**Preschool Quality and Children Non-Cognitive Ability Development:
Evidence from Rural China**

by Yalin Tang, Shaoping Li, Chengfang Liu, and Kevin Chen

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Abstract:

Although preschool enrollment rate in China has increased dramatically over the past two decades, the quality of preschool education remains poor in rural China. This paper provides new evidence on the effects of preschool quality on non-cognitive ability of children. Using a data set concluding 1,242 children in 26 preschools from two poor counties in southern China in 2018, we find that a one-point increase in the subjective preschool quality score results in 0.174 points increase in prosocial behavior and 0.389 points decrease in total difficulties measured in SDQ questionnaire. As for objective preschool quality, children in public preschools with better facilities and more educated teachers tend to have lower total difficulty scores. Furthermore, better school hardware facilities are associated with better prosocial behavior. In terms of transmission channels, preschool quality affects prosocial behavior of children mainly through changes in the inputs of material and time by caregivers. However, we did not find any evidence of mediating role by home-school connection or teacher parenting pattern.

Keywords: Preschool quality; Child development; Non-cognitive ability; Process quality

JEL codes: I20; H41; I26

Preschool Quality and Children Non-Cognitive Ability Development: Evidence from Rural China

Preschool education has been at the center of the academic and policy discussions on children development in recent years. It is generally accepted that high quality preschool education has substantial impacts on later life outcomes (Barnett, 1992, 1995; Heckman, 2006; Gormley Jr. et al, 2008; Heckman et al, 2013; Weiland & Yoshikawa, 2013), especially for children from disadvantaged socioeconomic backgrounds (Heckman, 2006, 2010; Kottelenberg & Lehrer, 2017) or from developing countries (Engle et al., 2011). Based on this, there is growing momentum behind investing in preschool education in both developed and developing countries (OECD, 2017; Su et al., 2020).

However, a substantial amount of research has shown that the impacts of preschool education are mixed (Barnett, 1995; Blau & Currie, 2006; Magnuson et al., 2007; Gupta & Simonsen, 2010). In particular, results on the effects of preschool education on non-cognitive abilities are contradictory (Barnett, 1995; Loeb et al., 2007, Baker et al., 2008; Neidell & Waldfogel, 2008; Almond & Currie, 2011). This finding has led researchers to pay more attention to the influence of preschool quality (Peisner-Feinberg et al., 2001; Chetty et al, 2011; Araujo et al, 2016). The first reason is that preschool quality varies greatly among or within countries (Britto et al., 2011; Engle et al., 2011; Eurofound, 2015; Coley et al., 2016). If preschool quality cannot be correctly assessed, relevant empirical research would suffer from severe measurement problem. Secondly, recent evidence has suggested that only high-quality preschool education could benefit child development, while poor quality preschool service has adverse effects (Engle et al., 2011; Britto et al., 2011; Ichino et al., 2019).

Despite the increase in the number of studies on preschool quality effectiveness recently, most of the evidence has focused on cognitive outcomes such as test scores, reading ability, or literacy level (Currie et al., 2000; Moore et al., 2008; Araujo et al., 2016; Morabito et al., 2018; Wang et al., 2020). At the same time,

studies correlating preschool quality and non-cognitive outcomes of children are scarce and their results are inconsistent (Peisner-Feinberg et al., 2001; Early et al., 2007; Mashburn et al., 2008; Alison et al., 2019). This is important because these neglected personality traits may be important channels by which preschool programs enhance future labor market returns (Chetty et al, 2011; Heckman et al, 2013), and non-cognitive abilities may have greater long-term effects on labor market returns than cognitive abilities (Heckman et al., 2006). Besides, poor-quality preschool education is sometimes accompanied by early teaching elementary school knowledge, especially in east Asian countries (Rao et al., 2012). In this case, if cognitive ability is the dominant indicator of child development, the impact of preschool quality may be upward biased. Beyond that, a fact often overlooked by economists is that the development of non-cognitive abilities, such as emotional control and peer communication skills, rather than increases in grades or vocabulary, is the primary goal of preschool education (Mcgrath, 1980).

Moreover, a close examination of literature on the relationship between preschool quality and development achievements such as non-cognitive ability reveals several limitations. First, many quality indicators are of limited practical relevance (Blanden et al., 2021), and in many RCTs designed to assess the impact of preschool quality, a simple dichotomy or trichotomy is often used to distinguish between high quality and low quality (Morabito et al., 2018; Wolf, 2019; Alison et al., 2019). Even if some studies use a series of observable indicators to describe quality, these indicators focus on either the teacher dimension or the school dimension (Chetty et al, 2011; Lai et al., 2011; Araujo et al., 2016). However, it is difficult to separate teacher quality from management and facility quality at the school level (OECD, 2018), and discussing one side alone may lead to biased results. In addition, while there are a few studies including process quality in the assessment of preschool quality (Peisner-Feinberg et al., 2001; Early et al., 2007; Bridget et al., 2013; Su et al., 2021), The close relationship between structural quality and process quality remains underappreciated. In fact, there is some evidence that structural quality may influence

process quality (None, 2002), and in this case, including them together in the model may result in estimation bias.

Second, inappropriate measures of non-cognitive ability may also lead to mixed empirical results. There are some studies using teacher-reported behavior evaluation to measure noncognitive ability (Magnuson et al., 2007; Loeb et al., 2007; Coley et al., 2016), which may exacerbate measurement problems. That is because the results reported by different interviewees will be different to some extent (Vugteveen et al., 2020). For example, teacher-reported non-cognitive performance of children may be less reliable because of the presence of self-selection problems, which suggests that better teachers may be inclined to have better or worse evaluations of their children.

Finally, little is known about caregivers' subjective assessments of preschool quality and their impacts on caregivers' material and time investment in their children. This is important because the care of caregivers have a significant impact on child development (Herbst, 2013; Sayour & Nagham, 2018), and the quality of preschool education may prompt caregivers to adjust their involvement in children (Araujo et al, 2016). For example, if the substitution effect of preschool quality is dominant, caregivers may spend less time with their children as a response to high-quality preschool education (Pop-Eleches & Urquiola, 2013).

This article seeks to examine the impacts of preschool quality on the non-cognitive ability of children in rural China. We focus on children entering preschool. The data are drawn from a preschool survey conducted by the authors in Hunan Province, China, in 2018. These preschools surveyed are all located in the rural areas of two state-level poverty-deprived counties, where the average per capita net income of rural residents is 866.93 dollars in 2018 (Bureau of Statistics of Xiangxi State, 2019), accounting for less than 40% of the average per capita net income of all the rural residents in China and less than 15% of the average disposable income of urban residents in China (National Bureau of Statistics of China, 2018). In a way, unlike the fierce competition for school choice in China's high-income areas (Lai et al., 2011),

higher commutes distances and lower income levels there would narrow the range of schools available to local families, which may reduce the severity of endogenous problem in school choice, although it is still possible.

Our data are from different questionnaires of our survey. In caregiver questionnaire, we tested the non-cognitive ability of children by caregiver version of strengthens and difficulty (SDQ) questionnaire, and collected the subjective assessment of preschool quality (by an eleven-point scale) of caregivers. We also collected rich data on preschools and teachers from questionnaires of principals and teachers respectively, including availability of equipment, preschool fee and type, background information of teachers and student-teacher ratio at the class level. Finally, we collected some background information about the child and their parents in caregiver questionnaire.

Our key results can be summarized as follows. First, subjective and objective preschool quality are both significantly correlated with non-cognitive abilities of children. On average, children from public preschools with better facilities and better-educated teachers perform better. Second, preschool quality affects different groups of children in different sub-dimensions. High-quality preschools help boys mainly in improving their prosocial behaviors and help girls in reducing the total difficulty score. Besides, children without parental care generally benefit more from high-quality preschools, and there is limited evidence that the better SES status of a family, the more children benefit from high-quality preschool. Finally, we explore the potential channels through which structural preschool quality may influence child development, and we find that higher structural quality is closely associated with more material and time investment in children, which has an important impact on prosocial behavior development. However, the home-school connection and teacher rearing model do not show significant influence in the channel analysis.

Our work makes several contributions to literature on the impacts of preschool quality. First, we contribute to this literature by detecting the comprehensive impact of subjective and objective preschool quality, and we also consider both school-level

and class-level quality indicators, which provides us a chance to show the variation of quality deeply and explore its impact in detail. Second, our conclusions support the idea that the preschool quality has a positive effect on non-cognitive ability and provide new evidence to relevant literature where impacts of preschool quality are highly inconsistent. Finally, we consider the influence of caregivers' feedback in our assessment of the impact of preschool quality, and our finding reveals the importance of considering family feedback in such studies.

The remainder of the paper proceeds as follows. Section 2 provides descriptions of sample and data used in this paper. We then present the model setting and the regression results in section 3, which includes the basic regression results, robustness test and heterogeneity analysis. The section 4 shows the results of mechanism analysis. We conclude in section 5.

Setting and Data

Sample

Sample data come from a survey by authors in rural areas of two poor counties in Hunan Province, China in 2018. These two counties, Longshan and Yongshun, are both the nationally designated poverty counties[1] in China. In the two counties, ethnic minorities account for more than 80% of the total population, where the Tujia ethnic group takes the main share. In addition, migrant work is very common in the two counties. In our sample, 80% of the children have at least one parent working outside the county. In summary, the sample areas are representative in terms of poverty and lack of parental companionship among children.

