Human Capital Investment in Children: An Empirical Study of Household Child Education Expenditure in China, 2007 and 2011

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Abstract:

Household education expenditure is an important component of human capital investment in children. In China, the rising child education expenditure and the subsequent financial burden on families have attracted much research and policy attention in the recent years. Using 2007 and 2011 data from the Urban Household Education Surveys, our empirical study provides new evidence on the education expenditure level, ratio of expenditure to household income, and inequality in this expenditure. We also elucidate changes in China's household education expenditure and explore factors associated with such changes. From the analysis, we obtain the following findings. First, education expenditure incurred outside the school significantly contributes to increasing household education expenditure. Second, compulsory education programs are effective in curbing in-school education expenditure; however, it does not prevent the rapidly increasing education investment outside school. Third, education expenditure disproportionally increases with family income. In other words, a larger share of the income earned by lower income families is spent on children's education, compared to higher income families.

Keywords: human capital investment; child education expenditure; out-of-school expenditure; compulsory education policy

JEL classification: I21; I23

1. Introduction

In recent years, the increasing household expenditure on children's education and the associated rising inequality have drawn significant attention from policy makers and researchers in China (Li, 2000; Gustafsson and Li, 2004; Lei, 2005; Chu, 2008a). Household expenditure on children's education is an important component of human capital investment and can help children achieve better educational outcomes, and subsequently, higher income in the labor market. However, there are also unintended consequences of excessive household expenditure on children's education. First, large investments in children's education may "crowd out" other types of household consumptions, thus lowering the quality of life. Second, the rising inequality of household education expenditure may largely contribute to the inequality in children's educational outcomes and, in turn, widen social inequality. Studies on regional and rural–urban education disparity in China have reported consistent findings that children from less developed regions and rural areas are less likely to enter colleges (Hannum & Wang, 2006; Qian & Smyth, 2008). According to Heckman and Yi (2012), secondary school enrollment in China's rural areas has been decreasing in the recent years. It is also possible that income inequality in the older generation is passed down to younger ones through inequalities in education expenditure.

Monetary investment in children's education comprises two types of expenditure: in-school and out-of-school education expenditures. School fees, which mostly cover tuition and textbooks, are considered in-school education expenditures, whereas payments for after-school classes or private tutoring are considered out-of-school expenditure. From the perspective of human capital investment, out-of-school

expenditures aim at developing two types of skills in children: extra-curricular skills (e.g., music, art, and sports lessons) and academic competencies (e.g., mathematics and foreign languages); the goal of the latter is to specifically improve children's grades in school. Like in several other countries, students in China must sit entrance examinations that help determine whether and to which school or college they should be admitted. As one would expect, the competition to excel these examinations is fierce. Thus, households incur out-of-school expenditures on classes related to the academic curriculum to increase children's performance in these entrance examinations.

Household expenditure on children's education in China differs from those in the United States or United Kingdom. First, unlike in China, less attention is paid to out-of-school expenditure in the United States or United Kingdom. The phenomenon of developing children's extra-curricular skills or improving their academic performance through private tutoring and after-school classes is more commonly observed in Chinese parents (Lei, 2005). Second, in the United States and United Kingdom, students must receive compulsory education amounting to 12–13 years. By contrast, China's Compulsory Education Law of 1986 stipulates a minimum of nine years as compulsory education: six years in elementary school and three years of junior high school, all of which are exempted from tuition fees. Initially, China's Compulsory Education Law did not prohibit schools from charging miscellaneous fees. However, from the 1990s to the early 2000s, the miscellaneous fees collected by schools during the years of compulsory education dramatically increased, leading to

the amendment to the law in September 2006, which further exempted students from miscellaneous fees (Wu et al., 2007).

This study aims to provide new evidence by examining (1) household expenditure on children's education and the ratio of this expenditure to household income (2) inequality in education expenditure among urban families, and (3) factors influencing household education expenditure. To do so, we obtained data from the Urban Household Survey, Education Supplementary, conducted by China's National Bureau of Statistics (NBS) in 2007. Extending the 2007 survey, we collaborated with NBS to re-design the Urban Household Education Survey, which was administered in 2011. We then compared survey data from 2007, the first year after the amendment to China's Compulsory Education Law was enacted, with data from 2011. The results help elucidate changes to in-school education expenditure in the first five years after the 2006 amendment and whether out-of-school expenditure exhibited a similar trend in 2007 and 2011.

We obtained the following major findings. First, out-of-school education expenditure increased rapidly from 2007 to 2011 and largely accounted for the rise in total child education cost. Second, although the compulsory education program helps curb the rising in-school education expenditure, it does not reduce Chinese parents' investment in out-of-school programs. We also found that household income and parents' education levels are two key factors influencing the household child education expenditure.

The remainder of this paper is organized as follows. Section 2 reviews the literature on household child education expenditure. Section 3 introduces the survey design, data collection process, and variables used in the analysis. Section 4 presents the results on the level, inequality, and determinants of household child education expenditure in 2007 and 2011. Section 5 summarizes the key contributions of the study and their policy implications, thus concluding the paper.

2. Literature Review

In developed countries, expenditures on tuition and other public schools fees are often covered by the government. Thus, in most studies on children's education in the United States, education investments include food, housing, transportation, clothing, healthcare, and intellectually stimulating learning materials. According to Haveman and Wolfe (1995), in 1992, the annual cost incurred by parents was 7,579 dollars per child. Furthermore, Olson (1983) used 1972–1973 consumer expenditure survey data and found that 13% of the costs incurred to raise a child before college was education related. Using 1996 Consumer Expenditure Survey data, Mauldin et al. (2001) found that, for families with two children and who reported positive expenditure on children's education, the education expenditure on children aged less than 18 years accounted for 7.56% of annual after-tax income. However, few studies have examined the impact of family education expenditures. Examples of parental investment variables previously studied are parents' income, education level, and family structure (Haveman and Wolfe, 1995; Kane, 1994; Mauldin et al., 2001). In contrast, social education expenditure has gained much attention from researchers in the United

States. Numerous studies have been conducted on the educational outcomes of tax subsidies for public schools, financial aids, the reduction of tuition and other fees, and policies with provisions that help families pay for college (Deming & Dynarski, 2009; Dynarski, 2003; Rivard & Raymond, 2004; Kane, 1995; 2004).

This situation starkly differs from those in Asian countries. As Chung and Choe (2001) proposed, "educational credentialism" is deeply rooted in the Asian culture, which has resulted in families incurring high education expenditures, particularly for private and after-school education. In Korea, household education expenditure has for long been under the social spotlight (Chung & Choe, 2001). In India, rural households reported sizable expenditure on education, especially among families with a lower socioeconomic status (Tilak, 2002).

