Early education policy in China: Reducing regional and socioeconomic disparities in preschool attendance

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Abstract

In China, enhancing preschool attendance has been an education policy priority since 2010. This study describes trends in preschool attendance and examines the associations among family socioeconomic status, geographic region of residence, and preschool attendance, from 2010 to 2016. This was done by examining parent-reported data on 9,271 three- to six-year-olds from the China Family Panel Studies (CFPS, waves 2010, 2012, 2014, and 2016) nationwide survey. Analyses indicated that preschool attendance rates for three- to six-year-olds increased from 59.34% to 66.33%, and that increases were larger for rural areas and for the less developed Western region (15.27% and 12.71%, respectively). There were also decreases in both regional disparities and gaps in attendance rates between children of more educated mothers and those whose mothers were less educated. Logistic estimates indicated that children who were younger, of mothers with relatively lower educational levels, from lower-income families, and from less economically developed areas were still less likely than other children to attend preschools after the policy. The use of grandparental childcare and parental expectations for children's education were also associated with preschool attendance. Implications of the findings for early education policy are discussed.

Keywords: preschool attendance, educational policy, socioeconomic disparity, regional disparity, China

Introduction

A large body of literature from different countries has shown the positive effects of preschool experiences on children's early development and subsequent academic outcomes (Berlinski, Galiani, & Manacorda, 2008; Brilli, Del Boca, & Pronzato, 2016; Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002; Rao, Sun, Pearson, et al., 2012; Rao, Sun, Zhou, & Zhang, 2012; Reynolds, Temple, Robertson, & Mann, 2001). The Abecedarian Project in the United States, which used a randomized design, has provided convincing evidence that high-quality preschool experience is related to higher scores on cognitive and academic tests up to the age of 21 and associated with better adult health (Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001; Campbell et al., 2014). Children from families with lower socioeconomic status (SES) – usually referring to lower levels of income or wealth, education, and occupation (Mueller & Parcel, 1981) – typically experience less-stimulating home environments and other risk factors that reduce their developmental potential (Bradley & Corwyn, 2002). Ensuring that disadvantaged children attend preschools is important, since it is known that high-quality preschool education compensates for their less stimulating home environments and other negative influences of growing up in less advantaged backgrounds (Barnett, 1998; Dumas & Lefranc, 2010; Magnuson, Ruhm, & Waldfogel, 2007). In this study, we examined SES-based and regional disparities in preschool attendance in China, focusing on a period in which the country saw increased government intervention and investment in preschool education.

In China, preschool education services for 3- to 6-year-olds are provided mainly by two types of programs – kindergarten (You Er Yuan) and pre-primary classes (Xue Qian Ban). Kindergarten is the predominant form, usually stand-alone, and provides three years of education services for 3- to 6-year-olds in age-segregated classes, before they enter primary schools. In some rural areas where stand-alone kindergartens are not available or are

insufficient to meet demand, children attend pre-primary classes in primary schools. Pre-primary classes are one-year programs that offer 5- to 6-/7-year-olds subject-based education to prepare them for school (Feng, 2017). The pre-primary classes are similar to kindergarten classes in elementary schools in the United States or reception classes in primary schools in the United Kingdom. Preschools, either publicly funded or privately run, form the network of preschool education services under the supervision of the Ministry of Education of the People's Republic of China (MOE).

Since 2010, the Chinese government has given priority to early childhood development and introduced several national policies to enhance preschool attendance. These policies and strategic plans, accompanied by expanded public funding, have primarily attempted to resolve problems of low preschool availability and affordability that have long confronted families with young children (State Council, 2010a). Another important government concern – equity – has been mainly pursued by giving priority to rural areas and less economically developed provinces, where preschool attendance rates are generally lower than the national average (Pang, 2009; State Council, 2010a; Zhang & Liu, 2017). To reduce the SES-based disparity in preschool attendance (Gong, Xu, & Han, 2015), governments have also provided subsidies for children from lower-income families. Based on government documents (MOE, 2012a, 2012b, 2019a, 2019b), between 2010 and 2018, the gross enrollment rate (GER) in preschool education for 3- to 6-year-olds increased from 57% to 82%, with enrollment growing from 30 million to 46 million children. Despite this preschool expansion, there remains a lack of knowledge about SES-based and regional gaps in preschool attendance since the policies have been issued.

