was economic, this policy is consistent with the national strategy to bring China to modernity through education, particularly in science and technology. The purposes of the expansion are: (1) to drive economic growth through stimulating domestic consumption on tuition and industries related to an expanded education system, (2) to enhance international competitiveness with a more skilled labor force, and (3) to meet public demands for higher education.

Knowing the socioeconomic contexts and structural and organizational changes of China’s higher education will help understand how the reform may affect class and gender inequalities in attaining higher education. An important context in which the 1999 higher education expansion occurred is that it was implemented at a time when China’s high school enrolment was still very low. Figure 1 depicts the historical trends of enrolment in elementary school and the progression rates at various educational levels in China since 1990 based on data from the China Statistical Yearbook. Near universal enrolment in elementary school was achieved a few years after the 1986 *Compulsory Education Law*. While progression to junior high school reached 95 percent in 2000 and approached universal level a few years after that, high school enrolment has been very low still. Senior high school system in China has a binary model and is accessible through entrance examinations. The results of these exams will decide which track of senior secondary education the pupil might attend. In the regular senior high schools (普通高中) which require higher examination scores, students are educated for three years and prepared for the National College Entrance Examination. For students who wish to enter the labor market at an earlier stage, they may attend technical or vocational high schools (职业高中 或 技校). Progression rate to senior high school, however, is low because high school education is not compulsory and the tuition rate (PPP adjusted) in China is one of the highest in the world (Liu et al, 2009).

When the college expansion policy was initiated in 1999, only half of those who graduated from junior high school advanced to senior high school. However, a very large gap existed between urban and rural high school promotion rate, particularly promotion to academic high schools. Only eight percent of rural youth as opposed to almost 50 percent of the urban junior high school graduates were promoted to an academic senior high school in 1999. This gap widened to 9 and 70 percent respectively in 2006 (calculated from China Statistical Yearbook). College expansion policy, thus, had limited impact on a substantial proportion of population, especially rural youth, who had not attended or completed high schools. Despite this low rate of high school enrolment, the Chinese government decided to allocate resources to tertiary education. In 1998, 43 percent of those who

graduated from senior high school advanced to a college. This rate increased sharply to 61 percent in 1999 when the college expansion policy began. This was followed by a rapid growth in the subsequent 6 years to 83 percent.

In contrast to previous education reforms that occurred at a time when the Chinese youth population was increasing, this college expansion was introduced in a period when the Chinese youth population was in sharp decline both in number and proportion of the total population (see Figure 2) when the first group of children born after the one-child policy reached college attending age. Between 1990 and 2000, the young adult population (age 19-26) declined from 202 million to 158 million and from 17.8 percent to 12.7 percent of the total population.

It is important to recognize that before the expansion the college attendance rate in China was very low by international standards. To give a comparative view of higher education in China, Figure 3 shows gross college enrollment ratios during the period 1990 to 2010 in China, as compared to selected countries in both the western industrialized world and in Asia.<sup>2</sup> As can be seen, China's college enrollment rates lag substantially behind other countries', slowly increasing from less than 3 percent in 1990 to about 5 percent in 1995, and then to 7 percent immediately prior to the college expansion policy of 1998. These rates were not only much lower than those in Western industrialized countries, but also lagged behind many Asian countries. For example, on the eve of the Chinese college expansion policy, college enrollment rates were about 70 percent in the United States, 60 percent in Canada, 65 percent in Australia, 56 percent in Britain, and 50 percent in France. Even compared to many other countries with lower income, China's college enrollment rates are significantly lower. In 1998, the college enrollment rate was 68 percent in South Korea, 51 percent in Taiwan, and 46 percent in Japan. Countries such as Thailand and the Philippines that have a GDP per capita closer to that of China have college enrollment rates of 31 percent and 30 percent respectively. After the college expansion policy, the college enrollment rate in China rose dramatically to 20.3 percent in 2005, then to 24 percent in 2010. However, even with this rapid increase, Chinese college enrollment rates remain significantly lower than all other countries included in the figure, except for India.

Figure 4a shows the college enrollment trends by the two types of colleges. As seen, about half of the increase was in the Full Program colleges (本科) that take 4 years to complete and the other half in short-cycle Program colleges (专科) that take 2 or 3 years to complete and focus on professional skills. There was an unprecedented increase in the annual total intake from about 1 million in 1998 to over 5 million students in 2005 and it continued to climb to 6.3 million in 2009. In terms of total number of college students, the 3.4 million college students in 1998 had increased to 15.6 million in 2005 (China Statistical Yearbook, 2006). Figure 4b shows that the increase occurred for both males and females with a narrowing gender gap in recent years. By 2009, female enrolment had surpassed that of men.

Despite the expansion, access to higher education remains a very competitive process. Students still have to pass the National College Entrance Examination. The admission rate in 1999 was increased to 48 percent from 34 percent in 1998.<sup>3</sup> The harsh competition for college education has been

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<sup>2</sup> The gross enrolment ratio is the total enrolment, regardless of age, divided by the population of the official age group which corresponds to a specific level of education. The ratios are expressed as a percentage of the population in the five-year age group following on from the official secondary school leaving age. The age groups based on which the gross college enrollment ratios were calculated vary somewhat across countries, as indicated in the parentheses in Figure 3.

<sup>3</sup> Admission rates are from <http://www.neea.edu.cn/>

described in the public media as “thousands of troops crossing a single-log bridge”. As noted earlier, admission quotas are centrally allocated to each province and students need to take the entrance examination where their hukou are located. Historically, there is a much higher quota allocated to youth who reside in urban areas where most colleges are located than in rural areas and the admission rate is also significantly higher for those with an urban hukou. Figure 5 shows the historical trend of college admission rates by hukou status. In 1998, before the college expansion policy, the admission rates were twice as high for those with urban hukou than for those with rural hukou - 7 and 14 percent respectively. These rates have increased for both groups after the college expansion, but the gap increased to 13 percent in 2003 (41 and 28 percent for urban and rural respectively) though declined to pre-expansion level after that. By 2005, the admission rates were 48 and 41 percent respectively. Another salient feature of the college expansion policy is that the number of university enrolments by subjects has changed, most notably, the percent of university graduates in social sciences and humanities increased from about 20 percent in 1998 to 27 percent in 2005 whereas the percent of graduates in engineering, medicine, and agriculture has declined (see Figure 6).

An important structural change in the college expansion policy is that higher education institutions have become increasingly more decentralized both financially and administratively. Universities have gained more autonomy and multiple campuses and private colleges have been established. By 2000, there were 1,770 institutions of higher education, and about 3 percent were private colleges (MOE, China, 2001). The rapid expansion has generated some concerns about a lower quality of tertiary education partly both because expenditures have not increased sufficiently for faculty and the infrastructures and operation in the burgeoning and more diverse institutions has not been carefully monitored in many colleges.

With the increased enrollment, total education spending on higher education increased six-fold from 1997 to 2005 in infrastructure, teachers, and administration (China Statistical Yearbook, 1999-2005). However, contribution from the government to the total expenditures declined from 64 percent before the college expansion policy (in 1998) to 42.5 percent in 2005 (China Statistical Yearbook, 1999-2005). Before the college expansion, the Chinese government had been the main funding source of higher education institutions. After 2000, private funding covered more than 50 percent of total education expenditures (National Bureau of Statistics of China, 2005). In contrast, the contribution from non-government resources such as private investment in schools, tuition, or donations has increased rapidly. In many areas, banks were heavily involved in lending to public universities. Ru, Lu & Li (2005) estimate that 150-200 billion yuan were loaned to higher education institutes in 2006. College tuition increased substantially from accounting for 14 percent of the total spending on higher education before expansion policy to more than 30 percent in 2005; and it is to be mostly self-financed by students (China Statistical Yearbook, 2005). The increase in tuition was dramatic, amounting to \$10,000 yuan or more per year in an average university when living expenses are taken into account. According to World Bank statistics, in 2005, the college tuition level corresponded to approximately 37 percent of the average Gross National Income per person in China (Worldbank China, 2007). The average tuition fees are about 50 percent of the per capital GDP since 1999, which is much higher than the 20 percent in developed countries (Worldbank China 2007). This presents a major financial burden for many households (Fleisher, Li, Li and Wang, 2004), especially at a time when no credit mechanism for borrowing has been established for low-income families.

Moreover, there has been an increasing disparity between different categories of colleges with heavy investment in elite universities such as Beida, Tsinghua, Fudan, Zhejiang University. There is also an increased regional disparity in both quantity and quality of higher education that has resulted from the college expansion. Government policies have granted eastern, coastal provinces

more resources to undergo greater reforms than were possible in inland or more rural and remote areas.