In developed countries, few studies have distinguished in-school from out-of-school education expenditure. Many studies have focused on in-school education expenditures with tuition fees as a major component, especially for college students (Deming & Dynarski, 2009; Kane, 1994; Rivard & Raymond, 2004). Kane (2004) provided a survey of studies evaluating after-school programs mandated by the U.S. government since 1998—these programs help children with working parents better utilize their time after school. He pointed out that although most studies found a positive relationship between the programs and attendees' behavior, there was insufficient evidence of them improving academic performance; this is possibly because the programs crowd out the time parents spend with their children.

Lino (2008) examined the distribution of education and childcare expenditures across families of different income levels and found that higher income families spent a larger proportion of their income on education and childcare before their children reached the age of 18 years. In 2007, for families in the United States at the bottom one-third of income distribution, education and childcare expenses per child accounted for 9.7% of the total expenditure on a child, while those in the highest income quantile reported approximately 11.5%. Similarly, Miller and Hexter (1985a, 1985b) found that the ratio of college education cost to household income/expenditure was lower for low-income families than middle-income families.

In addition to the level and inequality of household education expenditure, the literature discusses factors influencing families' expenditure on education in different countries. Using 1972–1973 Consumer Expenditure Survey data, Lazear (1988) found that family income levels and the number of children have a strong positive impact on household education expenditure, while a child's gender and age are not relevant factors. In addition to these factors, studies have suggested that the education level, race, and age of household heads and the region of residence influence family education expenditure in the United States (Huston, 1995; Mauldin et al., 2001). In Korea, it was found that mothers', and not fathers', income was positively correlated with household expenditure on children's private and after-school education (Chung & Choe, 2001). Additional factors that significantly impact household education expenditures are mothers' education levels and age.

In China, several household surveys have addressed household education expenditure. According to the National Household Compulsory Education Expenditure Survey conducted by Beijing Normal University in 2006, the average education expenditure of urban families during the years of compulsory education (elementary and junior high school) on one child was 3,654 yuan per semester, of which 76% accounted for out-of-school expenditures (2,777 yuan). Using the survey conducted by the Chinese Academy of Social Sciences' Institute of Economics, Gustaffson and Li (2004) found that the percentage of income spent by rural households on education increased from 1% in 1988 to 2.2% in 1995.

Chu (2008a) analyzed the inequality in education expenditure across households in China at the compulsory education stage and concluded that the inequality was higher for out-of-school expenditure than in-school expenditure. Few studies have explored in-school and out-of-school education expenditure and further discussed inequalities in household education expenditure between areas (rural and urban), regions, education stages, and types of schools (private and public)(Chi et al., 2011; Li, 2006; Wei & Qiu, 1998). The most intensively discussed determinants of household education expenditure in China are household income (Li, 2000; Qin & Liu, 1992), parents' education levels and occupation (Li, 2000; Lei, 2005), rural or urban area, and regions of residence (Lei, 2005). Chu (2008b) investigated factors influencing education expenditure during the compulsory education stage, such as parents' education level, occupation and region of residency.

However, the sample period for most of the aforementioned Chinese studies is restricted to one year, rendering it difficult to examine changes in the level, distribution, and determinants of household education expenditure. In addition, these studies do not adopt recent data and thus, there is a gap in literature regarding the current status of parents' education expenditure in and outside schools. Similar to the U.S. literature, few studies have estimated the effect of household education expenditure on children' education outcomes in China. Previous research in China has analyzed the impact of parental characteristics and Hukou status on children's high school attainment and academic test scores. Chen and Feng (2013) found that non-local Hukou status was significantly associated with worse school performance. Yang et al. (2014) found that family income and parental schooling were major factors in predicting children's high school attainment in rural areas.

The current study intends to contribute to the existing literature in three ways: first, using two years of household survey data, we are able to demonstrate the change in household educational expenditure. In particular, since 2007 was the first year after the amendment to China's Compulsory Education Law was enacted, we examined how in-school and out-of-school expenditures changed in the first five years since the enactment of the amendment. Our findings generally supported that the amendment was effective in curbing the growth of in-school expenditure, but it cannot help reduce the burden of out-of-school spending on families, especially for low-income families. Second, in-school and out-of-school household education expenditures are analyzed separately, and we provide more detailed information on the out-of-school

expenditure categories to illustrate on which items Chinese parents are spending for their children out of school. The evidence suggested that Chinese parents spent more on academic-related classes than extracurricular interest-related classes. This finding supported that the purpose of out-of-school expenditure is not to expand children's interests, but perhaps to improve children's grades in school. Finally, we separately provide evidence on the influence of household income and parental background on in-school and out-of-school expenditures, whereas previous studies combine them in such regression analyses. We found that in-school expenditure was not influenced by parents' education or income levels, while out-of-school expenditure was. This finding may again be related to the Compulsory Educational Law, since in-school expenditure was regulated by the Law, it was not affected by family circumstances.

3. Data and Variables

Data used in this study are adopted from the Urban Household Surveys conducted by China's NBS in 2007 and 2011. In addition to the monthly urban household survey conducted since 1987, NBS administered a supplementary survey on households' educational attainment and expenditure levels in 2007. We obtained this data in 2009 and collaborated with the NBS Urban Household Survey division to design and administrate a second wave of the supplementary education survey in 2011.

Both waves of data collection adopted an identical sample frame and a stratified sampling method. First, the urban and suburban districts were classified into three levels. The first level includes prefecture-level municipalities, provincial capital cities, and the central government's direct municipalities. The second and third levels

comprise county-level cities and county towns. The sample size was then determined for each level according to the proportion of population. The cities and towns were ranked by their average per capita income. Finally, the sample cities and towns were randomly selected as per the decided sample size.

Among the sample cities and towns, sub-districts (streets) were randomly sampled from the selected districts. This was followed by the selection of neighborhood committees from the chosen sub-districts and finally, that of households. The surveys were held in the form of face-to-face interviews during household visits and an adult from each household was chosen to participate in them.

The 2007 survey covered 21 cities from the eastern, western, and central areas of China, with a sample size of 5,000 households. Because of budget limitation, the 2011 survey was designed to survey households with school age children in only primary and junior high school stages. To make the sample used in the analysis consistent between the two years, for 2007, we first identified children/grand children in a household, and based on the child's educational level, we kept only those with the two educational levels (from 2,501 households). Based on the relation code to the household head, we then eliminated (1) grandchildren of the household head because in this case the child's parents cannot be accurately identified (3% observations); (2) children whose age is beyond the junior high stage (age>16) (31%), and (3) households with more than one child (9%). As a result, we obtained the final sample of 1,434 observations used for the analysis. The 2011 survey collected data from five province and cities across China, including the Hunan and Henan province (central

region), Shenyang and Dalian from Liaoning (eastern region), and Chongqing (western region). [1] The 2011 survey was addressed to the parents who have school age children in the two education stages. We only excluded families with more than one child to be consistent with the 2007 sample selection; thus, 10.6% of the observations were dropped. For 2011, the total sample used in the analysis was 1,976.