This study utilizes data from the China Family Panel Studies (CFPS) to describe trends in preschool attendance and to examine the associations among family SES, geographic region, and preschool attendance. In addition to describing changes in preschool

attendance, we were interested in how family SES and geographic region of residence were associated with preschool attendance and whether these associations changed from 2010 to 2016. Our analyses focused on a period soon after the preschool education policies were enacted. Thus, they may provide a broader view of the influences of national policies and have implications for future policies that aim at enhancing preschool attendance and promoting educational equity in China. We expect that evidence generated from a country that operates one of the world's largest preschool education systems will provide insights for other countries or regions that are expanding their preschool provisions.

Preschool attendance in the global context

In recent decades, governments around the world have developed or amended policies to enhance preschool attendance (Yoshikawa & Kabay, 2015), resulting in global GER in preschool education increasing from 32% in 2000 to 52% in 2018 (UNESCO, 2019). At the same time, however, considerable SES-related disparities in preschool attendance have persisted. For example, in Laos, 67% of children from the richest 20% of families were reported to participate in preschool education, compared to only 10% of children from the poorest 20% of families (UNESCO, 2016). Focusing on four central Asian countries (Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan), Habibov (2012) found that having a mother with higher education increased the odds of attending a preschool by from 52% to 62%, whereas one unit of increase in the wealth index increased the likelihood of preschool attendance by from 32% to 60%. Notably, the association between family income and preschool attendance is not necessarily linear; while children from families with the highest level of income are most likely to attend preschools, those from low-income families may be more likely to attend preschools than those from middle-income families when government interventions target the former (Bassok, Fitzpatrick, & Loeb, 2011). Geographic region of residence also matters. In Central Asia, there was a lower supply of preschools in rural areas

and a significant rural-urban gap in preschool attendance (Habibov, 2012). In developed countries like Australia, children living in the most disadvantaged areas (inhabited by more non-English speaking and indigenous families) were found to be half as likely to attend preschools than those living in the most advantaged areas (O'Connor et al., 2016).

Universal or targeted public policies have been used widely to enhance preschool attendance (Bertram et al., 2016), often involving strategies such as building new preschools (Berlinski & Galiani, 2007), providing free education (Cascio & Schanzenbach, 2013), and creating universal access to programs (Dumas & Lefranc, 2010). Although one would expect enrollment to increase after government intervention, the relation is more complex. The positive influences of government effort are evident in some contexts. In Uruguay, there was a 76% increase in the number of enrolled children after nine years of universalizing preschool education for 4- and 5-year-olds (Berlinski et al., 2008). In the United States, expanded public funding of preschool education for children from low-income families was found related to an increased possibility that children from families in the bottom- and middle-third income samples would attend preschools (Greenberg, 2010). However, SES-based and regional disparities in preschool attendance are not always mitigated after such policies are implemented. Temple (2009) found that preschool attendance rate for children residing in rural areas in the United States remained lower than that of non-rural children, despite increases in government funding over several years. In Australia, although preschool attendance for indigenous children increased significantly after a targeted approach was implemented (Hewitt & Walter, 2014), their attendance rate remained below the national average rate (O'Connor et al., 2016). Government provision of universal access does not guarantee increased preschool attendance, as a myriad of factors also influence parents' decision to send children to preschools (O'Connor et al., 2016).

Child gender matters in educational opportunities in some cultures because of son preference. In China, school-aged girls were found to have fewer educational opportunities than boys, because of traditional values privileging sons and perceived greater financial returns to families (Wang, 2005). Nevertheless, a recent study found a higher likelihood of attending preschools for girls than for boys (Gong et al., 2015). The availability of caregivers (e.g., parents, grandparents, older siblings) may reduce the demand for preschool education (Delprato, Dunne, & Zeitlyn, 2016; Giddings, Meurs, & Temesgen, 2007), especially in families with lower incomes and those with intergenerational connections (Del Boca, Piazzalunga, & Pronzato, 2014). Parents with lower levels of education and income tended to hold lower expectations for preschool education (Kildan, 2013), which might also reduce their use of preschool education.