We surveyed 26 preschools in the rural areas of these two counties, and collected the information of 1334 children mainly aged 3-5 (according to the regulations of the Ministry of Education of China, the starting age of preschools is 3 years old, and children often spend 3-4 years in preschool). We collected rich

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[1] The title of "Nationally Designated Poverty Counties" are designated by the central government of China, these countries can receive the poverty-alleviation assistance from central government, and they tend to be much poorer than provincial-level poverty-stricken counties and non-poverty-stricken counties generally. Under the efforts to reduce poverty of Chinese government, Longshan and Yongshun dropped out of the poverty-county list in February 2020 and December 2019, respectively.

information about the children, their caregivers and their family backgrounds from the caregiver questionnaire, and we also collected rich information about the quality of the preschools from the principal questionnaire and the teacher questionnaire. We matched the school level information and class level information with the children, and finally retained 1242 matched samples for analysis.

Data

　　Objective preschool quality: We use two types of indicators to measure the quality of preschool. The first type is the characteristics at school level, including preschool infrastructure index, whether the preschool provide school bus service, preschool fee per semester, whether the preschool is public. The second is the characteristics of teachers at class level, including years of teaching experience, years of schooling, whether teacher majors in preschool education, ten-student-teacher ratio of the class (unit is 10 kids per teacher). In the first three indicators, we only use the information of the head teacher, while in the last indicator number of teachers include both full-time teachers and childcare workers.

　　There is some evidence suggests that the structural quality of a school, including school hardware facilities (Britto et al., 2011), ICT equipment (Bernal et al., 2016), playground area and the number of libraries (Lai et al, 2011), have a significant impact on students' academic performance, cognitive and non-cognitive ability. There is also evidence from developing countries that the tuition fees and the type of school (public or private) also affect student performance (Newhouse et al., 2006; Amjad & MacLeod, 2014). Based on this, we separately use "preschool infrastructure index" (composed of 11 specific hardware devices) and "preschool bus" to measure the school's hardware facilities and software facilities, and take into account the preschool fee and preschool type.

　　A growing body of evidence also show that teacher plays an important role in school quality (Angrist & Victor, 1999; Rivkin et al., 2005; Lai et al., 2011), both including quantity and quality. The former, often measured by the student-teacher ratio, has been found to improve future earnings significantly (Card & Krueger,

1992a, b; Burchinal et al., 2000). Meanwhile, the common indicators of the latter include the years of teaching experience, years of schooling, whether the teacher majors in preschool education, and the teacher's rank (Card & Krueger, 1992b; Rivkin et al., 2005; Bernal et al., 2016). Due to too few teachers with professional degree (only 4.27%), we only collect the first three indicators from the teacher questionnaire and measure the ten-student-teacher ratio at the class level.

There is a concern that different indicators representing preschool quality may be highly correlated, which could lead to bias in estimates. Based on this, we construct the correlation coefficient matrix between the indicators representing preschool quality in Appendix Table 1. The results show that most of the correlation coefficients between these variables are not more than 0.3, so we conclude that the correlation among those core independent variables is not strong.

Subjective preschool quality: This indicator is constructed from a question "How would you rate your child's preschool (on a scale of 0-10)" in caregiver questionnaire, and we use it to capture overall perception of caregivers about the quality of preschools.

Table1 provides sample averages for those preschool and teacher characteristics in our data. In terms of school quality, the preschool infrastructure index has been standardized, but its mean value is slightly lower than 0 and its variance is small. 54% of schools have school buses. The school charges an average of 1,680 yuan (263.76 dollars) per preschooler per semester, with the highest being 2,470 yuan (387.79 dollars). Only 19% of schools are public. In terms of teacher quality, their average years of teaching experience is 5.83 years, their average years of schooling is 11.97 years (equivalent to high school level), 51% of the teachers graduate from preschool education major, and the average ten-student-teacher ratio of the class is 1.54. In the end, caregivers rated the school's subjective quality, on average, at 9.24, a fairly high score.

Child development outcomes:We use the caregiver version (revised in Chinese) of the Strengths and Difficulties Questionnaire (SDQ) to measure children's

non-cognitive abilities. SDQ is a classic scale for evaluating the emotional behavior and non-cognitive ability of children and its revised Chinese version has good reliability and validity (Du et al., 2006). To be specific, the questionnaire is divided into five factors: emotional symptoms, peer interaction problems, conduct problems, hyperactivity and prosocial behavior, and the first four factors can be added up to the total difficulty score (Dickey & Blumberg, 2004). Lower total difficulty scores and higher prosocial behavior scores are related to higher non-cognitive abilities of children. We also generate dummy variables "Abnormal prosocial behavior score" "Abnormal total difficulties score" based on official criteria (Score of prosocial behavior≤4; Score of total difficulties≥17).

Table1, upper panel, summarizes the basic condition of children's non-cognitive ability. The mean of the prosocial behavior score of the sample children is 6.79, and the mean of the total difficulty score is 12.41, both within the normal range. However, the lowest prosocial score and the highest overall difficulty score were far above the normal level. According to the two indicators, 16% of the children show abnormal prosocial behaviors, and 21% of the children suffer from severe behavioral difficulties (the abnormal probability of the four decomposition indexes of the total difficulty score is between 6%-24%).

Characteristics of Children and Families. We collect the following basic information of children: gender, age (unit is month), duration at preschool (unit is semester), whether the child is ethnic minority. We also include a dummy variable, preterm birth, to control for the child's physical condition at birth. As for family background, we collect the information of parents' age and years of schooling. We also generate the index of household durable assets to measure the socioeconomic status of families according to their ownership of 10 kinds of fixed assets.

The middle panel of Table1 shows the basic information about children and their family. 52% of the sample children is boys. The average age of the children is 55.52 months, the lowest is 23.03 months and the highest is 81.53 months. Children are in preschool for an average of 2.83 semesters. 16% of the children are premature.

The average age of fathers is 32.46 years and that of mothers is 29.63 years. The average years of schooling is 8.19 for both father and mother (equivalent to the second year of secondary school). The economic assets of households have been standardized.

Mediating Variable: We collect data about the number of activities attended by parents and the existence of a PTA where parents participate in decision-making in principal questionnaire. According to the OECD study (2011), both the frequency and depth of parental involvement in school activities are important indicators of home-school connection. We also construct the authoritative and authoritarian indexes of parenting patterns according to a series of questions in teacher questionnaire. Classical research from psychology has shown that more democratic parenting patterns are correlated with more prosocial behavior in children (Baumrind, 1971). Finally, we collect information about material and time investment in caregiver questionnaire. We use numbers of extra-curricular classes, numbers of children books and toys to measure material investment, and use numbers of caresses by family members yesterday, whether telling story/ playing games/ sing songs with children yesterday to measure the time investment. These indicators are all considered good measures of material and time investment from caregivers (Hamadani et al., 2010).

The lower panel of Table1 shows the basic information of the mediation variable. In the sample schools, caregivers visit the preschool an average of 6.54 times a year. In addition, 54% of preschools have parent committees participating in decision-making. At the teacher level, the average scores of authoritative and autocratic parenting patterns of teachers are 4.06 and 1.03. In terms of caregiver input, only 29 caregivers have enrolled their children in after-school classes, whose numbers are almost 1. There are 605 children owning children's books, with an average of 12.14 books per child. The vast majority of children in our sample own children's toys, with an average of 43.43. Finally, 11%, 22 % and 42% of caregivers told stories, played games and sang children's songs with their children the day before the survey.

Estimation Strategy and Results

Estimation Strategy

We estimate the effects of preschool quality on non-cognitive ability using the following specification:

$$y_{icsn} = Subjective_{icsn} + X_{icsn} + \alpha_n + \varepsilon_{icsn} \tag{1}$$

$$y_{icsn} = S_{sn} + C_{csn} + X_{icsn} + \alpha_n + \varepsilon_{icsn} \tag{2}$$

Where y_{icsn} is the non-cognitive development outcome, including score of prosocial ability and total difficulties for child i assigned to classroom c at school s in county n. The variable *Subjective* in (1) is caregivers' rating of the quality of preschool (0-10). The vector S_{sn} and C_{csn} in (2) are observable preschool (at the school level) and teacher (at the class level) characteristics separately. The vector X_{icsn} includes the child and parents background characteristics described above: parents' age and years of schooling, and the child's gender, race, age (in month), duration at preschool (in semesters) and whether the child is born prematurely. α_n is the county fixed effect used to control the differences in economic and social background between the two counties. ε_{icsn} is the i.i.d. error term. In all specifications, standard errors are clustered at class level.

Impacts of Subjective and Objective Preschool Quality

We begin by analyzing the impacts of subjective and objective preschool quality on non-cognitive ability separately. Results from the regressions of child non-cognitive ability on subjective preschool quality are reported in Table 2. The odd-numbered column refers to the OLS regression for the prosocial behavior score and the total difficulty score, whereas those with even numbers are Logit regression for whether children are beyond the threshold of abnormality on the above two indicators. Table 2 shows that higher evaluations of preschool quality by caregivers are significantly associated with better non-cognitive ability—children have 0.174 higher score of prosocial behavior and 0.389 lower score of total difficulties with one higher score of subjective preschool quality. Besides, children living in preschools with

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higher subjective quality are less likely to show abnormal on total difficulty scores. Finally, the results of the joint significance test show that the indicators representing preschool quality have a significant effect on reducing the total difficulty scores, but have little effect on prosocial behavior.