Both waves of the survey included detailed household education expenditure items. In 2007, the respondents reported expenditure on tuition and textbooks, room and boarding (if any), private tutors, after-school programs or classes, and other education-related activities. Following previous studies (Chu, 2008a), we classified education expenditures into four categories: in-school expenditure, including tuition, textbooks, and miscellaneous fees; out-of-school expenditure, including private tutors and after-school lessons and programs; room and boarding fees; and other fees. Total household education expenditure is the sum of these four categories. The 2011 survey asked room and boarding fees as a part of in-school expenditure, for consistency, we extracted those numbers from in-school expenditure, based on which we calculated the boarding and accommodation fees in 2011.

The lower panel of Table 1 presents sample characteristics for the two years. In 2007, about 62% of the sample had a child in primary school, nearly twice as many as those with a child in junior high school. In 2011, we only surveyed families with a child in primary or junior high school. The proportion of the families with a child in

[1] We attempted to survey the same cities in 2011 as in 2007. However, because of budget limitations and because some provinces refused to participate in the 2011 survey, we were only able to survey five provinces and cities in 2011, of which two cities were also surveyed in 2007. For each surveyed province and city, households were selected using the same sampling frame for 2011 and 2007.

these schooling stages was 66% and 34%, which is comparable to 2007. In 2007, little information was available about parents' demographics. The 2011 survey, however, included marital status and ethnicity of parents: 4% households were headed by a single parent[2] and 5% families had at least one parent from an ethnic minority group. For both years, information on parents' education level, Hukou type, and occupation was available. In 2007, 40% of the households had at least one parent with college or higher education, and this number increased to 50% in 2011. The number of households with both parents having a non-local Hukou, (i.e., migrants) is higher for 2007 (3.5%) than for 2011 (1.8%). In sum, despite different sample cities, the characteristics for 2007 and 2011 are comparable[3]. Table A1 in Appendix presents the definition and summary statistics of explanatory variables used in the empirical analysis. The t-test of mean differences for the continuous variables and Pearson Chi2 tests for the categorical variables in the last column also verified that most variables in the 2007 sample did not differ significantly from those in the 2011 sample.

4. Results

4.1 Education expenditure by urban households for 2007 and 2011

Table 2 reports China's household education expenditure for 2007 and 2011. The total household education expenditure increased from 1,229 to 2,201 Yuan. For a child in primary school, families spent 321 yuan on average on tuition, miscellaneous fees and textbooks per semester in 2007, and this amount decreased to 184 yuan in

[2] Respondents who have been never married or are divorced or widowed were deemed single-parent families.

[3] Furthermore, we compare sample characteristics of the two cities that were covered in both 2007 and 2011 surveys. The result is largely consistent with the comparison of the total sample of the two years. The results are available upon request.

2011. On the other hand, out-of-school expenditure per semester nearly tripled, increasing from 456 yuan to 1,270 yuan. In the junior high school stage, in-school expenditure decreased from 612 yuan to 380 yuan, while out-of-school expenditure increased from 675 yuan to 1,447 yuan. These numbers reveal two points: parents spent more on a child in junior high school than on one in primary school, and out-of-school expenditure increased rapidly, while in-school expenditure for both primary and junior high school children declined.

We further examined the composition of a child's in-school and out-of-school education expenditure. Table 2 suggests that, both tuition and miscellaneous fee and textbook cost have decreased, which may be attributed to the amendment to the Compulsory Education Policy that eliminated school miscellaneous fees in 2006, in addition to tuition exempt. Regarding out-of-school education expenditure, Table 2 suggests that, in 2007, parents tended to spend more on out-of-school classes at the primary school stages, while they invested more in private tutors in the junior high school stages. For the 2011 data, we further distinguished the two types of out-of-school classes: academic-related and extra-curricular classes. The former aims at helping a child improve academic performance, while the latter are considered interest classes, such as for piano, dance, or sports. Table 2 shows that, in 2011, parents spent more on out-of-school classes than private tutors. Moreover, between the two types of out-of-school classes, they invested more in academic-related classes than interest ones, especially for children in junior high school. These findings confirm that parents in China spend more on out-of-school education to improve their

child's academic performance, possibly because of the fierce competition in senior high school and college entrance examinations. In other words, out-of-school expenditure is less intended as human capital investment to broaden children's skills or competencies that are not covered in school.

In addition to the amount of household education expenditure, we focus on the financial burden posed by this expenditure. Table 3 shows the ratio of household education expenditure to total household income for 2007 and 2011. The ratio of in-school expenditure to income decreased during 2007-2011 (from 1.6% to 0.7% at the primary school stage and from 2.9% to 1.6% at the junior high stage), while that of out-of-school expenditure to income increased by 2.5-3.8 percentage points for both primary and junior high stages, which indicates that the rising financial burden on households mainly results from the increasing spending on out-of-school education.

4.2 Inequality in education expenditure for 2007 and 2011

Table 4 shows the distribution of education expenditure by income level. We divided the sample households into four quartiles per household income and calculated the ratio of education expenditure to household income for each quartile. The lowest income families spend the largest share of their income on their child's education, 13% in 2007 and 19% in 2011. We also found that as the household income quartile increased, the ratio of education expenditure to income decreased. The top quartile families spent only 5% income on their child's education in 2007 and 8% in 2011. These findings indicate that the expenditure on a child's education in

China is somewhat rigid, and thus low-income families have to spend a larger share of the income on their child's education.

Distinguishing in-school from out-of-school education expenditure revealed that the ratio of in-school expenditure to income greatly decreased from 2007 to 2011, especially for low-income families. For families at the bottom income quartiles, 5.33% of household income was spent on their child's tuition and book fees in 2007, which was reduced to 2.83% in 2011. On the other hand, the out-of-school education expenditure accounted for a greater share of family income. For the lowest income families, near 10% of household income was spent on out-of-school education programs in 2011, which is more than twice the percentage for 2007. For wealthier families, the share of income spent on out-of-school education also increased from 2007 to 2011, but not by the same extent.