Early education policy and preschool attendance in China

Aside from the shortage of preschools, getting a spot in a preschool that is affordable and conveniently located is a major problem for parents with young children, in part due to the non-compulsory nature of preschool education and the decentralized system of financing preschool education (Wu, Young, & Cai, 2012). County governments in rural areas and district governments in urban cities are responsible for the administration and funding of preschool education (Wu et al., 2012; Zhang & Liu, 2017). Local governments in China's less economically developed Western and Central regions, where residents are also typically less educated and earn lower incomes, invest less in preschool education than those in the more developed Eastern regions. Within provinces, public funding is often provided to urban preschools (Wu et al., 2012). Before the reform in 2010, the rates were about 100% in such Eastern provinces as Zhejiang and Shanghai, but lower than the national average in Western regions (Zhang & Liu, 2017). Regarding the rural-urban gap, 55.6% of urban children were estimated to participate in preschool education, while the corresponding figure was 35.6% for

rural children (Pang, 2009). Furthermore, survey data from some provinces reveal that children from families with lower levels of income and parental education are significantly less likely to attend preschools than their more advantaged counterparts (Gong et al., 2015). Children from lower-SES families and those living in under-resourced areas, if they have any opportunities at all, attend lower-quality preschools and have lower levels of developmental outcomes than their more advantaged peers (Li et al., 2016, 2019).

The Chinese government has increasingly recognized the importance of preschool education in child development and to the nation's goal of building strong human resources through the modernization of education. In 2010, the issuance of the *Outline of China's National Plan for Medium and Long-term Education Reform and Development 2010-2020* (hereafter *Outline*) marked a watershed moment of preschool education in China (State Council, 2010a). As a part of this blueprint for modernizing education, preschool education started to receive national government intervention (Feng, 2017; Zhou, 2011), in the form of concrete goals for universalizing the provision of preschool education. The government's goal was to ensure that 95% of 5- to 6-year-olds, 80% of 4- to 6-year-olds, and 70% of 3- to 6-year-olds enroll in preschool education by 2020. The *Outline* also highlighted the government's role in facilitating preschool education. Another fundamental concern was equity, which was typically pursued by prioritizing rural areas, the Central and Western regions, and under-privileged groups.

The State Council then formulated an implementation framework, *Suggestions on the Current Development of Preschool Education* (hereafter *Suggestions*; State Council, 2010b), to increase preschool availability by all means, including building new public preschools, increasing financial support for low-cost private preschools, and expanding existing preschools. The *Suggestions* also specified governments' roles in planning, investing, regulating, and legitimating preschool education. To address the problem of inadequate and

uneven distribution of public funding, the national government pledged to financially support the Central and Western regions and some rural Eastern areas to build preschool facilities. In recognition of SES-based disparities, preschool subsidies would be provided for children from lower-income families and those left behind by parents working away from their home villages (also known as "left-behind" children). Other measures were concerned with workforce size, teacher qualification and competence, preschool qualifications and program evaluations, preschool safety, regulation of tuition fees, curriculum and pedagogy, multi-sectoral collaboration in facilitating preschool education, and implementation monitoring.

The *Outline* and the *Suggestions* articulated the guiding principles for the post-2010 policies concerned with preschool education and were accompanied by expanded public funding, a decreased rural-urban gap in public spending, and increased subsidies for children from families with lower incomes (Liu, 2019; State Council, 2019). As an example, from 2009 to 2017, public funding for preschool education increased from US$3.5 billion to US$47.8 billion, and preschool subsidies for needy children from US$0.4 billion to US$3.4 billion (MOE & National Bureau of Statistics of the People's Republic of China [NBS], 2010, 2018). In line with policy priorities, most public funds provided by the national government were used for preschool facilities and teacher training in under-resourced areas (MOF, 2014).

Administrative data demonstrate a relation between preschool education policy and GERs in preschool education. As Figure 1 shows, during the late 1990s and early 2000s, due to a reduction in public funding for preschool education, there were concomitant declines in the numbers of preschools and enrolled preschoolers. From 2010 onwards, the number of preschools first decreased and then increased in rural areas; however, in urban areas and towns, the numbers grew consistently. The decrease in rural preschools may be attributed to transition issues associated with the adoption of a new policy. Before the policy was

implemented, preschool education in rural areas was typically provided in pre-primary classes that were co-located in primary schools and served a relatively small number of children. When the government began to construct stand-alone kindergartens, the number of pre-primary classes in primary schools decreased. Therefore, the closure of pre-primary classes, which were replaced gradually by kindergartens, led to an initial decrease in the number of rural preschools. Between 2010 and 2018, there was a 77% increase in the overall number of preschools and a 66% increase in the number of enrolled children (MOE, 2012b, 2019b). The number of enrolled preschoolers in the Western and Central regions increased by 76% and 65%, respectively, while the corresponding figure was 36% in the Eastern region (State Council, 2019). The Eastern region had a higher percentage of children enrolled in 2010; hence the increase was not as dramatic.

