Public Educational Expenditure, Family Background and Children's Access to High School in China

Juan Yang
School of Economics and Business Administration
Beijing Normal University
19, Xinjiekouwai Dajie, Beijing 100875, China
E-mail: yangjuan@bnu.edu.cn

Zhijun Sun
School of Economics and Business Administration
Beijing Normal University
19, Xinjiekouwai Dajie, Beijing 100875, China
E-mail: szhijun@bnu.edu.cn

Abstract With the increasing trend of public investment in education, the relationship between individuals' educational attainment and their family backgrounds turns to a major concern by sociologist, economists and policy makers. Using a 1/5 random draw of the 1% census data of 2005 and educational expenditure data in county level during 1999 to 2001 in China, we study the impact of family background on the decisions of individuals' educational participation to high school. Based on basic educational selection model, we found similar evidence with previous researches that father's educational level, income, career and children's city household registration are crucial to individuals' educational attainment to high school. Furthermore we investigate the interaction between public educational expenditure and individuals characteristics (e.g. family background) among different cities in China. The results indicate with the growing of public educational expenditure, the impact of parents' social-economic characters measured by father's income and father's career to their children's educational participation is an inverse U shape (i.e. first increasing and then decreasing). In addition, increasing public spending on education may result the gap of educational opportunity between urban children and rural children, between boys and girls continuously widening, while the influence of father's educational level is relatively stable irrespective the educational expenditure.

Key words: family background, public educational expenditure, educational opportunity, high school

1 Introduction

Participation in all levels of education is continuously expanding in China since 2000, particularly in post-compulsory education period. For example, the gross enrollment rate to high school[1] increased from 42.8% in 2000 to 52.7% in 2005 and even achieved 74% in 2008.[2] In the same time, public educational expenditure is continuously rising as well. Take the budgetary educational expenditure as an example, it is 698 yuan per student in 2000, 1562 yuan in 2005 and 3645 yuan in 2008, implying the average increasing rate reaches 20% according to the adjusted price. [3]

With the expanded of non-compulsory education and sharply increased public educational expenditure, two questions are raised and concerned by sociologist, economists and even policy

[1] High school is referring to grade10 to 12, also called senior middle school and belongs to non-compulsory education period in China.
[2] Data source: *China Educational Statistics Yearly Book 2009*, People Educational Press.
[3] Data source: *China Educational Expenditure Statistics Yearly Book* 2002, 2007 and 2010, China Statistics Press.

makers. The first one is how about the distribution of educational opportunity among different social-economic background or *equality of educational opportunity*. In another word, whether the children coming from lower socio-economic backgrounds could benefit from the education expansion. The second one is to investigate whether the large amounts of public subsidies injected in education can succeed in reducing disparities of accessing to education for children from different social backgrounds. In other words, the enhanced public educational expenditure is used to help disadvantaged groups or is allocated to privileged class.

In order to answer the first question, we should investigate the impact of family background to children's educational opportunity is enhanced, diminished or unchanged. There are substantive articles dealing with the relationship between educational attainment and family background from theoretical and empirical aspects (e.g. Becker & Tomes, 1986, Caucutt & Lochner, 2006, Chevalier, A , 2004). Most of the literatures found strong association between educational attainment and family background. There are some researches in China tackling this problem as well. Liu (2008) analyzes the influence of family background to children's educational attainment to primary school and middle school using national census data in 1980, 1990 and 2000. He found the significance and dimension of the influence for parent's education is continuously increasing, while the impact of father's career maintains the same size. The researches by Li (2003, 2010) and Wu(2009) are about the effect of family background on their children's higher educational attainment and their results are quite similar to Liu(2008)'s conclusion.

Bjorklund & Salvanes (2011) summarizes the causal effect of parental education on their offspring from five categories: the direct effect of parents' education, unobserved genetic cognitive abilities, families' cultural backgrounds, endowments, such as wealth or financial resources and public resources and more general public investments. Since children cannot select their parents, eliminating the credit constraints becomes the focus of educational equality.

Therefore the second question seems even more important, especially for politicians. Most of the researches on this field discuss the equality to tertiary-level of education and focused on college students' financing policy (e.g. Asplund et al, 2007) and to my knowledge, there are few articles researching the link between public educational expenditure and the impact of family background on their children' educational attainment. Fuchs & Wößmann (2006) found family background in developed country is not important as it is in developing countries, which suggest increasing educational subsidies may weaken the influence of family background to children's test score.

Since high school education has not been a compulsory education period in China and equality of education in this period is crucial (Marcenaro-Gutierrez et al, 2006), we would like to discuss the equality of high school attainment for children from different social-economic status

under varied level of public educational subsidy. In particular, the impact of family background to children's education participation will be enhanced or weakened with the increasing of public educational subsidy.

Equality of education, especially the equality in opportunity related with intergeneration mobility is quite an important perspective in every society. Most of the policies aimed at reducing the impact of family background on their children's educational attainment. The purpose of this paper is to evaluate the influence of family background on children's access to high school when public educational expenditure changes. The findings may indicate which level of public educational expenditure is optimum, how to improve the efficiency of public educational expenditure and have some suggestions on enacting the future educational policy.