Our regression results also show that some control variables come out significantly (Table 2). In terms of children characteristics, boys have worse performance than girls in non-cognitive ability, especially in prosocial behavior. The older the student is, the lower the total difficulty score is. Longer school days are associated with better prosocial behavior and a lower probability of abnormality on total difficulty score. In terms of family characteristics, fathers' education level is significantly positively correlated with children's non-cognitive abilities, suggesting that fathers play an indispensable role in children's development. However, unlike previous studies, there is no significant correlation between the household asset index, which represents the family's socioeconomic status, and non-cognitive ability of children. We speculate that this may be attributed to the widespread family poverty in the sample area. Finally, other control variables have no significant effect on SDQ scores.

Objective preschool quality indicators can distinguish the sub-projects that affect child development, and the self-selection problem there is weaker compared with the subjective evaluation scores. Based on this, given that other settings remain the same, we replace the subjective preschool quality score with the following 4 preschool characteristics—preschool infrastructure index, availability of preschool bus, preschool fee, preschool type and 4 teacher characteristics—experience, years of schooling, availability of preschool education degree and ten-student-teacher ratio in class in equation (2).

The corresponding results in Table 3 show the impacts of objective preschool quality on children SDQ scores. In general, similar to the regression results in Table 2, better objective preschool quality is associated with better non-cognitive abilities in children, through the different non-cognitive ability indicators are affected in the

different way. Columns (1)-(2) show that only the preschool infrastructure index has a statistically significant effect on prosocial behavior, in other words, children in preschools with a 1-standard deviation higher preschool infrastructure index have 0.205 higher prosocial behavior scores. However, all the preschool and teacher characteristics has no significant effect on anomaly probability of this indicator.

Column (3)-(4) show the effect on total difficulty scores. In columns (3), preschool characteristics other than tuition are all negatively and significantly associated with total difficulty scores. Specifically, one standard deviation higher infrastructure index is significantly associated with 0.392 lower total difficulty scores. In addition, children in preschools with school bus service and in public preschools score 0.757 and nearly one point lower in total difficulty. Among teacher characteristics, only years of schooling has a significantly negative impact on total difficulty score, meanwhile, more years of schooling is associated with the lower anomaly probability in this indicator in column (4), although the effects are statistically significant with $p < 0.1$. Column (4) also shows that children in public preschools are 11.0 percentage points (26.8% lower than the average) less likely to be abnormal in total difficulty. The other observable preschool and teacher characteristics all have no significant impact on total difficulty scores.

Our empirical findings support the conclusions of previous studies in some aspects, and also provides explanations for some controversial issues. Firstly, similar to the findings of Araujo et al. (2016), we find that caregivers could identify preschool quality to some extent, which is based on the fact that subjective and objective preschool quality (especially the preschool infrastructure index) have similar effects on non-cognitive ability. It also implies that caregivers' investment for children may be influenced by preschool quality, which need to be taken into account in subsequent analyses.

However, the significant impact of structural quality on non-cognitive ability stands in contrast to earlier studies (Early et al., 2007; Mashburn et al., 2008; Alison et al., 2019; Bernal & Ramírez, 2019). One possible explanation is that structural and

process quality are correlated significantly (Hu et al., 2017; Nores et al., 2019), and process quality can play its role only if structural quality reaches a certain threshold (Hu et al., 2017; Nores et al., 2019). While the structure quality of rural preschools in China is still relatively poor (Li et al., 2016, 2019), and there is a big gap compared to the countries in the above study. In this case, it is possible that preschools meeting the standard of structural quality can provide adequate space and facilities for children's activities and teacher-student interaction, which will be conducive to non-cognitive ability of children.

Furthermore, in terms of teacher characteristics, our study also reveals the ineffectiveness of some traditional teacher quality indicators. In contrast to earlier studies (Card & Krueger, 1992a, b; Angrist & Victor, 1999; Chetty et al., 2011), we find that professional degrees, teaching experience, ten -student-teacher ratio have little effect on non-cognitive ability. It may be due to the relatively low quality of preschool teacher education in China (Hu & Hu, 2018). Under this background, the meagre wages of preschool teachers may mean that those who stay in the profession longer tend to have lower human capital. Besides, the insignificant effect of the ten-student-teacher ratio may have something to do with large spatial differences in the number of preschools in the privatized education market (Bastos & Cristia, 2012), where the rural preschool may be too remote to recruit enough students. In contrast, the significant impact of years of schooling is consistent with results of previous studies (Guo et al., 2010; Howes et al., 2008; Wang et al., 2020). In fact, highly-educated teachers may provide children with high levels of teacher-student interaction and more emotional support (Howes et al., 2008), which could benefit the non-cognitive ability of children.

In addition, our results offer new explanations for the controversial effects of school type and preschool fee (Newhouse & Beegle, 2006; Coley et al., 2016; Amjad & Macleod, 2014). We find that children in public schools perform better on non-cognitive abilities, while preschool fee does not have significant impacts on any of the indicators. On the one hand, following the interpretation of Newhouse & Beegle

(2006), we think that public preschools may have higher quality than private preschools in China, and it may not be fully captured by observable factors. On the other hand, the insignificant effect of preschool fee reflects that there may be a certain degree of market failure in the preschool education market in rural areas, so that the quality of preschool service cannot be correctly reflected by prices.

In Appendix Table 2, we also explore the influence of preschool quality on each dimension of the total difficulty score. In terms of subjective preschool quality, it is significantly associated with fewer behavioral problems except emotional symptoms of children. Besides, in terms of objective preschool quality, better structural quality is significantly associated with fewer conduct problems and hyperactivity problems of children, and children in public schools have better performance in conduct and peer interaction. In addition, in terms of teacher characteristics, we find that longer years of schooling are strongly associated with fewer emotional symptoms and conduct problems. However, we also find some anomalous effects. For example, preschool fee has a significant positive effect on hyperactivity problems, meanwhile, professional degrees and teacher experience are significantly and positively associated with children's conduct problems. Overall, the results are basically consistent with the regression results on total difficulty scores in Table 3.

Robustness Check

There are several concerns for our results. The first is that caregivers can choose better preschool education, and the factors that influence the choice may be closely related to the factors that influence child development. Secondly, some economic and social factors at the regional level may affect both the preschool quality and child development. Based on the first concern, we check all the transfer samples in detail, where caregivers reported the reasons for transferring. We find 48 transfers due to quality problems, including dissatisfaction with teachers or preschool facilities. Appendix Table 3 reports the regression results when these samples are deleted. In addition, we take the distance between the township (where the preschool is located)

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and the county seat as a predictive variable of the local economic development level, and this variable is added into the regression as a control variable. The results in Appendix Table 4 support the robustness of the results in this paper. Of course, it does not mean that our results have a causal effect until now, since caregivers who having not choosing transferred may also have chosen preschool in advance.

Heterogeneity analysis

The next set of results examine whether the impacts of preschool quality differ across subgroups. Firstly, there is some evidence that the benefits of preschool education vary between boys and girls (Chetty et al., 2011; Heckman et al., 2013). We thus assess heterogeneity by gender in Table 4. In Panel A, we find that higher subjective preschool quality scores are associated with more prosocial behavior and lower overall difficulty scores for girls, and with lower total difficulty scores for boys. Overall, girls are most affected by the subjective preschool quality. In panel B, the influence of objective preschool quality on girls is mainly reflected in the reduction of total difficulties, among which, preschool type and teacher quality play the major role. For boys, the effect is mainly reflected in the improvement of prosocial behaviors (in terms of total difficulties, the effects of different indicators are opposite, so it is difficult for us to make a clear interpretation), both the years of schooling of teacher and preschool infrastructure index have significant effects. Therefore, we conclude that the impact of preschool quality on the non-cognitive abilities of boys and girls is reflected in different dimensions.

Moreover, there are some studies suggesting that non-parental care has a negative impact on child development (Herbst, 2013, Zhang et al., 2014). In rural China, where migrant work is common, the problem needs more attention (Heckman & Rozelle, 2019). Whether these left-behind children can benefit more from a high-quality preschool is a matter of further inquiry. We thus assess heterogeneity by the absence of parental care in Table 5. We distinguish two types of children. The first type of children has both the parents working outside the local county (Out), and the second type of children has at least one parent working in the county (Local). In Panel

A, we find that subjective preschool quality has a greater effect on children unaccompanied by parents. At the same time, Panel B shows the following results. In terms of prosocial behaviors, children in the first group are significantly affected by years of schooling of teachers, while children in the second group are mainly affected by structural index. In terms of total difficulty scores, both groups are affected by multiple factors, but the impact is greater for children without parental care. At the end, attention from high-quality teachers would be important for children unaccompanied by parents.