The present study

While administrative data have shown an increase in GER, it is unclear whether an increase in preschool attendance occurred for children from different SES groups or living in different parts of the country and whether SES-based and regional disparities in preschool attendance existed. The objectives of this study are to describe trends in preschool attendance and examine the associations among family SES, geographic region, and preschool attendance. Our analysis focuses on the following questions: (a) Are children of recent cohorts more likely to attend preschools than the 2010 cohort of children, regardless of family SES and geographic region of residence?; (b) Are family SES and locality of residence associated with preschool attendance, and did the association decrease after 2010?; and, (c) Are other child- and family-related demographic factors (i.e., child age, child gender, child's left-behind status, use of grandparental childcare) associated with preschool attendance? We anticipated that children born after the policy would be more likely to attend preschools than their older counterparts, after adjusting for family SES, geographic region,

and other child- and family-related factors. We expected to see significant but decreased associations among urbanicity, family SES, and preschool attendance. We also expected that child-related (e.g., age, gender, left-behind status) and family-related factors (e.g., parents' expectations for children's education and grandparental childcare) were associated with preschool attendance.

Method

Data

The CFPS is a biennial nationwide survey designed to collect health, education, employment, and social life information indicative of the social and economic transformation in contemporary China (Xie & Hu, 2014). The baseline survey, conducted in 2010, covered approximately 16,000 households from 25 provinces (or equivalent municipalities and autonomous regions) (Xie & Hu, 2014).[1] The same survey sample (i.e. the same households and family members) is followed every two years. In follow-up surveys, new members (e.g., newborn babies) in these households and new families constructed by members within these households (e.g., new families resulting from marriages) are also included. Half of the surveyed households are from Guangdong, Shanghai, Liaoning, Henan, and Gansu, while the rest are from the other 20 participating provinces. The CFPS sample was determined by multistage probability proportional to size sampling, with implicit stratification (Xie & Hu, 2014). The sampling was done in three stages: (i) selection of administrative districts (in urban areas) and counties (in rural areas) within a province (or equivalent municipality and autonomous region); (ii) sampling of neighborhood communities within selected administrative districts in cities and administrative villages in counties; and, (iii) sampling of households from the selected communities and villages (Xie & Hu, 2014). To account for

[1] In the CFPS, a household is defined as an economically independent dwelling unit with at least one family member who has citizenship of mainland China (Xie & Hu, 2014).

economic variations across China and maximize sample representativeness, the CFPS additionally uses local gross domestic product (GDP) and the proportion of rural population as implicit stratification variables to select administrative units within provinces. The distribution of urbanicity, age, gender, and adults' education levels of the 2010 wave sample was similar to the pattern generated from the 2010 national population census (Xie & Hu, 2014).

Trained interviewers conducted face-to-face interviews during home visits, using a computer-assisted personal interviewing system (Xie & Hu, 2014). Telephone and web-based interviews were used when target interviewees were not available for face-to-face interviews. For each selected household, the interviewers solicited responses from adults and children aged 10 and above to collect personal information (e.g., educational background), and interviewed the head of the household to collect family-related information (e.g., household income). Responses to questions about children aged below 10 were provided by parents or primary caregivers. For children under 6 years, the CFPS collected information on basic demographics (e.g., age, gender, health status), parental care (e.g., the use of grandparent's care, presence of parents at home), and schooling (e.g., preschool attendance), which facilitated the analyses of the factors correlated with preschool attendance.

