Relationship between Parents' Educational Attitudes and Children's Housework Performance in Chinese Households: Does Children's Gender Matter?

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Abstract

Children's housework can reflect parental educational investment strategies due to the time competition: more housework activities means less time for schoolwork activities. If parents have positive educational attitudes toward education, will they allocate less housework to this child? Will this association differ by gender? Using data derived from 2014 China Education Panel Survey (CEPS), a nationally representative survey, this article gains an understanding of the above questions. In this study, we construct parents' educational attitudes using direct (parental college expectation, parental educational requirement) and indirect measures (parental education, children's key school attendance and children's academic achievements). After conducting OLS analysis, the results reveal that associations between parents' educational attitudes and children's housework do exist but differ by gender.

1) Parental education requirement, key school attendance, and last term's academic achievement are negatively associated with girl's current housework time, regardless of this girl's hukou. Parental education is negatively associated with housework time for rural girls but not for urban girls.
2) Parental education requirement and key school attendance are *positively* related with urban boys' housework time but there are no such relationships for rural boys. If an urban boy's mother has higher education than his father, he will do more housework, and this pattern does not apply to rural boys.

Keywords: Children's housework, Gender, Parents' educational attitudes, China, Junior high school students

Introduction

Children's housework performance is commonly observed in developing countries (Lin and Adsera, 2013; Fares and Raju, 2007; Allais, 2009; Webbink, et al., 2011). Economic development level is important in deciding the amount of housework done by children, because there is no need for families with sufficient resources calling on children to serve as labor sources (Cohen, 2001). Variations may arise, however, due to cultural differences (Larson and Verman, 1999). Heavily influenced by Confucian culture, East Asian parents highly valued education (Larson and Verman, 1999; Huang and Gove, 2012; Huang and Gove, 2015; Rees, 2017). As opposed to North American parents, who paid attention to the advantages of housework in developing children' personalities (e.g. sense of responsibility, social abilities, autonomy and independence) (Cohen, 2001; Goh and Kuczynski, 2012), East Asian parents viewed household chores as barriers to academic success (Stevenson et al., 1990; Goh and Kuczynski, 2012). In East Asia, children were more likely to be relieved of housework responsibilities as long as they performed academically well in school (Stevenson et al., 1990). Evidence showed that, mothers of 5^{th} graders from urban China reported 15 min less housework per day performed by children than their U.S. counterparts (Stevenson and Stigler, 1992).

Parental attention to education resulting from specific culture has prevented parents form assigning more housework to their children. Therefore, there are reasons to expect that the amount of children's housework is negatively associated with parental educational attitudes, especially in East Asian countries where education-related decision is one of the most important family practices (Huang and Gove, 2012). This study aims at examining this rarely-explored relationship in the context of China. Meanwhile, this study also addresses the role children's gender plays in this relationship. Although most studies analyzing the gender division of housework center on married adults or couples in Chinese families (Yang, 2006; Attané, 2012; Zhang, 2017; Yu and Xie, 2011; Yu, 2014), some recent studies have also attracted their attention to that among children (Hu, 2015; 2018). Evidence showed that girls perform one hour more housework than boys do every week among 10-15 years old children in China (Hu, 2015; 2018). Scholars

attributed the factors resulting in girls' more housework engagement in developing countries to the traditional culture (Lin and Adsera, 2013) and children's imitation of parental housework division in the family (behavior modeling) (Hu, 2015). From the educational perspective, in regions such as rural China and India, one of the reasons for girls' higher housework attendance rates may be that they are perceived as less worthy of educational investment (Das Gupta et al., 2003). Therefore, this leads us to ask the question: will a girl who is considered as worthy of investment in education by her parents be allocated less housework time?

Using data from the 2014 China Educational Panel Survey (CEPS), a nationally representative survey, we fill in the important research gap by particularly examining the association between parents' educational attitudes and children's housework performance among junior high school students. Meanwhile, we explore the gender differences in these associations. We measure parents' educational attitudes through direct and indirect indicators. The rest of this article evolves as follows: the next section provide the framework and hypothesis that will guide the analysis; then data and methods employed in this article are described; in the following section, we display the analysis results; finally, conclusions and discussions of this study are presented.

Analytic Framework and Hypothesis

According to the International Labor Organization (ILO), child labor is defined as whether the activity is harmful to a child's health or development (ILO, 2012; Tang, et al, 2016). Some of these labor activities have economic outputs such as farming or family business; others are free of any market productions (Lin and Adsera, 2013; Tang, et al, 2016). Housework belongs to the latter category which particularly refers to cooking, housekeeping, laundry, grocery shopping (Hu, 2015) and caring for family members (Lin and Adsera, 2013). Most studies analyzed child labor either from a narrow perspective only focusing on labor producing market outputs (Basu and Van, 1998; Ray, 2000; Tang, et al, 2016) or a broader perspective including both economic work and household work (Heady, 2003; Zabaleta, 2011; Beegle et al., 2009; He,

2016). Only a few studies focused on housework exclusively (Lin and Adsera, 2013; Hu, 2015; Hu, 2018; Gager et al., 2009; McHale et al., 2009). In recent years in China, with the increase of school enrollment rate, the economically positive child labor had decreased, especially for teenagers younger than 15 years old. Evidence showed that the economic activity involvement rate decreased to 8.9% in 2010 among children (aged 10-15) who were attending school (Tang, et al, 2016). Housework has become the most common type of child labor and it is an inevitable part of students' extra-curricular activities in developing regions (Gibbons et al., 2005; Lin and Adsera, 2013; Putnick and Bornstein, 2015). For example, the attendance rate of housework for children aged 6-14 in India is approximately 60% in 2005 (Lin and Adsera, 2013). The China Education Panel Data shows that around 80% of the junior high school students are engaged in housework in the year 2014. If we want to understand the family strategies on resource allocation among school-aged children in their extra-curricular life, it is important to gain an insight into children's housework time division.