Several studies also show that children from disadvantaged households would benefit more from high-quality preschool education (Heckman, 2006, 2010; Kottelenberg & Lehrer, 2017). Therefore, we use household assets index to represent the household socioeconomic status (SES) and assess the heterogeneity by SES in Table 6. We find no difference in the impact of subjective preschool quality on children from poor or wealthy families in Panel A. However, we find something different in Panel B. For children from families of higher SES, higher preschool fee and owning teachers with professional degrees can improve their non-cognitive skills. This result supports the evidence that families of higher SES are more likely to identify and choose higher-quality preschool services (Alexandersen et al., 2021), while families of lower SES may be at a disadvantage in this regard.

Transmission Channels

Preschool quality may influence the non-cognitive ability of children through a variety of channels. On the one hand, caregivers may adjust their investment in child rearing as a response to preschool quality (the results above suggest that caregivers may be able to identify preschool quality to some extent). On the other hand, studies have shown that better structural quality is closely associated with better process quality (Hu et al., 2017; Nores et al., 2019), such as more efficient teacher-student interaction or home-school contact. To understand how better preschool produce better non-cognitive ability, we examine whether preschool quality can make a

difference through the above two channels.

We begin by analyzing whether home-school connection and teacher-student interaction quality are significantly associated with non-cognitive ability of children. We use the number of home-school activities and whether parents are involved in school decision-making to represent the strength of the home-school connection. We also use the parenting pattern of teacher to represent the quality of teacher-student interaction. According to the classical definition of psychologist Baumrind (1971), authoritative parenting style means warm support from teachers and democratic participation of children (high quality interaction), while authoritarian parenting style means the low quality of interaction with threats and punishment.

The results, presented in Table 7, indicate that caregivers' participation in decision-making has a negative impact on prosocial behavior of children, while authoritative parenting model is helpful to reducing behavioral difficulties. The former result contradicts much of the literature that emphasizes the importance of home-school connections (OECD, 2011; Barrera-Osorio et al., 2020), which may reflect the relatively low quality of home-preschool connections in rural China. In addition, involvement of caregivers in school decision-making may also lead to a greater trust crisis, as there is some evidence that interventions aimed at promoting home-school ties actually reduce parents' trust in schools (Barrera-Osorio et al., 2020). Therefore, in the poor rural China, the home-school connection may not be the channel through which preschool quality can make a sense. At the same time, the latter result suggests that friendlier and more democratic teacher parenting pattern will have a significant positive effect, and whether it is a transmission channel remains to be further tested.

We then mostly consider whether teacher parenting patterns can be affected by structural preschool quality in Table 8. However, we find that the effect of structural quality is contradictory and weak, and even more educated teachers tend to be more authoritarian in their parenting patterns. Similarly, the contradictory effects can also be seen in the influence of home-school connection. All the above results indicate that

it is difficult for structural quality to transform into process quality and exert its influence. We need to look for other possible channels.

In the next section, we discuss whether the preschool quality could make caregivers adjust their parenting behaviors, and whether this adjustment can be an important channel for preschool quality to exert influence. We begin by analyzing whether parenting behaviors are significantly associated with non-cognitive ability of children. In the household survey, we asked caregivers about a large number of inputs into children and their parenting behaviors. There has been much evidence showing that the material and time input from caregivers have a positive impact on child development (Hamadani et al., 2010), and our results in Table 9 also confirm this effect. More material and time investments are associated primarily with more prosocial behavior, meanwhile, more children books and telling stories to children could also help children reduce behavioral difficulties.

Based on this, we explore whether the above investments can be affected by preschool quality in Table 10. First of all, we find that preschool quality has little effect on numbers of children book and storytelling behaviors, so the total difficulty score dimension would not be affected by this transmission channel. Moreover, we also find some possible alternative impacts. For instance, more expensive schools may have more intramural interest classes, thus would reduce the need for caregivers to enroll their children in classes outside of school. Similarly, teachers with professional degree may be better at caring children, in this case this variable is associated with less caresses of family members. However, our data is not powerful enough to detect this important problem.

Despite the above problems, we find that both the hardware and software school infrastructure, whether hardware or software have a significant impact on material (the number of extracurricular classes, the number of toys) and time input (the caresses from family members, playing games). To sum up, we can conclude that the quality of preschool facilities can influence the prosocial behavior of children by influencing parenting involvement of their caregivers, although caregivers are not

necessarily aware of which quality dimension plays a role. Our result has two implications. First, we should not ignore the influence of reaction of caregivers in the discussion of preschool effect (Araujo et al, 2016). Second, the improvement of the process quality of schools may be more difficult than the improvement of the structural quality, but if this improvement can be made up in the long run, the impact of high-quality preschool on children development may be greater.

Conclusions and discussions

In this article, we explore the influence of preschool quality on children's non-cognitive development. Our findings are as follows. First, both subjective and objective preschool quality have a positive and significant impact on non-cognitive abilities. Among the objective quality indicators, preschool facilities and years of schooling of teachers play a major role. In addition, children in public preschools generally perform better than those in private preschools. Second, children differing in genders and family backgrounds are affected by different dimensions of preschool quality, and children with higher SES benefit more from high-quality preschool. Third, preschool quality affects prosocial behavior of children mainly through the influence of material and time input of caregivers, while home-school connection and teacher parenting pattern do not play the mediating role.

We conclude by considering some possible policy implications. First of all, our results show that efforts should be made to improve the quality of facilities and teachers in preschool education, especially in private preschools. In fact, the quality of preschool facilities in rural China is still at a relatively low level. Only by improving the quality of facilities can we create better conditions for the improvement of process quality. At the same time, improving the quality of teacher education and training will make some traditional indicators of teacher quality more explanatory. Finally, unlike the poor quality of public education in most countries, public preschools in China tend to be of higher quality because of more privileges. Based on this, the government needs to pay more attention to the improvement of private preschool quality.

Our results on the heterogeneity analysis suggest that the efforts of improving preschool quality should be targeted at specific subgroups and appropriate to their actual situation. For example, if the goal of the policy is to improve non-cognitive abilities of girls, then more investment in facilities may not be effective because it affects boys mainly. Similarly, if government aims to improve the situation of children without parental care, the quality of teachers is particularly important. At the same time, disadvantaged families require more policy attention to alleviate the inequality in the impact of preschool education.

Finally, our results suggest that preschool process quality in rural China requires more government input and stricter supervision. More attention should be paid to the process indicators such as home-school connection and teacher-student interaction, although they are not so easy to measure and check. Meanwhile, in order to improve the process quality such as teacher-student interaction, the government also needs to do more in the promotion of preschool education experience and the cross-regional exchange of excellent teachers.

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Table 1 Summary Statistics

Variable	Definition	Observations	Mean	Std.Dev.	Min	Max
Dependent variables						
Score of prosocial behavior	Score of prosocial behavior	1242	6.79	2.2	1	10
Abnormal prosocial behavior score	=1 if score of prosocial behavior ≤4	1242	0.16	0.36	0	1
Score of total difficulties	Score of total difficulties	1242	12.41	4.71	1	28
Abnormal total difficulties score	=1 if score of total difficulties ≥17	1242	0.21	0.41	0	1
Score of Emotional Symptoms	Score of Emotional Symptoms	1242	3.1	2.01	0	10
Abnormal Emotional Symptoms	=1 if score of emotional symptoms ≥5	1242	0.24	0.43	0	1
Score of Conduct Problem	Score of Conduct Problem	1242	1.81	1.55	0	8
Abnormal Conduct Problem	=1 if score of conduct problem ≥4	1242	0.15	0.35	0	1
Score of Hyperactivity	Score of Hyperactivity	1242	4.96	2.19	0	10
Abnormal Hyperactivity Problem	=1 if score of hyperactivity ≥7	1242	0.13	0.34	0	1
Score of Peer Problem	Score of Peer Problem	1242	2.54	1.8	0	9
Abnormal Peer Problem	=1 if score of peer problem ≥4	1242	0.06	0.24	0	1
Independent variables						
Preschool quality:						
Subjective preschool quality	Caregivers' rating of the quality of preschool (0-10)	1242	9.24	1.03	2	10
(School level) Objective preschool quality:						
Preschool infrastructure index	Index of school infrastructure constructed using first principal component of 11 kinds of basic hardware facilities[2]	26	-0.05	1.08	-1.85	2.4
Preschool bus	=1 if preschool provided school bus service	26	0.54	0.51	0	1
Preschool fee	School fee per semester (1,000 yuan)	26	1.68	0.33	1	2.47
Public preschool	=1 if preschool is public	26	0.19	0.4	0	1
(Class level) Teacher quality:						
Years of teaching experience	Teacher's working time in this industry (year)	99	5.83	5.74	0.02	31
Years of schooling of teacher	Teacher's schooling (year)	99	11.97	2.36	6	16
Teacher majored in preschool education	=1 if teacher majored in preschool education	99	0.52	0.5	0	1
Ten-student-teacher ratio	Ten-Ten-student-teacher ratio	99	1.54	5.95	0.35	2.90
Preschooler characteristics:						
Boy	=1 if preschooler is a boy	1242	0.52	0.5	0	1
Ethnic Minority	=1 if preschooler is ethnic minority	1242	0.89	0.31	0	1
Age	Preschooler 's age (month)	1242	55.52	11.99	23.03	81.53
Duration at preschool	Duration of child at preschool (semester)	1242	2.83	2.21	0	9
Preterm birth	=1 if gestational weeks <37 weeks	1242	0.16	0.37	0	1

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[2] These facilities include: reading room, professional running track, green belt, fire facilities, air conditioning, Internet, Video, TV, computer, dining hall, Montessori teaching equipment.