Sample

At the time of writing, the CFPS had completed the 2010 baseline survey and three rounds of follow-up surveys (in 2012, 2014, and 2016). Our sample was 3- to 6-year-olds (n = 9,740) from these four surveys. The official enrollment cut-off age for primary education is 6 years, and 444 6-year-olds reported as attending primary schools were excluded from the analysis. We then removed data from children who were from provinces not included in the CFPS, resulting in a final sample of 9271 children (2297 from the 2010 wave, 2209 from the 2012 wave, 2258 from the 2014 wave, and 2507 from the 2016 wave) nested in 351 counties

within 25 provinces. Some children who were between 3 and 6 years of age in more than one wave were surveyed twice (9.42% of those surveyed in 2010 and 2012, 10.54% in 2012 and 2014, and 9.97% in 2014 and 2016). Some families (n = 1,139) were asked questions about preschool attendance multiple times, as they had 3- to 6-year-olds over the four waves. The final sample included more boys (53.14%) than girls, more rural children (63.96%) than urban children, and a smaller proportion of 6-year-olds (20.60%) than 3-, 4-, and 5- year-olds. The numbers of children from provinces in Eastern, Central, and Western China were similar. The urbanicity, age, and gender distributions for our sample in the 2010 wave were similar to those for the 3- to 6-year-olds from the 2010 national population census (NBS, 2010). For the other three waves, there were no national census data to allow such a comparison.

Table 1 presents the demographic characteristics of the overall sample and subgroups. On average, the maximum formal education achievement of fathers was 8.32 years and that of mothers was 7.59 years. The average family income was CNY51,073 (US$7,930). There were increases in parental education and family income from 2010 to 2016. T-tests indicated that the urban sample had significantly higher levels of parent education and family income than the rural sample ($p < 0.001$). Of the three regions, the Eastern region had the lowest proportion of rural children and highest levels of parental education and family income, while the Western region had the highest proportion of rural children and lowest levels of parent education and family income. Chi-square tests indicated that, compared to the rural sample, the urban sample included significantly fewer children who were looked after by grandparents, fewer children whose fathers or mothers worked outside their hometowns, and more parents who expected their children to obtain a bachelor's degree in the future (ps < 0.001). Similarly, the Eastern sample included fewer children who were looked after by their grandparents ($p < 0.05$), fewer fathers and mothers who worked outside their hometowns ($p <$

0.001), and more parents who expected their children to obtain a bachelor's degree ($p <$ 0.001) than did the Central and Western samples.

Measures

Responses to the CFPS questionnaires were used to gauge preschool attendance, family SES, geographic region of residence, and several covariates (e.g., child age, child gender, child's left-behind status, parental expectation for children's education, use of grandparental childcare). The questions derived from CFPS are described below.

Preschool attendance. Preschool attendance was the outcome variable and was scored to reflect whether a child attended any type of preschool program. The questions used for preschool attendance differed slightly across the four waves. In the 2010 survey, the question to parents was, "*Is the child studying in a kindergarten?*" Responses were scored as 1 (Attends a preschool) or 0 (Not attending any preschool). In later waves, two separate questions sought to obtain information on the children's preschool attendance: (a) *Is the child studying in a school/kindergarten/nursery care center?* and (b) *What level of school is the child in?* Children were considered attendees if the answer were "yes" for question (a) and "kindergarten/pre-primary class" for question (b).

Family SES. Family SES was indicated by maternal education and family income. Information about paternal education was also obtained, but we did not use it in the analyses because its correlation with maternal education ($r = 0.60$) might have caused collinearity (Dormann et al., 2013). Maternal education was measured as years of formal education, which ranged from zero (no education experience) to 22 years (doctoral degree). For the 2016 wave, family income was based on annual family income; for the earlier three waves, it was based on the adjusted annual family income, which also considered the value of agricultural products. Wave-specific log incomes were created and used in the analyses.

Geographic region of residence. Geographic region of residence was indicated by urbanicity (i.e., whether children lived in rural or urban areas) and the region of China (Eastern, Central, or Western) in which the province was located. China's Central and Western regions are less developed and have a larger proportion of the population living at or below the national poverty line (NBS, 2019).[2] These two, especially the Western region, are the main recipients of the preschool funding from the national government.

Time point of survey. The time point of the survey was used as an indicator of policy environment. The variable *Wave* was dummy coded, with Wave 2010 serving as the reference group. We included the interactions between maternal education, family income, urbanicity, and wave dummy variables to determine whether family SES and urbanicity were related to preschool attendance differently across the waves.

