

Social Inequality in Child Educational Development in China

Airan Liu, Peking University

Wangyang Li, Beijing Normal University

Yu Xie, Princeton University

Introduction

Studies in social stratification have reached a consensus that education works as a primary mechanism in the reproduction of social inequality over generations, and that family background, which is usually measured by family's socioeconomic status (SES), is the most influential factor for children's educational achievement and attainment (Duncan et al. 1998; Duncan, Brooks-Gunn, and Klebanov 1994; Duncan, Ziol-Guest, and Kalil 2010). With more economic resources, higher SES families are able to provide children with a stable and safe environment to grow up in, make greater investments in children's education, purchase better educational services, and afford various extracurricular activities, all of which contribute to their children's better performances in school (Covay and Carbonaro 2010; Lareau 2011). Unfortunately, nearly all past studies examining the relationship between family and children's educational achievement have focused on Western countries, mainly the U.S. Very few have examined this question in East Asian countries such as China. Because China differs from Western countries profoundly in regard to institutional systems, social life, cultural values, etc. more research is needed on the relationship between family and educational outcomes in China, and how this relationship resembles or differs from that in Western societies. This study thus revisits a classical sociological question by investigating the relationship between family background and children's educational achievement in China.

In this study, we capitalize on data from the China Family Panel Studies, a recently available, nationally representative and longitudinal survey dataset, to investigate the relationship between multiple social determinants and children's educational outcomes in China. To facilitate our understanding of whether and how China differs from Western countries, we focus on the relative importance of different social determinants of children's achievement in China and how these differ from those in Western countries. Our studies contribute to the current literature on social stratification by broadening our understanding of the relationship between family and children's educational achievement in contemporary China.

Structural Forces, Family and Children's Achievement in China

One significant difference between China and other Western countries is the prominence of the government. In China, the government lays authoritative claims to key resources, and this is true at all levels, down to the individual community (Xie 2016). Due to the political system, China's social and economic inequality are heavily driven by structural forces such as geographic regions and household registration. While their roles are almost negligible in Western countries, structural forces in China have profound effects on individuals' social and economic outcomes, which carry more weight than other family and individual characteristics, such as race/ethnicity. If we take income inequality as an example, geographic regions account for around 10% of the inequality in China, but they have almost no explanatory power in the U.S.. Family structure, on the contrary, accounts for 12% of the inequality in the U.S. but only 2% of the inequality in China (Xie 2016; Xie and Zhou 2014). Moreover, because structural factors are predetermined and are not affected by individuals' own ability and effort, it is difficult for individuals to escape the influences of these factors (Xie 2016). The strong impacts of regions and household registration hold true when it comes

to education. As a matter of fact, educational opportunities for primary and secondary education in China are tightly attached to hukou and residence. Not only do these features limit educational choices for children, they also undermine the educational development of children from less developed and rural areas by shaping the distribution of educational resources, with children in urban or more developed counties having access to better and more abundant educational resources than children in rural and less developed counties. These regional and rural-urban differences in educational resources have placed students from less developed regions at a disadvantage vis-à-vis those from more developed areas and have contributed to the rural-urban differences in children's educational development. Based on these considerations, we propose our first hypothesis as follows:

H₁: In China, structural forces (hukou and geographic locations) shape children's educational achievement significantly. Their effects are greater than family-level characteristics.

Family's Resources and Chinese Children's Achievement

Generally measured by parents' education, occupation, and family's income, family SES has been widely documented to influence children's educational achievement in the past literature. Despite the strong correlation between each two of the three indicators, they largely represent two types of resources by which family affects children's academic achievement: non-monetary resources (such as parents' education) and monetary resources (such as family income) (Conger and Donnellan 2007; Duncan and Magnuson 2003; Ensminger et al. 2003). Existing studies in Western countries have consistently found that the effects of both income and parenting on children's education are positive and significant. And the significance of income's effects remains even after controlling for parents' education and other social demographic characteristics (Davis-Kean 2005). Based on these findings, it is widely agreed that family's monetary resources are indispensable to children's educational achievement in Western societies such as the U.S..

