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"Lost at the starting line": a reconsideration of educational inequality in China, 1978–2008

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Abstract

This research explores the changes in educational inequality between school transitions in China. Due to the mechanism of differentiated selection, life course, and heterogeneous early education, the impact of students' socioeconomic status and cultural background on their educational opportunities is expected to decline in secondary and higher education, while the impact of the grade of school is assumed to rise. A multinomial logistic regression was carried out to test this hypothesis based on the 2008 Chinese General Social Survey. Results show that the early stages see the most severe inequality of educational attainment; as students move up to higher stages of education, the contribution of SES and cultural background is largely replaced by the grade of school. Therefore, more emphasis should be put on educational inequality at an early stage.

Keywords: Educational inequality, Educational attainment, MMI, Educational tracking, Educational equality

Introduction

Educational opportunity is one of the core issues of social mobility studies, among which educational inequality is usually defined as the unequal distribution of educational opportunities (Wu 2010). In modern society, education functions both as a channel of the reproduction of the upper class and a chance for the lower class to move upward. Such a unique role causes sociologists to pay significant attention to educational issues, especially educational inequality. Since the structure of stratification and the mechanism of mobility have experienced great change since 1978 (Li 2008), the unequal distribution of educational opportunities can be seen partly as the unequal distribution of resources and power between groups. Exploring the production of and changes in educational inequality can thus contribute to our understanding of stratification and mobility in China.

There has been much scholarly discussion on educational inequality. Some researchers focus on the effect of specific ascriptive factors on educational opportunities (Hannum 2002; Hong 2010; Tan and Xie 2011; Wu 2012; Ye and Wu 2011); others pay attention to how such effects vary under the impact of school expansion (Guo and Wu 2008; Lucas 2001; Raftery and Hout 1993; Treiman 2013; Li 2010) and institutional transformation (Walder et al. 2000; Zhou et al. 1998; Li 2003; Li 2006; Wu

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2013b), while others are concerned with the mechanism producing inequality (Gao 2013; Li 2006; Liu 2008; Wu 2013a, 2013b). Generally speaking, these studies have established a firm foundation for understanding educational inequality in China.

However, despite the emphasis on quantitative difference in the distribution of educational opportunities, little has yet been said about the quality distinction between different opportunities. Another important aspect is also missing, that is, how the issue varies between different educational phases. This research was thus designed to reexamine educational inequality in China between 1978 and 2008 from both a qualitative and a life course perspective. To be more specific, our research question focuses on how family background—taking socioeconomic status and cultural background into consideration—has impacted the individual's educational attainment since Deng's era. How does this influence vary by different educational phases, and why does it vary?

In the following, we first present a short review of current studies, then show the necessity of qualitative and life course perspectives. After a close examination of Li and Liu's work (Li 2006; Liu 2008), we propose our own framework and research hypothesis to explore the variation in educational inequality and its mechanism. Finally, a multinomial logistic regression based on the 2008 Chinese General Social Survey (CGSS2008) is utilized to test our hypothesis.

The maximally maintained inequality and effective maintained inequality hypotheses: research based on local experience

Empirical studies on educational inequality can be roughly divided into two categories: studies designed to test the effect of school expansion and those that aim to reveal how other factors contribute.

Many sociologists are concerned with the question of whether school expansion can reduce educational inequality, to which the maximally maintained inequality (MMI) and effective maintained inequality (EMI) hypotheses provide two approaches. The originators of the MMI hypothesis, Raftery and Hout (1993), believe that for a specific education phase in a specific society, (1) the demand for education will increase with a population increase and the elevation of the average social origin; thus, the expansion of higher education is partly a reflection of the expanding demand for education; (2) when the enrollment rate resulting from school expansion exceeds the natural growth of the demand for education, the transition rate from all kinds of social backgrounds will be promoted, but members of the upper classes still have advantages; and (3) at a certain stage when the education demand of members of the upper classes is close to saturation, that is, their transition rate at the stage is close to or has already reached 100 %, further school expansion will be conducive to the lower classes. Raftery and Hout summarize these three phenomena as "MMI." Not satisfied with this conclusion, Lucas (2001) points out that members of the upper classes pursue not only more opportunities for education but also better education quality at the same time. Transition is not an either-or decision but a multiple choice with various options. Therefore, even if the education opportunity has already been saturated at a certain stage, the equalizing effect of further school expansion will not come since only low-quality education resources will be available to lower classes. In the future, their members will still remain in a weak position in the labor market. This is the hypothesis of "EMI."

