Assessing the Impact of College Enrollment Policy in China

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In the late 1990s, China implemented one of the most important educational policies in recent years - college enrollment expansion. Since then, the overall college enrollment has been dramatically increased, from 1,080,000 in 1998 to 4,200,000 in 2004. The extent to which the incremental quota for college enrollment has been equally allocated across gender, ethnic and socioeconomic status and how much the overall inequality in access to college education has changed since the implementation of this policy remain open questions. College education provides valuable human capital that has long-lasting consequences for the life chances of individuals and the international competitiveness of the country. It is important to understand the impact of the new policy to the overall educational attainment of the population as a whole, as well as its impact on different subgroups as the policy may either equalize or intensify inequality among subgroups in China. We first use the county-level census data collected in 1990 and 2000 to examine the evolution of the inequality in access to college education over time, focusing on observing the potential effects of the college enrollment expansion policies on the inequality of access to college education across various subgroups. We investigate differences by gender, region, urbanicity, and ethnic origins. In the next stage of our research, we will use the 1% sample census data in 1990, 2000, and 2005 to examine the changes at individual level for different birth cohorts.

Our strategy is to first break the sample by birth cohorts, and compare the within-birth-cohort indices of the inequalities in college education across the interested subgroups (gender, ethnicity, etc.) among birth cohorts. This depicts the evolution of the inequality in access to some college education over time. Furthermore, by comparing each subgroup's share of the within-birth-cohort inequality index between cohorts who

were about college age right before and after sharp changes in the college enrollment quota, we can estimate the effects of college enrollment expansion policy on this inequality across subgroups. The differential effects of such polices on different subgroups can also be estimated by the coefficients of the cohort-subgroup interactions in the regression of the individual college enrollment indicator on cohort dummies, subgroup dummies, the interactions of cohort and subgroups, and other available control variables in the data set. The policy effects are identified by the exogeneity of the policy changes, which cannot be manipulated by students and parents. We can also test for structural changes in the inequality in access to college education by comparing among birth cohorts, and see if the policy years represent "break points".

This project is among the first studies to use the latest China census data detailed at individual level to examine the impact of important changes in education policies on educational inequality at college level. Results from this project will add significant evidence to studies in the field usually with small-scale convenient sample or census data aggregated at the province/region level.

Preliminary Descriptive Data

We present some preliminary results based on the county-level census data to show changes over time across different subgroups. Table 1 presents the percentages of population in each province that were enrolled in higher education in 2000 and 1990, and changes from 1990 to 2000. We present data for junior colleges and universities separately. In China, junior college education is more professional-oriented and usually takes three years to finish, while university education usually takes at least four years,

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and are more academic-oriented. Moreover, admission to universities is usually much more competitive than to junior colleges. In 1990, the proportions in junior college and universities are generally very low, though higher for males than for females. On average, 1.2% of males and .5% of females were enrolled in junior colleges. The proportions in universities were even lower, less than half a percent on average. There was a higher degree of variation among provinces in university attendance than in junior colleges, particularly for females. Beijing and Shanghai were the two areas that have the highest proportions of population in higher education, with 2.2% for males and 1.2% for females in Beijing receiving university education, and 1.9% and 0.8% respectively for Shanghai.

From 1990 to 2000, the percentage of higher education enrollment had tripled rising to 3.1% for junior college and 1.3% for universities overall. The enrollment in junior colleges had increased more than that in universities, and more for males than for females. The percentage of university education had increased more for males than for female in every province. The provincial inequality in higher education at each level, as indicated by GINI coefficients and the coefficients of variation, had increased in 2000 except for percentage of male with junior college education, and the increase was larger among females. Beijing enjoyed the biggest gain over the decade and topped the list again in 2000, with about 7% enrollment in junior colleges and 6% in universities, and Shanghai trailed behind only by about one percentage point. Tianjin, Liaoning, and Xinjiang also had an impressive gain in higher education enrollment between 1990 and 2000. There is some suggestion from these preliminary results that the disparities may be even wider in graduate schools which only very few had attended by 2000 (averaging 1%

overall, with more males than females enrolled, and concentrate heavily in Beijing and Shanghai).