### **HAS THE COLLEGE EXPANSION POLICY REDUCED EDUCATIONAL INEQUALITY IN CHINA?**

There are two competing hypotheses regarding whether the college expansion policy has reduced education inequality in China among groups differentiated by family background, gender and hukou status. First, college expansion would be expected to reduce inequality if education serves as a great equalizer of life chances between children from advantaged and disadvantaged families, as argued by scholars such as Cremin (1951) and Downey (2004, 2008). The human capital theory posits that education potentially serves as an efficient instrument to reduce wage inequality (Ashenfelter and Rouse, 2000). Follow this line of thought, educational achievement will become increasingly more independent of family background.

Existing micro-level empirical evidence in this field, however, does not generally support this hypothesis. Research in countries such as South Africa, Israel, and Korea suggests that education expansion does not reduce the relative position of social groups. That is, there is little change in the “education queue” among individuals with different socioeconomic backgrounds after an education expansion (Mare, 1981; Halsey et al, 1980, Shavit & Blossfeld, 1993, Smith & Cheung, 1986). Mare (1981) shows the expansion of education does not necessarily lead to more equal distribution of access to education across social strata. Elites often manage to maintain their advantage by getting more education than the masses (Walters, 2000). Hout and Raftery (1993) propose the Maximum Maintained Inequality (MMI) hypothesis that argues that socioeconomically advantaged families will maximally maintain their advantage only when enrolment is saturated will there be a reduction of inequality. That is, intergenerational educational inequality will persist and the effect of family background will continue despite educational reform and economic development. Results from a set of coordinated international comparative research (Shavit, Arum, and Gamoran, 2007) also support this hypothesis.

Most critiques of the MMI model point out that inequality in access to education involves more than just attending or dropping out, one needs to consider the quality of the education too. Lucas (2001) posits that SES advantageous groups tend to reproduce their advantages quantitatively if possible, whenever inequality cannot be maintained, they will shift to differentiate themselves by obtaining qualitatively superior education. This is known as the Effectively Maintained Inequality (EMI). Both MMI and EMI theories predict sustained and even increased inequality after college expansion. Previous studies on China’s higher education expansion have generally not distinguished different types of institutions (Wu and Zhang, 2010).

Given that college enrolment in China is far from saturated, and college tuition in China has increased substantially and become increasingly self-financed since the college expansion policy, I expect to find that the college expansion policy has exacerbated intergenerational inequality in higher education as college education has become unattainable for individuals with disadvantaged socioeconomic family background. Against the backdrop of an increasing urban-rural ratio of income per capita from 2.5 in 1990 to 3.1 in 2000 and 3.2 in 2005 (Wu, 2010), youth in rural areas can be expected to be particularly disadvantaged. A combination of a higher level of self-financed tuition and the relatively slower increase in the admission rates for rural areas in the first few years of the expansion may have kept a disproportionately larger group of rural youth out of the college gate and even dampen their aspiration for higher education after the college expansion.

Not only is access to college education in general likely to become more unequal by family background, an increasing qualitative differentiation among subgroups can be expected. Youth from more socioeconomically advantaged groups are also more likely to gain access to more selective track of higher education than their counterparts. As noted above, China's school system is a binary system with academic and vocational/technical schools. I expect youth from families with higher socioeconomic status to have greater access to education in academic colleges.

Gender inequality literature on gender differences in educational attainment has revealed a global catch-up trend for female education, though returns to education vary across countries (Goldin, Katz, Kuziemko, 2006). For example, returns to education for female college graduates in Korea and Taiwan tend to be lower than for males. In China, as the college expansion policy increases the proportion of quota for social science and humanities and the gender gap in family education investment in boys and girls has been shown to have narrowed for the one-child policy generation (Tsui, M. & Rich, L. 2002; Veeck, Flurry, & Jiang, 2003), I expect to find a narrowed gender gap in higher education attendance in China after the expansion policy as well.

As high school enrolment is far from saturated, I expect that the college expansion policy will have an effect on raising high school enrolment through raising people's expectation and demand for education as education is increasingly seen as a valuable human capital for improving one's life chances. More will progress to high schools after graduating from junior high school. Since one is not qualified to take the college entrance examination without a high school diploma or vocational/technical certificate, high school education is a crucial pathway to college attendance. As the quality of high school education is highly predictive of how competitive one is in the college entrance examination, it is important to examine the high school enrolment stage when we attempt to understand how the college expansion policy affects the educational stratification in higher education in China.

## **DATA**

Analysis in this paper is based on data pooled from the 2005, 2006, and 2008 Chinese General Social Survey (CGSS) which collects data from households in both rural and urban areas in 30 provinces/districts (excluding Tibet, Taiwan, Hong Kong, and Macau). The 2005 and 2006 waves each covers about 10,000 households, and the 2008 wave covers 6,000 households. The study collects data on basic socioeconomic and demographic characteristics for respondents and family members, including family composition, education, ethnicity, health, and psychological well-being, as well as community administration data for the residence where the respondent resided at the time of the interview. These data allow us to examine trends of college enrollment among subgroups of the population across multiple birth cohorts.

## **SAMPLE AND MEASURES**

The analysis sample includes 8,429 respondents who were born between 1971 and 1985 and aged 22 and above at the time of the interviews. This sample is divided into five three-year birth cohorts in the analysis. The first two cohorts, born in 1971-1973 and in 1974-1976, would have been at college attending age (assumed to be about 18 to 22 years old) before the college expansion policy began in 1999. They serve as a baseline benchmark for comparison with the younger cohorts who were exposed to the college expansion policy. Some members of the cohort who were born between 1977 and 1979 (age 22-20 in 1999) would have been potentially affected by the policy. The other two younger cohorts, those who were born between 1980 and 1982 (age 19-17 in 1999) and

between 1983 and 1985 (age 14-16 in 1999), were also at college attendance age during the college expansion years, 1999-2006.

Multinomial logistic regression analyses are conducted to estimate the conditional probability of attending two types of high schools and colleges. At the high school level, we distinguish vocational and technical high schools from regular (academic) high schools. At the college level, we also distinguish the short cycle-programs, which take 2 or 3 years to complete and focus more on professional skills from the full-program colleges, which are more competitive academically, take 4 years to complete, and generally have a higher education return. Unfortunately, data do not allow us to distinguish the institutions further to identify the more selective schools or private universities.

Independent variables include gender, *Hukou* origin, ethnicity, whether either parent is a communist party member, and fathers' education and occupation. *Hukou* origin is measured as the *hukou* status when the respondent was at age 14 whenever this information is available. In the event this information is missing, we use mother's *hukou* status and father's *hukou* status<sup>4</sup> to characterize the respondent's origin rather than respondent's *hukou* status at the time of the interview as one may change his/her *hukou* status after attending college. Father's education is measured in three categories with those with no formal education as the reference group of those with up to junior high school education, and those with some high school or higher education. Father's occupation when the respondent was age 14, an indicator of social class, is operationalized as a three-category variable with agricultural work as the reference group for managerial/professional and other professions. International Socio-economic Index of Occupational status (1988 ISEI) was also used in the analysis though we present results with categorical occupation variables here only. Results are consistent and are available on request. Unfortunately, data for household income before an individual attends high school or college are not available for analysis.

## RESULTS

Table 1 shows the descriptive statistics for covariates used in the model for the sample as a whole and for those with urban and rural origin separately. The mean age of the sample is about 28, about half of the sample is male, and 90 percent of the sample is Han. With regard to parents' socioeconomic status, those with rural *hukou* origin are significantly more disadvantaged than those with urban *hukou* origin. While among those with rural origin, 25 percent have a father who has no formal education and slightly less than 10 percent have a father who has some senior high school education and above, the corresponding rates are 6 percent and 35 percent for those with an urban *hukou* origin. Similarly, while 82 percent of those with a rural origin have a father who works in agriculture and only 8 percent of them have a father who has a managerial and professional occupation, the corresponding percentages are 16 and 30 respectively for those with an urban origin.

### Trends in College Attendance

I first present descriptive analysis of change in college attendance rate at an individual level for different birth cohorts by *hukou* origin, gender, and family background. Then I present multivariate analysis to estimate the extent to which relationships between these family and individual characteristics and access to high school and college education vary before and after the college expansion policy.

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<sup>4</sup> The priority is to use mother's *hukou* status because before 1998, a child usually inherits mother's *hukou* status at birth. This rule has been relaxed after that allowing a new born to use either mother's or father's *hukou* status in some areas. Unfortunately mother's *Hukou* status variable has many missing values.