In order to realize this goal, we first describe the educational attainment among different social-economic status and estimate the impact of family background to individuals' educational attainment without considering the public subsidy. And then, observe the changes of parameters after adding the variable of public educational expenditure. The impacts of other individuals' characteristics (such as gender, minority) to children' educational attainment are also discussed in the paper.

The rest of the article is organized as follows: in the next part, we address the estimating method. In part three, we discuss the data and statistical description and analyze the empirical results in part four. Fart five makes a conclusion.

2 A theoretical model

The link between public educational expenditure and the impact of family background can be estimated through individuals' educational choice model. Family background can be reflected from two aspects: one is cultural capital or human capital, which can be represented by parental schooling. The other is wealth capital, which can be denoted by family income. According to Becker (1964), when a rational individual making educational decisions will maximize his lifetime utilities. Assume $U(C_0, C_1)$ is composed by two stages, stage 0 (in school) and stage 1 (at work). Current utility C_0 is determined by their parents' initial endowment and their schooling expenses. The initial endowment is highly related with parental income P^w, thus yields:

$$C_0 \quad Y_0(P^w) \quad E_0 \qquad (1)$$

Where schooling expenses E_0 refers to tuition fees burdened by individuals or

families.[4] When public educational expenditure G increases, the tuition fess paid by the families T(G) will drop, i.e. T() is a decreasing function of G and can be denoted as:

$$E_0 \quad T(G) \qquad (2)$$

Substitute (2) into (1), we get

$$C_0 \quad Y_0(P^w) \quad T(G) \qquad (3)$$

Assume individuals' consumption in stage 1 is determined by expected wages Y_1 and the expected wages is an increasing function of their educational attainment. We get,

$$C_1 \quad Y_1(S) \qquad (4)$$

Individuals' schooling is correlated with abilities, initial endowments, educational cost and expected rate of return to education. The impact of family background on their children's educational attainment is reflected in two aspects: on the one hand parents' schooling（P^a） may affect their children's study ability. The ability may come from inherited genes, family environment or parents' daily nurture. On the other hand, children' educational investments are subject to the budget constraint, which determined by family income P^w. When children do not have income pressure, they will devoted more on study, reduce part-time jobs and have a higher expectations on schooling. The changes of public educational expenditure may influence personal educational costs. When public educational subsidies are augmented, the percentage of tuition fees burdened by individuals will decline, which may encourage individuals to invest more on education. The expected rate of return to education is also quite an important variable in determining individuals' educational investment. However, the main purpose of this paper is to research the relationship between public educational expenditure and the impact of family background on their children's educational attainment. In order to simplify our estimating procedure, we assume education's rate of return and other affected variables are constant overtime.

$$S \quad F[A(P^a), Y_0(P^w), E, \overline{R}] \quad F(P^a, P^w, G, \overline{R}) \qquad (5)$$

When individuals are making optimal educational choices, it will maximize the two-stage utility function $U(C_0, C_1)$， subject to equation (3) and (4). It yields,

$$\text{Max} \quad a \ln C_0 \quad \ln C_1 \qquad (6)$$

where parameter ($a \quad (0,1)$)states the relative importance of C_0 to C_1. Thus, the impact of family background on individuals' educational choices can be represented as,

[4] Since extra curricular learning out of school is not popular in rural areas, other individuals' educational expenditures can be ignored.

$$\frac{U}{P^a} \quad (P^a, P^w, G) \qquad (7)$$

$$\frac{U}{P^w} \quad (P^a, P^w, G) \qquad (8)$$

In order to assess the link between public educational expenditure and the impact of family background on their children's educational attainment, we have to specify a function for equation (5),

$$S \quad P \ (P^a) C_0^{\ 1} \ (P^w, G) \qquad (9)$$

$$Y_1 \quad s \qquad (10)$$

Equation (9) is concluded from Cardak（2002）'s individuals' educational choices model. Assume (0,1) and 0 to secure marginal utility is decreasing and educational investments have a positive relationship with parental schooling and educational expenditure.

According to equation (3) to (10), one can get,

$$U \quad a \ln C_0 \quad \ln C_1 \quad a \ln(Y_0(P^w) \quad T(G)) \quad \ln \quad \ln P(P^a) \quad (1 \quad) \ln(Y_0(P^w) \quad T(G)) \qquad (11)$$

The impact of family income on their children's schooling is derived as,

$$\frac{U}{P^w} \quad a \ \frac{1}{C_0} \ \frac{C_0}{P^w} \quad (1 \quad) \frac{1}{C_0} \ \frac{C_0}{P^w} \quad \frac{1}{C_0} \ \frac{C_0}{P^w} \quad \frac{Y_0 \ (P^w)}{Y_0(P^w) \quad T(G)} \qquad (12)$$

where $a \ 1$,

Family income is positively related with individuals' initial endowments, i.e. $Y_0 \ (P^w) \ 0$. $T(G)$ is a decreasing function of public educational expenditure. Therefore, when G increases, the impact of family income on their children's educational investment $\frac{U}{P^w}$ will fall.

