Extended Abstract

Gender Inequality, Intrahousehold Allocation and Educational Outcomes in Rural China: Evidence from Sibling Data

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Introduction

Do parents invest more in sons than in daughters in rural China with strong tradition of son preference and differentiate the educational outcomes across children? Prior research suggests that girls have lower educational attainment than boys *across* families in China. However, existing research primarily relies on sample from urban families with only one child and pays little attention to rural families, normally have more than one child. In addition, sample from one child family is hard to know how parents allocate resources *within* families, since the only child expectably receives all the resources, but the rural child has to compete with their siblings. Therefore, we have little knowledge about gender differences in educational outcomes in rural China and how parents allocate the resource across children

This research aims to explore the gender differences in educational outcomes and how parents allocate resources across within families in rural China by using unique sibling data from the Gansu Survey of Children and Families (GSCF). Preliminary suggests that there is no difference in educational attainment, but sons outscore their sister in test scores. The next step of this research is going to explore how parental investment reinforces the gender differences in educational performance.

Rural China background

Rural China includes approximately 63% Chinese population in 2000 (National Bureau of Statistics of China, 2001) and the one-child policy is more loosely enforced and conditionally allows rural families to have more than one child (Hasketh, Lu, and Xing, 2005), experience different familial context from urban children. Children grow up in one-child family expectably receives all the resources their families have, but the rural child has to compete with their siblings.

Because few surveys in China contain full information about both focal children and their siblings, we know little about how children's gender is associated with educational outcomes and how parents allocate resources across children within families in the China context.

Data and measurement

The primary data source is the Gansu Survey of Children and Families (GSCF), a longitudinal survey from rural China. The target population of this survey is children from age 9 to 12 in Gansu, one of the poorest provinces in China. The initial year of the longitudinal study is year 2000, and followed up at 2004, 2007 and 2009. We mainly use wave 2 data in this research, because the information about educational performance of sample child and his/her 1st younger sister or brother of the sample child at school age was collected only in wave 2.

There are 1918 sample children and 932 sample siblings in this dataset. Although around 95% of sample children have at least one sibling, these siblings are either older than sample child or below school age; thus only information about 932 siblings of sample children are collected. We restrict our analysis to sample without missing values at all variables of interest, and reduce the number of observations further to 1474 sample children and 624 sample siblings. This full sample is used in the OLS analysis, but only 505 families have full information about both sample child and sample sibling, are included in the analysis of family-fixed effects model.

The dependent variables are educational progression and educational performance. Educational progression is measured by age-standardized grade-for-age, which is defined as the age standardization of the difference between current educational level of child and the educational level the child should be at a given age. The child is required by law to enroll in elementary school at age 6 in China, therefore if child is 6 years old, and is in 1st grade in the elementary school, grade-for-age is recoded as 0, represents no lag behind in school education at the given age. Because late enrollment in the primary school and grade repetition are common phenomenon in rural China and other developing countries as well (Glewwe, Jacoby and King, 2001; Meng Zhao and Glewwe, 2010), thus many children actually lags in schooling years at the given age. we standardized the schooling years lag behind by the child's age, for the variance of number years of schooling lag behind is increasing as the child is getting older,

Educational Performance is defined as grade-standardized math and language (Mandarin) test scores. Both math and language test questionnaires were designed based on grade-specific curriculum by researchers at the Gansu Educational Research Institute in the provincial Ministry of Education. Children were given difference test questionnaires based on their current grade level and took the tests at school in 2004.

Preliminary results

The result is displayed in Table 2. Model (1) in Table 2 reports the OLS estimation with full sample. We can see that girls lag more years behind at the given age in full, which is confirmed to prior research that girls have lower educational attainment in China, suggesting parents discriminate against girls in educational progression. Parents' education and the wealth of family are strongly positive association between child's educational progression, indicating family background is an important factor that accounts for educational progression even though these children are still at the

stage of compulsory education.

Model (2) in Table 2 reports the same estimation as model (1), but only includes families with sibling data. We can see that there is no association between gender and educational progression and this result remains the same by using family-fixed effects model after controlling for common shared heterogeneity among siblings, implying using sample of one child family or urban family can lead to difference results regarding the gender difference in educational outcomes in China.

For educational performance, boys outperform girls in math scores, but not in language scores with OLS estimation as shown in model (4) and model (7) respectively. Nonetheless the negative association is stronger between gender and both math and language test scores in model (5) and model (8). The gender differences in math and language test scores are even wider in the fixed-effects estimation as shown in model (6) and model (9) respectively. Clearly, boys have better educational performance than their sisters within families.

Next Steps of this research

Our preliminary results suggest that parents don't discriminate against daughters in providing opportunities and resources for progressing in compulsory education, however, boys apparently outscore their sisters in both math and language test scores in the family-fixed effects model. The question remains, what are the factors that account for gender differences in educational performance in rural China? Next steps of the research will highlight the family resource allocation across gender within the families that differentiates the educational performance. Specifically, we will explore the role of daily time use of children, parental educational expectations and additional educational investment outside school for sons in explaining the gender differences in educational performance in rural China.