Continued Table:

Family characteristics:

Household asset index	Index of household durable assets. Constructed using first principal component of 10 kinds of consumer goods[3]	1242	0	1	-2.14	2.63
Father's age	Father's age (year)	1242	32.46	5.64	22	56
Mother's age	Mother's age (year)	1242	29.63	4.83	19	50
Years of schooling of father	Father's schooling (year)	1242	8.19	2.75	0	17
Years of schooling of mother	Mother's schooling (year)	1242	8.19	2.72	0	19
Mediating variable						
Number of activities attended by parents	The total number of activities attended by parents in preschool last year[4]	26	6.54	3.61	2	14
A committee where parents involved in school decision-making	=1 if the preschool has a parent committee and the parent committee is involved in school decision-making	26	0.54	0.51	0	1
Overall Authoritative Parenting Style score of teachers	Overall authoritative parenting style score of teachers	99	4.06	0.44	2.33	4.93
Overall Authoritarian Parenting Style score of teachers	Overall authoritarian parenting style score of teachers	99	1.3	0.26	1	2.5
Number of extra-curricular classes (>0)	The number of extra-curricular classes that caregivers enroll their children in	29	1.03	0.19	1	2
Number of children's books (>0)	Number of children's books in the family	605	12.14	16.09	1	150
Number of children's toys (>0)	Number of children's toys in the family	1129	43.43	65.60	1	550
Number of caresses by family members (>0)	How many times did the family members caress the child yesterday	879	3.81	3.32	1	30
Tell stories to children	Did the caregivers tell stories to children yesterday	1242	0.11	0.31	0	1
Play games with children	Did the caregivers play games with children yesterday	1242	0.22	0.41	0	1
Sing children's songs with children	Did the caregivers sing children's songs with children yesterday	1242	0.42	0.49	0	1

Notes: statistics are from authors' survey in 2018.

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[3] These goods include: motorbike, electrical bicycle, car, van, refrigerator, air conditioning, computer, laundry machine, water heater, and flush toilet.

[4] These activities include: parent-teacher meetings, parent schools, preschool open days, parent activities related to child nutrition and health, parent-child activities, and other types of preschool activities involving parents.

Table 2 The Effect of Subjective Preschool Quality on Non-Cognitive Abilities

	(1) Score of prosocial behavior	(2) Abnormal prosocial behavior score (Logit)	(3) Score of total difficulties	(4) Abnormal total difficulties score (Logit)
Subjective Preschool Quality	0.174***	-0.001	-0.389***	-0.020*
	(3.06)	(-0.10)	(-3.24)	(-1.87)
Boy	-0.529***	0.062***	0.431*	0.010
	(-4.48)	(3.02)	(1.76)	(0.46)
Ethnic Minority	0.208	0.003	0.018	-0.017
	(1.11)	(0.10)	(0.04)	(-0.48)
Age	0.007	-0.002	-0.048***	-0.001
	(0.73)	(-1.44)	(-2.72)	(-0.75)
Duration at preschool	0.125***	-0.011	-0.104	-0.016*
	(3.08)	(-1.59)	(-1.14)	(-1.92)
Preterm birth	-0.174	0.002	0.615	0.019
	(-1.00)	(0.07)	(1.61)	(0.61)
Household asset index	-0.099	0.008	-0.079	0.006
	(-1.29)	(0.67)	(-0.53)	(0.47)
Father's age	-0.016	0.000	-0.012	-0.001
	(-0.94)	(0.03)	(-0.32)	(-0.29)
Mother's age	0.031	-0.003	-0.050	-0.003
	(1.55)	(-0.82)	(-1.27)	(-0.74)
Years of schooling of father	0.073***	-0.009**	-0.139**	-0.019***
	(2.72)	(-2.07)	(-2.43)	(-3.49)
Years of schooling of mother	-0.007	0.002	-0.025	-0.003
	(-0.27)	(0.49)	(-0.47)	(-0.67)
Constant	3.473***		22.320***	
	(3.82)		(12.77)	
County fixed effect	Yes	Yes	Yes	Yes
Observations	1242	1242	1242	1242
R-squared/Pseudo R-squared	0.051	0.036	0.050	0.037

Notes: In column (1), (3) the estimation method is OLS. In column (2), (4) the estimation method is Logit, from which marginal effects are reported. All regressions control county fixed effects. Robust standard errors in parentheses clustered by class level.
∗∗∗ Significant at the 1% level.
∗∗ Significant at the 5% level.
∗ Significant at the 10% level.

Table 3 The Effect of Objective Preschool Quality on Non-Cognitive Abilities

	(1) Score of prosocial behavior	(2) Abnormal prosocial behavior score (Logit)	(3) Score of total difficulties	(4) Abnormal total difficulties score (Logit)
Preschool infrastructure index	0.205**	-0.014	-0.392**	-0.017
	(2.01)	(-0.89)	(-2.50)	(-1.39)
Preschool bus	0.212	-0.005	-0.757**	-0.034
	(1.28)	(-0.17)	(-2.60)	(-1.36)
Preschool fee	-0.226	0.005	0.501	-0.038
	(-0.76)	(0.10)	(1.30)	(-1.04)
Public preschool	0.261	-0.039	-0.998***	-0.110***
	(1.07)	(-0.93)	(-3.10)	(-3.46)
Years of teaching experience	-0.002	0.000	-0.015	-0.002
	(-0.21)	(0.20)	(-1.10)	(-1.63)
Years of schooling of teacher	0.035	-0.004	-0.226***	-0.011*
	(1.05)	(-0.76)	(-3.10)	(-1.92)
Teacher majored in preschool education	0.093	-0.012	0.184	0.024
	(0.65)	(-0.50)	(0.77)	(1.07)
Ten-student-teacher ratio	-0.032	0.006	0.014	0.002
	(-0.26)	(0.30)	(0.07)	(0.14)
Boy	-0.525***	0.062***	0.414*	0.008
	(-4.38)	(3.03)	(1.74)	(0.37)
Ethnic Minority	0.181	0.007	-0.075	-0.015
	(0.89)	(0.23)	(-0.19)	(-0.45)
Age	0.007	-0.002	-0.045**	-0.000
	(0.71)	(-1.30)	(-2.44)	(-0.24)
Duration at preschool	0.123***	-0.012	-0.091	-0.017*
	(2.86)	(-1.60)	(-0.94)	(-1.89)
Preterm birth	-0.170	0.003	0.556	0.014
	(-0.94)	(0.09)	(1.54)	(0.48)
Household asset index	-0.082	0.006	-0.105	0.004
	(-1.00)	(0.43)	(-0.69)	(0.29)
Father's age	-0.013	0.000	-0.017	-0.001
	(-0.78)	(0.05)	(-0.49)	(-0.42)
Mother's age	0.030	-0.003	-0.043	-0.002
	(1.49)	(-0.78)	(-1.13)	(-0.54)
Years of schooling of father	0.070***	-0.009**	-0.130**	-0.019***
	(2.65)	(-2.02)	(-2.25)	(-3.43)
Years of schooling of mother	-0.011	0.003	-0.003	-0.002
	(-0.41)	(0.57)	(-0.06)	(-0.39)
Constant	4.987***		20.580***	
	(4.76)		(11.15)	
p-value	0.261	0.857	0.000	0.000
County fixed effect	Yes	Yes	Yes	Yes
Observations	1242	1242	1242	1242
R-squared/Pseudo R-squared	0.048	0.040	0.059	0.049

Notes: In column (1), (3) the estimation method is OLS. In column (2), (4) the estimation method is Logit, from which marginal effects are reported. All regressions control county fixed effects. Robust standard errors in parentheses clustered by class level.

∗∗∗ Significant at the 1% level.

∗∗ Significant at the 5% level.

∗ Significant at the 10% level.