Table 2 shows the higher education enrolment by the quartiles of proportion of non-agricultural households in the county[1]. In 1999, the percentage of higher education was higher for counties with higher percentage of non-agricultural population. From 1990-2000, the increase in the percentage of higher education enrollment at each level was higher for counties with a higher proportion of non-agricultural households, with disproportionately large increases in areas belonging to the 4th quartile of proportion of nonagricultural population (most urban areas).

Table 3 shows the distribution by regions. Historically, northeast region had the highest proportion of population enrolled in higher education and southwest region had the lowest. During this decade, the increase in percentage of population receiving higher education at each level was highest for the Northeast, which contains the three cities of Liaoning, Jilin, and Heilongjiang. The other four regions, North, East, South, and Northwest also had comparable progress in the percentage of population receiving higher education. (Beijing is in the North region, and Shanghai is in the East region.) The Southeast region had the smallest increase. This region includes Sichuan, Yunan, Guizhong, and Xizang, most of which are among the most economically under-developed provinces of China, and are with much larger ethnic diversity than other regions. This differential rate of increase resulted in a much sharper disparity between the Southwest and other regions in recent years. From 1999-2000, in every region, the increase in the percentage of higher education at each level was higher for males than for females.

[1]In the 1990 data, the first, second, and third quartiles correspond to approximately 6%, 9% and 17% of the total households in the county that are non-agricultural. The corresponding proportions are 11%, 16%, and 36% in 2000.

Table 4 shows the patterns comparing the minority-concentrated areas (i.e., areas/counties where the majority ethnic group Han population consists of no more than 50% of the total population[2] and the rest of the sample. For both males and females, at all level of higher education in both years, the minority-concentrated areas had a lower percentage receiving higher education than the rest of the sample. Moreover, they also had a significantly smaller increase in the percentage of junior college education than the rest of the sample. This indicates that, although there had been some increase in higher education completion for minority groups, disparity in higher education completion between the Han majority and the other ethnic groups remained a challenge in China.

Preliminary Observation

These descriptive statistics, though crude, suggest that there appear to be wider disparities among gender and ethnic sub-groups as well as by region and urbanicity in 2000 compared to 1990. There is also some hint that the disparities may be even sharper with graduate schools enrollment which only very few have attended to date in China. We cannot be sure, however, that this amplified inequality in higher education is a result of the policies aimed at expanding the college enrollment based on these results. With the 1% census data at the individual level, more detailed analyses will be conducted in the next few months to better assess the effects of the college enrollment expansion policies on the inequality of access to college education across various subgroups.

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[2] This cut-off point is used to obtain adequate between-group variation in ethnic diversity in both the 1990 and 2000 census data. Other lower percentage of Han population was also used, and similar patterns were obtained.