The Role of Children's Gender

Worldwide, regardless of economic development, there has always been a gender gap in housework: girls perform more housework than boys (Larson and Verman, 1999;Raley and Bianchi, 2006). Gender differences in housework, including amount of time and types of work, result from social norms and parental expectations for adult roles of girls and boys (Larson and Verman, 1999). In most cultures, parents were more likely to develop daughter's housework abilities and invest in son's education (Stromquist, 1989). Traditionally, girls were expected to become housewives and mothers whereas boys were anticipated to play public roles in the future. Therefore, girls had a higher possibility to be allocated housework time instead of study time (Webbingk, et al., 2011). If a culture held a stronger preference for sons, this differentiated treatment would be severer (Lin and Adsera, 2013). Characterized by patriarchy and patrilocal residence, traditional Chinese families expected sons to support old parents and carry on the family lines (Jiang et al., 2012; Sun, 2002). However, daughters will eventually marry out of natal families and be located within their husbands' families (Das Gupta et al., 2003; Xie and Zhu, 2009). As

Xie and Zhu (2009) stated, for the families, sons were “permanent” members and daughters “transitory” (Xie and Zhu, 2009). In this case, sons’ future successes were more important to natal families than daughters’ and parents tended to allocate more family resources to sons. One of the practices is that parents would prefer to involve sons in schooling or other human capital accumulation activities (e.g. doing sports) (Lin and Adsera, 2013) and exempted them from housework burden which was not only considered as a barrier to schooling (Webbink et al., 2011) but also had little contribution to human capital accumulation (Lin and Adsera, 2013). However, for daughters who were free of the old-support responsibility, doing housework when they were young was regarded as a contribution they can gave to natal families (Webbink et al., 2011). Meanwhile, as a preparation for future marriage life, girl’s housework performance was largely encouraged by traditional social norms (McHale et al., 2003; Webbink et al., 2011).

Some other scholars analyzed gendered division of housework among children from the perspectives of behavior modeling (Cunningham, 2001; Hu, 2015) or family structure (Hu, 2018). Besides arranged by parents, children would also imitate parents’ behavior in housework division. Son’s housework time grew with paternal housework (Cunningham, 2001; Evertsson, 2006), while daughter’s increased with maternal (Cunningham, 2001). In Chinese families, where females were heavily involved in housework (Zhang, 2017; Yu and Xie, 2011; Yu, 2014), this behavior imitation turned out to be a pronounced gendered division in housework among children: daughters were occupied in much more housework than sons (Hu, 2015). The behavior-modeling theory of children’s housework time had been supported in China (Hu, 2015). Hu (2018) also gained an insight into the effects of presence/ absence of certain family members on daughter’s and son’s housework time and found that this process was characterized by patriarchy: the absence of mother and presence of father in the family had stronger positive effects on girls’ housework time than on boys’.

Parents' Educational Attitudes and Children's Housework Performance

The association between parents' educational attitudes and children's housework performance had been less discussed in the existing literature (He, 2016). In this study, we focus on three sets of indicators to measure parental attitudes towards education.

The direct indicators. In this study, direct indicators mainly refer to direct opinions related to education such as educational expectation and educational requirement for children or the attitudes towards the importance of education. Being mutually exclusive with educational time, school-aged children's housework time is considered to be a reflection of parental investment in education (Hannum et al., 2009; Putnick and Bornstein, 2015). If parents have positive educational attitudes, they will be likely to reduce children's housework time and set aside more time for children's learning. A study found that 34% U.S. parents reported children's housework attendance after school; compared to only less than 10% East Asian parents had such reports (Stevenson et al., 1990). Scholars explained that the reason behind this difference was parental attitudes: East Asian parents highly valued the importance of education and viewed education as the main way achieving upward social mobility; they believed housework would distract children from schoolwork (Stevenson et al., 1990; Larson and Verma, 1999). This association is more common in urban China, where most domestic labor has been completed by modern facilities. A depth-interview conducted in Xiamen, a developed coastal city of China, indicated that caregiver (parents or grandparents) tended to protect their children from housework because they thought children's primary task is their homework rather than housework (Goh and Kuczynski, 2012). Overall, in urban China, parents' high educational expectation has placed children's education into priority against any other family affairs, particularly housework (Goh and Kuczynski, 2012; Huang and Gove, 2012; Stevenson et al., 1990). Besides in East Asian, this association had even been observed in Western settings. A study conducted in the U.S. used the question: "how important is it to you that your children perform well in school" to measure parental educational attitude and found that the higher the importance that parents evaluated, the less housework their children were involved in (Blair, 1992). Based on previous findings,

we expect that if parents hold positive attitudes toward their children's education, they will be less likely to let them do housework. In addition, taking children's gender into account, because daughter performs more housework than son, there is a higher possibility that housework acts as an obstacle to girls' education. When parents value the importance of education, they will be more likely to relieve their daughters of housework. In addition, if parents pay attention to daughter's education, they probably have less traditional gender role attitudes and thus allocate less housework to their daughter. Based on this, we also expect that the negative association between parental education attitudes and children's housework time is stronger for girls than boys.

H1: If parents hold positive education attitudes, their children will do less housework (a); the association is stronger among girls than boys (b).

The indirect indicators: parental education. When parents receive relatively high education, they will value the importance of education and be more likely to engage children in school activities rather than labor activities (Mukherjee and Das, 2008; Webbink, 2011). Previous empirical studies demonstrated that parental education was an important factor in decreasing children's housework (Cunningham, 2001; Kurosaki et al., 2006; Self, 2011; Webbink, 2011). Meanwhile, higher educational level of parents means the affordability of domestic outsourcing (Killewald, 2011), and thus acts as a protective factor keeping children from housework. Furthermore, parents having more education tend to hold more equal gender ideology (Kulik, 2002) and will be inclined to allocate similar amount of housework between sons and daughters. For girls, mothers' education is especially important, because with higher educational level, mothers will realize the importance of schooling for women and be more likely to free their daughters from labor activities (Webbink et al., 2011). In addition, more education will give mother greater bargaining power in the time management of her daughter (Basu et al., 2010). Based on this, we hypothesize that parental higher educational level narrows the gender gap in housework time. Considering children's gender, we expect that the negative association between parental education and children's

housework time is stronger for girls than boys and mother's education is more important for girls than boys.

H2: If parents have higher education level, their children will do less housework (a); this association is stronger among girls than boys (b); girls benefit (do less housework) more from maternal education than boys do (c).