Covariates. We included child, parent, and family characteristics that might have influenced preschool attendance as covariates. In addition to child age and gender, we included left-behind status, which has been found to predict children's opportunities for schooling (Lu, 2012). Left-behind status was denoted by whether the children's fathers and/or mothers worked outside their hometowns. In the 2010 survey, the CFPS asked whether a child's father/mother was present at home and the reason(s) for any absences. Data from parents who reported being "away from home for work" were recoded as "working outside hometown." In later surveys, the CFPS asked for how many months the surveyed children had lived with their parents in the previous year; if parents reported that their children had lived with their fathers/mothers for one month per year or less, responses were recorded as "father and/or mother working outside hometown." We also took into account the use of grandparental childcare and parents' education expectations for their children, which may have influenced their decision to send their children to preschool (Delprato et al., 2016).

[2] In the year 2018, the rural poverty line in China was CNY 2,952 (US$ 446) per person.

The use of grandparental childcare was determined by whether a child was looked after by his or her grandparents during the day. Parental expectations for their children's education attainment were coded as a binary variable and denoted whether parents expected their children to obtain a bachelor's degree in the future.

Analytic strategies

All four waves of data were combined into one dataset and the record for each child in a wave was counted as a single observation. We undertook the following analytic steps. First, multiple imputations were conducted to account for missing data in the independent variables in Stata 15. Those respondents who had missing values on one or more variables accounted for 8.3% of the sample; the proportion of missing values ranged from 2.58% for "mother works outside hometown" to 7% for maternal education. Parental education and family income tended to be missing for children living in urban areas and those who did not participate in preschool education. Little's chi-square test indicated that the data were missing not completely at random (Little, 1988); therefore, we ran multiple imputation with chained equation (MICE), with urbanicity, preschool attendance, and all other variables of interest being included in the imputation models to reduce the bias of substantive analyses (Sterne et al., 2009; White, Royston, & Wood, 2011). The MICE procedure also accounted for data clustering. The results of the analyses with the imputed data were similar to those with the original data.

Second, we described the trends in preschool attendance by providing the descriptive information on attendance rates for the overall sample and the subgroups. Third, a series of three-level hierarchical logistic models were constructed to test the associations among wave dummy variables, family SES indicators, urbanicity, and preschool attendance, after adjusting for the covariates (Model 1). Ideally, the data would be treated with a four-level hierarchical model, which is helpful to demonstrate how preschool attendance and the effects

of the measured explanatory variables vary across families, counties, and provinces. However, the results of the four-level unconditional model indicated that the variance attributed to family level was relatively small; therefore, we treated the data with a three-level random intercept model, with the nesting structure referring to children nested within counties and then within provinces. We then added the interaction terms in addition to the variables in Model 1, to see whether maternal education, family income, and urbanicity were associated differently with preschool attendance across the four waves (Model 2). Given the regional differences in family income and maternal education, as a robust check, we replicated Model 2 for each region, considering only the clustering structure of children within counties.

Finally, we adopted a household fixed-effects model to account for potential bias caused by unobservable family characteristics that might influence preschool attendance. For example, decisions about whether to send children to preschool may be influenced by parents' perceptions of preschool quality or by mothers' employment status. As noted earlier, over 1,000 families were surveyed twice or more across the four waves. The survey records of those families were either for the same children surveyed twice (e.g., children who were aged 3 in 2010 and aged 5 in 2012) or for siblings within the same household. Given that a child was likely to be in preschool if he or she had been reported attending a preschool in a previous wave, our analysis focused on the latter cases (634 families). To be specific, the household fixed-effects model focused on the 3- to 6-year-olds surveyed in 2010 and their younger siblings, surveyed between 2012 and 2016. In this way, the fixed-effects model also enabled us to compare a child's preschool attendance before policy implementation to his or her younger sibling's attendance after the policy was enacted.

Results

Descriptive information on preschool attendance rates

Table 2 presents preschool attendance rates for the overall sample and subgroups. The overall rate increased from 59.34% in 2010 to 69% in 2014, although it dropped slightly to 66.33% in 2016. Based on the population of preschool-aged children in the country, it is estimated that the number of 3- to 6-year-old enrolled preschoolers in 2016 was at least seven million more than that in 2010. Figure 2 shows the trends in preschool attendance rates from the CFPS, based on parent reports, and the GER, published by MOE and based on school reporting. The two data resources yielded similar results; that is, preschool attendance rates for 3- to 6-year-olds increased from 2010 to 2014; however, for 2016, CFPS data indicated a lower preschool attendance rate than that reported by MOE.