Similarly, the impact of parental schooling on their children's educational attainment can be calculated as,

$$\frac{U}{P^a} \quad \frac{P \ (P^a)}{P(P^a)} \qquad (13)$$

As the impact of family background on their children's schooling is independent on public educational expenditure, it means the changes of public educational expenditure have little influence on the impact of parental schooling.

According to the assumptions and the theoretical model, we get (1) the rising of public educational expenditure will reduce the impact of family income on their children's schooling; (2) public educational funds are independent of the impact of parental schooling on their children's educational attainment

3 Empirical identification strategies

The above theoretical model can be estimated empirically by a Probit or logit model. In this paper, we assume the variable is satisfied with a normal distribution and intend to employ a Probit model to evaluate it, which yields,

$$P(y \quad 1 \mid x) \quad G(\quad _0 \quad \quad _1 I \quad \quad _2 H \quad \quad _3 E) \qquad (14)$$

P（y＝1）represents individuals' probability to accept high school education, y=1 means individuals attended or are attending high school education, otherwise y=0. G() is a standard normal accumulation function. I is a vector of individuals' characteristics, H is a vector of family background and E denote public educational expenditure. s are parameters which estimate the effects of each explanatory variable to individuals' probability to attend high schools.

Whether the changes of public educational funds will affect the significance and size of the impact of family background to individuals' educational attainment are the focuses of this paper. Technically this effect could be evaluated by adding the interaction term between family background variable and public educational expenditure variable in the basic framework. The interaction term of family background variable with educational expenditure shows the impact of family background to individuals' educational participation under different levels of public educational expenditure. According to the signs and dimensions of coefficient, we could judge the effect of family background is enhanced, weakened or unchanged with the growing of public educational expenditure. The linear interaction term indicates the changing trends of family backgrounds' impacts have the same speed as the changes of public educational expenditure. While the impact of family background may increase at first and then decrease after reaching a certain point or other non-linear characters. In order to further investigate the relationship, the interaction of family background variables with the quadratic educational expenditure term, cubic educational expenditure term, even higher power of educational expenditure term are included in the equation. [5] In addition, we investigate the association between other individuals' characteristics (e.g. gender) and educational attainment with the changes of public educational expenditure as well. Thus the basic model can be rewritten as:

$$P(y \quad 1 \mid x) \quad G(\quad _0 \quad \quad _1 I \quad \quad _2 H \quad \quad _3 E \quad \quad _4 E^2 \quad \quad _1 I \quad E \quad \quad _2 I \quad E^2 \quad \quad _3 H \quad E \quad \quad _4 H \quad E^2)$$

[5] We tried the interaction of family background with cubic term and found it was not significant. Therefore we did not list the cubic term in the regression.

(15)

where E^2 represents educational expenditure square, is the coefficients of each interaction term, which reflect the impact of family background and other individuals' characteristics under different levels of educational expenditure. Take the family background as an example, its impact on educational participation is $_2 \quad _3E \quad _4E^2$. After substituting the estimated coefficients and different levels of educational expenditures into equation (15), one can conclude how the impact of family background to individuals' educational attainment responds to varied levels of educational expenditure.

4 Data and descriptive statistics

The data on individuals' characteristics and family background comes from a 1/5 random draw of the 1% census of 2005. The census data is the largest and most representative dataset in China covering 31 provinces and all ages of individuals collected by National Statistics of Bureau. In order to analyze equation (15), we have to match fathers with their children in the data. This implies we only analyze the children who live with their parents. Those who did not live with their parents will be exempted from our data. This may bias the sample distribution. In order to minimize the sample bias, we restrict our data to those aged from 16 to 20. The reasons we select this period of individuals are based on two principles: maximize the sample size and minimize the sample bias in the same time.

In China, students will normally attend high school at age 15 or 16. Therefore age 16 is a good point to observe the high school attainment. After analyze the data, we found more than 95 percents of individuals below 21 are lived with their parents. When individuals are more mature,

cboy	Children's gender（male＝1；female＝0）	0.528(0.499)	80822
cmin	Are you a Hanese (not ethnic minority)（Yes＝1；No＝0）	0.907(0.29)	80822
cage	Children's age	17.9(1.3)	80822
Father's characteristics			
fhuk	Father's registration status (*Hukou*) （ urban registration＝1，rural registration＝0）	0.26(0.439)	71374
fschys	Father's schooling（unit: year）	9.0(2.8)	71374
fwage	Father's monthly income（unit: hundred yuan）	7.385(8.9)	71374
Father's socio-economic status（yes＝1；no＝0）			
fzhy1	Director or cadre in enterprises, institutions or other organizations	0.030(0.170)	71374
fzhy2	Professional technicians or specialists	0.066(0.248)	71374
fzhy3	Clerks	0.049(0.216)	71374
fzhy4	Employees in wholesale, retail, catering or other social services	0.116(0.32)	71374
fzhy5	Peasants in agriculture, forestry, animal husbandry or fishing industry（default group）	0.525(0.499)	71374
fzhy6	Manual workers in mining, manufacturing, construction, transportation or other related industry	0.214(0.41)	71374
Educational expenditure			
pjexp	Budgetary educational funds per middle school student （unit: hundred yuan）	8.96(6.512)	332
pjexp2	Budgetary educational funds per middle school student' square	80.288	332

Note：*All the senior school, high school or upper secondary school in the paper refers to total of senior schools include that of regular senior schools, adult senior schools, regular secondary technical schools, vocational secondary schools, technical worker school, adult technical secondary schools.