The indirect indicators: returns to education and children's academic performance. Higher returns to schooling always lead to parental higher educational expectation. In developing settings, parents will compare the opportunity cost and the future benefit of schooling then decide whether to send children to school or labor (Hilson, 2010). If there are higher returns of schooling activities, parents will pay more attention to children's education and reduce their housework. Evidence from India showed that regional returns of education decreased children's attendance in work (Chamarbagwala, 2008). Also in India, Probe (1999) found that parents who held lower expectation for educational returns were willing to involve their children in outside work or domestic work. In developing regions, children's academic performance is positively linked with returns to education (Glewwe, 1996; He, 2016). If children show promise in learning abilities or they achieve academic success, they will be given more free time and be relieved of housework or other household burdens (Stevenson et al., 1990). In China, academic success usually refers to higher test scores (Huang and Gove, 2015) or attending a key school. He (2016) made the first attempt to empirically investigate whether children's academic scores (gained in 2000) decreased their housework attendance (performed in 2004) in rural China and the result suggested that there was no such a relationship (He, 2016). One possible explanation is that the time lag between the two performances was too long and one's academic performance can change in four years. In addition, He (2016)' study didn't examine whether this relationship differed by children's gender. So it is important to reexamine this relationship using lagged variables with shorter time difference and explore whether the associations between academic performance and housework time are different between girls and boys. We hypothesize that children's academic performance is negatively related to their housework time.

Furthermore, involved in a greater amount of housework, girls are more likely to use good schooling performances as bargaining power to get rid of housework burden. Therefore, we anticipate this association is stronger for girls than boys.

H3: If children have better academic performances, they will do less housework (a); the association is stronger among girls than boys (b).

Hukou System

In China, an important factor affecting children's housework division is household registration type (*hukou*) (Hu, 2015). Since its establishment in 1958, *hukou* has become a major part of China's social stratification (Liang, 2016) by dividing its population into agricultural and non-agricultural groups or rural and urban peoples (Wu and Treiman, 2004). Due to the prevalent industrialization in urban areas, urban people are liberated from most domestic labor activities with the modernized facilities (Whyte, 2010). However, in rural areas, the generally lower depth of industrialization process leads to the lack of sufficient infrastructure for domestic work **(**Whyte, 2010**)**. Rural people are thus involved more housework than urban people (Hu, 2015) and in this situation, rural children will be more likely to be responsible for the overflowing household work than their urban counterparts. In addition, the developed educational facilities and the modern ideas regarding education in urban areas might pull school-aged children out of housework responsibilities (Webbink et al., 2011). Meanwhile, because of the more conventional gender role attitudes in rural areas, the gendered pattern in children's housework time and education resource allocation is different between rural and urban context with wider gender gap in rural areas. Given these stratifications of housework, education and gender ideology between rural and urban areas, the analyses will be performed separately for the rural and urban areas in our database to explore whether there are different influencing mechanisms between rural and urban areas.

Data and Method

Data

The 2014 China Education Panel Survey is a nationally representative survey aiming to investigate how individual educational output is impacted by family, school and community. Conducted by Renmin University of China, the data was gathered with a fourth-stage probability sampling design that randomly selected 19,487 students of grade 7 and grade 9 from 438 classes across 112 junior high schools in 28 counties (districts) in China. The data covers all the 31 provinces in mainland China. Students aged 12-18 along with their parents, teachers and school leaders constituted the final survey sample. The data had a response rate of 98.74%.

Because in this article the key variables are related to parents' educational attitudes, we delete records in which "parental questionnaire" were answered by grandparents and other relatives rather than parents (n=2097). Meanwhile, my dependent variable is children's housework time, so we delete the cases without this information (n=921). This leaves a total sample of 16,469. After eliminating cases with missing values in any of the variables (6.5% in the total sample), the final analytical sample size is 15,391, of which 49.48% are girls and 53.50% are from rural areas.

Dependent Variable

The dependent variable of this study is children's time spent in housework every day during school terms in 2014. Questions about children's housework time were drawn from student's questionnaire. Students were asked to recall their average housework time both on a weekday and a weekend day during school terms. The questions are "How much time on average did you spend on helping your parents with housework from Monday to Friday last week?", and "How much time on average did you spend on helping your parents with housework last weekend?". We create the housework time variable through multiplying the weekday time by five and the weekend time by two, summing the values up then dividing

it by 7 (Larson and Verma, 1999). The final dependent variable is average daily housework time in minutes.

Key independent variables

Key independent variables in this article consist of the gender of children and variables related to parents' educational attitudes including three sets of measures.

Direct measures: parents' educational expectation and educational requirement. For educational expectation, parents were asked "What's the level of education you expect that your child achieve?" Responses were given as (1) "stop now" all the way to (9) "doctoral degree". They were also given the option to select (10) "do not care". We treat parental expectation as a dummy variable, with "1" indicating "college education and above" and "0" indicating "less than college education" or "do not care". For educational requirement, parents were asked "What's your requirement on this child's academic record?" Responses were presented as (1) being one of the top five of his/her class; (2) above the average; (3) about the average; (4) no special requirement. We regroup the answers by combining the first three categories into one category. So parental requirement is measured with two categories (0) have requirement; (1) no requirement. We code this variable as a dummy variable with "1" indicating "have requirement" and "0" indicating "no requirement".

Indirect measures: parental education and maternal education relative to paternal. For parental education, we construct a three-category variable, with "1" indicating "the highest education of mother's and father's is lower than junior high school" and "3" indicating "higher than junior high school". I use the education level of mother relative to father to measure mother's education. Another three-category variable is created with "1"= "maternal education is lower than paternal", "2"= "maternal education=paternal education" and "3"="maternal education>paternal education".