In China, the MMI hypothesis is the main concern. However, in addition to the general discussion of the adaptability of the MMI hypothesis, Chinese scholars attach great importance to the transformation of the institutional environment and the socio-historical conditions, especially the impact of the changes of the overall Chinese social stratification system on educational inequality since the reform and opening up. As Li (2009) points out, changes in the structure of social inequality affect the mechanism of social mobility, and education is the main mechanism of intergenerational mobility and inheritance in modern society. Therefore, scholars must associate educational inequality with its background of macro-sociohistorical changes so that its true functioning mechanism and historical evolution can be deeply understood (Li 2009). From the perspective of institutional change, scholars have basically achieved consensus that due to the policy intervention of the nation before the reform, the impact of social class background on education was greatly weakened and members of the lower class even have a reverse advantage. After the reform, especially in the deepening period after 1992, education inequality brought about by educational background, the urban–rural gap, and socioeconomic status has significantly improved. Education was transformed from an opportunity for the elite to the masses (Guo and Wu 2008; Wu 2010; Zhou et al. 1998; Hao 2007; Li 2003; Li 2010; Li 2006; Wu 2009; Wu 2013b). This means that although the phenomenon described by MMI does exist, it is not the inevitable result of industrialization, but can be constrained by national policy. Only when the national policy has a tendency toward marketization will the characteristics predicted by MMI appear.

In addition, some scholars discuss the issue of educational inequality in terms of five dimensions: social stratum, urban or rural, gender, ethnicity, and region (Feng 2012). After the reform and opening up, the inequality of educational attainment between different classes and urban and rural areas has been maintained and even intensified (Wu 2010; Hao 2007; Li 2010; Wu 2009; Wu 2013a), while the educational opportunities of different genders gradually equalized (Treiman 2013; Wu 2012; Ye and Wu 2011; Zhang and Chen 2013). Educational attainment still varies by ethnicity, and the variation results from such factors as urban and rural residence as well as social stratum. Some scholars even found that when these factors are controlled, ethnic minority children can obtain more educational opportunities (Hong 2010; Tan and Xie 2011). Whether educational opportunities of different regions polarize or equalize is still a controversial issue (Feng 2012).

Educational quality and the comparison of different school transitions: a new perspective of exploring educational inequality

There are two main problems in the existing research. First, the main focus is given to the quantitative inequality of educational opportunities among different classes with the qualitative inequality missing. This is probably because of the controversy on how to define quality in education and the difficulty in cross-national comparisons due to the fact that institutional factors that define educational quality vary in different countries (Lucas 2001). However, the addition of a qualitative dimension can help us more deeply understand educational inequality in a particular country. In this circumstance, it is necessary to discuss the inequality in educational quality. Among the existing research, Li (2010), Wen (2005), Liu and Gao (2011), and Hou et al. (2008) have tested

the EMI hypothesis in their research, all of which, however, showed certain defects in terms of data representativeness and statistical methodology.

Wu's "Educational Tracking System and the Educational Stratification in China (1978–2008)" (2013a) is a new attempt to explore the inequality of educational quality. He constructs the model concerning the grade of school through the key school system and school tracking system. The result of school transition between primary school and junior high school is divided into three categories: going to a key school, going to a nonkey school, and no further study. The results of school transition between junior high school and high school and between high school and universities are divided into the two aforesaid dimensions. The same three categories as above apply to the key school system, while in the school tracking system the results are divided into the three categories of attending an ordinary high school, attending a vocational high school, and no further study. Based on relevant data from CGSS2008, Wu found that the key school system and the double tracking system of academic and vocational education maintain educational inequality and students from a family with high socioeconomic status are more likely to enter a key school or academic tracking. In addition, there is a cumulative advantage in such inequality.

Wu's research is a breakthrough in this field. However, the differentiation he has made between the two analysis paths of the key school system and the school tracking system may lead to ascribed factors being underestimated. Indeed, the educational tracking system and the key school system are the two major factors in differentiating educational quality, but whether they can be treated as two parallel dimensions still remains to be discussed. In fact, according to Wu's division, when studying the effect of the key school system, ordinary nonkey schools (including high schools and universities) are grouped together with vocational schools; when studying the effect of the school tracking system, key schools and nonkey schools are grouped together. This increases within-group variation and affects the estimates.

In fact, unlike those in European countries, Chinese vocational educational institutions cannot provide high-quality vocational and technical training; thus, their graduates do not have the same market competitiveness as those in the academic track. Therefore, the vocational track cannot be a reasonable choice for one's life planning; on the contrary, vocational education always becomes an appendage of academic education. A hierarchical structure has basically been formed in all phases of education as key schools, nonkey schools, and vocational schools. Especially in the institutional circumstance of the Chinese Unified Entrance Examination, key schools, ordinary nonkey schools, and vocational schools enroll students on the basis of their academic records, which very clearly shows the hierarchical differences.

The second deficiency of the existing research lies in the neglect of cross-stage comparison. The research on the inequality of educational opportunities addresses two aspects: (1) whether at a particular enrollment stage the influence of family background varies in different cohorts and (2) whether in a particular cohort the influence of family background varies in different enrollment stages. When Mare proposed the school transition model (Mare 1980), he found an interesting fact: the influence of family background gradually weakens with the elevation of the enrollment stage. The following comparative research findings in every country and every cohort turn out to be surprisingly consistent, all supporting the foregoing conclusion (Lucas 1996; Lucas

2001). However, Chinese scholars pay little attention to the comparison of different school transitions, probably because with the development of statistical methodology in recent years, the fact that the influence of family background weakens with the elevation of enrollment stage is considered an illusion due to the deficiency of statistical techniques to a certain extent (Holm and Jæger 2011; Lucas 2001). However, in this research, comparison of different school transitions is still regarded as a strong supplement to the existing studies that are dominated by the cohort comparison for the following two main reasons.