CGSS data confirm the increasing college enrollment seen at the national level presented earlier. Figure 7 shows the proportion of individuals who have attended college (including both short cycle and full program colleges) in each of the five birth cohorts for the entire sample and by Hukou origin. Among members of the oldest cohort who were born between 1971 and 1973 and at college attendance age before the college expansion, 9.4 percent have ever attended college (including full-program and short cycle colleges) by the time of the interview. In contrast, 22.1 percent of the youngest cohort, born in 1983-1985 and at college attending age during the college expansion years, has attended colleges. This general upward trend hides a stark disparity that has existed historically between those of urban and rural origin. For the oldest cohort, a little more than a fifth of those of urban *hukou* origin have attended a college, compared to only 2.3 percent of those of rural *hukou* origin. Overtime, although the college attendance rates have increased for both groups, and at a faster rate for those of rural origin, the gap between the two subgroups has widened in more recent cohorts. For the youngest cohort, the rates are 48.4 and 7.9 percent for those with urban and rural *hukou* respectively.

Figure 8 shows the trend by gender. There is an increasing trend for both genders, though faster for females than for males. For the oldest cohort, about 12 percent of males versus about 7 percent of females have ever attended college. This gap has narrowed over time and even reversed for the youngest cohort with 23 percent females vs. 21 percent males attending college. Figure 9 shows the percent attending college by father's education. For the oldest cohort, the gap between the rates for those whose fathers had no education (3 percent) and those whose fathers had high school and above education (33 percent) is astounding, and this gap has widened even more for post-college-expansion cohorts. For the group with fathers who had no-schooling, although the rate has increased to 6.4 percent for the cohort that was born in 1977-79, it declined to 2.7 and 3 percent for the youngest two cohorts. In contrast, for those whose fathers had high school and above education, almost half of the youngest cohort have attended college.

## MULTIVARIATE ANALYSIS

As hypothesized above, college expansion policy may affect not only college attendance rate of those who have graduated from high schools but also high school attendance rate as the policy is likely to send a strong message about the value of education in general and raise individual and family's aspiration and demand for education beyond compulsory level such that those who would have otherwise not attended high school may attend high school after the policy change. Therefore, to understand the impact of the college expansion policy on social stratification, I also examine if access to high school education has changed for different subgroups of youth. Multinomial logistic regression analyses are conducted to estimate the impact of gender, family background, and geographic location over time on the probability of progressing from senior high school after graduating from junior high school, and to college after graduating from senior high school. As noted above, two types of schools, short-cycle program and academic-oriented, are distinguished to observe the extent to which individual and family characteristics affect the chances of attending high school or colleges of different quality. To take into consideration variation across provinces, estimates are clustered by province to adjust for standard errors. I also include control variables for the number of siblings<sup>5</sup> and region, indicating whether each youth resided in the Northeast, Central or Western region. To examine whether the impact of these individual and family background

<sup>5</sup> Unfortunately, the 2005 CGSS does not have the variable "number of siblings". I conducted the analyses with and without this variable. As number of siblings is shown to be statistically significant in some models, we show results from models that include this variable, thus excluding the 2005 data. Results from models that do not include "number of siblings" are not qualitatively different.

factors change significantly in years before and after the college expansion policy, I add to the model several interaction terms between the birth cohort indicator and gender, hukou origin and parents' education level. A crude dichotomized variable is created to indicate whether an individual was at a college attendance age before or after the expansion. The older three cohorts are treated as the "before policy" group (i.e., those at college-attending age before the college expansion policy) whereas the youngest two cohorts are treated as the "after policy" group.<sup>6</sup> Interaction terms between the pre-post policy indicator and the independent variables are added to the models to observe if the relationships differ before and after the college expansion policy started.

Table 2 presents the multinomial logit estimates of the odds of transitioning from junior high school to the two types of senior high school (vocational/technical and academic high school). Columns 1 and 2 shows the log odds and column 3 and 4 showing the relative risk ratios. Table 3 presents corresponding results for the odds of progressing from senior high school to the two types of colleges – namely, the short-cycle colleges and the full-program colleges.

### Progression from Junior High to Senior High Schools

As expected, family background is highly consequential to one's probability of attending senior high school. The largest gap in the probability of transitioning to high school is observed between groups with different *hukou* origin. Before expansion, a youth of rural *hukou* origin has just over one third the chance of progressing to either a vocational/technical high school (OR=.36) or an academic high school (OR=.34) than that of a youth of an urban *hukou* origin. After expansion, although the interaction terms are not statistically significant, the point estimates suggest that these odds may have declined from about a third to about a quarter.

In regards to ethnicity, the odds of a Han attending a senior high school were about twice those for a minority in pre-expansion years. These patterns have not changed significantly in post-expansion years.

Another indicator of family socioeconomic characteristics, father's occupation, is also positively related to one's chances of progressing to high school and the relationship has not changed significantly after the college expansion. Compared to youth whose fathers had agricultural occupations, those whose fathers were in other types of occupations were between 1.4 to 1.8 times as likely to attend either type of high school. These odds have not changed significantly after the college expansion. Another occupational status indicator, International Socioeconomic Occupational Index (1988 ISEO) was also used in the analysis and results show that it has a significant impact only on the transition to academic high schools but not to vocational/technical high schools.

Geographic location<sup>7</sup> also has a very significant implication. Compared to those who lived in the Northeastern region, youth in central and western regions were only about half to 65 percent likely to progress to either type of high schools. This geographic variation also has not changed significantly in post-expansion years. While family background is highly influential, there is no significant change in the degree of influence from before to after the expansion policy for any family background variables—except for parents' education.

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<sup>6</sup> An alternative cut off is used where the cohort born between 1977 and 1979 is included in the "after policy" group. Results are similar though the effect of time change is slightly weaker. Given that there may be a lag effect of the policy, I choose to include only the older two cohorts in the "after policy" group.

<sup>7</sup> This is an indicator of respondent's residency at birth. Unfortunately, data for residency before high school are not available for analysis.

The only characteristic that has a significantly different impact between the pre- and post-expansion years is father's education. In pre-reform years, youth whose fathers had high school and above education were 6 times as likely to progress to vocational/technical high schools, and 8 times as likely to progress to academic high schools, than those whose fathers had no formal education. In post-reform years, the impact of parents' education, though still significant, is weaker. Youth whose father had a high school and above education were now only 1.7 (6.097\*.279) times as likely to progress to vocational/technical high schools and 3.5 (8.162\*.433) times as likely to progress to academic high schools.

### **Progression from Senior High School to College**

One notable difference at the stage of transitioning from high school to college is that few individual or family characteristics are significant predictors. This is a testimony of meritocracy in China's higher education system in that the national college entrance examination is the key determinant of college entrance, although a few characteristics still play a role in progressing to both short cycle and academic colleges.

In terms of gender, males had a small but insignificant advantage in transitioning to short cycle colleges in pre-expansion years, holding other characteristics constant. In post-expansion years, the direction of the coefficient is reversed: females had 20 percent higher odds of attending short cycle colleges than males. For academic colleges, males were 1.8 times as likely to attend as females in pre-expansion years (Odds Ratio= $\exp(.609)=1.84$ ). This could be explained by the larger quota of male-dominant subjects such as engineering and science in academic colleges, or a possibly greater family investment in boys for more selective colleges (note that the first three cohorts were born before the one-child policy). After the college expansion policy, this male advantage disappeared. The odds ratio fell from 1.84 to .99 ( $=\exp(.609-.802-.616/\exp(-.802))$ ), with females edging slightly ahead in progressing to academic college than males. Figure 10 charts the odds ratios in pre- and post-expansion years for males and females. These changes can partly be explained by three factors: (1) an increase in the proportion of quota in humanities and social sciences after college expansion, which increased the chances of female students being admitted, (2) a decreased gender difference in parental investment in children's education as a consequence of the one-child policy, and (3) female students may have competed favorably in examinations because of their aptitude and longer attention span for studying. This gender reversal of higher education attainment is consistent with the patterns seen in the US, South Korea and other countries (Goldin, Katz and Kuziemko, 2006; Shavit et al, 2007).

The difference in transition to college between youth of rural and urban origin has not changed significantly after the college expansion policy. Pre-reform, holding other characteristics constant, those with a rural origin were about 30 percent less likely (Odds Ratio= $\exp(-.340-.011)=.70$ ) to progress to an academic college after high school graduation. This disadvantage has neither been alleviated nor exacerbated post-reform. The lower transitioning rate for youth with a rural origin may be attributed to several factors: (1) the lower admission quotas for students in rural areas, (2) the tendency of rural youth to be less competitive in the college entrance examination due to the lower public expenditure allocated to middle and high schools in rural areas, and (3) the possibility that rural parents and youth to find the shorter-term economic return from entering the labor market after high school graduation or attending short cycle colleges more attractive than attending a 4-year academic college with high tuition fees and a more academic nature.