Previous studies use father's education, mother's education, father's socio-economic status or mother's socio-economic status to measure the effect of family background. They found the impact of mother's education or career to children's education is even more important to father's education or career (Antonovics & Goldberger, 2005). However, many China's studies found father's socio-economic background is more important to individuals' educational attainment. Therefore father's characteristics are generally used in their analysis (Li 2010; Li 2006).

According to a regression analysis of our data, we also found the influence of father's background is more significant than mother's background and after adding mother's background in the model, the goodness of fit is reduced. In addition, the missing variables of mothers' information in the data are quite large. Therefore father's socio-economic background is chosen to represent family background. Precisely we include father's education, monthly income, career and registration status (*hukou*) in the analysis. Since fathers' background characters may be correlated with mothers' education, income, etc., the estimating coefficients of fathers' background may partly reflect the impact of mothers' socio-economic characters. In the paper, fathers' characters were used as representatives to family background in order to investigate the changes of impact of family background when public educational expenditure rises. In other words, the impacts coming from fathers solely or from fathers and mothers are not our concern.

The other part of our data is administrative data from Educational Finance Statistical Yearbook. An important explanatory variable—public educational expenditure was represented by *budgetary educational funds per middle school student*[6]. The reason we choose this indicator as a measurement for public educational expenditure is that according to educational production function individuals' access to senior school is affected by the quantity and quality of junior school. And this indicator is quite an important factor to measure this effect (Wang, shanmai 1996).[7] *budgetary educational funds per middle school student* comes from county data in China Educational Finance Statistics Yearbook. Since Educational Finance Statistics Yearbook is no longer to publish county data after 2002, we select the data from 1999 to 2001 and calculate the mean value of these three years in order to match the corresponding educational funds data in 2005 to the maximal extent.

Individuals in the 1% census data of 2005 can only be identified in the city level, instead of county. Therefore we sum the county data of *budgetary educational funds per middle school student* within a same city and take the average value to represent a certain city's public educational expenditure. The mean value and observations are also reported in table 1.

Table 2 Descriptive statistics of Higher School Attendees(%)

Variables		Mean	Std. Error
Gender	Male	53.1	49.9

6

	Female	55.0	49.8
Ethnic	Hanese	55.7	49.7
	Minority	37.4	48.4
Hukou	Rural	44.8	49.7
	Urban	84.8	35.9
Father’ s educational Level	Primary	34.6	47.6
	Junior	50.7	50.0
	Senior	74.4	43.6
	Higher Education	96.2	19.1
Father’s Income	Lowest	35.4	47.8
	Mid-lower	43.4	49.6
	Mid-higher	60.0	49.0
	Highest	80.0	40.0
Father’s Career	fzhy1	82.9	37.6
	fzhy2	73.5	44.1
	fzhy3	88.3	32.1
	fzhy4	68.9	46.3
	fzhy5	36.8	48.2
	fzhy6	63.1	48.3
Educational Expenditure	Lowest	48.3	50.0
	Mid-lower	49.7	50.0
	Mid-higher	52.7	49.9
	Highest	66.5	47.2

Table 2 shows high school accessibility is almost equal between males and females or between Haness and other ethnic minority. However the probability to attend high school is significantly varied for different registration status, father’s education level, father’s income and father’s career. Children whose fathers acquired higher education have 62% higher probability to attend high school than those whose fathers have only primary or below education. Children from families with top quarter income may increase 45% opportunity to attend high school than those from bottom quarter income families. And fathers are directors or cadres are more likely to send their children to high school than other occupation’s fathers.

5 Empirical estimatiing results

According to the above analysis, firstly we estimate a Probit model including all the explanatory variables, except interaction term (i.e. equation (14)). The marginal effect of these variables to individuals’ educational participation of high school education was reported in model I of table 3. The table shows all the variables, but gender, have significant impact to educational attainment, which in compliance with the expectation. The probability of accessing to high school

for being a Hanese is up to 15% higher comparing to other minority. Fathers are urban registration in contrast to rural registration may rise 29% probability of their children's accessibility to high school. One year increases of father's education may result 3% rise of children's educational participation.[8] The impact of father's career has large differences in children's educational attainment, though they all positively significant comparing to default group, implying accessing to high school is unfavorable to peasants' children. The education attainment of clerk's children is the highest keeping all the other variables constant, about 19% higher comparing to peasant's children, followed by directors or cadres in enterprises, institutions or other organizations, about 14% higher. The children from professional technicians, employees in social services and manual workers are 11%, 9% and 6% higher, respectively. These results are in conforming to the previous researches. The results also show the coefficients of local public educational expenditure is positive indicating educational expenditure is positively associated with local senior school enrollment ratio.