Table 1: Percentage of higher education in the population

In 2000

province	Junior College			University			Graduate School		
	all	male	female	all	male	female	all	male	female
Beijing	7.4	7.4	7.4	6.2	6.9	5.4	0.8	1.0	0.6
Tianjin	5.8	6.2	5.4	3.9	4.5	3.2	0.2	0.3	0.2
Hebei	2.6	2.9	2.3	1.1	1.3	0.8	0.0	0.0	0.0
Shanxi	2.7	3.1	2.3	0.9	1.1	0.7	0.0	0.0	0.0
Neimenggu	3.4	3.8	3.0	1.0	1.2	0.7	0.0	0.0	0.0
Liaoning	5.1	5.5	4.7	2.2	2.7	1.7	0.1	0.1	0.1
Jilin	3.8	4.2	3.4	2.1	2.4	1.7	0.1	0.1	0.1
Heilongjiang	4.1	4.5	3.6	1.4	1.7	1.1	0.0	0.1	0.0
Shanghai	6.4	7.2	5.5	5.3	6.5	4.0	0.5	0.6	0.3
Jiangsu	4.3	5.2	3.3	2.4	3.1	1.6	0.1	0.2	0.1
Zhejiang	2.7	3.2	2.2	1.3	1.7	0.9	0.1	0.1	0.0
Anhui	3.0	3.8	2.1	1.5	2.2	0.9	0.1	0.1	0.0
Fujian	2.7	3.5	1.9	1.4	2.0	0.9	0.1	0.1	0.1
Jiangxi	2.5	3.3	1.6	0.9	1.3	0.5	0.0	0.0	0.0
Shandong	3.1	3.8	2.4	1.5	1.9	1.0	0.1	0.1	0.0
Henan	3.6	4.2	3.1	1.2	1.5	0.8	0.0	0.1	0.0
Hubei	3.6	4.4	2.8	1.5	2.0	1.0	0.1	0.1	0.1
Hunan	3.2	3.9	2.6	1.3	1.8	0.8	0.1	0.1	0.0
Guangdong	3.4	4.2	2.6	1.4	1.8	0.9	0.1	0.1	0.1
Guangxi	2.7	3.3	2.1	1.1	1.4	0.7	0.0	0.1	0.0
Hainan	3.2	4.2	2.1	1.2	1.7	0.7	0.1	0.1	0.0
Chongqing	2.4	2.7	2.0	1.2	1.6	0.8	0.1	0.1	0.0
Sichuan	2.1	2.5	1.6	0.8	1.0	0.5	0.0	0.1	0.0
Guizhou	1.7	2.1	1.3	0.7	0.9	0.4	0.0	0.0	0.0
Yunnan	1.6	1.9	1.2	0.6	0.7	0.4	0.0	0.0	0.0
Xizang	0.8	1.1	0.5	0.3	0.4	0.2	0.0	0.0	0.0
Shaanxi	2.9	3.4	2.3	1.3	1.7	0.9	0.1	0.1	0.1
Gansu	2.4	3.0	1.7	0.8	1.1	0.5	0.0	0.1	0.0
Qinghai	2.6	3.1	2.0	0.9	1.1	0.5	0.0	0.0	0.0
Ningxia	3.3	3.8	2.7	1.4	1.8	1.0	0.0	0.0	0.0
Xinjiang	4.9	5.0	4.7	1.3	1.5	1.0	0.0	0.0	0.0
Coefficient of variation	0.42	0.36	0.52	0.79	0.73	0.95	1.81	1.63	2.12
Gini coefficient	0.22	0.19	0.26	0.34	0.32	0.39	0.68	0.59	0.79
Total	3.1	3.6	2.5	1.3	1.7	0.9	0.1	0.1	0.0

in 1990

Province	Junior College			University		
	all	male	female	all	male	female
Beijing	1.9	2.2	1.5	1.7	2.2	1.2
Tianjin	1.3	1.6	0.9	0.8	1.0	0.5
Hebei	0.6	0.9	0.4	0.3	0.4	0.2

province	all	male	female	all	male	female
Shanxi	0.8	1.1	0.4	0.3	0.4	0.1
Neimenggu	1.1	1.4	0.7	0.4	0.6	0.2
Liaoning	1.4	1.8	1.0	0.6	0.9	0.3
Jilin	1.4	1.9	1.0	0.8	1.1	0.5
Heilongjiang	1.6	2.0	1.2	0.4	0.6	0.2
Shanghai	1.7	2.4	1.1	1.3	1.9	0.8
Jiangsu	1.2	1.7	0.6	0.6	0.9	0.3
Zhejiang	0.8	1.2	0.5	0.4	0.6	0.2
Anhui	0.9	1.3	0.5	0.5	0.7	0.2
Fujian	0.9	1.3	0.5	0.5	0.8	0.2
Jiangxi	0.9	1.3	0.4	0.4	0.6	0.1
Shandong	0.7	1.0	0.4	0.3	0.4	0.1
Henan	0.9	1.2	0.5	0.3	0.5	0.1
Hubei	1.1	1.6	0.6	0.4	0.6	0.2
Hunan	1.1	1.5	0.6	0.4	0.6	0.2
Guangdong	1.1	1.6	0.5	0.4	0.6	0.2
Guangxi	0.7	0.9	0.3	0.3	0.5	0.1
Hainan	1.5	2.2	0.6	0.4	0.6	0.1
Sichuan	0.6	0.9	0.3	0.3	0.5	0.1
Guizhou	0.5	0.7	0.3	0.3	0.4	0.1
Yunnan	0.5	0.7	0.3	0.2	0.3	0.1
Xizang	0.3	0.5	0.2	0.2	0.2	0.1
Shaanxi	0.7	1.0	0.4	0.4	0.6	0.2
Gansu	0.7	1.0	0.3	0.3	0.4	0.1
Qinghai	0.8	1.2	0.4	0.4	0.7	0.2
Ningxia	1.1	1.6	0.7	0.6	0.8	0.3
Xinjiang	1.3	1.6	0.9	0.5	0.7	0.3
Coefficient of variation	0.39	0.35	0.52	0.64	0.60	0.94
Gini coefficient	0.21	0.19	0.27	0.28	0.27	0.39
Total	0.9	1.2	0.5	0.4	0.6	0.2