The only family background covariate that has a significantly different impact before and after the policy change at the college attendance stage, again, is fathers' education. In the post-expansion years, father's education became highly predictive of the odds of transitioning to a full-program academic college (although it had no effect on the transition to short cycle program). After the college expansion policy, compared to those whose parents have no formal education, those whose parents have an elementary to junior high school education are 2.4 times as likely, and those whose parents have high school and above education are 5 times as likely, to attend the academic college (see Figure 10 for the contrast). As household income is not included in the model, father's education may have captured some of the income effects. However, since we do include fathers' occupations and their party membership, both of which are highly correlated with family income during respondents' adolescent years, a large part of parents' education effect may be non-financially related. Increased investment of family/private financial resources toward providing a stimulating home environment, better academic training, and more extra-curricular activities that enhance a youth's cultural capital or psychological well-being may only explain a small part of the parents' education effect. This effect may be explained to a larger degree by a higher level of parental expectation, and non-monetary investments such as more parental time involvement in schooling.

Father's occupation in the 3-category form is not positively related to the odds of transitioning to college, although the ISEI index does show a significant correlation with the progression to academic college (but not with progression to the special-program college). This relationship has not changed after the expansion.

## DISCUSSION

Results in this study add significant evidence to extant research that often uses small-scale convenient samples or census data aggregated at the province or region level. Although findings are in general agreement with previous studies (for example, Wu and Zhang, 2010), this study investigates the structural and organizational changes of the reform to help explain how education expansion may affect inequalities across different subgroups in attaining higher education and distinguishes two levels of educational institutions. The college expansion policy in China has allowed a significantly larger number of youth of different characteristics to attain tertiary education. The relationship between parent's education and high school attendance appears to have weakened in the post-college expansion years, reducing inequality among youth from different family background and potentially equalizing youth's chances to attend colleges. In this sense, higher education has become more inclusive, allowing more offspring from the emerging middle class into the college gates. The college expansion policy thus serves an equalizing purpose. However, systemic inequality across social strata remains, particularly in the academic colleges. Results also reveal some changes in the impact of gender and family background in the post-college expansion years. Unfortunately, the analysis cannot firmly establish the causal relationship between the policy and these changes.

Gender inequality in higher education has declined notably and even reversed. In particular, women have about 20 percent higher odds of transitioning to vocational or technical colleges, and an equal chance of transitioning to academic colleges, than men do in post-expansion years. However, the impact of the expansion policy cannot be disentangled from other social forces during these years, such as the one-child policy that may have prompted parents to invest in their only child regardless of gender, thus narrowing the gap between family investment in son's and daughter's education over time.

No significant reduction (or increase) in the stark disparities by *hukou* origin was observed after the policy change. Results show that the root of the disadvantages of rural youth lies in the educational system earlier than college entrance time as they have a strikingly lower chance (about 30 percent) of attending either vocational or academic high schools. The prohibitively high tuition for high school education and the fact that youth can only take the entrance examinations where one's *hukou* is located kept many rural youth out of the high school gates (Liu et al, 2009), let alone those of colleges. High school attendance presents a formidable bottleneck for a large proportion of the population, particularly, those of rural origin. Making high school education free and compulsory will be a critical step in equalizing access to tertiary education in China in the long run. Indeed, doing so can alleviate inequality of all kinds in China even if the politically sensitive and administratively challenging *hukou* problem is not resolved soon. In addition, the lower quality of primary and junior high school in rural areas (Tseng, 2002; Paine and Feng 2007) weakens students' competitiveness in high school and college entrance examinations. Rural youth are disadvantaged not only because of their rural *hukou* status that restricts their opportunity to attend high school and colleges in urban areas but also because of their disadvantaged family background as indicated by the much lower occupational status and educational attainment of their parents. In college attending stage, youths of a rural origin are significantly disadvantaged in academic college attendance. This has serious implications for China's social stratification as a college education is the main mechanism, "a golden ticket", for a youth in rural areas to move to the cities, to gain an urban *hukou* status, and to hold a government, managerial and professional position.

The impact of parents' education substantially decreases at the stage when youth transition to high school but increases in college attendance stage. As noted, parents' education reflects not only the financial advantage but also attitudinal and behavior aspects of parenting behavior. Research has shown that parents with higher education tend to provide a more stimulating home environment, have higher educational expectation, invest more in children's cultural capital, and are more involved in children's schooling (Lareau, 2003; Yeung and Pfeiffer, 2009). These are long-term benefits that go beyond a family's ability to finance college tuition and will contribute to an increasing divergence in educational attainment for children with different family background. As youth in rural areas have parents who have a much lower educational level, a widened gap between urban and rural children's life chances can be expected. Due to the *hukou*-bound and quota-based college entrance examination, students in rural areas often need higher scores to meet the cut-off than those in urban areas in order to be admitted to selective educational institutions (Zhang and Liu, 2005; Fish, 2010). Such inequality is likely most severe in the more selective elite colleges which the CGSS data do not allow a careful examination. Recent reports of a declining proportion of rural students in elite universities such as Peking and Tsinghua universities may reflect such increasing disparities (Liu, 2004). Unfortunately, the CGSS data do not allow more detailed analysis for selective universities. An evaluation of the admission policies and public expenditure on rural education systems is needed.

Results support the Maximum Maintained Inequality (MMI) hypothesis that when attendance at a particular level of education has not reached a saturation level, there will be a persistence of intergenerational educational inequality with the effect of family background continuing despite the educational reform. Elites will manage to maintain their advantage by getting more education than the masses, as predicted by Walters (2000). Moreover, after the college expansion policy, youth with highly educated parents have higher odds of attending higher quality colleges, namely, the four-year academic colleges that tend to have a higher education return, as the Effectively Maintained Inequality hypothesis predicts. Unfortunately, data do not allow a more precise differentiation among colleges of different quality than comparing full-program to short cycle colleges. CGSS data also do not have information about family income before an individual attended college. A careful examination of circumstances of youth from a full range of income distribution and a spectrum of

quality of colleges is warranted to unearth the complex relationships between one's family background and access to a higher education over time. Clearly, the impact of the college expansion policy on social stratification in China will be long lasting. Its influence on China's development and on the well-being of various subgroups of the Chinese population should be carefully monitored in future research.

Although college enrollment has expanded at a faster pace and produced more college graduates than what the current Chinese labor market can absorb, thus causing high unemployment rates among young adults, this situation will likely improve over time as China's economy transitions from an export-oriented labor intensive model to a more service-oriented and high-tech model that demands a high level of human capital. In the short run, the Chinese government has taken steps to review college curriculum toward the goal of offering more flexibility and specialty training to respond to market demands, help college students find employment by creating new skilled jobs and improving employment information and guidance systems, encourage college graduates to work in rural areas or in smaller township or to "go west", provide financial support to graduates to start their own businesses, and invest more in small and medium enterprises. These are reasonable strategies to ameliorate the dire unemployment problem. Relaxing or abolishing the *Hukou* system to equalize development and social safety nets provided in urban and rural areas and to allow a greater mobility in the labor market will be key for alleviating the regional mismatch of the supply and demand of labor.

As noted in the international comparative analysis, Chinese college attendance rates remain very low by international standards, significantly lower even than some low-income countries such as the Philippines and Thailand. The decision to expand higher education is a step in the right direction, if not in scale, especially in view of a working age population that will begin to shrink in the next decade. China needs to prepare its labor force for a rapidly growing and transforming economy. Enhancing the human capital of a population does not take place overnight. Fortunately, the Chinese government now has more financial capacity to increase education investment. China's impressive economic growth has so far not been matched by a similarly rapid growth in education. For example, average years of schooling was still only 6.6 years in 2000 (up from 3.7 years in 1980) and the increase in public spending on education till the turn of the century has been relatively small. In 1999-2000, China's public expenditure on education accounted for only 1.9 percent of its GDP, lower even than developing countries such as Thailand (5.4 percent) and India (4.4 percent) (UNESCO, 2000). In the past decade, the Chinese government has significantly increased its investment in human resources. As of 2009, the education expenditure has increased to account for 3 percent of its GDP (UNESCO, 2010). Increasing government investment in higher education is necessary if China's growth model is to be transformed. More resources and opportunities should be channeled to those with disadvantaged family background, particularly the rural underclass, starting in education systems much earlier than the tertiary education.