Indirect measures: key school attendance and children's last term's academic test scores. As a reflection of children's academic performance and sometimes also parental education attitudes, key school attendance is included in the analysis as a key predictor. Middle schools in China are stratified in to "key" school and "ordinary (non-key)" school by educational resources (Lin, 1999). Key schools are privileged in selecting the best students within this region, employing the best teachers and getting more funding from the local government (Ye, 2015). Because the admission rates of key schools are pretty low, only those who have better academic achievements or come from family with more resources can get the access to these schools (Lin, 1999). As a result, the key school attendance is closely related to children's academic performance. If one can get the opportunity to study in a key school, it means that either the student academically performs very well or he/she has a family which is willing and able to afford the "school-selection" fee for this child's educational advantage (Ngok, 2007). In this study, the related question was "what is the current ranking of the junior high department of your school in the local county/district?" with five options of "near the bottom", "below average", "average", "above average" and "among the best" which was answered by school principal. We combine the last two options as key school and the first three options as non-key school. A dummy variable is generated with "non-key school" coded as "0" and "key school" coded as "1". Information about students' academic scores was provided by schools: the test scores of three major subjects (Chinese, Math and English) in previous midterm (autumn, 2013). In this paper, we employ the standardized scores which were respectively calculated based on schools and grades. The standardized score has a mean value of 70 and a standard deviation of 10. We create the academic score variable using the average standardized scores of the three majors then dividing it by 10.

Covariates

We include a variety of individual, family and school variables that may influence children's housework time or parents' educational attitudes. Previous studies suggested that age is critical in deciding one's ability of doing housework: children do more housework as they age (Hofferth and Sandberg 2001; Hu,

2018). In China, for junior high school students, 9 graders will be involved in the preparation for high school entrance examinations and thus have more schoolwork than 7 graders (Larson and Verma, 1999). Therefore, we expect grade has an important impact on children's housework time. We put a dummy variable in the model indicating whether this student attend a boarding school, because if a student is studying at a boarding school, he/she will do less housework in the weekday (Hu, 2018). Children's cognitive ability is important to one's academic performance and usually associated with parental education attitudes. So we include children's cognitive ability in the analysis as well[1]. Previous studies showed that household wealth influenced children's housework: If a household was relatively wealthier, children were less likely to be involved in housework (Webbink et al., 2011). Family size is also an important factor affecting children's housework: more siblings mean more labor activities (Patrinos and Psacharopoulos, 1997). At last, we also control for the context/regional factors by including school's location within the county/district and the location of the county/district within the country.

Analytic Strategy

In the first step, we give the descriptive analysis in the total sample, rural sample and urban sample. Gender difference and rural-urban difference in terms of all the variables in the analysis are tested. In the second step, we employ ordinary least square (OLS) regression to predict children's daily housework time. In this stage, firstly, we estimate the housework time for all children in the sample to test Hypothesis 1a, 2a and 3a. We then stratify the sample by gender to test Hypothesis 1b 2b/2c and 3b (Table 2); Secondly, we divide the sample into rural and urban samples to explore the associations between parents' educational attitudes and children's housework time particularly on rural girls, rural boys, urban girls and urban boys (Table 3).

[1] Cognitive abilities were obtained based on a "cognitive ability test" along with this survey. This test, which covers three dimensions of abilities including language, figure and computational logic, was designed to evaluate the logical thinking and problem-solving abilities of students. Characterized by international comparability and national standardization, this test can provide an accurate measurement of students' cognitive skills. We employ the standardized total test scores which were calculated by three parameter IRT model.

Result

Descriptive Analysis

Figure 1 plots the gendered distribution of housework time in the total sample, rural sample and urban sample. In the total sample, girls do an average of 6 minutes more housework than boys do every day. In the subsamples, the gender gap is wider in rural areas (8 minutes) than urban areas (4 minutes). In addition, the rural-urban gaps are extremely large. For girls, those from rural areas perform nearly 30 minutes (on average) more housework than those from urban areas do. Compared with girls, the rural-urban gap for boys is a little smaller but still large (on average 20 minutes). Two-tailed *t* test demonstrates that the gender difference and rural-urban difference are statistically significant. These are with our expectations that children from rural areas do more housework than those from urban areas and the gender difference is larger in rural areas than urban areas. The relatively lower social-economic developmental level and the traditional culture in rural areas make rural girls' housework time the most among all children in the sample.

Figure 1 about here

Table 1 presents the percentages and means of all the key independent variables and covariates in the analysis. The results for the educational factors are striking. Girls are found to be advantageous in receiving parents' college expectation both in rural and urban areas. The pro-female gender bias is even higher in rural areas (5%) than urban areas (3%). Girls are more frequently to be required to perform well than boys in school with a gender gap of 5% both in rural and urban areas. Meanwhile, girls perform better than boys indicated as higher key school attendance and academic scores. The pro-female gender gap in key school attendance is statistically significant only in rural areas. The last column in Table 1 presents the significance for rural-urban difference of all variables. Urban children enjoy more educational resources than rural children with parental education requirement as an exception. For

example, students attending key schools in urban areas are much more than those in rural areas (87% vs. 76%).

The descriptive analyses of parent's educational expectation and requirement suggest that the traditional attitudes toward daughter's education have been transformed. Families begin to attach the same even more importance to daughter's education as to that of son's. The reason behind this perhaps is that parents anticipate more education women should have to attain the same occupational status as men (Tusi and Rich, 2002). The larger rural-urban gaps of educational resources reveal that the educational inequality among teenagers is mainly manifested in the rural-urban stratification rather than the gender difference nowadays. However, although there is a rise in their educational resources, daughters still shoulder more housework than sons. The traditional attitudes in the domestic labor realm have not been changed.

Table 1 about here

Multivariate analysis

Table 2 shows the coefficients from OLS models predicting children's housework for all children, girls and boys in the total sample with every model including the key independent variables and the covariates.

As we can see in the second column of Table 1, other things being equal, parental college expectation, parental education and children's academic test scores are negatively associated with children's housework. If parents expect children to go to college, their children, on average, will do 7 minutes less housework every day than children whose parents do not have such expectations. Children whose parents have junior high school education or higher do at least 12 minutes less housework than children whose parents have lower education do. When children gain 10 more scores on their main subjects last term, their current housework time will declines on average by 8 minutes. For all children, the associations between housework time and parents' educational requirement or key school attendance are not

significant. Therefore, Hypothesis 2a has been supported and Hypotheses 1a and 3a have been partly supported.