To further demonstrate the inequality in household education expenditure in China, we calculated the Gini coefficient for the distribution of education expenditure (Table 5). For comparison, we also calculated the Gini coefficient for income distribution. As shown, the Gini coefficient for the household education expenditure is higher than that for income distribution, suggesting that household expenditure on a child's education is distributed more unequally than household income[4]. In both years, Gini for the distribution of out-of-school expenditure was larger than that for in-school-expenditure. An interesting finding is that despite the fact that the Chinese

[4] Although we intended to compare the Gini coefficients for household income and education expenditure within each year rather than over time, we found that the Gini coefficient of household income for 2011 was smaller than that for 2007, as in Table 5. This trend seems to be at odds with the trend of rising income inequality described in recent studies (Xie and Zhou, 2014). A possible explanation is that the income distribution varied across the cities covered in the two waves of the survey. We calculate the Gini coefficient of household income for Dalian, a city covered in both years. The Ginis for income distribution were 0.31 in 2007 and 0.32 in 2011.

government eliminated tuition and fees for compulsory education in 2006, inequality in in-school education expenditures increased from 0.42 to 0.60 at the primary school stage and from 0.49 to 0.60 at the junior high stage during the period from 2007 to 2011. Further investigation shows that this is mainly attributable to the increased variance in tuition and miscellaneous fees, rather than to textbook fees. As seen from Table 2, standard deviation of textbook fees increased slightly, while standard deviation of tuition and miscellaneous fees exhibited a much larger increase. Our data shows that in 2007, one year after miscellaneous school fees were eliminated in addition to tuition, only 20% of respondents reported paying zero tuition and miscellaneous fees, and the maximum paid for such fees was 5,000 Yuan per semester. In 2011, after four years had passed, 36% of sampled households reported paying zero tuition and miscellaneous fees; however, the maximum paid for such fees increased to 17,733 Yuan. This suggests that the amendment to the Compulsory Education Policy was effective, and hence the proportion of households paying zero or very low tuition and fees increased dramatically, while rich families spent a much higher amount on tuition and fees in 2011 compared to 2007, which is likely due to the increase in private school attendance and the fact that private schools charge much higher tuition and fees. As a result, the variation in in-school expenditures did not decrease but increased.

We also plotted concentration curves to demonstrate the inequality in education expenditures. The concentration curve can provide more information than the Gini index. For example, the concentration curve can show whether inequality was greater

at the high- or low-income levels. The Y-axis indicates the cumulative percentage of education expenditure and the X-axis denotes the cumulative percentage of the sample ranked by household income. The 45-degree line represents expenditure equality. The further the line is from the 45-degree line, the greater the inequality. Figure 1 is consistent with Table 5, showing that among the different types of education expenditures, out-of-school expenditure is distributed most unequally. Moreover, compared to that of 2007, the concentration curve for in-school expenditure was closer to the 45-degree line among low-income families (below 0.5 in the X-axis) in 2011. This indicated the effect of the amendment to the compulsory education policy in reducing in-school expenditure inequality among low-income households.

4.3 Determinants of China's urban household education expenditure

Analyzing factors influencing household education expenditure can help provide insight into why the expenditure, especially for out-of-school education, has been high in the recent years. Following previous research (Mauldin et al., 2001), we developed an empirical model and considered four groups of determinants: household income level; family size; child's gender, child's current education stage; and parents' characteristics such as education level, occupation, Hukou status, and region of residence. For 2011, we have more control variables; however, to maintain consistency between the two years and keep the results comparable, we only include the variables that are available for both years.

Table 6 reports the regression results for the determinants of education expenditure. We distinguished in-school from out-of-school expenditures and examined the factors related to total expenditure as well as in-school and out-of-school expenditure. In Table 6, the first six columns show the results for 2007 and the last six columns for 2011. Since a father's and mother's education and occupation are highly correlated, we separately controlled for a father's and mother's characteristics and reported the estimates.

By doing so, we were able to observe a few patterns (Table 6). First, household income had a significantly positive effect on household education expenditure, indicating that high-income families spent more on their child's education. Interestingly, household income is positively related to out-of-school expenditure while it is not significantly related to in-school expenditure. As is seen, the coefficient estimates for household income in the out-of-school expenditure regression are significantly positive and much higher than those in the in-school or total expenditure regression. But the effect of household income on out-of-school expenditure decreased from 2007 to 2011. To further test whether or not the change in the effect of household income on out-of-school expenditure is statistically significant, we pooled two years of data and added the interaction of household income with the dummy variable for 2011. The estimate for the interaction term is significantly negative, suggesting that the decrease in the effect of household income on out-of-school expenditure is statistically significant. These results suggest that under the compulsory education policy, in-school expenditure is fixed and less associated

with family income, while out-of-school expenditure is highly correlated with income. Over time, however, the impact of family income on out-of-school expenditure declined.

Second, household education expenditure varied by a child's education stage. In 2007, total and in-school education expenditure was significantly higher for a child in the junior high school stage than in the primary school stage, while the out-of-school expenditure did not significantly vary between education stages. In 2011, we found consistent results as that for 2007.

Third, among parent characteristics, e.g., education level, occupation, and Hukou status, fathers and mothers' education level was positively but not significantly correlated with out-of-school education expenditure in 2007. In 2011, both fathers' and mothers' education levels were significantly associated with out-of-school education expenditure. In both 2007 and 2011, parents' education levels had an insignificant relationship with in-school expenditure. This finding may also be related to the compulsory education policy. That is, because of the policy, in-school expenditure in compulsory education stage was the same across families and thus, it was not affected by parent characteristics.

As for the effect of parents' Hukou status on a child's education expenditure, we found that, only for 2011, a father with a non-local rural Hukou status had significantly higher in-school expenditure than the base category (local urban Hukou). These results raise the concern that non-local rural residents may not benefit from the compulsory education policy by the same extent as local residents and thus, have to

spend more on the child's in-school education. This finding is consistent with previous studies regarding the lack of access to public schools for migrant children in China (Chen and Feng, 2013). Regarding the effect of parents' occupation on household education expenditure, there is no clear or consistent pattern between the two years.

In addition, we were able to control effects arising from for gender. The child's gender had a significant impact on the amount of education expenditure in 2011. The estimates suggest that families tend to spend more on education if the child is a girl. Again, this result is mainly driven by out-of-school expenditure. Using 2011 data, we also controlled for the effect of whether the child was raised by a single parent. When mothers' characteristics were controlled for, single parents appear to spend significantly more on a child's education, especially on out-of-school education.[5]

Finally, in terms of model fitness, we noticed that for the total expenditure and in-school expenditure regressions, R^2 is around 0.3, and it is around 0.2 for out-of-school expenditure regression for both years, implying that only 20-30% of the variance in education expenditure can be explained by the independent variables included in the analysis. Our results are somewhat consistent with previous studies reporting that household income, family size, parental background and other control variables can explain 30% and36% of the respective variance in total and out-of-school education expenditures in urban Chinese households (R^2 = 0.36 and 0.30)(Chu, 2008b). Nevertheless, this finding suggests that our understanding of the

[5] Due to limit space, we did not report these results in a table. They are available from authors upon request.

determinants of household educational expenditure is still limited, which calls for future research on this issue.

Table 7 reports the same set of results as Table 6; however, in this case, the dependent variable is the ratio of education expenditure to household income. A comparison of Tables 6 and 7 revealed a few insights. First, different from the positive effect of household income on the amount of education expenditure, the effect of household income on the ratio of education expenditure to income is significantly negative, suggesting that low-income families spent a larger share of their income on a child's education. This implies that the financial burden from education expenditure is higher for low-income families in China. This finding stands in contrast to that for the United States in that higher income families spend a higher share of their income on children's education and childcare (Lino, 2008; Miller and Hexter, 1985a; 1985b). Comparing the estimates for 2007 and 2011, we find that the negative coefficient for total and out-of-school expenditure is larger in 2011; in other words, the education expenditure burden on low-income families became even heavier in 2011. The estimate for the interaction term of household income with the 2011-year dummy based on the pooled data is significantly negative.