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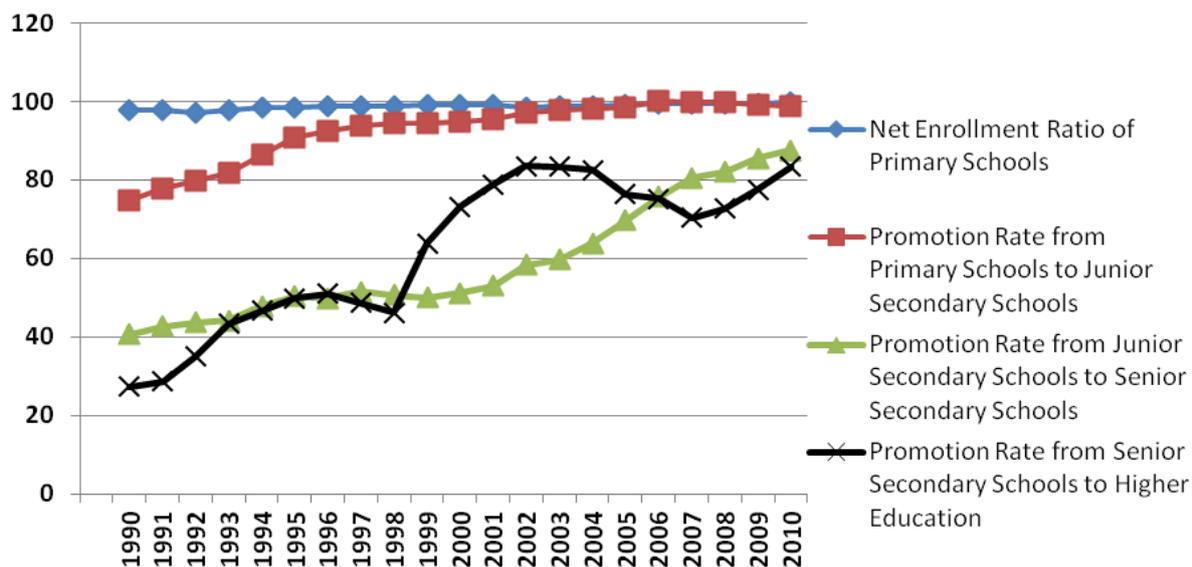
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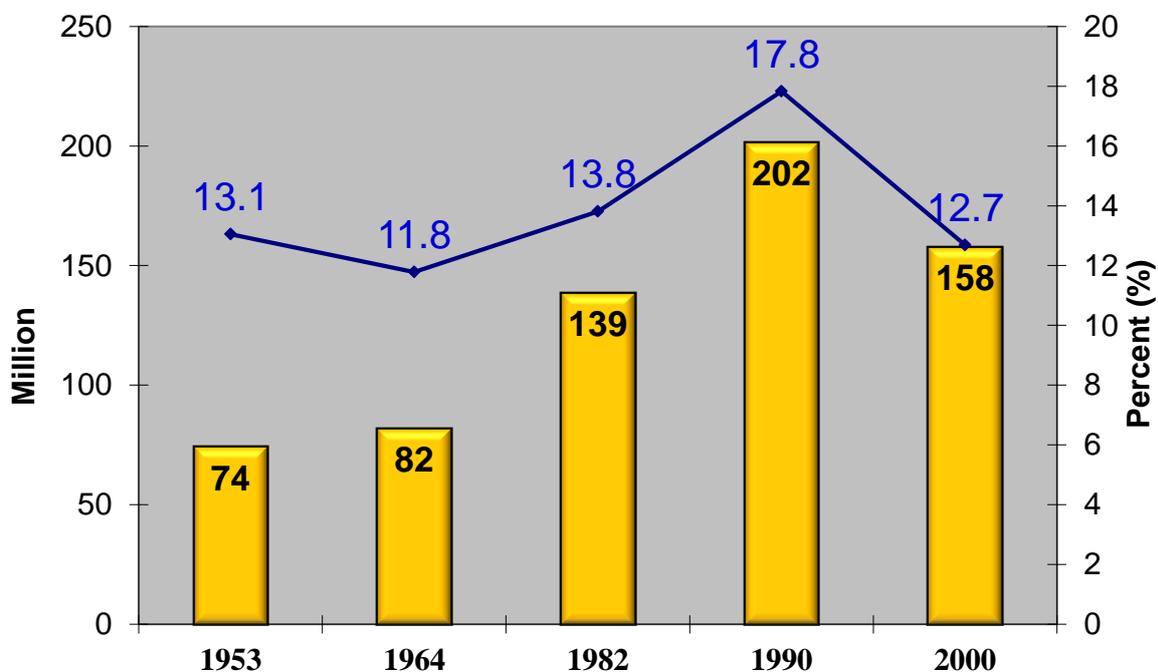
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**Figure 1: Net Enrollment Ratio of Primary Schools and Promotion Rate of Various Schools, 1990-2010**



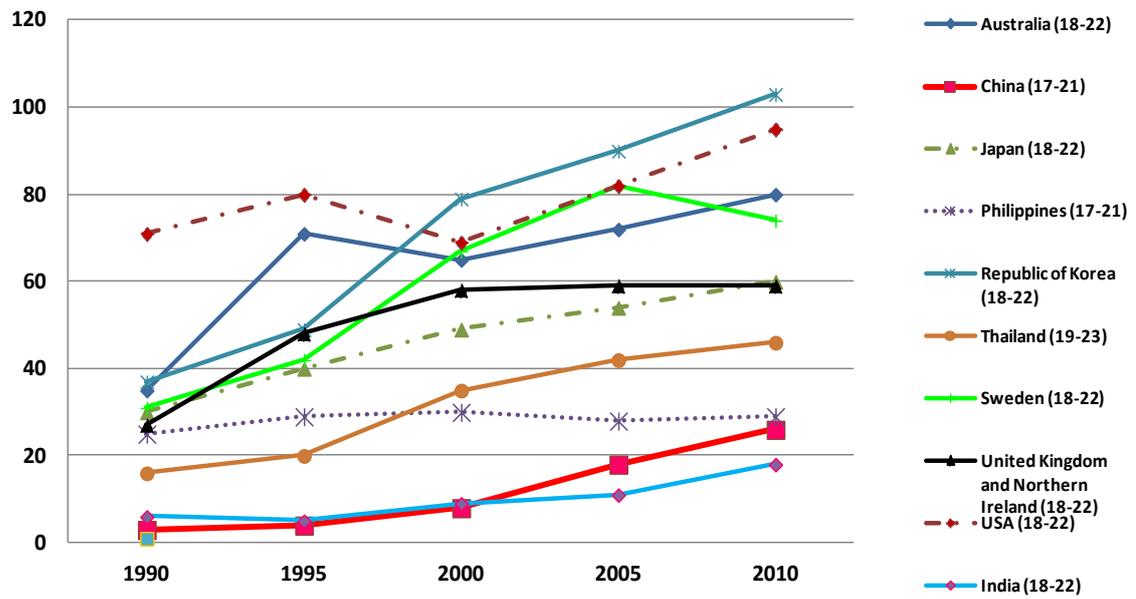
Source: China Statistical Yearbook

**Figure 2. Size and Percentage of Population Aged 19-26 in China by Year**



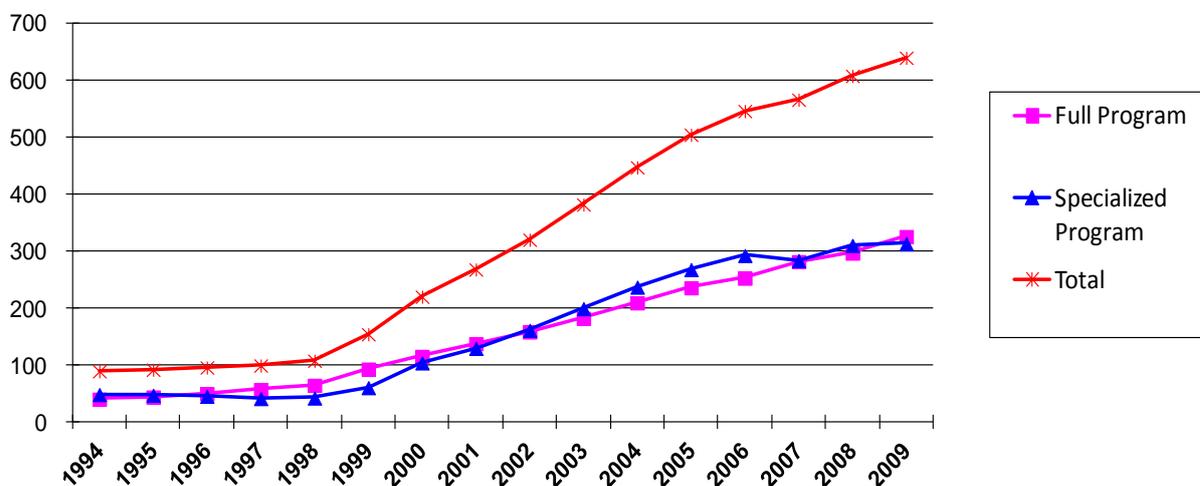
Source: 1953,1964,1982,1990,2000 Chinese Censuses