How about the gender differences in terms of the associations between parental education attitudes and children's housework time? We present the estimation results for girl and boy in the third and fourth column respectively. Regarding to key independent variables, the results are quite different between girl and boy. For girls, parental educational attitudes, parental education and children's academic performance are all negatively linked with their housework time. To be specific, girls whose parents hold positive education attitudes (e.g. expect college and have educational requirement) perform on average around 10 minutes less housework every day than girls whose parents do not. Parents with junior high school or higher educational level reduce their daughter's housework time by at least 19 mins. If a girl attends a key school, she will do 9 minutes (on average) less housework every day than who does not. With the 10 scores increase in academic test last term, girls' current daily housework time significantly decreases by 11 minutes. However, for boys, there are no significant relationships between parents' educational attitudes and housework time. Those whose parents have more education than junior high school do around 9 minutes housework less than those whose parents' education is lower than junior high. This relationship is much weaker than that for girls. In terms of academic performances, whether a boy attends key school or not is not related to his housework time. Academic test score is negatively associated with boys' housework time with the link weaker than that for girls. An additional analysis (not shown) has suggested a significant interaction effect between gender and academic performance which implies that the association between academic score and housework time for girl is statistically greater than that for boy. Overall, all the relationships of parents' educational attitudes (direct or indirect) are statistically stronger for girls than boys. Hypotheses 1b, 2b and 3b have been supported. Associations between maternal relative education and housework are not statistically significant both for girls and boys.

Table 2 about here

To further study rural-urban differences in the perceived associations between parental educational attitudes and children's housework time, we conduct analyses among rural and urban subsamples separately (results shown in Table 3).

In rural sample, parents' educational requirement, parents' education and children's academic performance are negatively associated with rural girls' housework time. For example, rural girls who are required to perform well in study by their parents are doing on average 14 minutes less housework than those who are not required to. However, these relationships do not exist among rural boys. Although academic test score significantly lowers rural boys' housework, this association is weaker than that for girls: on average, 10 scores increase in academic test is accompanied by 14 minutes decline in housework time for girls while only 8 minutes for boys. Interaction analysis (not shown) also suggests that this gender difference is statistically significant.

In urban sample, the results are more compelling. For urban girls, housework time is negatively associated with parents' educational requirement, key school attendance and academic scores. Urban girl whose parents have educational requirement will do less (9 minutes, on average) housework than those whose parents do not. If an urban girl attends a key school, she will carry out on average 14 minutes less housework than her non-key school counterparts. The negative relationship between parental education and housework time observed among rural girls does not apply to urban girls. The results for urban boys are exceedingly different from that for urban girls. As we can see in the last column of Table 3, urban boy's housework time is *positively* associated with parents' educational requirement, maternal education and key school attendance and the results are statistically significant. To be specific, if an urban boy is required to perform well in study by his parents, he will do 9 minutes more housework averagely than the one who is not required to. If an urban boy's mother achieves higher education than his father, he will do 10 minutes more housework than the one whose mother has lower education than father. Similarly, when an urban boy attends key school, his daily housework time is 8 minutes (on average; $p=0.06$) more than the one who does not. Urban boys' academic test score is negatively linked to housework time, while

additional analysis for interaction test (not shown) indicates that the association is stronger for girls than boys.

Table 3 about here

In order to explore the gender differences in terms of the associations between parents' educational attitudes and children's housework time, we run additional models with interactions between these educational factors and gender among rural children and urban children separately. The results (not shown) show that the interaction effects are significant. To aid interpretation, we plot the interaction effects of these models with all other variables held at their mean values in Figure 2, Figure 3 and Figure4. Because the results for parental college expectation are not significant in both rural and urban areas, we have not plotted the related bar chart.

Figure 2 illustrates the predictive housework time by gender and parental education requirement in rural and urban areas. It clearly shows that parental education requirement can protect rural and urban daughters from housework burden. In contrast, the presence of parental education requirement leads to more housework for both rural and urban boys, though the effect is not statistically significant for rural boys (see Table 3). This implies that gender difference in housework time dramatically shrinks among children whose parents have educational requirement for their children's academic performance.

Figure 2 about here

Figure 3 shows the predictive housework time across gender and key school attendance in rural and urban areas. Girls from key schools perform less housework than girls from non-key schools and this pattern applies to both rural girls and urban girls. While for boys, key school attendance increases housework time with this association only statistically significant for urban boys (see Table 3). The gender gaps in housework time narrow significantly when children attend key schools, and this effect works both among rural children and urban children.

Figure 3 about here

Figure 4 displays the predicative housework time by gender and academic achievement from rural sample and urban sample. As we can see, children's housework time declines with their academic achievements and the declining speed is rapider for girls than boys. When child achieves a score around 85 or more, the gender differences reverse: girls do less housework than boys. This pattern applies both to rural children and urban children.

Figure 4 about here

It is noteworthy that some covariates play important role in shaping girl's and boy's housework time in China. Reviewing Table 3, children's age has a significantly positive effect on housework while grade has a negative effect. In China, this difference makes sense. Holding the grade level constant, older children have gained the abilities of doing more housework and the awareness to alleviate their parents' burdens (Hu, 2018). Compared with grade 7, grade 9 is more critical for Chinese junior high students, because in this period they are facing the high school entrance examination which is an important exam deciding whether they can be admitted into a high-quality high school (Larson and Verma, 1999). Therefore, parents of grade 9 students tend to allocate less housework time and more study time to their children to ensure their success in the exam.

Conclusion and discussion

This study aims at examining whether children are involved in less housework when their parents have positive educational attitudes. It mainly focuses on the gender differences in these associations and the influences of Hukou system.

Main Findings of this study are comprised of three parts.

Firstly, for the total sample, parental college expectation, parental education and children's last term's academic test score are negatively associated with children's housework time. When we distinguish the sample into girl and boy, the gender differences emerge. Parental college expectation, parental education requirement, parental junior high education, children's key school attendance and academic score all help decrease a girl's housework time by 10-20 minutes every day. However, for boys, the associations are weaker or disappear.