Second, similar to the results for the amount of education expenditure (Table 6), Table 7 shows that families spent a higher share of their income on a child's education if the child is at the junior high school stage than the primary school stage. Both in-school expenditure and out-of-school expenditure are higher for the junior high school stage.

Third, parents' education does not have a significant effect on the ratio of education expenditure to income in 2007; however, in 2011, parents' education levels became a significant factor associated with the share of household education expenditure. Specifically, parents with a higher education level spent a larger share of their income on their child's education. No significant and consistent results were found for the effect of parents' Hukou status. As to the effect of parents' occupation, the base category omitted from the regression are unemployed mothers or fathers. The effect of parents' occupation is insignificant in 2007, but becomes significant for several occupation categories in 2011. The results suggest that unemployed parents spent less of their income on a child's education, especially on out-of-school education. This is likely because they spent more time with their children and substitute time for monetary expenditure.

5. Conclusion

Using the urban household survey data for 2007 and 2011 in China, we examined the level, inequality, and factors determining household expenditure on a child's education. The analysis provided a few new results.

First, with the two years of data, we show the change in in-school and out-of-school expenditure. In particular, the studied period covers the first five years since the enactment of the amendment to China's compulsory education policy, which eliminated miscellaneous school fees in addition to tuition. Our results illustrate the effect of this policy in the first five years since it was enacted. However, our results need to be interpreted with caution, taking into consideration that the samples of the

two years should be comparable. Our findings are generally in favor of the policy: the in-school expenditure level decreased; the burden of in-school expenditure on families decreased; and in-school expenditure was not affected by family income or parental characteristics in 2007 and 2011.

We also noticed some less favorable trends: although families spent less on in-school education, they spent more on out-of-school programs, so the total expenditure did not decrease. What is more concerning is that the burden on low-income families caused by out-of-school expenditure increased significantly, and out-of-school expenditure was increasingly influenced by family income and parental educational levels. Another puzzling finding is that although the in-school expenditure level decreased, the Gini index of its distribution across the sampled families increased from 2007 to 2011. We found that despite the policy that eliminated tuition and miscellaneous fees, in-school expenditure did not drop to zero immediately. The percentage of families who reported paying zero tuition and fees per semester increased from 20% to 36% from 2007 to 2011, but this was still far from 100%. On the other hand, high-income families spent a much higher amount on tuition and fees in 2011 than 2007. Consequently, the Gini index for in-school expenditure did not decrease, but rather increased. The centration curve for in-school expenditure, however, showed some evidence of decreased inequality in this expenditure among low-income families. We encourage future studies to further examine this issue.

Second, our data allows us to examine out-of-school expenditure in detail. We found that from 2007 to 2011, families shifted out-of-school expenditure from private tutoring to out-of-school classes. This may result from the increase in the cost of private tutoring and/or the growing popularity of out-of-school training and tutoring companies. The 2011 data further show that parents tend to send their children to out-of-school classes intended to improve children's academic performance, such as Mathematics and English classes, rather than interest classes, such as sports and art lessons. This pattern became even more evident for junior high school children than primary school children. This implies that the purpose of out-of-school expenditure is not to expand children's interests and supplement in-school education, but to reinforce students' learning in school subjects.

Based on our findings, we provide the following policy implications. Policy makers should not only uphold the compulsory education program to control the expansion of in-school fees but also pay attention to the rising out-of-school expenditure. Parents spend on out-of-school programs for their child possibly because of the lack of such investment opportunities in schools—e.g., special art and sport lessons—or because they are not satisfied with the quality of in-school education; thus, they enroll their children in out-of-school programs as a supplement to in-school education. To reduce household spending on out-of-school education programs and lower the inequality in such spending, in-school programs should be improved to provide high-quality academic as well as extracurricular activities to all school children. Moreover, as long as higher education resources are scarce and not evenly

distributed, there will always be competition for the limited higher education access. This, in turn, will continue to give parents the incentive to invest in out-of-school programs aimed at helping their children gain a competitive advantage. Our finding that, in 2011, parents spent much more on out-of-school classes that are academic related than interest based echoes this view. Therefore, the long-term solution to the rising level and inequality in education expenditure prior to college is to enhance equal access to high-quality higher education resources.

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Table 1: Sample characteristics for 2007 and 2011

Total Sample Characteristics					
	2007			**2011**	
	Observations	Percentage		Observations	Percentage
Total Sample	5000	100%	**Total Sample**	2210	
Children Education Level[3]			**Children Education Stage**		
Kindergarten	436	9%	Kindergarten	-	-
Primary school	1601	32%	Primary school	1466	66%
Junior high school	920	18%	Junior high school	744	34%
Senior high school	1153	23%	Senior high school	-	-
College and above	841	17%	College and above	-	-
Not reported	49	1%	Not reported	-	-
Primary and Junior High School Sample Characteristics					
	2007			**2011**	
	Observations	Percentage		Observations	Percentage
Total Sample	1434	100%	**Total Sample**	1976	100%
Children Education Stage			**Children Education Stage**		
Primary school	889	62%	Primary school	1304	66%
Junior high school	545	38%	Junior high school	672	34%
Parents in Sampled Families			Parents in Sampled Families		
Marital Status			**Marital Status**	1976	100%
Single parent	-	-	Single parent	76	4%
Race			**Race**	1976	
At least one parent is of minority origin	-	-	At least one parent is of minority origin	104	5%
Education Level	1425		**Education Level**	1976	
At least one parents with a college or higher education	570	40%	At least one parents with a college or higher education	994	50%
Hukou Type	1434		**Hukou Type**	1976	
Both parents are migrants	51	3.5%	Both parents are migrants	35	1.8%

Data Source: China Urban Household Education Surveys for 2007 and 2011.
Note:
1. Single parents are those who have never been married or those divorced or widowed.
2. Minorities include foreigners.
3. In the upper panel, if a family has more than on e child, children educational level is referred to that of the younger child in the family.