Figure 3: International comparison of Gross College Enrolment Ratio, 1990-2010

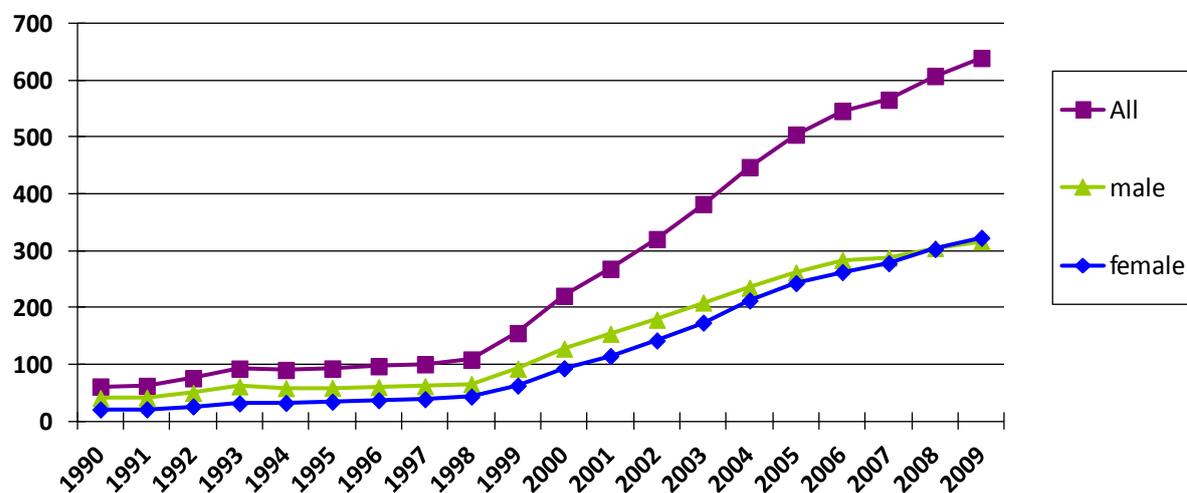


Source: UNESCO Statistic Database

**Figure 4a: Annual Enrollment in Tertiary Education in China  
(in 10,000) 1994-2009, by Program**  
Full Program (本科), Specialized Program (专科)



**Figure 4b: Annual Enrollment in Tertiary Education (in 10,000) 1990-2009, by Gender**



Source: Chinese National Bureau of Statistics, 1990-2010

Figure 5: College Admission Rates in China by Houkou Status

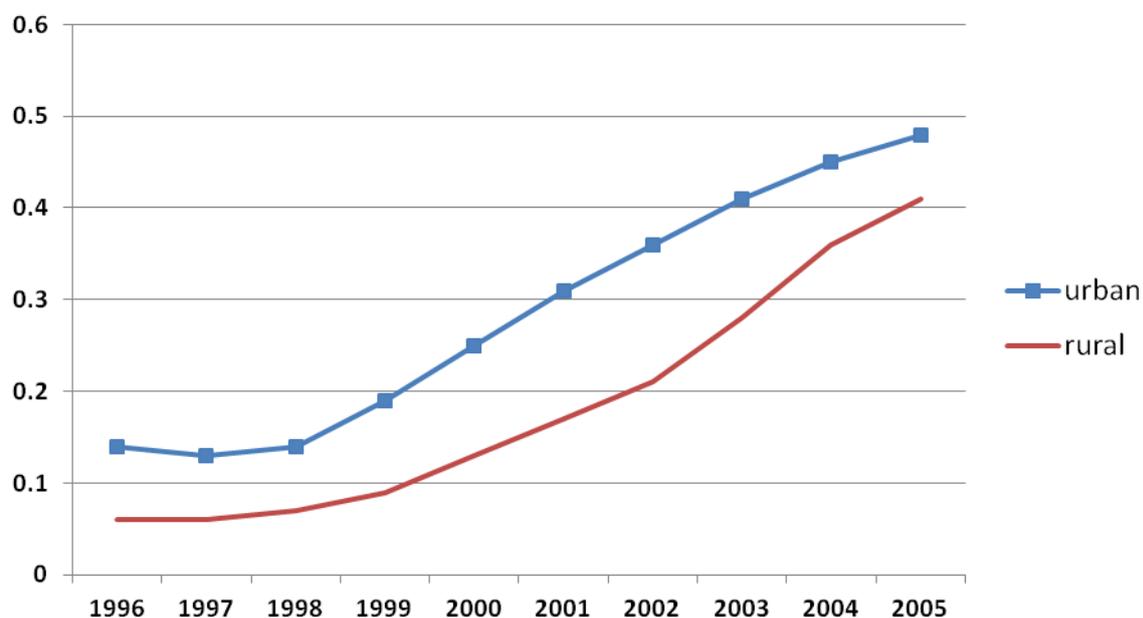
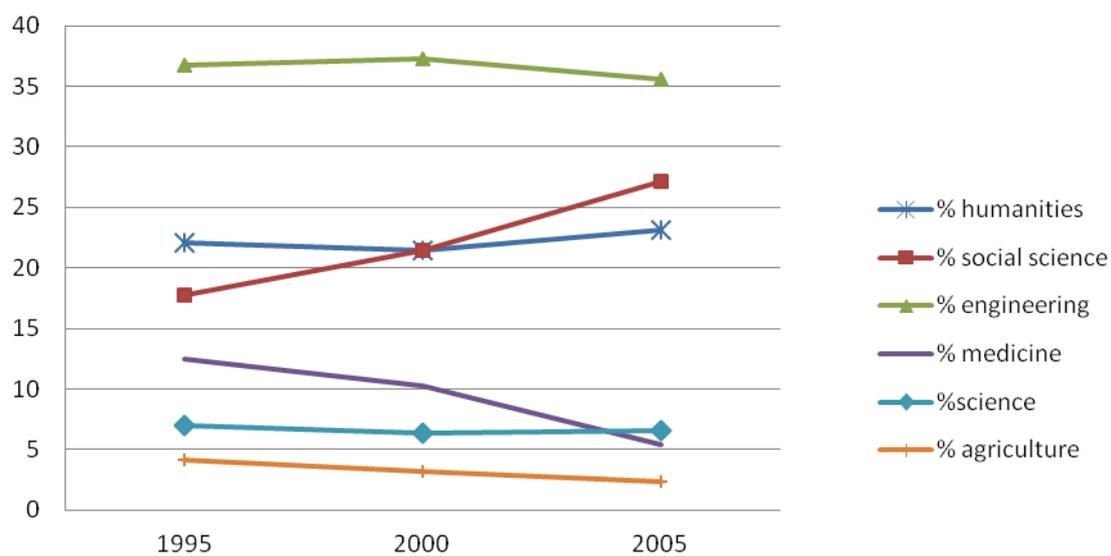


Figure 6: Percent University Graduates in China by field of study, 1995-2005

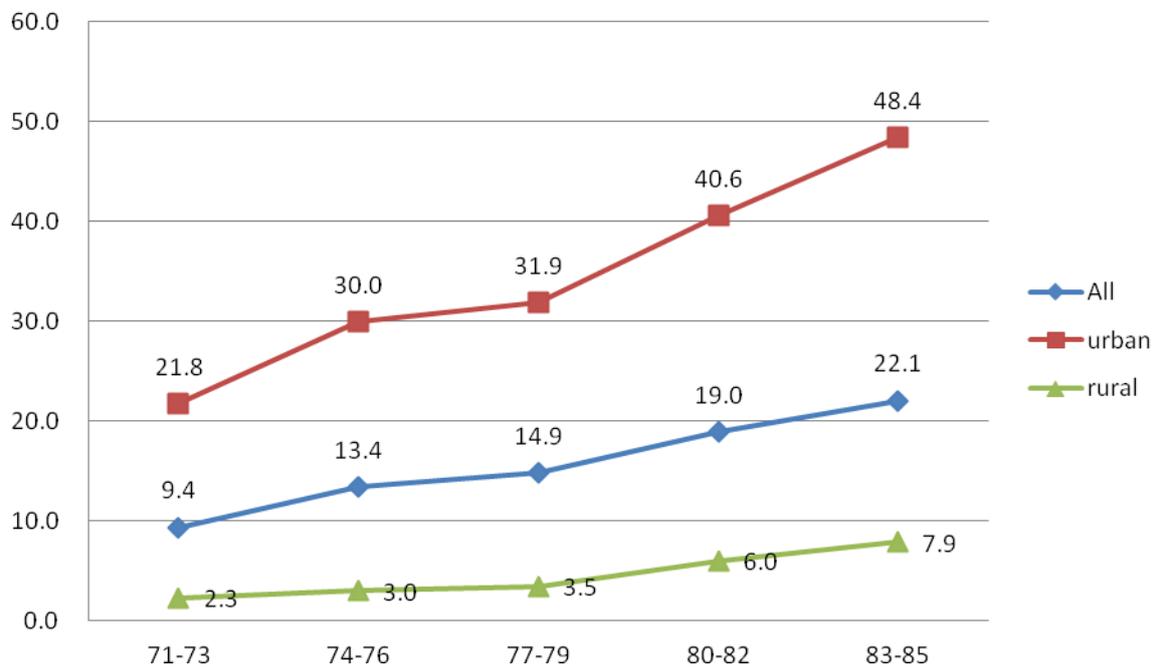


Source: *China Education Statistical Yearbook (1994–2007)*;  
*National Bureau of Statistics of P.R. China*