First, a cohort comparative study focuses more on the influence of macrostructural factors on educational inequality such as school expansion and decreasing fertility rates, while comparison of different school transitions contributes to the understanding of the generation mechanism of educational inequality from the microcosmic individual perspective, especially from the development of individual life angle.

Second, the Chinese educational grouping system differs from that of the USA (Ballantine and Hammack 2011). In the USA, students can choose their courses every semester and are grouped or tracked to college preparatory education, general education, or vocational education according to their selected courses. In this situation, students can adjust their courses according to their parents' expectations, learning ability, motivation, and other factors; hence, school internal mobility is very high. In China, school internal grouping is relatively low. The main grouping or tracking is reflected between schools: they are divided into key schools, ordinary schools, and vocational schools. Also, the courses taken by Chinese students in each semester are fixed, formulated by schools in a unified way; thus, school internal mobility is relatively low. Therefore, the school transitions of each Chinese student tend to directly determine the educational quality they receive, and 3 years of different educational quality will in turn affect the next school transition. In other words, compared to that of the USA, the cumulative effect or path dependence of education in China is stronger. Due to the existence of this cumulative effect, it is natural for us to question whether family background has a different impact between early and late education.

Because of these two deficiencies, this research aims to add the qualitative dimension when studying educational inequality, dividing the school category into key schools, nonkey schools, vocational schools, and no further study and comparing educational inequality in different school transitions. When there is a change in the individual school transition, the macro-factors such as population, system, and social structure also change. Thus, the impact of the former on educational inequality should be discussed under the control of these factors.

Research framework and hypothesis

Resource internalization and structural grant: the dual generation path of educational inequality

The works "Institutional Change and Generation Mechanism of Educational Inequality" by Yu Li (2006) and "Opportunity Inequality and its Change in Chinese Basic Education" by Jingming Liu (2008) provide the main basis for the construction and analysis framework of this research. Therefore, before proposing the research hypothesis, a brief review of two articles is presented.

Li's research (2006) attempts to explore the micro-mechanism of educational reproduction with a systematic background. He proposes three ideal patterns that influence intergenerational educational opportunity and points out the respective institutional conditions that these three patterns depend on. Among them, the cultural reproduction pattern and resource transformation pattern are particularly relevant to this research. The cultural reproduction pattern refers to the fact that children whose parents have a higher education background have the advantage of attaining educational opportunity (Li 2006). In this pattern, parents' educational expectations, cultural capital, and human capital are internalized as children's learning motivation and learning performance, indirectly transforming to educational opportunity. Its institutional foundation lies in the fact that the educational system is ruled by the performance principle to ensure the transformation from learning performance to educational opportunity. The resource transformation pattern refers to the fact that the family's socioeconomic resources are transformed into their children's advantage of educational opportunity attainment, thus realizing the transmission of intergenerational inequality (Li 2006). In this pattern, the higher class takes advantage of their resources to directly gain more educational opportunities than other classes in school transitions. Its institutional foundation lies in the resource transformation space in the educational system. With strict social differentiation, resource ownership varies greatly in different classes. If there is a certain institutional space that enables the exclusion mechanism to operate effectively, the resource transformation pattern will become the dominant logic of generating educational inequality.

Liu (2008) also discusses the micro-mechanism of educational inequality. He distinguishes two types of ascribed family resources: endogenous family resources and exdogenous family resources. The term "endogenous family resources" refers to a natural indigenous family structure and the intellectual and emotional system internalized in family members. Typical endogenous resources include family structure and family cultural capital (Liu 2008). It is less influenced by the intervention of external social conditions and social processes. Relatively, exdogenous family resources are dependent on the external social environment. The material resources necessary for children's growth and development depend on their parents' or guardians' gains in the labor market (more widely, in all areas of society). The resources have a close relationship with labor market conditions, system environment, and other social environmental changes (Liu 2008). The two types of educational resources have different influencing mechanisms of educational attainment: endogenous family resources affect students' educational opportunity attainment by way of changing and differentiating learning ability; exdogenous family resources change students' educational opportunities by way of structural grants and direct resource distribution. The two different influencing mechanisms lead the inequality caused by endogenous family resources to continuously and steadily increase, while the inequality caused by exdogenous family resources weakens or strengthens in light of other social conditions such as school expansion.

Both the distinction made by Li between the cultural reproduction pattern and the resource transformation pattern and the distinction made by Liu between endogenous and exdogenous family resources point to this fact: the reproduction of the inequality of educational opportunity attainment has dual paths. By way of internalizing as children's learning motivation and learning ability, certain endogenous family resources

influence children's learning performance, which in turn are transformed into further learning opportunities. Some exogenous family resources change students' attainment probability of educational opportunities through structural grants and direct resource distribution. This insight provides an important analysis method for this research, which aims to point out that exdogenous resources can not only change students' attainment probability of educational opportunities through structural grants and direct distribution but can also internalize it in some way, directly shaping students' learning performance.