Table 2: Household expenditure on a child's education for 2007 and 2011

	Total Expenditure	**In-School Expenditure**	*Tuition & Miscellaneous Fee*	*Textbook Fee*	**Boarding & Accommodation Fee**	**Out-of-School Expenditure**	*Private Tutor*	*Out-of-School Classes*		**Other Expenditure**
2007										
Total sample	1228.7 (1595.4)	431.9 (558.6)	*256.0 (519.4)*	*175.9 (136.7)*	150.11 (629.6)	539.7 (1083.1)	*249.8 (900.1)*	*289.9 (599.5)*		105.4 (243.4)
Education stage										
Primary school	952.9 (1160.4)	321.4 (295.4)	*173.1 (244.1)*	*148.0 (114.6)*	96.6 (417.4)	456.1 (955.1)	*165.2 (725.5)*	*290.8 (577.1)*		78.8 (164.1)
Junior high school	1677.5 (2046.2)	611.8 (792.4)	*391.3 (764.8)*	*221.5 (156.5)*	236.7 (864.2)	675.0 (1254.1)	*386.7 (1115.6)*	*288.4 (635.5)*		148.4 (330.2)
2011							*Private Tutor*	*Out-of-School Classes (academic)*	*Out-of-School Classes (interests)*	
Total sample	2200.9 (2589.8)	250.7 (677.6)	*149.4 (637.9)*	*101.2 (145.8)*	243.8 (569.3)	1329.9 (2017.4)	*129.8 (726.6)*	*764.6 (1220.4)*	*435.5 (1159.9)*	376.5 (771.1)
Education stage										
Primary school	2030.1 (2523.5)	184.3 (594.1)	*106.6 (569.3)*	*77.0 (104)*	223.8 (596.7)	1269.7 (1922.1)	*59.5 (362.3)*	*660.1 (1022.6)*	*550.0 (1351.3)*	352.3 (741.0)
Junior high school	2533.0 (2685.4)	379.7 (800.7)	*232.7 (747.1)*	*147.0 (195.6)*	282.6 (510.1)	1447.0 (2187.5)	*266.6 (1128.0)*	*967.7 (1514.1)*	*212.8 (580.5)*	423.7 (825.1)

Data Source: China Urban Household Education Surveys for 2007 and 2011.
Note:
1. For 2011, expenditure was adjusted by CPI and presented in 2007 RMB yuan value.
2. For 2011, other expenditure includes spending on learning materials and devices, excluding computers and iPads, which were not specific to the child's education.
3. Standard deviations are reported in parentheses.

Table 3: Ratio of household education expenditure to household income for 2007 and 2011

	In-School Expenditure	Out-of-School Expenditure	Boarding and Accommodation Fee	Other Expenditure	Total Expenditure
2007					
Total sample	2.13	2.67	0.74	0.52	6.07
Education stage					
Primary school	1.63	2.31	0.49	0.40	4.82
Junior high school	2.91	3.21	1.13	0.71	7.97
Region					
Eastern	2.16	2.49	0.62	0.55	5.83
Central	2.48	4.12	0.89	0.46	7.95
Western	1.81	1.88	0.89	0.51	5.10
2011					
Total sample	1.01	5.35	0.98	1.52	8.86
Education stage					
Primary school	0.73	5.00	0.88	1.39	8.00
Junior high school	1.60	6.09	1.19	1.78	10.66
Region					
Eastern	1.23	8.79	1.00	1.56	12.58
Central	1.51	4.48	1.26	1.71	8.96
Western	0.47	1.92	0.79	1.35	4.06

Data Source: China Urban Household Education Surveys for 2007 and 2011.

Note:
1. Data are presented in percentage.
2. Education expenditure ratios are calculated as mean of education expenditure divided by mean of household income.
3. For year 2007, Eastern region includes provinces Jiangsu, Zhejiang, Shandong, Guangdong, Liaoning, Jilin, Heilongjiang, Tianjin, and Shanghai; Central region includes provinces Shanxi, Jiangxi, Henan, Hubei, Hunan; Western region includes provinces Guizhou, Shannxi, Ningxia, Gansu, Qinghai. For year 2011, Eastern region includes Liaoning; Central region includes Henan and Hunan; Western region includes Chongqing.

Table 4: Ratio of education expenditure to household income by household income quartiles for 2007 and 2011

Ratio of Education Expenditure to Total Household Income	Household Income Quartile			
	0–25	25–50	50–75	75–100
2007				
Total education expenditure	12.63	7.69	6.36	5.20
In-school education expenditure	5.33	3.07	2.11	1.72
Out-of-school education expenditure	3.86	2.67	2.96	2.51
2011				
Total education expenditure	18.92	9.50	8.28	7.90
In-school education expenditure	2.83	1.30	0.81	0.78
Out-of-school education expenditure	9.96	5.53	5.11	4.98

Data Source: China Urban Household Education Surveys for 2007 and 2011.

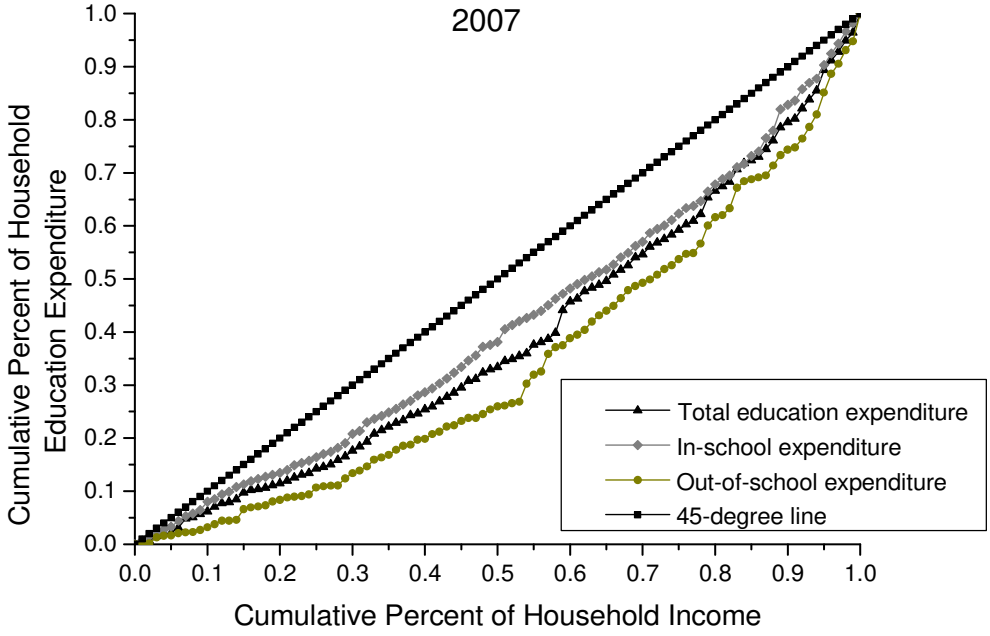
Note: Data are presented in percentage.