**Table 1: Weighted Mean and (standard deviation) of Sample Characteristics by Hukou Origin**

	<u>N</u>	<u>All</u>	<u>Urban Origin</u>	<u>Rural Origin</u>
Age	8525	28.65 (0.06)	28.25 (0.1)	28.77 (0.08)
Gender (Male=1)	8525	0.46 (0.01)	0.49 (0.01)	0.45 (0.01)
Hukou origin (rural=1)	8393	0.71 (0.01)	0 (0.00)	1 (0.00)
Ethnicity (Han=1)	8525	0.90 (0.00)	0.92 (0.01)	0.90 (0.01)
Parent party member (yes=1)	8435	0.15 (0.00)	0.25 (0.01)	0.11 (0.01)
Father's Education				
No formal schooling (ref group)	8462	0.20 (0.01)	0.06 (0.01)	0.25 (0.01)
Elementary & junior high school	8462	0.64 (0.01)	0.59 (0.01)	0.66 (0.01)
Some senior high & above	8462	0.16 (0.00)	0.35 (0.01)	0.09 (0.00)
Father's occupation				
agricultural workers (ref group)	8151	0.64 (0.01)	0.16 (0.01)	0.82 (0.01)
managers, professionals	8151	0.14 (0.00)	0.3 (0.01)	0.08 (0.00)
Others	8151	0.22 (0.01)	0.54 (0.01)	0.10 (0.01)
Father's ISEI	7262	32.2 (0.21)	42 (0.39)	27.9 (0.22)
Number of Siblings	5946	0.97 (0.02)	0.71 (0.03)	1.05 (0.03)
Region				
east (ref group)	8525	0.39 (0.01)	0.45 (0.01)	0.37 (0.01)
middle	8525	0.35 (0.01)	0.33 (0.01)	0.36 (0.01)
west	8525	0.25 (0.01)	0.22 (0.01)	0.27 (0.01)

**Figure 7: Percent of College (both types) Attendance by Birth Cohort and Hukou Origin**



**Figure 8: Percent of College (both types) Attendance, by Birth Cohort and Sex**

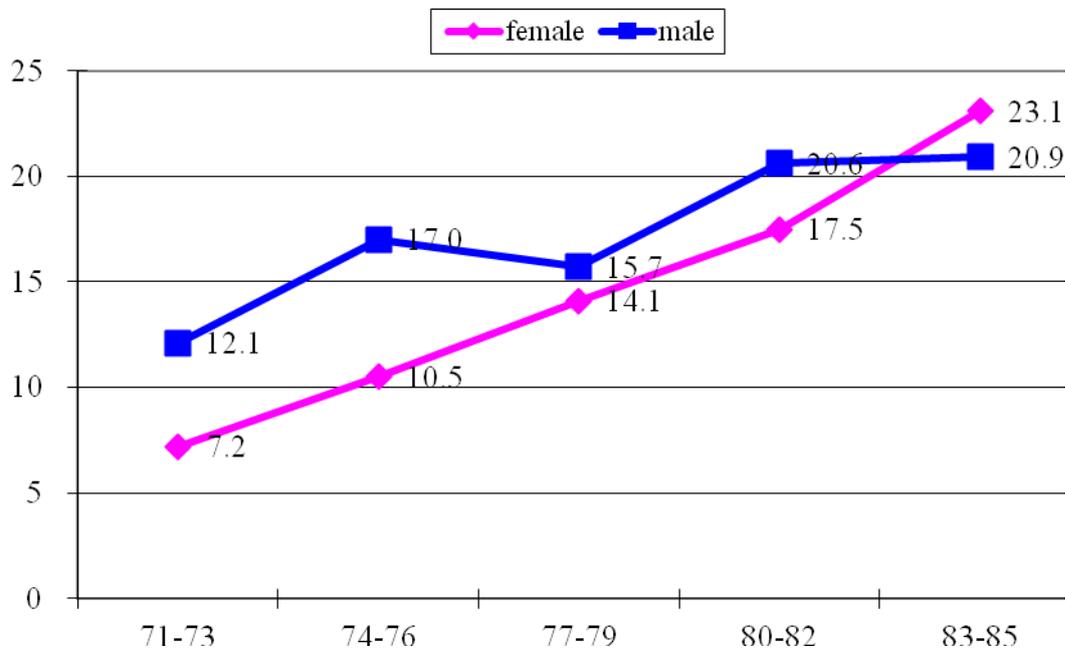
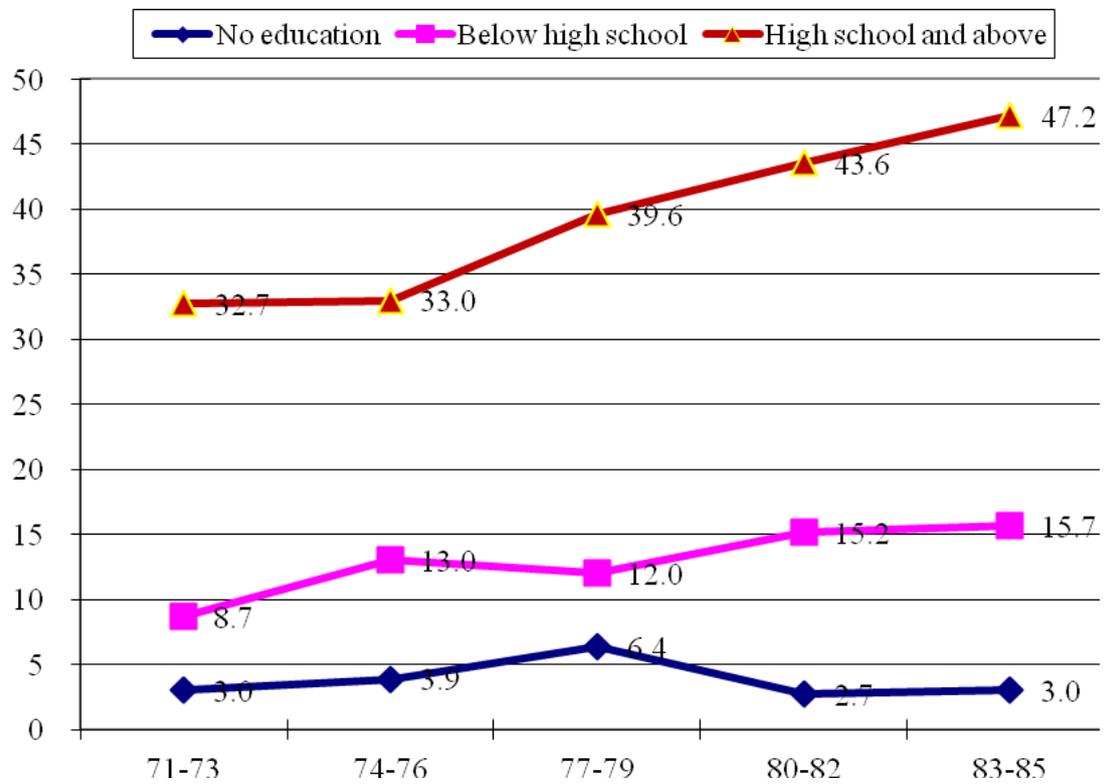


Figure 9: Percent of College (both types) Attendance by Birth Cohort and Father's Education, 2005, 2006 and 2008 CGSS