However, whether and to what extent family's economic resources and non-economic resources affect children's educational development in China remains unclear. We argue that the situation is likely to be different in China, and that family's monetary resources such as income will be much less important than family's non-monetary resources such as parenting and expectations regarding children's educational achievement. In contrast with Western countries, China is deeply influenced by Confucian culture, which emphasizes the importance of education and personal effort. It is also widely believed that success is attainable through consistent hard work rather than resulting from innate ability fixed at birth (Chen and Stevenson 1995; Stevenson and Stigler 1994). These distinct features of Confucianism promote an education-oriented parenting style regardless of family's economic conditions and weaken the ties between family's socioeconomic origin and parents' attitudes towards education and their parenting practices. For example, Asian Americans parents are found to hold high educational expectations for their children even when they are from low income groups (Liu and Xie 2016). It is also been found that parental involvement and educational expectations in China are independent of family income and are positively and significantly related to children's achievement (Liu and Xie 2015). As these non-monetary characteristics of the family are closely related to children's development (Lareau 2011; Mayer 1997), income's effects will be limited in China. We thus propose our second hypothesis:

H₂: In China, the effects of family non-monetary characteristics on children's educational achievement are greater than those of family's economic resources and processes.

Data and Measurement

Data. We use data from the China Family Panel Studies in this study. The CFPS is a nationally representative longitudinal survey which began in 2010. It sampled 15,000 families and 30,000 individuals in its baseline wave and has followed this sample with biennial surveys. The CFPS has a child module for all respondents below age 15. In this module, questions are included regarding children's achievement as well as parenting behaviors and attitudes. Moreover, children ages 10-15 were administered cognitive tests on their math and reading ability. When children grow beyond age 15, they are automatically transferred into the adult module. One feature of the CFPS is that it collects information on the family and on core family members, which allows us to link children with their families and to examine our research questions. In our study, we combine data from CFPS 2010, 2012, 2014 and the most recent available 2016 wave.

Measuring Educational Achievement. We use several measurements for children's academic achievement. The first measurement is the child's test scores on math and reading in the CFPS. Because we combine information from multiple waves and the children are in different age groups, some of the children may have taken the tests multiple times. For these children, we use the score from the time that they first took the assessments. We also use high school enrollment as another measure of children's academic achievement.

Key Independent Variables. Our key independent variables fall into several categories. First, structural factors include hukou type (rural vs. urban) and county. Second, to measure family's economic resources, we use (1) family's annual income and (2) family's annual expenses on children's education. For family's non-economic resources, we adopt the following measurements: (1) parents' educational expectations for their children, (2) home environment, and (3) parenting behaviors, which includes the parents' devotion to both children's academic studies and their wellbeing.

Covariates. We also control an extensive set of covariates such as children's age, gender, parents' education, residential area, etc.

Analytical Strategy

Our analyses fall into two parts, with each part corresponding to one of our hypotheses. To test our first Hypothesis on the relative importance of structural factors and family characteristics for children's educational achievement, we construct *bivariate R²* and *partial R²* (Xie and Zhou 2014). To obtain the *bivariate R²*, we first construct a simple linear regression model and regress each of the three focal measurements of achievement on basic demographic control variables. Equation 1 specifies the model we construct. In the equation, X_1 is a vector of control variables. We term the R^2 obtained from this model as R_0^2 .

$$Y = \beta_0 + \beta_1 X_1 + \epsilon \quad (\text{Eq. 1})$$

Based on the model in Equation 1, we add the structural factors (county indicator and hukou) and family characteristic variables (parents' education and income) into the model one at a time (Eq. 2). In Equation 2, A_i is one the four variables from structural factors or family characteristics.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 A_i + \epsilon \quad (\text{Eq. 2})$$

Next, we calculate the change in the R^2 between Equation 1 and Equation 2, that is the change between the models before and after we include one focal explanatory variable. This change is termed *bivariate* R^2 and gauges the extent to which the overall differences in achievement outcome can be explained by a given factor. Nevertheless, because we only include one focal explanatory variable in each model, this measurement of the explanatory power of each variable is likely to be contaminated and thus overestimate the explanatory power as different determinants of achievement are correlated and share common explanatory power. For example, urban hukou and higher parents' education all contribute to children's higher achievement. However, parents' education and hukou are correlated and urban hukou parents tend to have higher levels of education than rural hukou parents. Therefore, the model in which we only include parents' education without hukou and the estimates of R^2 will be confounded and the explanatory power of parents' education partially comes from hukou status.