The relationship between elevation of the enrollment stage and educational inequality: a research hypothesis[1]

The research aims to explore the change in educational inequality with the elevation of the enrollment stage. Mare (1980) finds that along with the elevation of the enrollment stage, not only is the direct correlation between family background and enrollment probability reduced but the indirect correlation between family background and learning performance and the deviation of students' learning performance declines as well. He claims that this is the result of a differentiated selection, which refers to the idea that those who have inferior socioeconomic status and often have a poor academic performance have already been screened out at an early stage. Those who stand out with access to education thus display a higher level and small variation in their learning motivation, ability, and family background.

However, some scholars (Lucas 1996) disagree with the differentiated selection hypothesis. They claim that the phenomenon is due to the fact that at an early age children have more economic, social, and psychological dependence on their parents, but as they grow up their dependence declines; thus, the relationship between family background and enrollment probability gradually weakens, namely the life course perspective. This in fact points out such a phenomenon: the transformation of learning motivation and learning ability made by parents' educational expectations, cultural capital, and human capital decreases with age, and the basis of students' own learning motivation and ability in turn becomes the major factor promoting the further increase of learning motivation and ability. Thus, difference selection and life course perspective are not in conflict; the former focuses on group composition, while the latter is concerned with the development of individual ability in the group. They can be regarded as two mechanisms that reduce the influence of family background. Based on the hypothesis of difference selection and the life course perspective, the following two conclusions can be drawn:

>   Hypothesis 1: The influence of family socioeconomic status on enrollment probability declines with school transitions.
>   Hypothesis 2: The influence of family cultural background on enrollment probability declines with school transitions.

In addition, there is an important mechanism in the generation process of educational inequality, called heterogeneous education in this research. There are differences in the quality of school education. A school with better educational quality can more

effectively improve students' learning motivation and learning ability, thus promoting their learning performance more effectively. Since children from higher classes can receive better education, the advantage of their socioeconomic status will gradually turn into an academic advantage and the direct intervention of socioeconomic resources in education opportunities is no longer necessary. Therefore, the relationship between later educational attainment and socioeconomic background will become increasingly weak. In other words, the indirect influence of family background on educational achievement will decline or disappear under the intervention of such mechanisms as talent and motivation (Zhang 2011).

This means that exogenous family resources can enhance students' learning motivation and learning ability through early quality education. Even if students' endogenous family resources, learning motivation, and learning ability are poor, a high-quality school education can still effectively compensate for the disadvantages, improving their academic record. In other words, for the different cohorts in the same enrollment stage, the influencing mechanism of endogenous resources is independent of that of exodgenous resources, while for the same cohort in the different enrollment stages exogenous resources can also influence students' learning motivation and learning ability by means of early education as the intermediate stage.

In fact, this influencing mechanism is particularly important in China because the difference in teaching within Chinese schools is relatively small, while the difference between schools is large. In addition, as stated earlier, Chinese students always have a fixed curriculum with little freedom to select their courses. As a result, a Chinese student's school transition is very likely to directly determine the educational quality that he/she can achieve in the next 3 or 4 academic years. This will in turn influence the student's learning motivation and learning ability, and thus affect learning performance, which become the main determinants in school transitions in China's unified examination and enrollment system. This enables students who attain quality education at an early age to enjoy a huge advantage in school transitions, which may be stronger than that of the students in the USA. On the other hand, once students fall back in early education, they will be in an inferior position. This is exactly the meaning of the phrase "losing at the starting line."

In conclusion, students who can attain better education at an early stage can achieve better academic results, thus entering a better school and further gaining a better education. With the elevation of the enrollment stage, this advantage can be accumulated, making it more and more difficult to transition from a lower to a higher level at a later stage. Early heterogeneous education manifests itself as the influence of the grade of school. In other words, the influence of school level becomes increasingly large in school transitions, substituting for the influence of socioeconomic status. If this mechanism exists, such a phenomenon should be found:

Hypothesis 3: The impact of the grade of school on enrollment probability gradually increases in school transitions.

In summary, this research claims that under relatively stable institutional circumstances, the influence of family background on enrollment probability decreases with the elevation of the enrollment stage. The specific process is presented below: family

background produces an important influence on previous school transition, K (such as the transition from primary school to junior high school), and students with good family background are admitted into better schools (key junior high schools). At this moment, (1) difference selection results not only in the convergence of learning motivation and ability but also that of family background of students within schools in the enrollment stage; (2) due to life course development, namely a student's individual growth, the transformation efficiency from family resources to learning motivation and ability decreases. The joint influence of difference selection and life history leads the impact of family background to be relatively reduced, while individual factors are magnified; and (3) due to the influence of heterogeneous education, school educational resources are transformed into students' learning motivation and learning ability; thus, students from better schools already have an advantage in learning motivation and ability, and the necessity and willingness of family intervention is reduced. The common result of the three aforementioned mechanisms is the fact that the impact of family background decreases in later school transitions, $K + 1$ (such as the transition from junior high school to high school).