Secondly, the rural-urban subsample analyses give a deeper insight into these associations. For girls, the results do not change much when we divide the sample into rural and urban. Parental education requirement, key school attendance and academic score reduce housework time of both rural and urban girls'. However, parental education significantly decreases rural girls' housework time while have no effects on that of urban girls. For boys, the relationships are more complicated. Parental education requirement and key school attendance brings about more housework to boy although the result for rural boy is not statistically significant. Educational requirement and key school attendance mean less housework for girls but more housework for boys and the positive relationships for boys are significant only in urban areas. This is perhaps because parents who have educational requirement or who send their child to a key school may hold more modern gender ideology and gender role attitudes. These concepts would be more likely to be turned into practices in non-traditional context (urban areas).

Thirdly, if a boy's mother has higher education than father, he will do more housework than the one whose mother does not have such educational advantage. This may be explained by that mother's more education means more bargaining power and less traditional gender role attitudes and such power entitled by her education works only in non-traditional settings, in this case, urban areas.

As with any other studies, the current study has some limitations. First of all, the measurement of housework is crude. Due to data limitation, we measure housework only based on general question, which is "the time spent in helping parents with housework". Without detail information, further analysis of different types of housework is impossible. Despite this, this dataset has its own strength: the rich information about education enables a fuller understanding of relationship between housework and parents' educational attitudes. Second, we should be cautious in drawing a causal relationship, because housework may affect parents' educational attitudes through children's academic achievements. For academic test score, lagged test scores help (the time difference is around half a year), but may not entirely: children perform less housework currently probably did less housework last year, too. Most scholars believe the causal relationship usually should be the opposite direction: more housework leads to poor academic performance (Putnick and Bornstein, 2015; He, 2016; Heady, 2003; Zabaleta, 2011; Beegle et al., 2009) and then results in negative educational attitudes.

Despite these weaknesses, it is important to analyze children's housework distribution from a perspective of intrahousehold resource allocation (Fuwa et al., 2006) and understand the role of parental education attitudes in the division of housework among children. Although Chinese girls' educational statuses have greatly improved in recent years (Ye and Wu, 2011), housework is still a heavy burden for them. One way they can change this is to perform better in schooling to gain the bargaining power and get rid of housework. What scholars or policy makers can do is to strengthen parents' emphasis on children's education, especially on daughter's.

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Table 1 Definition, percent or mean of variables in the analysis, CEPS 2014

Variable	Total (n=15391)		Rural (n=8234)		Urban (n=7157)		P (rural-urban diff.) [a]
	Girl n=7616	Boy n=7775	Girl n=4017	Boy n=4217	Girl n=3599	Boy n=3558	
Key independent variable							
Parental college expectation							
No (reference)	10.29	14.32	13.49	18.38	6.72	9.50	
Yes	89.71	85.68*	86.51	81.62*	93.28	90.50*	0.000
Parental educational requirement							
No (reference)	19.59	24.23	19.99	24.28	19.14	24.17	
Yes	80.41	75.77*	80.01	75.72*	80.86	75.83*	ns
Parental education (the highest education level of father and mother)							
<Junior high (reference)	8.18	8.95	12.15	12.88	3.75	4.30	
=Junior high	43.62	42.83	60.62	57.70	24.65	25.21	
>Junior high	48.20	48.22	27.23	29.43*	71.60	70.49	0.000
Maternal education relative to paternal							
Maternal<paternal (reference)	34.36	33.61	34.06	32.84	34.70	34.51	
Maternal=paternal	49.45	50.61	51.51	53.36	47.15	47.36	
Maternal>paternal	16.19	15.78	14.44	13.80	18.14	18.13	0.000
Key school attendance							
No (reference)	18.04	19.65	22.80	24.80	12.73	13.55	
Yes	81.96	80.35*	77.20	75.20*	87.27	86.45	0.000
Last terms' academic achievement (1.69-9.77)	7.25	6.83*	7.25	6.80*	7.25	6.86*	0.01
Covariates							
Children's age (12-18)	14.45	14.53*	14.60	14.64	14.29	14.39*	0.000
Children's grade							
Grade 7 (reference)	51.46	54.20	49.84	53.59	53.26	54.92	
Grade 9	48.54	45.80*	50.16	46.41*	46.74	45.08	0.004
Boarding school							
No (reference)	68.78	69.18	53.00	53.76	86.39	87.46	
Yes	31.22	30.82	47.00	46.24	13.61	12.54	0.000
Cognitive ability	0.06	0.04	-0.08	-0.09	0.23	0.20	0.000
Family wealth (parental subjective report of family economic level)							
Poor-income (reference)	19.30	21.17	26.39	27.65	11.39	13.49	
Medium-income	74.97	72.62	70.10	67.28	80.41	78.95	
Wealthy-income	5.72	6.21*	3.51	5.07*	8.20	7.56*	0.000
Sibship size (number of children in the family)							
Only child (reference)	42.02	49.66	21.41	34.27	65.02	67.90	
2 children	42.77	39.70	57.31	52.17	26.54	24.93	
2+children	15.22	10.64*	21.28	13.56*	8.45	7.17*	0.000
School location (where the school is located in the selected county/district)							
Town or rural (reference)	35.25	34.79	51.26	49.28	17.39	17.62	
Suburban	24.30	25.84	26.06	28.46	22.34	22.74	
Central urban	40.44	39.37	22.68	22.27*	60.27	59.64	0.000
County/district location (where the selected county/district is located in China)							
Western China (reference)	22.95	22.43	18.50	18.92	27.92	26.59	
Central China	19.87	20.46	27.83	28.20	10.89	11.30	
Eastern China	57.18	57.11	53.67	52.88	61.10	62.11	0.000

* in the boy column indicates a significant gender difference ($p<0.05$, determined by chi square test or two-tailed *t* test) in terms of all the variables; [a] significance of rural-urban difference is determined by *chi-square* test or two-tailed *t* test

Table 2 OLS models predicting children's daily housework time for girl and boy, total sample, China Education Panel Survey, CEPS 2014