Table 4 The Effect of Preschool Quality by Gender

	Score of prosocial behavior		Abnormal prosocial behavior score (Logit)		Score of total difficulties		Abnormal total difficulties score (Logit)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Male	Female	Male	Female	Male	Female	Male	Female
Panel A: Effect of subjective quality								
Subjective Preschool Quality	0.134	0.220***	-0.010	-0.023	-0.316*	-0.439**	-0.145	-0.111
	(1.39)	(2.98)	(-0.09)	(-0.18)	(-1.91)	(-2.59)	(-1.60)	(-1.06)
County fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	641	601	641	601	641	601	641	601
R-squared/Pseudo R-squared	0.045	0.060	0.028	0.043	0.053	0.081	0.041	0.039
Panel B: Effect of objective quality								
Preschool infrastructure index	0.232*	0.157	-0.110	-0.082	-0.604***	-0.150	-0.260**	0.081
	(1.69)	(1.45)	(-0.76)	(-0.53)	(-3.25)	(-0.61)	(-2.11)	(0.67)
Preschool bus	0.298	0.139	-0.154	0.109	-1.060***	-0.643	-0.288	-0.206
	(1.25)	(0.66)	(-0.54)	(0.33)	(-2.71)	(-1.39)	(-1.44)	(-0.81)
Preschool fee	-0.455	0.064	0.174	-0.250	1.079**	-0.258	0.145	-0.743**
	(-1.18)	(0.19)	(0.40)	(-0.43)	(2.08)	(-0.43)	(0.42)	(-2.30)
Public preschool	0.283	0.289	-0.169	-0.522	-0.978**	-1.155**	-0.596**	-0.887***
	(1.01)	(0.90)	(-0.50)	(-1.00)	(-2.42)	(-2.21)	(-2.26)	(-2.77)
Years of teaching experience	-0.005	0.000	0.013	-0.019	0.001	-0.028	0.000	-0.035**
	(-0.34)	(0.00)	(0.72)	(-0.75)	(0.03)	(-1.46)	(0.01)	(-2.53)
Years of schooling of teacher	0.079*	-0.014	-0.106*	0.072	-0.149	-0.295***	-0.053	-0.090
	(1.67)	(-0.29)	(-1.81)	(1.17)	(-1.57)	(-2.80)	(-1.10)	(-1.64)
Teacher majored in preschool education	0.048	0.170	-0.110	-0.084	0.313	0.063	0.142	0.166
	(0.25)	(0.86)	(-0.44)	(-0.33)	(0.95)	(0.17)	(0.68)	(0.71)
Ten-student-teacher ratio	0.112	0.187	-0.157	-0.182	-0.150	-0.631	-0.059	-0.142
	(0.69)	(1.04)	(-0.69)	(-0.60)	(-0.66)	(-1.45)	(-0.40)	(-0.74)
County fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	641	601	641	601	641	601	641	601
R-squared/Pseudo R-squared	0.058	0.056	0.042	0.053	0.071	0.099	0.053	0.059

Notes: In column (1)-(2) and (5)-(6) the estimation method is OLS. In column (3)-(4) and (7)-(8) the estimation method is Logit, from which marginal effects are reported. All regressions control county fixed effects. Robust standard errors in parentheses clustered by class level. Controls include boy, ethnic Minority, age, duration at preschool, preterm birth, household asset index, father's age, mother's age, years of schooling of father, years of schooling of mother.

∗∗∗ Significant at the 1% level.

∗∗ Significant at the 5% level.

∗ Significant at the 10% level.

Table 5 The Effect of Preschool Quality by Out-work

	Score of prosocial behavior		Abnormal prosocial behavior score (Logit)		Score of total difficulties		Abnormal total difficulties score (Logit)	
	Out	Local	Out	Local	Out	Local	Out	Local
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Effect of subjective quality								
Subjective Preschool Quality	0.191**	0.155*	-0.022	0.009	-0.546***	-0.154	-0.176**	-0.060
	(2.35)	(1.78)	(-0.21)	(0.07)	(-4.00)	(-0.69)	(-2.33)	(-0.52)
County fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	706	536	706	536	706	536	706	536
R-squared/Pseudo R-squared	0.067	0.069	0.037	0.057	0.070	0.060	0.045	0.039
Panel B: Effect of objective quality								
Preschool infrastructure index	0.132	0.267*	0.063	-0.376**	-0.464**	-0.298	-0.084	-0.155
	(1.20)	(1.68)	(0.44)	(-2.51)	(-2.50)	(-0.82)	(-0.79)	(-1.02)
Preschool bus	0.007	0.434**	0.086	-0.196	-0.442	-1.191**	-0.015	-0.474*
	(0.03)	(2.23)	(0.31)	(-0.70)	(-1.05)	(-2.40)	(-0.07)	(-1.78)
Preschool fee	-0.489	0.016	0.270	-0.327	-0.050	1.241	-0.792**	0.291
	(-1.56)	(0.04)	(0.64)	(-0.57)	(-0.09)	(1.49)	(-2.01)	(0.71)
Public preschool	0.026	0.469	0.156	-1.109**	-1.341***	-0.475	-0.981***	-0.368
	(0.10)	(1.46)	(0.45)	(-2.14)	(-2.81)	(-0.67)	(-3.84)	(-0.99)
Years of teaching experience	-0.004	-0.004	0.002	0.014	0.006	-0.040	-0.010	-0.027
	(-0.42)	(-0.33)	(0.14)	(0.69)	(0.22)	(-1.46)	(-0.78)	(-1.57)
Years of schooling of teacher	0.088*	-0.026	-0.105*	0.078	-0.208**	-0.241**	-0.021	-0.136**
	(1.98)	(-0.65)	(-1.95)	(1.46)	(-2.03)	(-2.06)	(-0.44)	(-2.00)
Teacher majored in preschool education	0.053	0.107	-0.199	0.183	-0.293	0.594	-0.179	0.541*
	(0.30)	(0.50)	(-0.95)	(0.67)	(-0.92)	(1.24)	(-1.03)	(1.88)
Ten-student-teacher ratio	-0.088	0.044	0.024	0.123	0.432	-0.593*	0.292**	-0.516**
	(-0.52)	(0.27)	(0.14)	(0.56)	(1.34)	(-1.78)	(1.96)	(-2.37)
County fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	706	536	706	536	706	536	706	536
R-squared/Pseudo R-squared	0.072	0.083	0.049	0.085	0.088	0.092	0.067	0.078

Notes: In column (1)-(2) and (5)-(6) the estimation method is OLS. In column (3)-(4) and (7)-(8) the estimation method is Logit, from which marginal effects are reported. All regressions control county fixed effects. Robust standard errors in parentheses clustered by class level. Controls include boy, ethnic Minority, age, duration at preschool, preterm birth, household asset index, father's age, mother's age, years of schooling of father, years of schooling of mother.

∗∗∗ Significant at the 1% level.

∗∗ Significant at the 5% level.

∗ Significant at the 10% level.

Table 6 The Effect of Preschool Quality by HH-SES

	(1) Score of prosocial behavior	(2) Abnormal prosocial behavior score (Logit)	(3) Score of total difficulties	(4) Abnormal total difficulties score (Logit)
Panel A: Effect of subjective quality				
Household asset index*Subjective Preschool Quality	-0.024	0.000	-0.031	-0.038
	(-0.44)	(0.00)	(-0.22)	(-0.54)
Household asset index	0.123	0.065	0.204	0.393
	(0.25)	(0.09)	(0.16)	(0.60)
Subjective Preschool Quality	0.173***	-0.008	-0.390***	-0.131*
	(3.01)	(-0.10)	(-3.27)	(-1.89)
County fixed effect	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	1,242	1,242	1,242	1,242
R-squared/Pseudo R-squared	0.061	0.036	0.059	0.038
Panel B: Effect of objective quality				
Household asset index* Preschool infrastructure index	-0.030	0.002	-0.093	0.028
	(-0.49)	(0.03)	(-0.52)	(0.29)
Household asset index*Preschool bus	0.051	-0.271	-0.035	0.077
	(0.38)	(-1.46)	(-0.12)	(0.45)
Household asset index*Preschool fee	0.439**	-0.080	-0.455	-0.482*
	(2.07)	(-0.26)	(-0.93)	(-1.74)
Household asset index* Public preschool	0.067	-0.252	0.128	0.047
	(0.38)	(-0.94)	(0.36)	(0.17)
Household asset index*Years of teaching experience	0.012*	0.004	-0.026**	-0.016**
	(1.98)	(0.31)	(-2.09)	(-1.96)
Household asset index*Years of schooling of teacher	0.011	0.050	-0.008	-0.023
	(0.35)	(1.16)	(-0.14)	(-0.63)
Household asset index*Teacher majored in preschool education	-0.000	-0.414**	0.419	0.196
	(-0.00)	(-2.22)	(1.43)	(1.29)
Household asset index*Ten-student-teacher ratio	0.011	0.048	-0.002	-0.016
	(0.33)	(1.08)	(-0.04)	(-0.47)
Household asset index	-1.591***	0.229	0.518	1.117
	(-2.95)	(0.27)	(0.38)	(1.47)
Preschool infrastructure index	0.186*	-0.107	-0.384**	-0.095
	(1.75)	(-0.91)	(-2.40)	(-1.14)
Preschool bus	0.266	-0.075	-0.775**	-0.226
	(1.59)	(-0.34)	(-2.60)	(-1.33)
Preschool fee	-0.166	0.031	0.393	-0.324
	(-0.51)	(0.07)	(0.97)	(-1.35)
Public preschool	0.290	-0.345	-0.933***	-0.664***
	(1.15)	(-1.05)	(-2.82)	(-3.21)
Years of teaching experience	-0.002	0.003	-0.016	-0.018*
	(-0.18)	(0.17)	(-1.25)	(-1.76)

Continued Table:

	(1)	(2)	(3)	(4)
Years of schooling of teacher	0.033	-0.037	-0.229***	-0.068*
	(0.92)	(-0.80)	(-3.07)	(-1.81)
Teacher majored in preschool education	0.072	-0.080	0.216	0.185
	(0.48)	(-0.43)	(0.90)	(1.24)
Ten-student-teacher ratio	0.130	-0.132	-0.395	-0.093
	(0.88)	(-0.68)	(-1.47)	(-0.85)
County fixed effect	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	1,242	1,242	1,242	1,242
R-squared/Pseudo R-squared	0.073	0.049	0.078	0.053

Notes: In column (1), (3) the estimation method is OLS. In column (2), (4) the estimation method is Logit, from which marginal effects are reported. All regressions control county fixed effects. Robust standard errors in parentheses clustered by class level. Controls include boy, ethnic Minority, age, duration at preschool, preterm birth, household asset index, father's age, mother's age, years of schooling of father, years of schooling of mother.