To deal with potential bias and corroborate our findings, we further calculate the partial R^2 . We first construct a linear regression model, including all the four focal explanatory variables of county, hukou, parents' education and family income (Eq. 3).

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 \text{CountyID} + \beta_3 \text{Hukou} + \beta_4 \text{Education} + \beta_5 \text{Income} + \epsilon \quad (\text{Eq. 3})$$

We denote the R^2 from this full model as R_F^2 . Next, we take the four focal variables out of the full model, one at a time, and obtain four R^2 from these parallel models. We denote this R^2 as R_{-i}^2 with i indicating the explanatory variable taken out of the model. The partial R^2 is defined as the change in R^2 of the model before and after we take out one focal explanatory variable (Eq. 4).

$$\text{partial } R^2 = \frac{R_F^2 - R_{-i}^2}{R_F^2} \quad (\text{Eq.4})$$

This *partial* R^2 measures the remaining variation in achievement that can be explained by a focal variable when all other variables are controlled (Xie and Zhou 2014). Compared with the *bivariate* R^2 , the *partial* R^2 is a more conservative measurement of the explanatory power of a focal variable and will be smaller than the *bivariate* R^2 . Combining these two R^2 measurements will provide us with an interval estimate to assess the explanatory power of different factors, with *bivariate* R^2 being the upper bound and *partial* R^2 being the lower bound. Based on this interval estimate, we can draw inferences about the relative importance of different factors for children's achievement.

To test our second hypothesis, we employed conventional regression analyses.

Preliminary Results

Results from preliminary analyses corroborate our two hypotheses. Figure 1 shows the R^2 analyses assessing the relative importance of structural factors vs. family-level characteristics. As it shows, residence county and hukou type account for a significant proportion of the variance in math achievement, reading achievement and high school enrollment, which is much higher than that accounted for by family's income and parents' education. This suggests that structural factors in China are stronger determinants of educational outcome than family's socioeconomic characteristics, which is different from Western societies. Table 1 summarizes the preliminary results from the regression analyses. As it shows, among all the family level characteristics, neither family income nor expenses

on education relate significantly to children’s achievement in China. Family’s non-economic characteristics such as parenting, expectations, etc. are significantly associated with children’s educational outcomes.

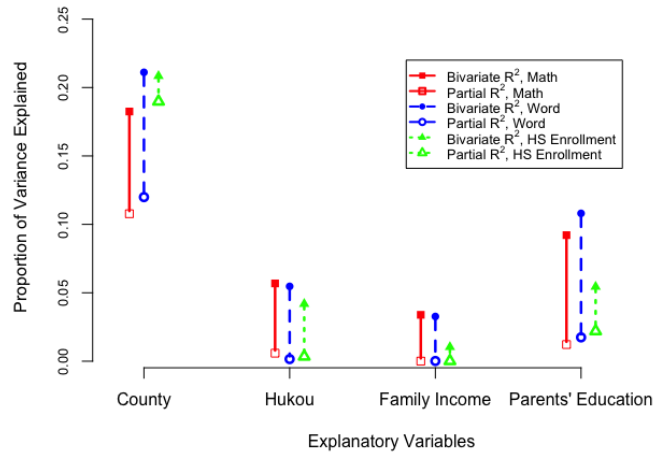


Figure 1. Bivariate and partial R2 for different predictors of educational achievement

Table 1. The Effects of Family Monetary and Non-monetary Resources on Children's Education

	Math test	Word test	HS enrollment
Family monetary resources			
ln (income per capita)	0.01 (0.01)	0.01 (0.01)	0.00 (0.10)
Education expenses (1000)	0.00 (0.00)	0.01 (0.00)	0.00 (0.07)
Family non-monetary resources			
Parental involvement	-0.01 (0.01)	0.01 (0.01)	0.00 (0.03)
Home environment	0.05 *** (0.01)	0.06 *** (0.01)	0.03 ** (0.10)
Grade expectation	0.01 *** (0.00)	0.01 *** (0.00)	0.00 (0.01)
Social demographic controls	Yes	Yes	Yes
County level fixed effects	Yes	Yes	Yes
Observations	4,805	4,804	1,415

Note: Social demographic controls include children's gender, age, migrant status, number of siblings, and parents' education.

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