In conclusion, this research claims that the influence of family socioeconomic status and cultural background on children's educational opportunity decreases with the elevation of enrollment stages, while the impact of the grade of school increases. This research adopts the data of CGSS2008 to test these hypotheses.

Data, variable, and model

Data

This study uses data collected from the 2008 Chinese General Social Survey (CGSS2008). CGSS2008 uses the method of multistage random sampling, collecting a sample of 6000 in Chinese mainland with 3982 samples from urban areas and 2018 samples from rural area, which is representative of the national scale. The data collected detailed information on the education background of both respondents and their family members. The object of this study is the sample enrolled in junior high school, senior high school, or higher education between 1978 and 2008. Furthermore, since the aim of this study is to examine the effect of family background on access to education, education background is strictly defined as formal and full-time education, which means in-service education is not taken into account. In addition, the sample is not included in this study if the student took more than 5 years to graduate, which means students who took more time to gain the same education than normal students are not discussed. The descriptive statistics of effective sample size and related variables in each educational stage are shown in Table 1.

Variable

Dependent variable

The dependent variable in this paper is the admission of each education stage. Samples who did not gain education at the former stage were excluded from the fitting model of each education stage. For instance, at the education stage of senior high school, samples who had not experienced education in junior high school were not included in the model for senior high school. The remaining samples who had experienced

Table 1 Descriptive statistics of variables

Variable	Transition between primary and junior high school		Transition between junior high and senior high school		Transition between senior high school and universities	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Did not enroll	0.155	0.362	0.421	0.494	0.692	0.462
Grade of school						
Nonkey junior high school	0.770	0.421	–	–	–	–
Key junior high school	0.075	0.263	–	–	–	–
Vocational senior high school	–	–	0.140	0.347	–	–
Nonkey senior high school	–	–	0.318	0.466	–	–
Key senior high school	–	–	0.120	0.326	–	–
College	–	–	–	–	0.178	0.382
Nonkey university	–	–	–	–	0.088	0.283
Key university	–	–	–	–	0.042	0.201
Year of enrollment (1978–1991 = 0)	0.342	0.475	0.451	0.498	0.598	0.490
Father's IESI when respondent was 14 years old (divided by 10)	3.134	2.008	3.320	2.070	3.804	2.125
Years of parent's education	7.713	4.293	8.055	4.240	9.012	4.158
Residence at the age of 14						
Rural area	0.556	0.497	0.502	0.500	0.338	0.473
Town	0.150	0.357	0.164	0.371	0.198	0.399
City	0.152	0.359	0.170	0.376	0.222	0.416
Provincial capital	0.141	0.348	0.162	0.369	0.240	0.427
Ethnicity (Han = 0)	0.079	0.269	0.062	0.241	0.060	0.237
Sex (male = 0)	0.529	0.499	0.506	0.500	0.476	0.500
Number of siblings	2.288	1.776	2.197	1.745	1.858	1.616
Grade in school before enrollment						
Nonkey junior high school	–		0.913	0.282		
Key junior high school	–	–	0.087	0.282	–	–
Vocational senior high school	–	–	–	–	0.263	0.440
Nonkey senior high school	–	–	–	–	0.544	0.498
Key senior high school	–	–	–	–	0.193	0.395
Sample size for analysis	2587		2465		1502	

education in junior high school were coded as follows: did not enroll in senior high school = 0; enrolled in vocational senior high school = 1; enrolled in nonkey senior high school = 2; and enrolled in key high school = 3. Students are admitted by the government at different stages for key high schools (including junior high schools and senior high schools) and key universities. When there was more than one school in a certain education stage, we used the grade of the first school enrolled in this stage.

Independent variables

The independent variables of this study are as following:

(1) Family social and economic status. We transformed the vocational status of the father when the child was at age 14 into the standard of the International

Socio-Economic Index (ISEI) as a measure of family socioeconomic status. CGSS records the occupation of the respondents and their family members according to the 1988 International Standard Classification of Occupations (ISCO88) so it can easily be converted to ISEI.

(2) Family cultural background. We took parents' educational years as the index of family cultural background. The parent with the higher level of education was used and coded as the following: uneducated = 0, old-style private school = 3, primary school = 6, junior high school = 9, senior high school = 12, college = 15, undergraduate = 16, and graduate student and higher = 19.

(3) School types. This variable was the grade of school in which the sample enrolled when entering a school. For example, at the stage of senior high school, a sample who had not enrolled in junior high school was not included in the model; key senior high schools and nonkey senior high schools were treated as a dummy variable in the model. At the stage of higher education, the dummy variables of vocational senior high school and key senior high school were used in the actual model.