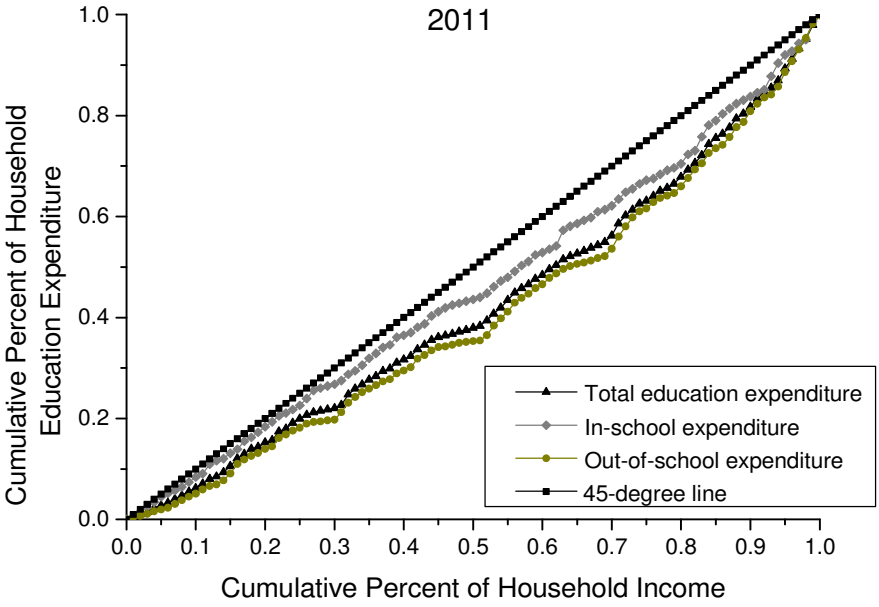
Table 5: Gini coefficient for distribution of household education expenditure and household income for 2007 and 2011

	In-School Expenditure	Out-of-School Expenditure	Total Expenditure	Total Household Income (Half Yearly)
2007				
Total sample	0.48	0.75	0.55	0.40
Education stage				
Primary school	0.42	0.74	0.51	0.38
Junior high school	0.49	0.74	0.55	0.41
2011				
Total sample	0.60	0.64	0.52	0.29
Education stage				
Primary school	0.60	0.63	0.53	0.29
Junior high school	0.60	0.66	0.51	0.28

Data Source: China Urban Household Education Surveys for 2007 and 2011.

Note: Household expenditure is presented for a single semester. For comparison, we calculated the Gini coefficient for household income on a half yearly basis.





Data Source: China Urban Household Education Surveys for 2007 and 2011.

Figure 1: Concentration curves of household education expenditure for 2007 and 2011

Table 6: Regression analysis of determinants of household education expenditure for 2007 and 2011

	2007						2011					
	Logarithm of Total Expenditure		Logarithm of In-School Expenditure		Logarithm of Out-of-School Expenditure		Logarithm of Total Expenditure		Logarithm of In-School Expenditure		Logarithm of Out-of-School Expenditure	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Logarithm of per capita household income	0.380***	0.406***	0.107	0.125	1.128***	1.345***	0.387***	0.334***	-0.019	-0.029	0.915***	0.824***
Family size	0.050	-0.022	0.058	0.047	0.169	0.146	0.075	0.073*	-0.095	-0.106	0.155	0.154
Gender of child (male)	0.049	0.087	0.025	-0.002	-0.156	-0.092	-0.102***	-0.111***	0.053	0.052	-0.419**	-0.417***
Child Education Stage												
Junior high school	0.371***	0.376***	0.442***	0.452***	0.395	0.223	0.266***	0.263***	0.815***	0.821***	-0.171	-0.164
Father's Education Level												
High school	0.135		0.036		0.423		0.135**		-0.083		0.230*	
Above high school	0.232		0.250		0.821		0.416***		-0.103		0.917***	
Father's Hukou Status												
Local rural	-0.126		-0.752		0.997		-0.269		-0.305		-0.851	
Non-local urban	-0.500		-0.183		-1.752		0.018		-0.393		0.351	
Non-local rural	-0.089		-0.155		-0.272		0.052		0.476***		-0.305	
Father's Occupation												
Managerial	0.312		0.194		0.823		-0.090		0.127		-0.183	
Technical and professional	0.066		0.025		0.236		-0.154		0.166		-0.155	
Commercial and social service	0.303		0.150		0.245		-0.033		0.069		0.039	
Production worker or operator	0.302		0.398*		0.344		0.229*		0.128		0.257	
Clerical and administrative	-0.003		0.100		-0.789		-0.107		-0.080		-0.028	
Agriculture, military and other	0.258		0.300		-0.071		-0.047		0.154		-0.062	
Mother's Education Level												
High school		0.118		-0.015		0.299		0.184***		-0.000		0.677***
Above high school		0.117		0.162		0.131		0.426***		0.090		0.998**
Mother's Hukou Status												
Local rural		0.180		-0.552		1.051		-0.094		-0.105		-0.267

Non-local urban		-0.126		-0.111		-1.949		-0.031		-0.316		0.303
Non-local rural		-0.216		-0.223		-0.787		-0.066		0.334		-0.315
Mother's Occupation												
Managerial		0.267		0.253		0.090		0.200**		0.196		0.391
Technical and professional		-0.225		-0.089		0.031		0.009		0.272*		-0.050
Commercial and social service		-0.035		0.245		-0.275		-0.091		0.244		-0.233
Production worker or operator		-0.241		-0.205		-0.502		0.004		0.442***		-0.297
Clerical and administrative		0.024		0.155		0.332		0.112*		0.224**		0.276*
Agriculture, military and other		-0.351		-0.301		-0.068		0.059		0.201*		0.008
Province (city) Dummy Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	2.980***	3.329***	3.968***	4.258***	-6.578***	-7.746***	3.885***	4.176***	5.642***	5.598***	-1.941	-1.574
Observations	1362	1362	1335	1362	1338	1365	1954	1963	1954	1963	1954	1963
Adjusted R^2	0.35	0.34	0.30	0.30	0.19	0.18	0.28	0.29	0.20	0.19	0.25	0.26

Data Source: China Urban Household Education Surveys for 2007 and 2011.

Note:

1. Coefficient estimates and the significance level are reported. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors clustered at the city level are estimated. Due to space constraints, they are not reported but can be made available by the authors upon request.
2. The base groups excluded from the regression are (1) child's current education stage is primary school (2) a parent's education level is below high school (3) parents with local urban Hukou status, and (4) parent's occupation were the unemployed.
3. For 2011, expenditure was adjusted by CPI and presented in 2007 RMB yuan value.
4. We keep observations that either father or mother's control variables are missing in order to obtain as many observations as possible. Therefore, the number of observations slightly differs across models.