	All	Girl	Boy
Key independent variable			
Children's gender	10.95***		
Parental college expectation (no)	-7.20**	-9.66*	-5.34
Parental educational requirement (no)	-2.54	-11.50***	5.35
Parental education (<Junior high)			
=Junior high	-12.47***	-18.56***	-6.66
>Junior high	-16.50***	-24.37**	-9.28*
Maternal education relative to paternal (maternal < paternal)			
Maternal=Paternal	0.38	-2.91	3.97
Maternal>Paternal	1.25	-0.73	3.62
Key school attendance (no)	-1.24	-8.94**	5.27
Last term's academic achievement	-8.43***	-11.35***	-7.19***
Covariates			
Children's age	8.35***	9.42***	7.86***
Grade 9 (grade7)	-29.56***	-33.55***	-27.32***
Boarding (no)	-4.27*	-7.02*	-2.07
Cognitive ability	-11.12***	-10.92***	-10.99***
Family wealth (poor-income)			
Medium-income	-13.02***	-18.65***	-8.18**
Wealthy-income	-14.28***	-23.46***	-6.60
Sibship size (only child)			
2 children	7.18***	10.29***	5.10*
2+children	17.25***	18.60***	16.16***
School location (town or rural)			
Suburban	-12.66***	-12.79***	-12.15***
Central urban	-22.29***	-23.09***	-20.65***
County/district location (western China)			
Central China	-10.59***	-9.17**	-11.34***
Eastern China	-16.29***	-16.37***	-15.47***
Urban hukou (rural)	-2.51	0.31	-4.71
Constant	67.96***	113.48***	40.86
R^2	0.091	0.122	0.068

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; the variables in parentheses in the first column are references.

Table 3 OLS models predicting children's daily housework time for girl and boy, rural and urban subsamples, China Education Panel Survey, CEPS 2014

	Rural		Urban	
	Girl	Boy	Girl	Boy
Key independent variable				
Parental college expectation (no)	-9.34	-3.33	-10.50	-8.45
Parental educational requirement (no)	-13.62**	2.96	-9.46*	8.93**
Parental education (<Junior high)				
=Junior high	-23.00***	-5.49	-0.05	-8.09
>Junior high	-27.76***	-5.39	-8.06	-13.36
Maternal education relative to paternal (maternal < paternal)				
Maternal=Paternal	-4.90	4.05	-0.42	4.22
Maternal>Paternal	-4.05	-2.59	3.11	9.93**
Key school attendance (no)	-7.92*	4.12	-13.65**	7.96+
Last term's academic achievement	-13.56***	-8.29***	-8.40***	-5.84***
Covariates				
Children's age	9.24***	5.43*	8.76***	11.65***
Grade 9 (grade7)	-35.27***	-22.49***	-29.94***	-34.58***
Boarding (no)	-11.68***	-4.08	2.11	2.37
Cognitive ability	-12.24***	-12.53***	-9.55***	-9.24***
Family wealth (poor-income)				
Medium-income	-22.32***	-8.02*	-8.88	-7.68
Wealthy-income	-29.96***	-5.46	-12.04	-6.73
Sibship size (only child)				
2 children	12.92**	4.19	6.84*	3.89
2+children	14.18**	12.07*	33.41***	22.83***
School location (town or rural)				
Suburban	-19.49***	-16.09***	-3.69	-6.55
Central urban	-25.73***	-23.34***	-14.95**	-13.80**
County/district location (western China)				
Central China	-18.78***	-21.88***	-0.40	5.56
Eastern China	-27.39***	-22.53***	-8.59**	-9.85***
Constant	153.98***	91.68*	61.79	-37.03
R^2	0.112	0.046	0.111	0.088

$^{+}$ $p < 0.07$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; the variables in parentheses in the first column are references.

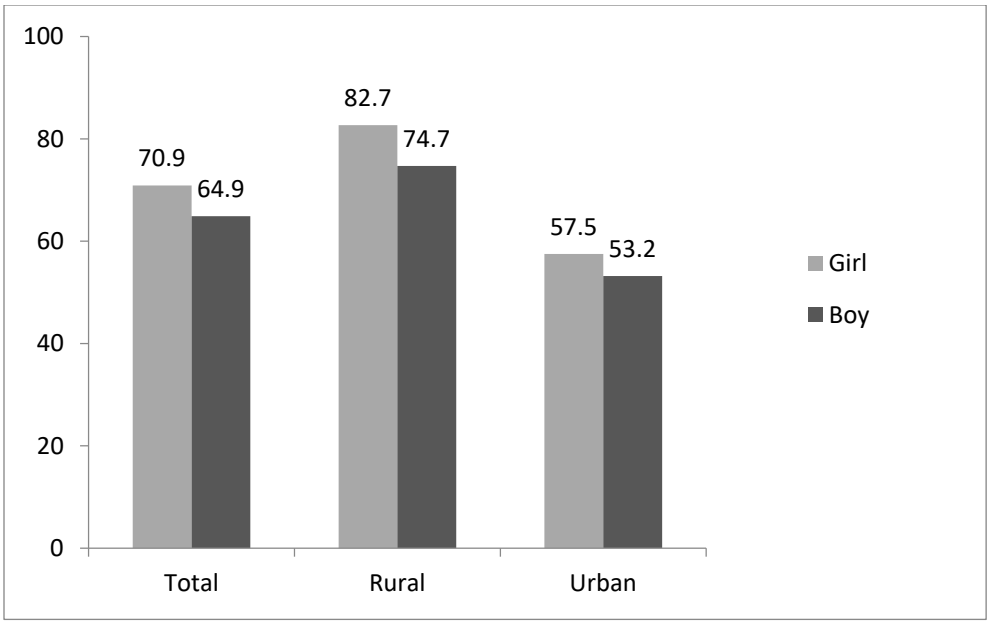

Figure 1 Mean of children's housework time (in minutes), by gender and hukou, CEPS 2014