Granted these results, do the impacts of family background and gender variables have anything different under varied levels of public educational expenditure? As discussed in the methodology part, we intend to investigate the problem by adding interactions of family background with educational expenditure and the quadratic term of educational expenditure. In order to examine the robustness of the analysis, we tried to put each interaction term separately into the model as well as all the interaction terms into the model and found the results are quite similar. Due to limited space, only two regression results are reported in the paper (i.e. model II and model III in table 3). Model II add the interaction of family background and gender variable with educational expenditure variable into the basic model (model I). Model III additionally control the interaction of family background and gender variable with educational expenditure square. The regression results could reflect how family background and gender differences will react to the changes of public educational expenditures. The results in table 3 report the marginal effect of each explanatory variable to high school participation.

Table 3 the Impact of Family Background on Individuals' High School Attendance

variable	Model I	Model II	Model III
cboy	-0.0036(0.0038)	0.0427(0.0075)***	0.0770(0.0145)***
cmin	0.1494(0.0068)***	0.1276(0.0143)***	0.0498(0.0277)*
cage	-0.0563(0.0014)***	-0.0567(0.0014)***	-0.0568(0.0014)***

[8] One may argue the test score of individuals from well educated families may be better than children from less educated families resulting a high educational attainment. In the paper we are researching all types of senior school participations and there is not a high requirement of test score for other types of senior school, except key regular senior school. Therefore missing ability variables or censoring problem is not essential in our analysis.

fhuk	0.2867(0.0048)***	0.2338(0.0098)***	0.2066(0.0205)***
fschys	0.0336(0.0008)***	0.0316(0.0016)***	0.0346(0.0030)***
fwage	0.0081(0.0000)***	0.0088(0.0001)***	0.0052(0.0015)***
fzhy1	0.1399(0.0130)***	0.1262(0.0249)***	0.1083(0.0527)**
fzhy2	0.1056(0.0086)***	0.0773(0.0180)***	0.0369(0.0354)
fzhy3	0.1858(0.0108)***	0.1716(0.0198)***	0.1234(0.0429)***
fzhy4	0.0933(0.0065)***	0.0771(0.0126)***	0.0480(0.0258)*
fzhy6	0.0562(0.0054)***	0.0007(0.0107)	-0.0717(0.0219)***
pjexp	0.0076(0.0004)***	0.0035(0.0018)**	-0.0146(0.0053)***
pjexp2			0.0006(0.0002)***
pjexp×fschys		0.0002(0.0002)	-0.0006(0.0005)
pjexp2×fschys			0.00003(0.00002)
pjexp×fwage		-0.0001(0.0001)	0.0006(0.0002)***
pjexp2×fwage			-0.00002(0.00000)***
pjexp×fzhy1		0.0030(0.0027)	0.0087(0.0098)
pjexp×fzhy2		0.0047(0.0022)**	0.0146(0.0067)**
pjexp×fzhy3		0.0030(0.0021)	0.0154(0.0077)**
pjexp×fzhy4		0.0029(0.0014)**	0.0106(0.0047)**
pjexp×fzhy6		0.0073(0.0012)***	0.0229(0.0039)***
pjexp2×fzhy1			-0.0003(0.0003)
pjexp2×fzhy2			-0.0004(0.0002)**
pjexp2×fzhy3			-0.0005(0.0002)**
pjexp2×fzhy4			-0.0004(0.0002)**
pjexp2×fzhy6			-0.0006(0.0001)***
pjexp×cboy		-0.0060(0.0008)***	-0.0130(0.0027)***
pjexp×cmin		0.0013(0.0014)	0.0126(0.0044)***
pjexp×fhuk		0.0069(0.0011)***	0.0130(0.0040)***
pjexp2×cboy			0.0002(0.0000)***
pjexp2×cmin			-0.0003(0.0001)**
pjexp2×fhuk			-0.0002(0.0001)*
Prob>chi2	0.0000	0.0000	0.0000
Pseudo R2	0.1765	0.1782	0.1791
N	80822	80822	80822

Note: Std. Errors are in parentheses, significant level: ***< = 0.001, **< = 0.05, *< = 0.01.

Please refer to table 1 for the definition of each variable.

We could summarize the regressing results from the following aspects:

5.1 Under different levels of public educational expenditure, the impact of father's education on their children's high school attainment is similar.

The results in model II and model III shows the impact of father's education is not changed with the levels of public educational expenditure in size and significance. The coefficient of father's education is significant with a positive sign in both model II and model III. However the coefficients of interaction terms with public educational expenditure or public educational expenditure square are both not significant. This indicates the effect of father's education is stable and persistent: the higher is father's education, the larger is the probability for their children to attend high school. In addition, this character is not changed with other factors, which in lines with previous researches that the effect of father' education is a congenital factor and is far less likely to be affected by external environment.

5.2 **With the increasing of public educational expenditure, the impacts of father's income, socio-economic status and nationality to children's high school participation are strengthening first and then gradually decreasing.**

(1) The impact of father's income

In model II, the coefficient of father's income is still positive, while its interactive term with educational expenditure is negative. This implies, with the increasing of public funds in education, the influence of father's income may decrease. Since the coefficient for the interaction term is not significant, the results may be not reliable. When the interactive term with public educational expenditure square is added into model III, all the variables are statistically significant at 1% level. The signs of father's income and its interactive term with educational expenditure are positive, while its interactive term with public educational expenditure square is negative. The results suggest the increasing of public educational expenditure, the impact of father's income to children's educational attainment is increasing at a decreased speed. In other words, with the improvement of educational expenditure, the influence of father's income to their children's high school participation is increasing first and after reaching a certain point then gradually decreasing.