Table 7: Regression analysis of determinants of the ratio of household education expenditure to income for 2007 and 2011

	2007						2011					
	Ratio of Total Expenditure to Income		Ratio of In-school Expenditure to Income		Ratio of Out-of-school Expenditure to Income		Ratio of Total Expenditure to Income		Ratio of In-school Expenditure to Income		Ratio of Out-of-school Expenditure to Income	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Logarithm of per capita household income	-0.049***	-0.051***	-0.025***	-0.025***	-0.009	-0.007	-0.164***	-0.164***	-0.023***	-0.024***	-0.073***	-0.071***
Family size	-0.017**	-0.023***	-0.007**	-0.009***	-0.005	-0.007**	-0.032***	-0.032***	-0.004**	-0.004***	-0.016***	-0.016***
Gender of child (male)	0.012	0.014	0.003	0.004*	0.006	0.007*	-0.015*	-0.015**	-0.001	-0.001	-0.013***	-0.012***
Child Education Stage												
Junior high school	0.042***	0.044***	0.013***	0.015***	0.011**	0.011**	0.036***	0.034***	0.012***	0.012***	0.011***	0.011***
Father's Education Level												
High school	0.015		0.001		0.000		0.032***		0.005**		0.011**	
Above high school	0.015		0.002		-0.003		0.080**		0.005*		0.038***	
Father's Hukou Status												
Local rural	0.016		-0.002		0.050		-0.018		-0.002		-0.011	
Non-local urban	-0.005		0.003		-0.014		-0.013		0.001		-0.005	
Non-local rural	-0.010		0.006		-0.014**		0.022		0.006		0.007	
Father's Occupation												
Managerial	0.005		0.003		0.005		0.068*		0.002		0.054***	
Technical and professional	-0.002		0.001		-0.004		0.065		-0.002		0.049**	
Commercial and social service	0.009		0.004		-0.006		0.048		-0.004		0.042*	
Production worker or operator	0.009		0.004		-0.011		0.059		0.000		0.044**	
Clerical and administrative	-0.018		0.005		-0.016		0.039		0.002		0.035	
Agriculture, military and other	-0.027		0.004		-0.037		0.047		0.001		0.041	
Mother's Education Level												
High school		0.013		-0.002		0.005		0.048***		0.003		0.025***
Above high school		-0.007		0.001		-0.006		0.079***		0.009***		0.035***
Mother's Hukou Status												
Local rural		0.045		0.000		0.056		-0.012		-0.001		-0.008

Non-local urban		0.005		-0.001		-0.015		-0.021		0.002		-0.018
Non-local rural		-0.022		0.001		-0.015**		-0.006		0.002		-0.002
Mother's Occupation												
Managerial		0.024		0.000		0.022		0.063***		0.008		0.033**
Technical and professional		0.001		-0.001		-0.009		0.052**		0.006**		0.023**
Commercial and social service		-0.014		0.001		-0.016*		0.029*		0.004*		0.014*
Production worker or operator		-0.004		-0.001		-0.025**		0.107*		0.018**		0.033
Clerical and administrative		0.012		0.005		0.002		0.047**		0.003		0.027**
Agriculture, military and other		-0.058**		-0.006		-0.025		0.037		0.004		0.014
Province (city) Dummy Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.542***	0.591***	0.255***	0.276***	0.143**	0.123**	1.600***	1.600***	0.223***	0.231***	0.745***	0.743***
Observations	1335	1362	1335	1362	1338	1365	1954	1963	1954	1963	1954	1963
Adjusted R^2	0.21	0.23	0.40	0.37	0.12	0.13	0.18	0.19	0.17	0.18	0.18	0.17

Data Source: China Urban Household Education Survey for 2007 and 2011.

Note:

1. Coefficient estimates and the significance level are reported. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors clustered at the city level are estimated. Due to space constraints, they are not reported but can be made available by the authors upon request.
2. The base groups excluded from the regression are (1) child's current education stage is primary school (2) a parent's education level is below high school (3) parents with local urban Hukou status, and (4) parent's occupation were the unemployed.
3. We keep observations that either father or mother's control variables are missing in order to obtain as many observations as possible. Therefore, the number of observations slightly differs across models.

Appendix Table A1: Variable definition and summary statistics for 2007 and 2011

Variable	Definition	2007		2011		2007-2011
		Mean	Std. Dev.	Mean	Std. Dev.	T-test/ Pearson Chi2
Household income	Half yearly household income (yuan)	20440.8	18471.3	24835.9	19658.0	4.44***
Family size	Number of family members	3.38	0.80	3.21	0.61	5.23***
Gender of child (male)	= 1 if the child is male	0.49	0.51	0.52	0.50	Chi2(1)=0.18
Single parent	= 1 for a single parent family			0.04	0.19	
Child Education Stage						
Primary school	= 1 for a child in primary school	0.62	0.49	0.66	0.47	Chi2(1)=0.35
Junior high school	= 1 for a child in junior high school	0.38	0.49	0.34	0.47	
Age of father	age of father	39.90	4.65			
Father's Education Level						Chi2(2) = 4.53
Below high school	= 1 for junior high or lower education	0.30	0.46	0.17	0.38	
High school	= 1 for high school and equivalent education	0.35	0.48	0.41	0.49	
Above high school	=1 for college and higher education	0.36	0.48	0.42	0.49	
Father's Hukou Status						Chi2(3) = 0.46
Local urban	= 1 if a father has a local urban Hukou status	0.93	0.25	0.93	0.25	
Local rural	= 1 if a father has a local rural Hukou status	0.03	0.16	0.04	0.20	
Non-local urban	= 1 if a father has a non-local urban Hukou status	0.02	0.12	0.01	0.11	
Non-local rural	= 1 if a father has a non-local rural Hukou status	0.03	0.16	0.01	0.11	
Father's Occupation						Chi2(7) =7.96
Managerial	= 1 for managerial	0.10	0.30	0.12	0.33	
Technical and professional	= 1 for technical or professional	0.19	0.39	0.27	0.44	
Commercial and social service	= 1 for commercial and social service	0.15	0.36	0.13	0.35	
Production worker or operator	= 1 for production worker or operator	0.27	0.45	0.14	0.35	
Clerical and administrative	= 1 for clerical and administrative	0.16	0.37	0.19	0.39	
Agriculture, military and other	= 1 for military, agriculture worker, and other unspecified	0.06	0.24	0.11	0.31	
Unemployed	=1 for unemployed	0.06	0.24	0.04	0.20	
Age of mother	age of mother	37.66	4.32			
Mother's Education Level						Chi2(2)=7.36**
Below high school	Same as for fathers	0.36	0.48	0.19	0.40	
High school		0.35	0.48	0.42	0.49	
Above high school		0.29	0.46	0.39	0.49	
Mother's Hukou Status						Chi2(3)=2.33
Local urban	Same as for fathers	0.92	0.27	0.91	0.28	
Local rural		0.03	0.16	0.06	0.24	
Non-local urban		0.02	0.15	0.01	0.11	
Non-local rural		0.03	0.17	0.01	0.12	
Mother's Occupation						Chi2(7) =10.32
Managerial	Same as for fathers	0.03	0.17	0.04	0.19	
Technical and professional		0.14	0.35	0.09	0.29	
Commercial and social service		0.27	0.44	0.32	0.47	
Production worker or operator		0.09	0.29	0.05	0.22	
Clerical and administrative		0.20	0.40	0.27	0.45	
Agriculture, military and other		0.06	0.24	0.13	0.34	
Unemployed		0.21	0.41	0.10	0.31	

Data Source: China Urban Household Education Survey for 2007 and 2011.

Note: 1. Sample size n = 1,434 for 2007 and n = 1,976 for 2011. Families with more than one child were excluded.

2. T-tests of mean for continuous variables and Pearson Chi2 tests of proportions for categorical variables are reported in the last column.