Control variables

The control variables in this study are:

(1) Gender: male is the reference group, male = 0.
(2) Ethnicity: Han is the reference group, Han nationality = 0.
(3) Residence at age 14: the four categories are rural, town and county, city, and provincial capital, with rural used as the reference group. This variable has more power in explanation than the variable of registered residence; see Wu (2013a).
(4) Number of siblings: the number of the sample's brothers and sisters.
(5) The history phase enrollment at different education stages: this study uses the history stage of enrollment at different education stages to control the influence of macro-factors such as population, institutions, and social structure. CGSS2008 records detailed information on education including the beginning and ending time of education at different stages. For respondents who had successfully entered the next stage (such as a junior high school graduate entering senior high school), we took the beginning time of the higher stage of education as the enrollment time. For respondents who did not enter the higher stage, we took the ending time of the highest stage of education as the enrollment time. We then formed two history stages of 1978–1991 and 1992–2008 according to the change in socioeconomic conditions and educational policy in the country. As mentioned, the sample was not included in the models if there were more than 5 years between the beginning time and ending time.

Model

Since the dependent variable is a multicategorical variable, considering the common practice in domestic and foreign research, we used the method of multiple logistic regression and used STATA to analyze the data. The ISEI coefficient (divided by ten), years of parents' education, and numbers of siblings were used as interval variables. The remaining five nominal variables were included the models as dummy variables.

Data analysis

The multinomial logistic regression takes students who did not enroll as the reference group, the results of which are presented in Table 2. For the convenience of reading, the regression coefficients of ISEI, years of parents' education, grade of school, which are the most significant factors, are listed in Table 2.

Model 1: transition between primary and junior high school

Model 1 shows that the ascribed factors of socioeconomic status and cultural background have a significant and efficient effect on the enrollment in junior high school. When controlling other factors, a ten-unit increase in fathers' ISEI leads to a 31.1 % ($1.311-1 = 0.311$, $p < 0.001$) increase of OR in the enrollment in nonkey junior high

Table 2 Multinomial logistic regression model of enrollment at different education stages (only independent variable)

Variable	Model 1 Transition between primary and junior high school		Model 2 Transition between junior high and senior high school			Model 3 Transition between senior high school and university		
	Nonkey junior high school	Key junior high school	Vocational senior high school	Nonkey senior high school	Key senior high school	College	Nonkey university	Key university
Enrollment year[a]	0.584*	0.377	0.481*	−0.093	0.713**	0.986**	0.947**	0.702
	(0.227)	(0.314)	(0.217)	(0.166)	(0.243)	(0.307)	(0.344)	(0.412)
	[1.793]	[1.458]	[1.617]	[0.912]	[2.039]	[2.680]	[2.579]	[2.018]
Father's IESI when respondent was 14 years old (divided by 10)	0.271***	0.307***	0.110*	0.085*	0.178**	−0.011	0.062	0.056
	(0.064)	(0.079)	(0.045)	(0.041)	(0.055)	(0.052)	(0.074)	(0.092)
	[1.311]	[1.360]	[1.117]	[1.089]	[1.195]	[0.989]	[1.064]	[1.057]
Years of parent's education	0.117***	0.214***	0.069**	0.085***	0.085**	0.060	0.066	0.122*
	(0.022)	(0.036)	(0.025)	(0.020)	(0.031)	(0.032)	(0.042)	(0.050)
	[1.124]	[1.239]	[1.071]	[1.088]	[1.088]	[1.062]	[1.068]	[1.130]
Grade of school[b]								
Key school	–	–	0.872*	−1.231***	2.418***	1.207***	1.902***	2.200***
			(0.356)	(0.350)	(0.267)	(0.236)	(0.275)	(0.355)
			[2.393]	[0.292]	[11.229]	[3.343]	[6.700]	[9.028]
Vocational senior high school	–	–	–	–	–	−2.032***	−4.287***	−3.854***
						(0.354)	(1.021)	(1.035)
						[0.131]	[0.014]	[0.021]
Constant	0.278	−3.288***	−2.494***	−1.660***	−3.850***	−2.531***	−3.304***	−4.751***
	(0.255)	(0.519)	(0.352)	(0.257)	(0.357)	(0.546)	(0.583)	(0.805)
N	2587		2465			1502		
Pseudo R^2	0.16		0.16			0.23		
Log likelihood	−1436.44		−2094.33			−638.93		

The numbers in parentheses are standard deviation; the numbers in brackets are odds ratio
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$
[a]1978–1991 is the reference group
[b]Nonkey junior high schools and nonkey senior high schools are the reference group. It is important to note that we usually take the lowest school type, such as nonkey junior high schools or vocational senior high schools, as the reference group. However, there were a few vocational senior high school graduates entered in the stage of college in the sample. There was no vocational senior high school graduate who entered the stage of higher education before 1992, and there were only two after 1992. Hence, we took nonkey senior high schools as the reference group

school and a 36 % (1.36−1 = 0.36, $p < 0.001$) increase of OR in the enrollment in key junior high school, referring to unenrolled students. One more year of parents' education leads to a 12.4 % (1.124−1 = 0.124, $p < 0.001$) increase of OR and a 23.9 % (1.239−1 = 0.239, $p < 0.001$) increase of OR.