Based on the sample data and estimating results, an inverted U-shape relationship between father's income and educational expenditure per student could be concluded and presented in figure 1. When other variables are controlled, figure 1 shows when the educational expenditure per students are 500, 1500 and 3000 respectively, growing of father's income could improve their

children's access to high school about 7%, 9% and 5% respectively. Further raising the educational expenditure, the impact of father's income will be even less.

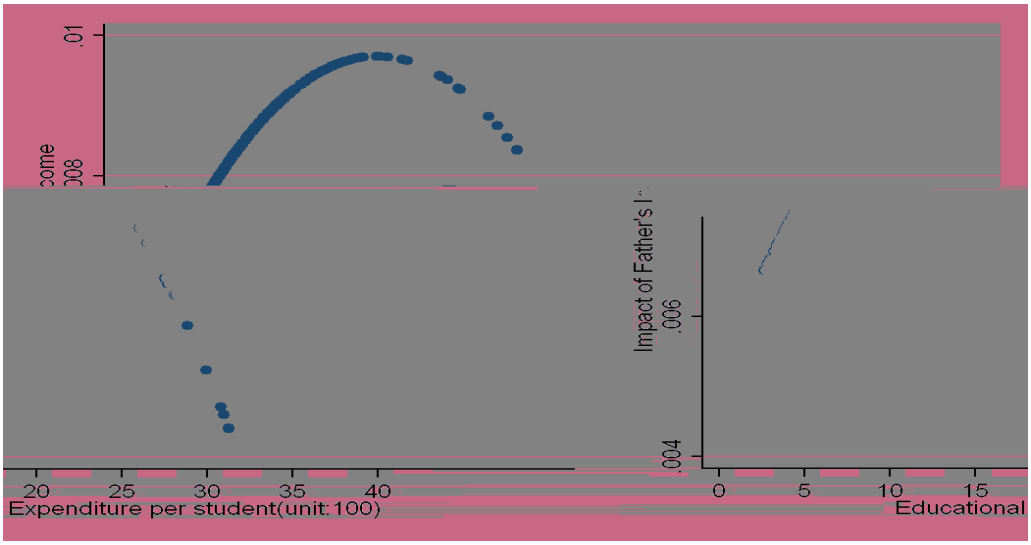

Figure 1 The Impact of Father's Income on Children's High School Attainment Under Different Levels of Public Educational Expenditure

(2) The impact of father's socio-economic status

Model II shows the coefficients of dummy variables of each socio-economic status and their interactive terms with educational expenditure are all positive, suggesting the impact of father' socio-economic status to educational attainment is a monotonic linear relationship with the increasing of educational expenditure. In other words, the impact of father's socio-economic status will enhance when educational expenditure levels are improving. However the results in model III tell a different story: though the sign of the interaction between socio-economic status and educational expenditure is positive, the sign of its interactive term with educational expenditure square is negative. The results imply the impact of father's socio-economic background is rising at the beginning and then weakening. Whereas the interaction terms for father's socio-economic status belongs director or cadre in enterprises, institutions or other organizations (fzhi1) are not significant in both model II and model III. One possible explanation is the wealthy endowment for children from such kind of families is enough large, therefore the impact of father's socio-economic status to children' high school attainment is not affected by the public educational expenditure level.

Figure 2 presents an intuitive description of the differential of father's socio-economic status's impact under different levels of educational expenditure per student comparing to the default group when father is a peasant (since the impact of father's socio-economic status is not statistically significant for fzhy1, we did not draw its effect). At the lowest educational expenditure areas, the probability for fzhy3's children to attend high school is 16% higher than

peasants' children. Comparing to the default group, fzhy2's children may increase 7% likelihood to access to senior school, while worker's children may decrease 2%. Note when educational expenditure per student is comparatively low, the senior school participation rate of fzhy6' children are lower than fzhy5 and fzhy4's children, whereas when educational expenditure per student is over 1200, children from fzhy6 family are more likely to access to senior school than those from fzhy5 and fzhy4's children. It is quite an interesting topic to research. My explanation is worker's socio-economic status in undeveloped areas is comparatively higher than peasants' and waiters' status, therefore the intention to encourage their children to attend senior school is not very strong. While worker's socio-economic status in developed areas is not very good and may have a strong desire to let their children study hard in order to join the society.

When the educational expenditure reaches 1500, the impact differential of father's socio-economic status for fzhy3, fzhy2, fzhy6 and fzhy4 contrast to the default group rise to 24%, 17%, 15% and 12%, respectively. When educational expenditure per student is over 3000, the impacts of all kinds of socio-economic status are all dropping significantly, especially for children coming from fzhy4.