∗∗∗ Significant at the 1% level.

∗∗ Significant at the 5% level.

∗ Significant at the 10% level.

Table 7 The Effect of Preschool Process Quality on Non-Cognitive Abilities

	(1) Score of prosocial behavior	(2) Abnormal prosocial behavior score (Logit)	(3) Score of total difficulties	(4) Abnormal total difficulties score (Logit)
Number of activities attended by parents	0.014	-0.003	0.002	-0.001
	(0.46)	(-0.57)	(0.04)	(-0.19)
A committee where parents involved in school decision-making (logit)	-0.301*	0.022	0.397	-0.012
	(-1.80)	(0.77)	(1.42)	(-0.51)
Overall Authoritative Parenting Style score of teachers	0.248	-0.033	-0.490	-0.051**
	(1.44)	(-1.43)	(-1.57)	(-2.19)
Overall Authoritarian Parenting Style score of teachers	-0.076	0.075	-0.580	-0.017
	(-0.23)	(1.45)	(-0.93)	(-0.37)
County fixed effect	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	1242	1242	1242	1242
R-squared/Pseudo R-squared	0.048	0.041	0.045	0.038

Notes: In column (1), (3) the estimation method is OLS. In column (2), (4) the estimation method is Logit, from which marginal effects are reported. All regressions control county fixed effects. Robust standard errors in parentheses clustered by class level. Controls include boy, ethnic Minority, age, duration at preschool, preterm birth, household asset index, father's age, mother's age, years of schooling of father, years of schooling of mother.

∗∗∗ Significant at the 1% level.
∗∗ Significant at the 5% level.
∗ Significant at the 10% level.

Table 8 The Effect of Preschool Structural Quality on Preschool Process Quality

	(1)	(2)	(3)	(4)
	School level		Class level	
	Number of activities attended by parents	A committee where parents involved in school decision-making (logit)	Overall Authoritative Parenting Style score of teachers	Overall Authoritarian Parenting Style score of teachers
Panel A: Effect of subjective quality				
Subjective Preschool Quality	0.157	0.031*	0.002	-0.004
	(1.21)	(1.77)	(0.08)	(-0.36)
County fixed effect	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	1242	1242	1242	1242
R-squared/Pseudo R-squared	0.291	0.045	0.032	0.035
Panel B: Effect of objective quality				
Preschool infrastructure index	1.170***	0.014	-0.108**	-0.011
	(4.39)	(0.42)	(-2.01)	(-0.36)
Preschool bus	-0.218	-0.163*	-0.049	0.037
	(-0.30)	(-1.85)	(-0.55)	(0.75)
Preschool fee	-3.008***	0.907***	0.279*	-0.045
	(-2.80)	(7.80)	(1.85)	(-0.60)
Public preschool	-1.771**	0.003	0.060	-0.044
	(-2.26)	(0.03)	(0.45)	(-0.60)
Years of teaching experience	0.068	0.013**	0.007	0.001
	(1.34)	(2.56)	(1.57)	(0.18)
Years of schooling of teacher	-0.135	-0.010	0.034	0.025***
	(-1.33)	(-0.62)	(1.35)	(2.76)
Teacher majored in preschool education	0.009	-0.076	-0.060	0.009
	(0.01)	(-0.94)	(-0.64)	(0.18)
Ten-student-teacher ratio	-1.134**	-0.139**	0.097	0.056
	(-2.22)	(-2.11)	(1.42)	(1.31)
County fixed effect	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	1242	1242	1242	1242
R-squared/Pseudo R-squared	0.449	0.409	0.101	0.101

Notes: In column (1), (3), (4) the estimation method is OLS. In column (2) the estimation method is Logit, from which marginal effects are reported. All regressions control county fixed effects. Robust standard errors in parentheses clustered by class level. Controls include boy, ethnic Minority, age, duration at preschool, preterm birth, household asset index, father's age, mother's age, years of schooling of father, years of schooling of mother.
∗∗∗ Significant at the 1% level.
∗∗ Significant at the 5% level.
∗ Significant at the 10% level.

Table 9 The Effect of Caregivers' Involvement in Parenting on Non-Cognitive Abilities

	(1)	(2)	(3)	(4)
	Score of prosocial behavior	Abnormal prosocial behavior score (Logit)	Score of total difficulties	Abnormal total difficulties score (Logit)
Number of extra-curricular classes	0.659**	-0.146	-0.287	-0.066
	(2.29)	(-1.20)	(-0.37)	(-0.72)
Number of children's books	0.012**	-0.003**	-0.026**	-0.001
	(2.59)	(-2.31)	(-2.27)	(-1.10)
Number of children's toys	0.003***	-0.001**	0.001	-0.000
	(3.22)	(-2.17)	(0.39)	(-0.25)
Number of caresses by family members	0.056***	-0.007	0.012	-0.001
	(3.03)	(-1.63)	(0.35)	(-0.42)
Tell stories to children	0.179	-0.023	-0.759*	-0.106**
	(0.87)	(-0.55)	(-1.70)	(-1.97)
Play games with children	0.378**	-0.016	-0.374	-0.003
	(2.45)	(-0.67)	(-1.02)	(-0.10)
Sing children's songs with children	0.074	-0.028	-0.013	0.005
	(0.55)	(-1.26)	(-0.05)	(0.21)
County fixed effect	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	1242	1242	1242	1242
R-squared/Pseudo R-squared	0.076	0.063	0.048	0.042

Notes: In column (1), (3) the estimation method is OLS. In column (2), (4) the estimation method is Logit, from which marginal effects are reported. All regressions control county fixed effects. Robust standard errors in parentheses clustered by class level. Controls include boy, ethnic Minority, age, duration at preschool, preterm birth, household asset index, father's age, mother's age, years of schooling of father, years of schooling of mother.

∗∗∗ Significant at the 1% level.
∗∗ Significant at the 5% level.
∗ Significant at the 10% level.

Table 10 The Effect of Preschool Quality on Caregivers' Involvement in Parenting

	(1) Number of extra-curricular classes	(2) Number of children's books	(3) Number of children's toys	(4) Number of caresses by family members	(5) Tell stories to children (logit)	(6) Play games with children (logit)	(7) Sing children's songs with children (logit)
Panel A: Effect of subjective quality							
Subjective Preschool Quality	0.002	0.011	-2.168	0.115	0.013	0.015	0.021
	(0.57)	(0.04)	(-1.06)	(1.40)	(1.51)	(1.20)	(1.44)
County fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1242	1242	1242	1242	1242	1242	1242
R-squared/Pseudo R-squared	0.024	0.073	0.091	0.068	0.024	0.063	0.026
Panel B: Effect of objective quality							
Preschool infrastructure index	0.020***	0.467	6.988***	0.244**	0.010	-0.005	-0.011
	(2.97)	(0.83)	(3.05)	(2.59)	(0.93)	(-0.41)	(-0.62)
Preschool bus	0.027**	-0.256	13.439***	0.268	-0.007	0.058*	-0.082**
	(2.10)	(-0.30)	(3.33)	(1.16)	(-0.31)	(1.82)	(-2.33)
Preschool fee	-0.028*	0.488	1.431	-0.235	0.004	0.045	0.118**
	(-1.73)	(0.35)	(0.22)	(-0.62)	(0.12)	(1.11)	(2.20)
Public preschool	-0.011	-0.756	4.647	-0.063	0.006	0.049	-0.008
	(-0.83)	(-0.59)	(0.93)	(-0.21)	(0.21)	(1.40)	(-0.17)
Years of teaching experience	0.002	0.022	0.277	0.003	0.001	0.000	0.000
	(1.51)	(0.43)	(1.08)	(0.27)	(1.15)	(0.01)	(0.05)
Years of schooling of teacher	0.000	0.123	0.969	-0.019	-0.005	0.004	-0.005
	(0.06)	(0.83)	(1.09)	(-0.41)	(-1.25)	(0.71)	(-0.54)
Teacher majored in preschool education	-0.011	0.415	-0.499	-0.325*	-0.016	-0.031	-0.047
	(-1.00)	(0.51)	(-0.13)	(-1.74)	(-0.90)	(-1.08)	(-1.41)
Ten-student-teacher ratio	-0.001	0.665	-4.513	0.010	0.025	-0.023	0.057**
	(-0.10)	(1.00)	(-1.24)	(0.06)	(1.51)	(-1.11)	(2.22)
County fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1242	1242	1242	1242	1242	1242	1242
R-squared/Pseudo R-squared	0.036	0.072	0.102	0.067	0.031	0.067	0.033

Notes: In column (1)-(3) the estimation method is OLS. In column (4)-(7) the estimation method is Logit, from which marginal effects are reported. All regressions control county fixed effects. Robust standard errors in parentheses clustered by class level. Controls include boy, ethnic Minority, age, duration at preschool, preterm birth, household asset index, father's age, mother's age, years of schooling of father, years of schooling of mother.