Model 2: transition between junior high and senior high school

Model 2 shows that the effects of socioeconomic status and cultural background weaken in both significance and efficiency on the enrollment in senior high school. When controlling other factors, a ten-unit increase in fathers' ISEI leads to an 11.7 % (1.117−1 = 0.117, $p < 0.05$) increase of OR in the enrollment in a vocational senior high school, an 8.9 % (1.089−1 = 0.089, $p < 0.05$) increase of OR in the enrollment in a non-key senior high school, and a 19.5 % (1.195−1 = 0.195, $p < 0.001$) increase of OR in the enrollment in a key senior high school, referring to unenrolled students. Compared to the 31.1 and 36 % in the enrollment in junior high school, the effect decreases significantly. Similarly, the effect of years of parents' education is reduced. When controlling other factors, 1 more year of parents' education leads to a 7.1 % (1.071−1 = 0.071, $p < 0.05$), 8.8 % (1.088−1 = 0.088, $p < 0.001$), and 8.8 % (1.088−1 = 0.086, $p < 0.01$) increase of OR in the enrollment in a vocational senior high school, a nonkey senior high school, and a key senior high school. Compared to the 12.4 and 23.9 %, the effect is also reduced.

In sharp contrast with the reduced effect of socioeconomic status and cultural background, the effect of grade of school is greatly significant on enrollment in senior high school. Compared with students in nonkey junior high schools, key junior high school students have a 139.3 % (2.393−1 = 1.368, $p < 0.05$) higher OR in the enrollment in a vocational senior high school, a 70.8 % (0.292−1 ≈ −0.708, $p < 0.001$) lower OR in the enrollment in a nonkey senior high school, and a 1022.9 % (11.229−1 ≈ 10.229, $p < 0.001$) even higher OR in the enrollment in a key senior high school. In other words, the graduates of key junior high schools have a higher probability of enrolling in key senior high schools than graduates of nonkey junior high schools. For those key junior high school graduates who did not enroll in key senior high schools, it is more possible for them to enroll in vocational senior high schools than nonkey junior high school graduates; they do not prefer to enroll in nonkey senior high school. One possible explanation for the nonlinear relation between grade of school and enrollment could be that key junior high school graduates who did not enroll in key or nonkey senior high schools may value the greater returns to education provided by vocational senior high schools than the academic education with common quality provided by nonkey senior high schools since they usually have poor performance, which means they cannot access the high-quality academic education provided by key senior high schools.

Model 3: transition between senior high school and university

Model 3 shows that the effects of socioeconomic status and years of parents' education are rarely significant. Only the effect of years of education is significant on the enrollment in a key university. One more year of parents' education leads to a 13 % (1.13−1 = 0.13, $p < 0.05$) increase of OR in the enrollment in a key university, referring to unenrolled students. Nevertheless, for the same grade of school at a different stage

(vocational senior high school versus college, nonkey senior high school versus nonkey university, key senior high school versus key university), if we put aside the statistical insignificance and compare the OR caused by ISEI and years of parents' education at the stage of senior high school and higher education, it is not hard to find that the effect size of ISEI and years of parents' education is smaller at the stage of higher education.

The effect of grade of school is further enhanced at the stage of higher education with statistical significance. The effect of the education track system is especially significant. Whether a key university or nonkey university, vocational senior high school graduates have a nearly 90 % ($0.014 - 1 = -0.986$, $p < 0.001$; $0.021 - 1 = -0.979$, $p < 0.001$) lower OR than nonkey senior high school graduates. In other words, once a student enrolls in a vocational senior high school, it is nearly impossible for him/her to return to a university. Even in the competition of enrollment in college, vocational senior high school graduates are still in at a disadvantage when referring to nonkey senior high school graduates. One possible explanation is that few vocational senior high school graduates would choose to apply to college even with great performance, and most graduates with average performance already have the command of skills needed for a job. They do not intend to access further education. The effect of the key school system is also enhanced at the higher stage. Compared to nonkey senior high school graduates, key senior high school graduates have a higher OR of 234.3 % ($3.343 - 1 = 2.343$, $p < 0.001$) in the enrollment in college, 570 % ($6.7 - 1 = 5.7$, $p < 0.00$) in the enrollment in a nonkey university, and 802.8 % ($9.028 - 1 = 8.028$, $p < 0.001$) in the enrollment in a key university, referring to unenrolled students, which is a significant effect. It should be noted that the estimated value of grade of school at the stage of higher education could be higher than the actual number since the sample of key university students is too small.

The model results show that the effects of family socioeconomic status and cultural background on enrollment are weakened with a higher stage of education, which supports hypotheses 1 and 2. In contrast, the grade of school plays an important role in the enrollment in senior high school and higher education. Furthermore, the effect becomes greater at higher stages. However, given that the regression coefficient could be biased, we sparingly conclude that the hypothesis is partly supported. Overall, socioeconomic status and cultural background mainly affect enrollment at the lower stage of education; at the higher stage, they are replaced by the grade of school.