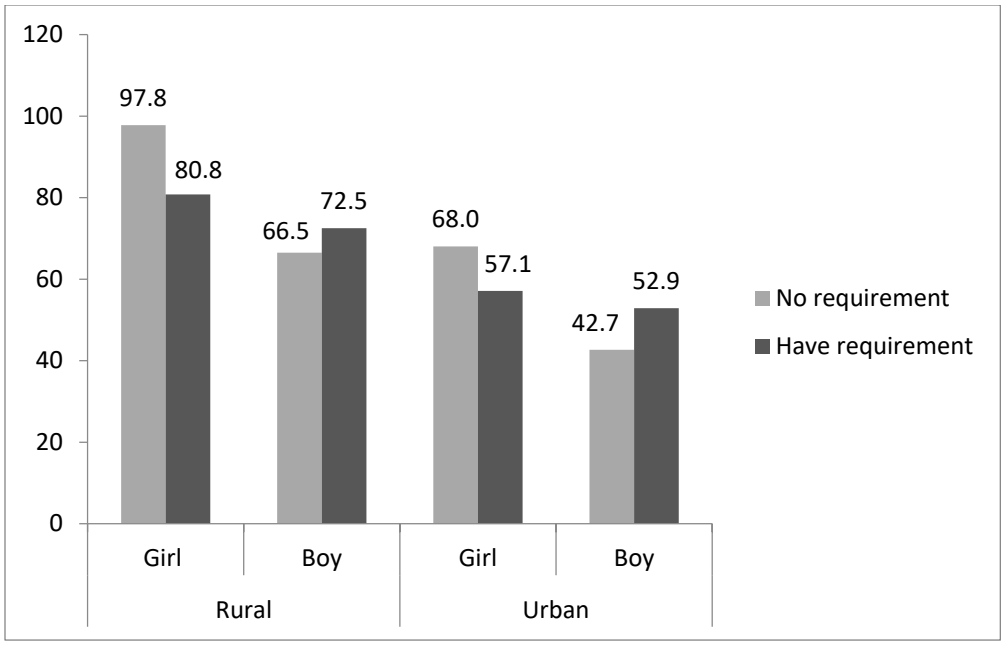

Figure 2 Predictive children's housework time (in minutes) across children's gender and hukou, by parental education requirement, CEPS 2014

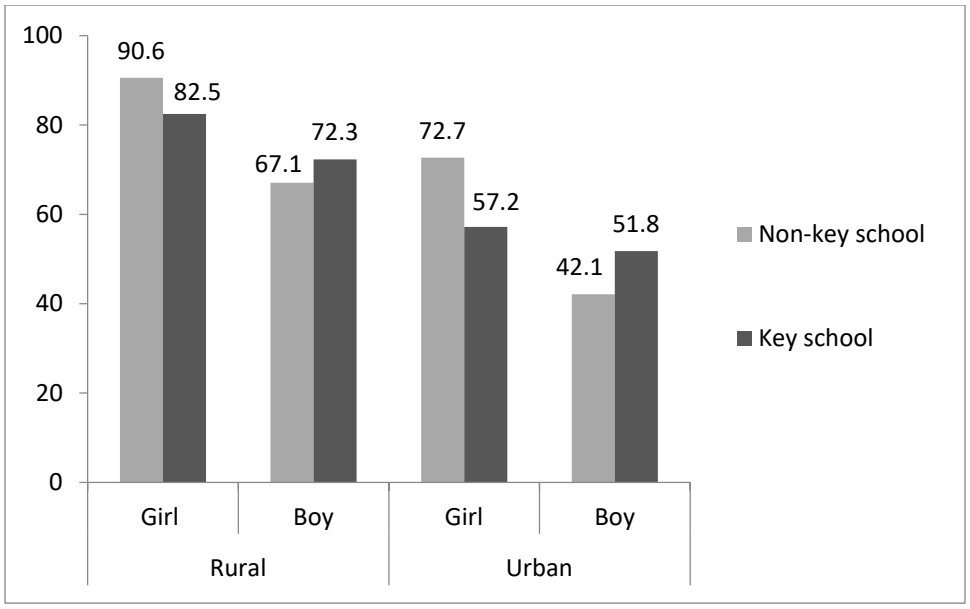

Figure 3 Predictive children's housework time (in minutes) across children's gender and hukou, by school's teaching quality, CEPS 2014

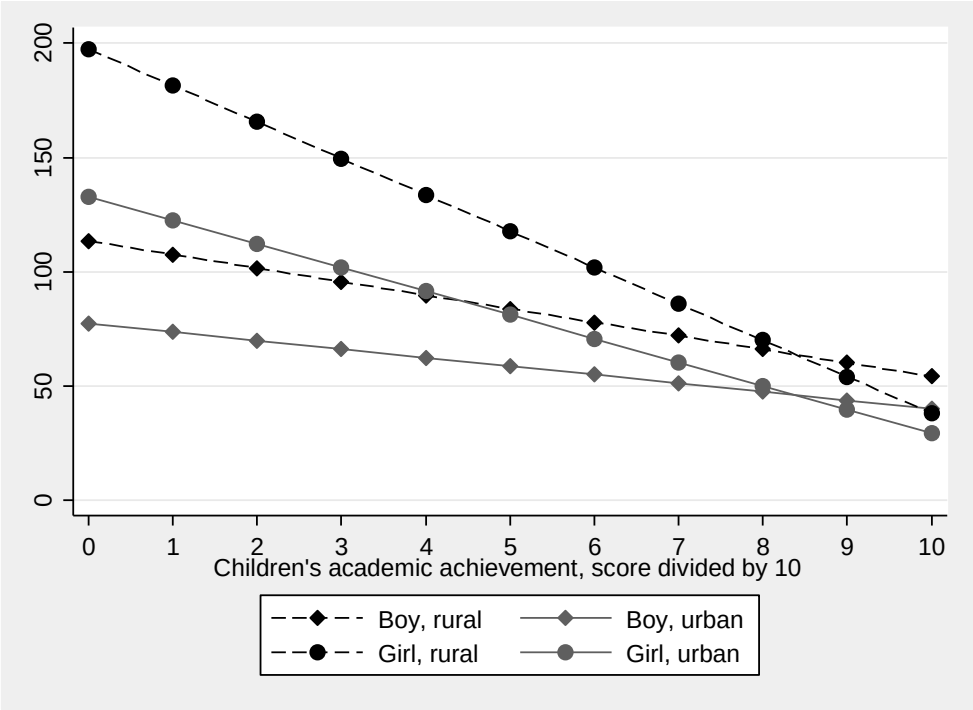

Figure 4 Predictive children's housework time (in minutes) across children's gender and hukou, by student's academic achievement (divided by 10) last term, CEPS 2014