∗∗∗ Significant at the 1% level.
∗∗ Significant at the 5% level.
∗ Significant at the 10% level.

Appendix Table 1 Correlation Coefficient Matrix

	Preschool infrastructure index	Preschool bus	Preschool fee	Public preschool	Years of teaching experience	Years of schooling of teacher	Teacher majored in preschool education	Ten-student-teacher ratio
Preschool infrastructure index	1							
Preschool bus	-0.242	1						
Preschool fee	-0.039	-0.528	1					
Public preschool	0.561	0.091	-0.330	1				
Years of teaching experience	-0.031	-0.161	0.156	-0.183	1			
Years of schooling of teacher	0.140	-0.210	0.215	0.019	-0.154	1		
Teacher majored in preschool education	0.153	0.034	-0.169	0.213	0.194	0.228	1	
Ten-student-teacher ratio	-0.122	0.185	0.056	-0.178	0.063	-0.079	-0.034	1

Appendix Table 2 The Effect of Preschool Quality on Sub-Dimensions of Score of Total Difficulties

	(1) Score of Emotional Symptoms	(2) Abnormal Emotional Symptoms (Logit)	(3) Score of Conduct Problem	(4) Abnormal Conduct Problem (Logit)	(5) Score of Hyperactivity	(6) Abnormal Hyperactivity Problem (Logit)	(7) Score of Peer Problem	(8) Abnormal Peer Problem (Logit)
Panel A: Effect of subjective quality								
Subjective Preschool Quality	-0.061	-0.011	-0.109***	-0.011	-0.114*	-0.009	-0.105*	-0.009
	(-1.03)	(-1.02)	(-2.83)	(-1.14)	(-1.97)	(-1.04)	(-1.96)	(-1.22)
County fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1242	1242	1242	1242	1242	1242	1242	1242
R-squared/Pseudo R-squared	0.048	0.034	0.026	0.026	0.024	0.019	0.019	0.063
Panel B: Effect of objective quality								
Preschool infrastructure index	0.059	0.006	-0.110**	-0.015	-0.240***	-0.017	-0.102	-0.005
	(0.69)	(0.31)	(-2.16)	(-1.28)	(-3.60)	(-1.20)	(-1.50)	(-0.45)
Preschool bus	-0.196	-0.049*	-0.155	-0.021	-0.383***	-0.028	-0.026	0.008
	(-1.18)	(-1.74)	(-1.29)	(-0.95)	(-2.69)	(-1.11)	(-0.20)	(0.45)
Preschool fee	-0.042	0.015	0.020	-0.023	0.652***	0.034	-0.128	-0.009
	(-0.17)	(0.33)	(0.16)	(-0.87)	(3.44)	(1.09)	(-0.68)	(-0.28)
Public preschool	-0.338*	-0.044	-0.127	-0.077***	-0.066	0.005	-0.468***	-0.067***
	(-1.86)	(-1.08)	(-1.06)	(-2.75)	(-0.36)	(0.15)	(-2.87)	(-2.75)
Years of teaching experience	-0.003	0.001	-0.007*	-0.000	-0.004	0.000	-0.000	0.002**
	(-0.34)	(0.66)	(-1.79)	(-0.01)	(-0.69)	(0.23)	(-0.05)	(2.56)
Years of schooling of teacher	-0.078**	-0.016**	-0.071***	-0.009**	-0.049	-0.008*	-0.028	0.002
	(-2.51)	(-2.49)	(-3.02)	(-2.18)	(-1.47)	(-1.70)	(-1.08)	(0.65)
Teacher majored in preschool education	-0.189	-0.008	0.333***	0.062***	0.101	0.036*	-0.059	-0.019
	(-1.51)	(-0.34)	(3.53)	(3.04)	(0.82)	(1.85)	(-0.49)	(-1.11)
Ten-student-teacher ratio	-0.145	-0.032*	-0.070	-0.023	0.157	0.018	0.075	0.002
	(-1.48)	(-1.71)	(-1.05)	(-1.52)	(1.45)	(1.34)	(0.69)	(1.39)
County fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1242	1242	1242	1242	1242	1242	1242	1242
R-squared/Pseudo R-squared	0.058	0.046	0.036	0.046	0.029	0.027	0.024	0.085

Notes: In column (1), (3), (5), (7) the estimation method is OLS. In column (2), (4), (6), (8) the estimation method is Logit, from which marginal effects are reported. All regressions control county fixed effects. Robust standard errors in parentheses clustered by class level. Controls include boy, ethnic Minority, age, duration at preschool, preterm birth, household asset index, father's age, mother's age, years of schooling of father, years of schooling of mother.

*** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level.

Appendix Table 3 Estimates of Samples Have Not Turned for Quality

	(1) Score of prosocial behavior	(2) Abnormal prosocial behavior score (Logit)	(3) Score of total difficulties	(4) Abnormal total difficulties score (Logit)
Panel A: Effect of subjective quality				
Subjective Preschool Quality	0.178***	-0.004	-0.396***	-0.022**
	(3.06)	(-0.40)	(-3.23)	(-1.98)
County fixed effect	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	1194	1194	1194	1194
R-squared/Pseudo R-squared	0.048	0.034	0.026	0.026
Panel B: Effect of objective quality				
Preschool infrastructure index	0.188*	-0.010	-0.322*	-0.016
	(1.81)	(-0.62)	(-1.90)	(-1.28)
Preschool bus	0.169	0.005	-0.621**	-0.032
	(0.97)	(0.16)	(-1.99)	(-1.27)
Preschool fee	-0.193	-0.003	0.502	-0.037
	(-0.68)	(-0.05)	(1.22)	(-1.05)
Public preschool	0.248	-0.034	-0.924***	-0.106***
	(1.03)	(-0.84)	(-2.69)	(-3.23)
Years of teaching experience	-0.004	0.000	-0.018	-0.003*
	(-0.51)	(0.20)	(-1.34)	(-1.88)
Years of schooling of teacher	0.037	-0.005	-0.247***	-0.012**
	(1.08)	(-0.82)	(-3.27)	(-2.11)
Teacher majored in preschool education	0.109	-0.010	0.260	0.033
	(0.77)	(-0.40)	(0.99)	(1.43)
Ten-student-teacher ratio	-0.054	0.011	0.050	0.010
	(-0.47)	(0.59)	(0.23)	(0.64)
County fixed effect	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	1194	1194	1194	1194
R-squared/Pseudo R-squared	0.052	0.045	0.059	0.049

Notes: In column (1), (3) the estimation method is OLS. In column (2), (4) the estimation method is Logit, from which marginal effects are reported. All regressions control county fixed effects. Robust standard errors in parentheses clustered by class level. Controls include boy, ethnic Minority, age, duration at preschool, preterm birth, household asset index, father's age, mother's age, years of schooling of father, years of schooling of mother.

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

Appendix Table 4 Estimates of Samples Controlling the Economic Development of Towns

	(1)	(2)	(3)	(4)
	Score of prosocial behavior	Abnormal prosocial behavior score (Logit)	Score of total difficulties	Abnormal total difficulties score (Logit)
Panel A: Effect of subjective quality				
Subjective Preschool Quality	0.175***	-0.001	-0.390***	-0.020*
	(3.08)	(-0.10)	(-3.26)	(-1.86)
County fixed effect	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	1242	1242	1242	1242
R-squared/Pseudo R-squared	0.051	0.036	0.049	0.038
Panel B: Effect of objective quality				
Preschool infrastructure index	0.211*	-0.014	-0.405**	-0.020
	(1.92)	(-0.92)	(-2.25)	(-1.45)
Preschool bus	0.195	-0.003	-0.718**	-0.025
	(0.98)	(-0.09)	(-2.15)	(-0.89)
Preschool fee	-0.251	0.008	0.560	-0.023
	(-0.76)	(0.15)	(1.21)	(-0.53)
Public preschool	0.249	-0.037	-0.970***	-0.103***
	(1.01)	(-0.84)	(-3.00)	(-3.10)
Years of teaching experience	-0.002	0.000	-0.014	-0.002
	(-0.24)	(0.21)	(-1.00)	(-1.46)
Years of schooling of teacher	0.036	-0.004	-0.226***	-0.011*
	(1.06)	(-0.76)	(-3.09)	(-1.93)
Teacher majored in preschool education	0.100	-0.013	0.168	0.020
	(0.68)	(-0.53)	(0.72)	(0.89)
Ten-student-teacher ratio	-0.027	0.006	0.002	-0.000
	(-0.22)	(0.26)	(0.01)	(-0.03)
County fixed effect	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	1242	1242	1242	1242
R-squared/Pseudo R-squared	0.048	0.040	0.058	0.049

Notes: In column (1), (3) the estimation method is OLS. In column (2), (4) the estimation method is Logit, from which marginal effects are reported. All regressions control county fixed effects. Robust standard errors in parentheses clustered by class level. Controls include boy, ethnic Minority, age, duration at preschool, preterm birth, household asset index, father's age, mother's age, years of schooling of father, years of schooling of mother.

∗∗∗ Significant at the 1% level.
∗∗ Significant at the 5% level.
∗ Significant at the 10% level.