Increase in the percentage of higher education in the population:1990-2000

province	**Junior College**			**University**		
	all	male	female	all	male	female
Beijing	5.5	5.2	5.9	4.5	4.7	4.2
Tianjin	4.5	4.6	4.5	3.1	3.5	2.7
Hebei	2.0	2.0	1.9	0.8	0.9	0.6
Shanxi	1.9	2.0	1.9	0.6	0.7	0.6
Neimenggu	2.3	2.4	2.3	0.6	0.6	0.5
Liaoning	3.7	3.7	3.7	1.6	1.8	1.4
Jilin	2.4	2.3	2.4	1.3	1.3	1.2
Heilongjiang	2.5	2.5	2.4	1.0	1.1	0.9
Shanghai	4.7	4.8	4.4	4.0	4.6	3.2
Jiangsu	3.1	3.5	2.7	1.8	2.2	1.3
Zhejiang	1.9	2.0	1.7	0.9	1.1	0.7
Anhui	2.1	2.5	1.6	1.0	1.5	0.7
Fujian	1.8	2.2	1.4	0.9	1.2	0.7
Jiangxi	1.6	2.0	1.2	0.5	0.7	0.4
Shandong	2.4	2.8	2.0	1.2	1.5	0.9

Henan	2.7	3.0	2.6	0.9	1.0	0.7
Hubei	2.5	2.8	2.2	1.1	1.4	0.8
Hunan	2.1	2.4	2.0	0.9	1.2	0.6
Guangdong	2.3	2.6	2.1	1.0	1.2	0.7
Guangxi	2.0	2.4	1.8	0.8	0.9	0.6
Hainan	1.7	2.0	1.5	0.8	1.1	0.6
Sichuan	1.5	1.6	1.3	0.5	0.5	0.4
Guizhou	1.2	1.4	1.0	0.4	0.5	0.3
Yunnan	1.1	1.2	0.9	0.4	0.4	0.3
Xizang	0.5	0.6	0.3	0.1	0.2	0.1
Shaanxi	2.2	2.4	1.9	0.9	1.1	0.7
Gansu	1.7	2.0	1.4	0.5	0.7	0.4
Qinghai	1.8	1.9	1.6	0.5	0.4	0.3
Ningxia	2.2	2.2	2.0	0.8	1.0	0.7
Xinjiang	3.6	3.4	3.8	0.8	0.8	0.7
Coefficient of variation	0.0	0.0	0.2	0.3	0.1	0.4
Gini coefficient	0.0	0.0	0.1	0.1	0.0	0.1
Total	2.2	2.7	1.3	0.8	1.3	0.3

Table 2: Percentage of higher education in the population, by quartiles of % non-agricultural households

Percentage of higher education in the population in 2000, by quartiles of % non-agriculture households

Quartiles of % of non-agri HH	Junior College			University			Graduate School		
	all	male	female	all	male	female	all	male	female
1st quartile	1.1	1.4	0.7	0.2	0.3	0.1	0.0	0.0	0.0
2nd quartile	1.6	2.1	1.1	0.3	0.5	0.2	0.0	0.0	0.0
3rd quartile	2.5	3.1	2.0	0.7	1.0	0.5	0.0	0.0	0.0
4th quartile	7.2	7.9	6.4	3.9	4.8	2.9	0.2	0.3	0.1
Total	3.1	3.6	2.5	1.3	1.7	0.9	0.1	0.1	0.0