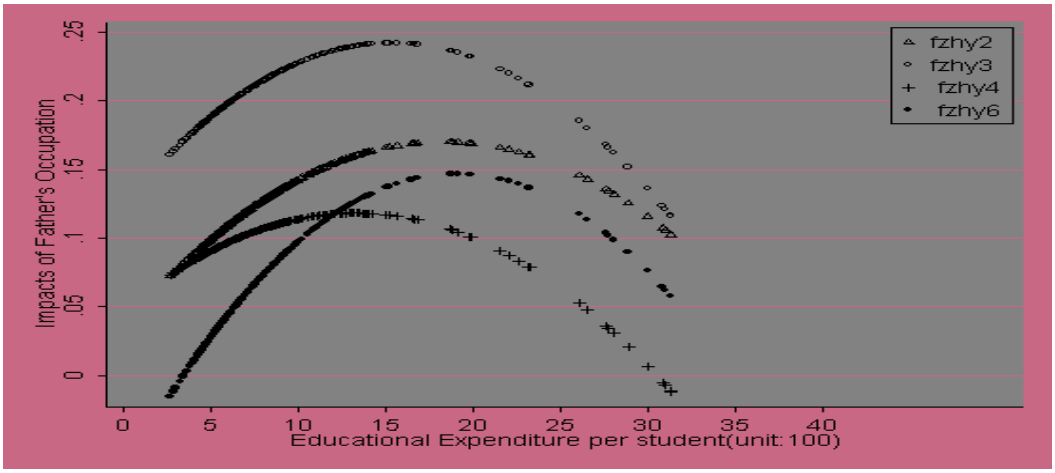

Figure 2 The Impact of Father's Occupation on Children's High School Attainment Under Different Levels of Public Educational Expenditure

(3) High school enrollment difference between Haneses and other ethnic minority

Generally speaking, Hanese children's high school attainment is higher than minority children. Figure 3 confirms the advantage positions of Haness comparing to other ethnic minority under different levels of public educational expenditure. The difference is rising at the beginning and then dropping when educational expenditure increase to a certain level according to model III. At comparatively low educational expenditure level, high school participation of Hanese's children, is 8% higher than minority children, then expands to 18% when educational expenditure per student is about 2000 and gradually drops to 15% when educational expenditure per student is

over 3000. The trend shows with further improvement of educational funds, the difference will continuously decrease.

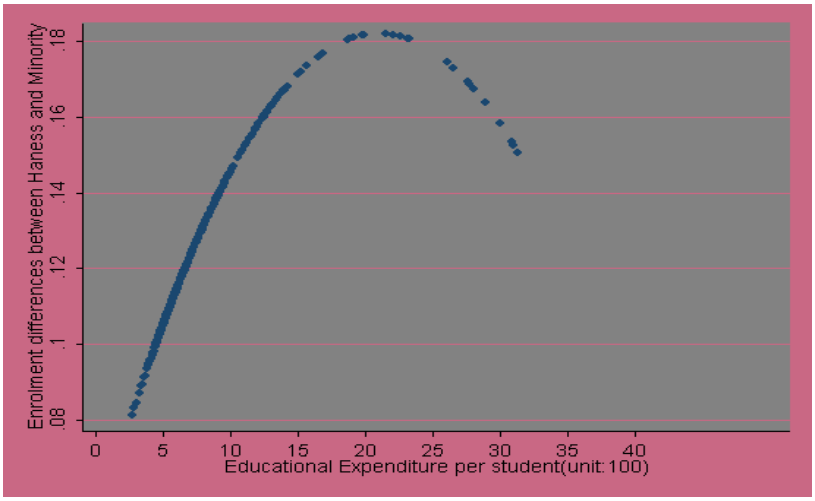

Figure 3 Enrolment Differences Between Haness and Minority Children under Different Levels of Public Educational Expenditure

5.3 Children whose father's registration status is city *hukou* are far more likely to attend high school than children whose father's registration status is rural *hukou*. In addition, the difference is augmented with the improvement of public educational expenditure.

The results in model I show children whose fathers' registration status are city *hukou* are far more likely to attend high school than children whose fathers' registration status are rural *hukou*. Then the question is how the difference changes when the overall educational expenditure is increasing. The regressing results in model II illustrate the coefficients of the interaction term for *hukou* and educational expenditure is positive, suggesting the growing of educational expenditure will not shrink the differences between city registration and rural registration. The difference is larger in comparatively high educational expenditure districts. The results in model III are similar to other variables, the interaction term for *hukou* and educational expenditure is positive, but its interaction with educational expenditure square is negative. This means in comparatively high levels of educational expenditure, the difference between city registration and rural registration may weaken. In order to further illustrate these results, we mimic the results of difference between city registration and rural registration under different levels of educational expenditure in figure 3. The figure explains children whose fathers are city *hukou* are 24% more likely to attend high school than children whose fathers are rural *hukou* in comparatively low educational expenditure areas. With the growing of educational expenditure, the difference is enhancing as well. In 2001, the highest average educational expenditure per student in a city is about 3200 in our data and this point shows a smoothing trend for the differences of city registration and rural registration.

However the differences reach 42% at this point. According to the regressing results and the figure, there seems to be a shrink trend between city registration and rural registration, but it needs more empirical data to test.