Conclusion and discussion

This paper supplements the recent research on the existing education inequalities from the angle of comparing school transitions at different stages of education. We argue that inequalities in educational opportunities are altered not only with changes in macro-social and historical conditions but also with change along with individuals' enrollment at different stages of education. In the situation where social and historical conditions are relatively stable, socioeconomic status and cultural background play the most important role in the primary stage of enrollment in education. This effect gradually decreased with a higher stage of enrollment in education. In contrast, the grade of school plays a more and more important role as the stage of enrollment in

education becomes higher. This is mainly due to the combined effect of the following three mechanisms:

(1) Differentiated selection, which means that the selection at the primary stage of education leads to the convergence of the student's family socioeconomic status and cultural background.

(2) The development of life course, which means that the conversion from family resources to motivation and ability of learning decreases but the student's endogenous motivation and learning ability become the dominant factors of academic performance.

(3) Heterogeneous education, which means that high-quality primary education resources are converted into the student's motivation and learning ability, so that the impact of the social structure relatively declines.

These three motivation systems expand the research of Liu (2008) and Li (2006) on the production of educational inequality, noting that exogenous family resources can also take effect through student motivation and learning ability. In addition, the institution of China's education and enrollment also makes the heterogeneous education system particularly important.

We used CGSS2008 data to test these assumptions, where a father's ISEI was an indicator of the family's socioeconomic status, the parent with the higher number of years of education was an indicator of the cultural background of parents, and the type of school was an indicator of the grade of school. Control variables included gender, ethnicity, main residence at the age of 14, number of siblings, and historical phase when they enrolled. The result of the logistic regression model showed that the effect of socioeconomic status is relatively strong at the stage of primary and secondary education and gradually decreases at the stage of higher education. The effect of family cultural background shows the same trend, while the effect of grade of school increases at the higher stage of education. The education track system has such a significant effect that once a student steps on the track of vocational education, it is very hard for them to go back to the academic track. The key school system in the education track system also has a great effect: key school graduates have a great advantage in enrollment.

The results of data analysis generally support the hypothesis of this study that claims the effects of socioeconomic status and cultural background take place mainly in primary education and this effect gradually weakens in higher education. The grade of school correspondingly plays a more important role; that is, the educational selection of the low social class is the most severe at the primary education stage. Most of the competitors have already "lost at the starting line." At the stage of higher education, the role of socioeconomic status is gradually replaced by the grade of school. The upper class can help their children enter a better school in the early stages of education in order to obtain a better education. Children with a good education will have an advantage in the enrollment test and thus enter a better school at a higher stage and continue to receive a better education. This advantage accumulates stage by stage, until the graduates secure a job. The most serious problem is that the process of social reproduction will often be veiled by the equity of the standardized test.

From the angle of policy making, the government should prioritize the inequality in primary and secondary education since to some extent the inequality in higher education is only the extension of previous inequality. This view is also supported by other scholars (Li 2014). In fact, in economically developed regions such as Shanghai and Jiangsu, a large number of expensive private schools have been established, especially private primary schools and private junior high schools. They hold the best quality education resources at the stage of primary school and junior high school. If the three motivation systems that we are verifying in this paper are true, the expansion of private schools with economic barriers as an important standard of enrollment will undoubtedly provide favorable conditions for the production of educational inequality. Ensuring that the distribution of educational opportunities in primary and secondary education is fair and will not produce a huge stratification will be a new challenge for the future.

Of course, the realization of social mobility is not the only function of education. Excellent family environment and family traditions are often the important foundation for training elites. The extent to which educational equality is suitable and helpful in the improvement of total social benefits remains a subject for further study. As Ying and Liu (2015) point out, when discussing educational inequality we should not only realize the significance of education in promoting social justice, but also be consciously aware of the limits of this pursuit. Handling the relationship between efficiency and equity of education may be an eternal theme in educational philosophy and the educational sciences.

The main weakness of this paper is the neglect of the endogenous problem of the study, which causes weakness in inferring causality (Holm and Jæger 2011; Lucas 2001; Chen and Fan 2010, 2011). Another weakness is the lack of attention to how family resources affect enrollment through their effect on the grade of school. This is mainly because the author is limited in resources for further study. Additional efforts are needed to compare the education inequalities among different stages with a more restricted method. Meanwhile, we did not discuss the effects of macro-social processes such as urban and rural dual structure, local social and economic development, the local education investment, regional nutritional and health conditions, changing conditions of the labor market, and changes in the population structure on educational inequality. As Liu (2008) points out, these should be taken into consideration in order to discuss the problem of education equity in depth. In addition, strictly speaking, this paper only provides indirect support for the three motivation systems and does not completely open the black box of the production of education inequality. Whether it is only through conversion of the advantage of school educational resources to higher academic achievement, or through enlarging the effect of family background on the basis of the former process, more microscopic and meticulous research is needed to determine specifically how early quality education affects students' academic achievement.

Endnote

[1]I want to extend my great thanks for the comments made by anonymous professors on the research hypothesis.

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