Percentage of higher education in the population in 1990, by quartiles of % non-agriculture households

Quartiles of % of non-agri HH	Junior College			University		
	all	male	female	all	male	female
1st quartile	0.3	0.5	0.1	0.1	0.1	0.0
2nd quartile	0.4	0.7	0.2	0.1	0.2	0.0
3rd quartile	0.7	1.0	0.3	0.2	0.3	0.1
4th quartile	2.1	2.7	1.4	1.1	1.6	0.6
Total	0.9	1.2	0.5	0.4	0.6	0.2

Increase between 1990 and 2000

Quartiles of % of non-agri pop	Junior College			University		
	all	male	female	all	male	female
1st quartile	0.8	0.9	0.6	0.1	0.2	0.1
2nd quartile	1.2	1.4	0.9	0.2	0.3	0.2
3rd quartile	1.8	2.1	1.7	0.5	0.7	0.4
4th quartile	5.1	5.2	5.0	2.8	3.2	2.3
Total	2.2	2.4	2.0	0.9	1.1	0.7

Table 3: Percentage of higher education in the population, by region

Percentage of higher education in the population in 2000, by region

Region	Junior College			University			Graduate School		
	all	male	female	all	male	female	all	male	female
1 North	3.2	3.5	2.8	1.3	1.6	1.1	0.1	0.1	0.1
2 Northeast	4.4	4.8	3.9	1.8	2.2	1.4	0.1	0.1	0.1
3 East	3.2	3.9	2.4	1.6	2.2	1.1	0.1	0.1	0.1
4 South	3.3	4.0	2.6	1.3	1.7	0.8	0.1	0.1	0.0
5 Southwest	1.7	2.1	1.3	0.7	0.9	0.4	0.0	0.0	0.0
6 Northwest	3.3	3.7	2.8	1.1	1.4	0.8	0.0	0.1	0.0
Total	3.1	3.6	2.5	1.3	1.7	0.9	0.1	0.1	0.0

Percentage of higher education in the population in 1990, by region

Region	Junior College			University		
	all	male	female	all	male	female
1 North	0.8	1.1	0.5	0.4	0.5	0.2
2 Northeast	1.5	1.9	1.1	0.6	0.8	0.3
3 East	0.9	1.3	0.5	0.4	0.7	0.2
4 South	1.0	1.4	0.5	0.3	0.5	0.1
5 Southwest	0.5	0.7	0.3	0.3	0.4	0.1
6 Northwest	0.9	1.2	0.5	0.4	0.6	0.2
Total	0.9	1.2	0.5	0.4	0.6	0.2

Table 4: Percentage of population in higher education, by % Han population

Percentage of population in higher education in 2000

	Junior College			University			Graduate School		
% of Han population	all	male	female	all	male	female	all	male	female
less than or equal to 50%	1.73	2.14	1.28	0.39	0.54	0.24	0.01	0.02	0.01
more than 50%	3.34	3.90	2.76	1.46	1.88	1.03	0.07	0.10	0.05
Total	3.09	3.62	2.54	1.29	1.66	0.90	0.06	0.09	0.04

Percentage of population in higher education in 1990

	Junior College			University		
% of Han population	all	male	female	all	male	female
less than or equal to 50%	0.90	1.21	0.55	0.28	0.42	0.14
more than 50%	0.93	1.28	0.55	0.41	0.61	0.20
Total	0.93	1.28	0.55	0.40	0.60	0.20

Increase in the percentage of higher education in the population: 1999-2000

	Junior College			University		
% of Han population	all	male	female	all	male	female
less than or equal to 50%	0.83	0.93	0.72	0.11	0.12	0.11
more than 50%	2.41	2.61	2.22	1.05	1.27	0.83
Total	2.17	2.34	1.99	0.89	1.07	0.71