**Table 2: Multinomial Logit Estimates of the Probability of Progressing from Junior High School to Senior High School**

	Log odds		Relative Risk Ratios	
	Voc/tech	academic	Voc/tech	academic
<b>Male</b>	0.247 (1.10)	0.257 (1.63)	1.281 (0.289)	1.293 (0.203)
<b>Han</b>	0.661* (2.05)	0.558* (2.51)	1.936* (0.624)	1.747* (0.389)
<b>Rural Hukou origin</b>	-1.030*** (-4.76)	-1.068*** (-5.36)	0.357*** (0.077)	0.344*** (0.068)
<b>Party member</b>	0.283 (1.54)	0.189 (1.41)	1.327 (0.245)	1.208 (0.162)
<b>Father educa (ref=no education)</b>	.	.	.	.
Elem-JuniorH	0.665* (2.40)	0.883*** (4.54)	1.945* (0.540)	2.418*** (0.471)
High Sch+	1.808*** (5.15)	2.100*** (7.93)	6.097*** (2.142)	8.162*** (2.161)
<b>Father occupa (ref=agriculture)</b>	.	.	.	.
Managerial/professional	0.359! (1.69)	0.458** (2.81)	1.432 (0.306)	1.581** (0.258)
Other	0.578*** (3.44)	0.504*** (3.50)	1.782*** (0.299)	1.655*** (0.238)
<b>Number of sibling</b>	-0.0389 (-0.80)	-0.0349 (-0.99)	0.962 (0.047)	0.966 (0.034)
<b>Region (ref=east)</b>	.	.	.	.
Central	-0.476* (-2.47)	-0.588** (-3.07)	0.621* (0.120)	0.555** (0.106)
West	-0.413* (-2.34)	-0.436* (-2.24)	0.662* (0.117)	0.647* (0.126)
<b>After expansion (AF)</b>	1.117* (2.55)	0.846* (2.52)	3.054* (1.338)	2.331* (0.784)
AF * male	-0.197 (-0.88)	-0.293 (-1.35)	0.821 (0.184)	0.746 (0.162)
AF * Rural	-0.431 (-1.37)	-0.373 (-1.58)	0.650 (0.205)	0.688 (0.163)
AF * fath edu1	-0.457 (-1.09)	-0.465 (-1.19)	0.633 (0.265)	0.628 (0.246)
AF * fath edu2	-1.276** (-2.98)	-0.836* (-2.11)	0.279** (0.120)	0.433* (0.172)
<b>_cons</b>	-2.026*** (-3.87)	-1.184*** (-3.62)	0.132*** (0.069)	0.306*** (0.100)
<b>N</b>		4600		4600
<b>df_m</b>		26		26
<b>LI</b>		-4026.8		-4026.837

*t* statistics are shown in parentheses

!  $p < 0.1$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

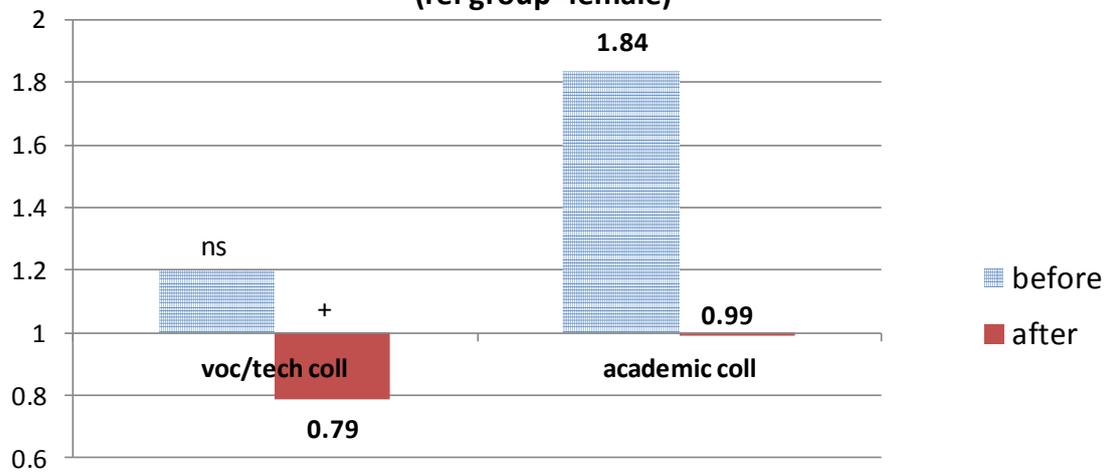
**Table 3: Multinomial Logit Estimates of the Probability of Progressing from Senior High School to Short Cycle Program and Full-program Colleges**

	Log Odds		Relative-Risk Ratios	
	short cycle	academic	short cycle	academic
<b>Male</b>	0.206 (1.03)	0.609* (2.44)	1.228 (0.245)	1.839* (0.459)
<b>Han</b>	0.214 (0.76)	0.264 (0.82)	1.239 (0.348)	1.302 (0.418)
<b>Rural Hukou origin</b>	0.054 (0.27)	-0.340! (-1.88)	1.056 (0.209)	0.712! (0.129)
<b>Party member</b>	0.026 (0.14)	0.262 (1.21)	1.026 (0.185)	1.300 (0.282)
<b>Father educa (ref=no education)</b>				
Elem-JuniorH	0.158 (0.37)	-0.734! (-1.69)	1.171 (0.495)	0.480! (0.209)
High Sch+	0.707 (1.62)	-0.226 (-0.56)	2.028 (0.886)	0.798 (0.322)
<b>Father occupa (ref=agriculture)</b>				
Managerial/professional	0.079 (0.28)	0.248 (1.18)	1.082 (0.306)	1.281 (0.268)
Other	0.140 (0.48)	0.247 (1.07)	1.150 (0.336)	1.281 (0.297)
<b>Number of sibling</b>	-0.060 (-1.28)	-0.007 (-0.09)	0.942 (0.044)	0.993 (0.083)
<b>Region (ref=east)</b>				
Central	-0.428* (-2.14)	-0.429 (-1.43)	0.652* (0.130)	0.651 (0.196)
West	-0.253 (-0.81)	0.010 (0.03)	0.776 (0.243)	1.010 (0.333)
<b>After expansion (AF)</b>	0.652 (1.42)	-0.802 (-1.28)	1.920 (0.884)	0.448 (0.282)
AF * male	-0.448! (-1.95)	-0.616* (-2.48)	0.639 (0.147)	0.540* (0.134)
AF * Rural	-0.284 (-1.15)	-0.011 (-0.03)	0.753 (0.186)	0.990 (0.351)
AF * fath edu1	-0.123 (-0.30)	1.614* (2.41)	0.884 (0.360)	5.020* (3.357)
AF * fath edu2	0.008 (0.02)	1.839*** (3.43)	1.008 (0.476)	6.287*** (3.370)
<b>_cons</b>	-1.552** (-2.76)	-1.634** (-2.89)	0.212** (0.119)	0.195** (0.110)
<b>N</b>		4600		4600
<b>df_m</b>		26		26
<b>LI</b>		-4026.8		-4026.837

*t* statistics are shown in parentheses

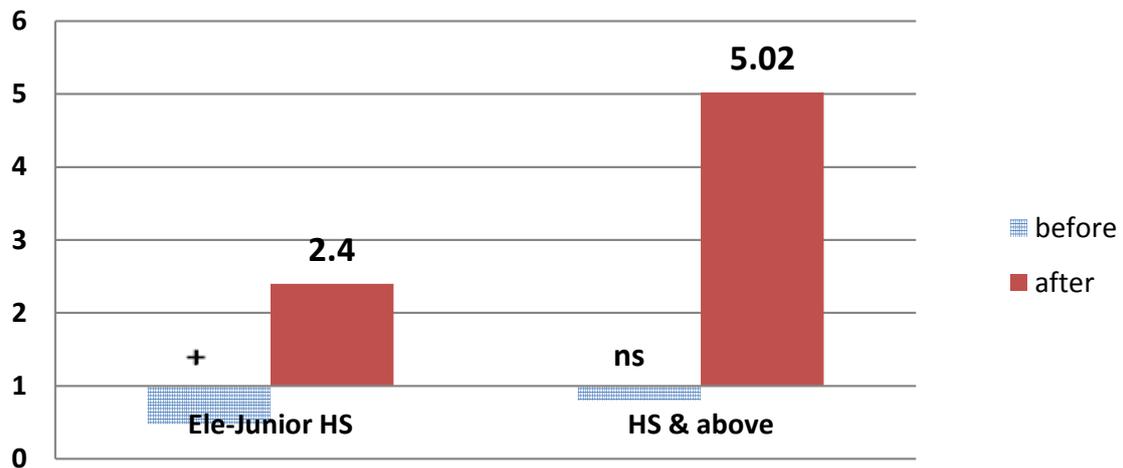
!  $p < 0.1$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Figure 10: Odds Ratio for Males to Progress to College before and after college expansion years (ref group=female)**



+: significant at .10 level; ns: not significant

**Odds Ratios of Progressing to Academic Colleges before and after college expansion years by Father's Education (ref group= parents with no formal education)**



+: significant at .10 level; ns: not significant