Reference

Glewwe, Paul, Hanan Jacoby and Elizabeth King. (2001). "Early Childhood Nutrition and Academic Achievement: A Longitudinal Analysis", *Journal of Public Economic* 81(3):346-369

Hasket, Thereseh, Li Lu, and Zhu Wei Xing. (2005) The Effect of China's One-Child Family Policy after 25 Years. *New England Journal of Medicine*, 353(11): 1171–1176.

Meng Zhao and Paul Glewwe. (2010). "What Determines Basic School Attainment in Developing countries? Evidence from Rural China". *Economic of Education Review* 29:451-460

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Table 1: Descriptive Statistics for Variables Used in the Analysis

	Sample Child (N=1474)				Sample Sibling (N=624)			
	Mean	SD	%	Max(Min)	Mean	SD	%	Max(Min)
Dependent Variables								
Age-standardized Grade-for-age	0.08	0.91	-	1.89(-3.84)	-0.04	0.94	-	3.05(-3.69)
Grade-standardized Math Scores	0.01	1.00	-	4.37(-2.18)	0.08	1.01	-	4.00(-2.19)
Grade-standardized Chinese Scores	0.00	1.00	-	3.02(-3.68)	0.03	0.97	-	2.67(-3.06)
Independent Variables								
Birth Weight(kg)	2.98	0.53	-	5.00(1.00)	2.96	0.44	-	4.50(1.90)
Girl	-	-	45.73	-	-	-	41.51	-
1st Child (Yes=1)	-	-	45.86	-	-	-	0.00	-
Age of Children	14.96	1.12	12.00	17.00(12.00)	12.46	1.86	-	17.00(8.00)
Sibship size	2.32	0.72	-	6.00(1.00)	2.46	0.70	-	6.00(2.00)
Mother's Schooling years								
years<6	-	-	67.23	-	-	-	71.15	-
6<=yrs<9	-	-	13.23	-	-	-	13.14	-
years>=9	-	-	19.54	-	-	-	15.71	-
Father's Schooling years								
years<6	-	-	36.23	-	-	-	37.02	-
6<=years<9	-	-	17.03	-	-	-	19.87	-
years>=9	-	-	46.74	-	-	-	43.11	-
Wealth(log)	9.60	0.92	-	13.90(6.34)	9.59	0.96	-	13.90(5.58)

Table 2: OLS and Family-fixed Effects Model of Children's Characters and Family Background on Child's Educational Progression and Performance

	Age-standardized grade-for-age			Grade-Standardized Math Test Scores			Grade-Standardized Language Test Scores		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Birth Weight	0.035*	0.028	0.034	0.042*	0.042	0.024	0.026	0.007	-0.019
	(0.019)	(0.029)	(0.033)	(0.022)	(0.033)	(0.040)	(0.021)	(0.032)	(0.042)
Girl	-0.083**	0.012	0.008	-0.155***	-0.189***	-0.219***	-0.073	-0.120*	-0.150**
	(0.040)	(0.056)	(0.059)	(0.045)	(0.061)	(0.075)	(0.044)	(0.062)	(0.075)
1st Child (Yes=1)	0.104**	0.103	0.165**	-0.026	-0.116	-0.014	0.044	0.071	0.112
	(0.044)	(0.068)	(0.079)	(0.050)	(0.075)	(0.108)	(0.051)	(0.076)	(0.103)
Age of Children	-0.015	-0.016	-0.042	-0.023*	-0.020	-0.061**	-0.034***	-0.041**	-0.052
	(0.012)	(0.019)	(0.026)	(0.013)	(0.019)	(0.031)	(0.013)	(0.019)	(0.032)
Sibship size	0.015	-0.023	-	0.062*	0.065	-	0.071**	0.081	-
	(0.036)	(0.064)	-	(0.037)	(0.053)	-	(0.033)	(0.052)	-
Mother's Education (schooling years<6years)									
6<=years<9	0.280***	0.362***	-	-0.002	0.063	-	0.101	0.171*	-
	(0.052)	(0.077)	-	(0.067)	(0.089)	-	(0.069)	(0.092)	-
years>=9	0.258***	0.242***	-	0.082	0.130	-	0.087	0.150*	-
	(0.051)	(0.077)		(0.064)	(0.098)	-	(0.062)	(0.090)	-
Father's Education (schooling years<6years)									
6<=years<9	0.317***	0.293***	-	0.012	0.066	-	-0.018	0.002	-
	(0.065)	(0.103)	-	(0.064)	(0.087)	-	(0.067)	(0.091)	-

years>=9	0.322***	0.311***	-	0.062	0.116	-	0.104*	0.133*	-
	(0.051)	(0.081)	-	(0.055)	(0.079)	-	(0.053)	(0.077)	-
Wealth(log)	0.178***	0.185***	-	-0.029	-0.060*	-	-0.016	-0.034	-
	(0.023)	(0.034)	-	(0.024)	(0.034)	-	(0.025)	(0.037)	-
Model	OLS[a]	OLS	FE[b]	OLS	FE	FE	OLS	FE	FE
Observations	2,080	1,030	1,030	2,080	1,030	1,030	2,080	1,030	1,030
R-squared	0.120	0.131	0.010	0.014	0.030	0.052	0.011	0.021	0.017
Pairs of Sibling			515			515			515

Standard errors are in parenthesis; ***,**,* denotes significant level at 1%, 5%, and 10% respectively

[a] OLS represents ordinary least square regression; [b] FE represents family-fixed effects model