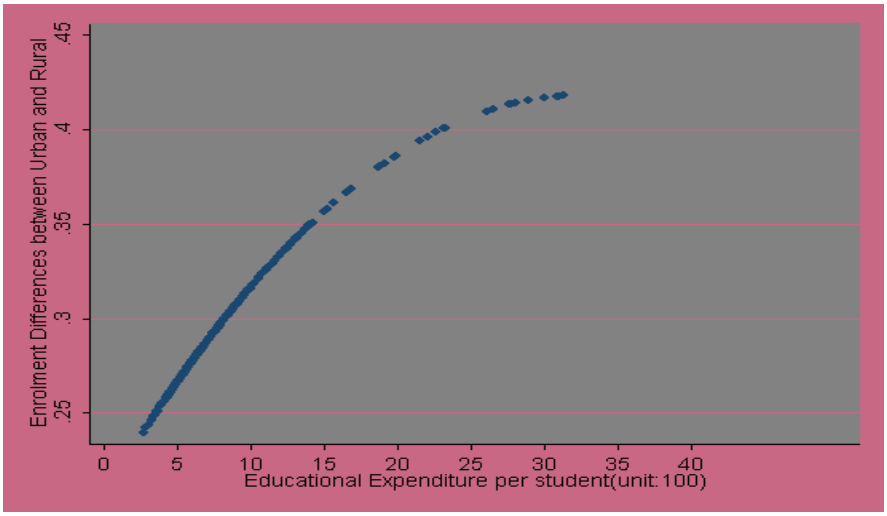

Figure 4 Enrolment Differences between Urban and Rural Children under Different Levels of Public Educational Expenditure

5.4 Boys' high school participation probability are higher than girls' in comparatively low educational expenditure areas and girls' educational participation are increasing with the improvement of educational expenditure and finally exceeds boys' high school participation.

Gender differences of high school enrollment under different levels of public educational expenditure have some discrepancies with other individuals' characters. According to model III, the gender enrollment difference is significantly changed with the increasing of educational expenditure. In comparatively low public educational expenditure, boys' high school attainment is significantly larger than girls'. With the improvement of educational expenditure, the difference is dropped sharply and girls' high school participation is even higher than boys'. Whereas the decreasing trend of difference is smoothing in comparatively high educational expenditure. The results suggests, with the rising of educational subsidy, girls are more likely to access to high school comparing to boys, which needs further investigation on the reasons. This conclusion can be reflected in figure 5 and the vertical axis represents the high school participation differences between boys and girls.

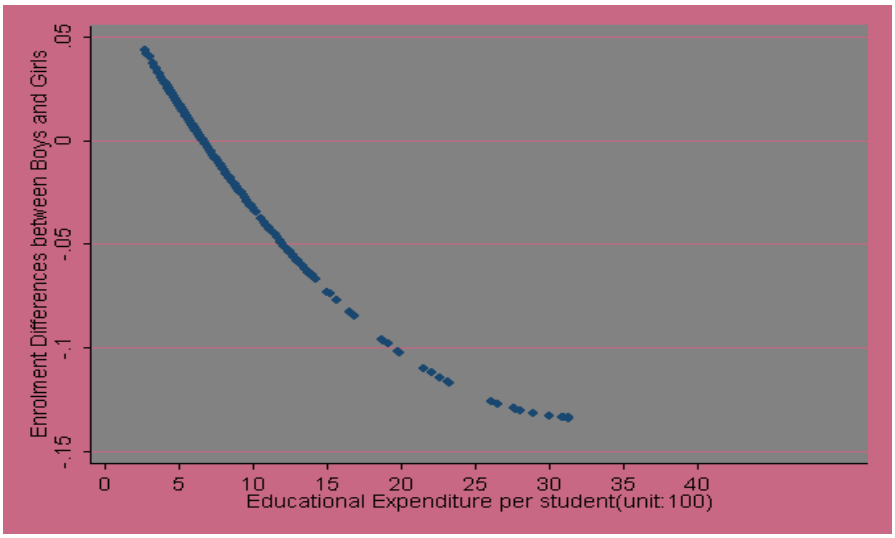

Figure 5 Enrolment Differences between Boys and Girls under Different Levels of Public Educational Expenditure

6 conclusions

No matter from sociologist's status classification theory or economists' human capital investment decision model, family background is quite an important factor to individuals' educational choices. And government's educational funds may strengthen or weaken this association. Our research intends to provide some empirical evidence in China about the relationship between educational expenditure and the impact of family background on individuals high school attainment. After examining individuals' educational investment decision model, we conclude the following findings:

The first results is some family background characteristics, such as father's education, father's socio-economic status, income, registration status are crucial to individuals' educational attainment. In particular, individuals come from well educated, wealthy, high socio-economic

educational expenditure, boys are more likely to attend high school and with the increasing of public educational funds, the situation is reverted.

The empirical evidence suggests the impact of family background to children from wealthy cities is lower than those from poor areas. Current China's educational financing strategy is associated with local fiscal providing abilities, therefore educational expenditure per student in poor areas is much less than that in rich districts. The possible policy suggestions to weaken intergeneration impact are to increase the public educational expenditure per student in poor areas. Otherwise the intergenerational mobility will be even more stable in poor areas, as family background has a strong influence to children's educational attainment under low levels of educational expenditure per student. In addition, the results show the current allocation strategy is in favor of urban areas, resulting the enrollment differentials are comparatively large between urban and rural areas. In future, more public educational funds should be allocated to rural areas.

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