As shown in Table 2, preschool attendance rates for rural areas and the Western region recorded larger increases (15.27% and 12.71%, respectively) than the 6.99% increase reported for the overall sample. The rural-urban gap in preschool attendance rate decreased from 27.6% in 2010 to 5.42% in 2016. However, attendance rates in rural areas and the Western region were still lower than the overall rate after 2010. Four-, five-, and six-year-olds had higher attendance rates and showed larger increases in those rates than did 3-year-olds, reflecting the government's emphasis on older children's preschool attendance in the current policy phase.

We compared 4- to 6-year-olds' preschool attendance by geographic region of residence and maternal education. From 2010 to 2016, there was a larger increase (23.14%) in the rate for rural Western children than for urban Eastern children (see Figure 3a). Similarly, the increase in attendance rate for children of mothers with primary education or less (17.21%) was larger than that for those of mothers with tertiary education (see Figure 3b). Figure 3 also demonstrates narrowing attendance gaps between rural Western and urban

Eastern China (36.36% in 2010 and 19.66% in 2016) and between children of more-educated and less educated mothers (30.76% in 2010 and 8.88% in 2016).

Family SES, urbanicity, and preschool attendance

The first column of Table 3 presents the logistic estimates of the associations among maternal education, family income, urbanicity, wave dummy variables, and preschool attendance for the overall sample, adjusting for a rich set of covariates. After adding the interaction terms in Model 2 (see Column 2), the associations among the SES indicators, urbanicity, dummy variables, and preschool attendance detected in Model 1 (see Column 1) remained, but the magnitudes of the coefficients were slightly larger. Estimates in Model 2 provide evidence of the statistically significant association between the survey time point and preschool attendance. Children who were surveyed in recent waves had a higher likelihood of attending preschools than those surveyed in 2010 (Wave 2012, OR = 2.89; Wave 2014, OR = 2.86; Wave 2016, OR = 2.69; *ps* < 0.001). Regardless of survey time point, preschool attendees were more likely to be living in urban areas (OR = 3.86), having mothers with relatively higher education levels (OR = 1.11), and coming from families with higher levels of incomes (OR = 1.20) than non-attendees. There were negative and significant associations between the wave dummy variables and urbanicity (e.g., Wave 2016 × Urban, B = -1.33, p < 0.001), indicating a weaker relation between urbanicity and preschool attendance over time. The association between maternal education and preschool attendance also decreased in 2014 and 2016, as indicated by the negative coefficients of Wave 2014 × maternal education (B = -0.05, p = 0.044) and Wave 2016 × maternal education (B = -0.07, p = 0.003). These results suggest that living in urban areas and having more educated mothers between 2012 and 2016 were not as advantageous as they had been in 2010.

Columns 3, 4, and 5 show the results of Model 2 for the Eastern, Central, and Western regions. Similar to the overall sample, in each region, those surveyed after the policy were

more likely to attend preschools than those surveyed in 2010. The positive association between living in urban areas and preschool attendance was also mitigated. The relation between family income and preschool attendance was significant in the Eastern region, but not in the Western and Central regions; maternal education was associated with preschool attendance in the Eastern and Western regions, but not in the Central region. The interaction terms between wave dummy variables and maternal education and family income were not significant within every region wherein children shared more similarities in terms of maternal education and family income.

Four- to six-year-olds were more likely to attend preschools than were 3-year-olds. Child gender and whether the child's father/mother worked outside the hometown were not associated significantly with preschool attendance. The use of grandparental childcare reduced the probability of attending preschool. Grandparents' involvement in childcare is a strong traditional intergenerational tie in China and has been increasingly used in both rural and urban families as a strategy to maximize family well-being by reducing the conflict between paid maternal employment and childcare (Chen, Liu, & Mair, 2011). Further, if parents consider preschool as a babysitting service rather than an environment that facilitates their children's development and learning, they may opt for grandparental childcare over preschool education, since the former is free. For the Central and Western regions, parents' expectations for their children's educational attainment also mattered, in that there was an increased likelihood of preschool attendance by children whose parents expected them to obtain a bachelor's degree in the future. However, this association was not significant for the Eastern region, possibly given that there was less variation in parents' expectations for their children's highest level of formal education.

Household fixed-effects estimates

Table 4 demonstrates the estimates from the household fixed-effects model, which controlled for the potential effects of unobservable household characteristics on preschool attendance. This model assumed that the effects of omitted variables were constant over time; thus, it could not control for the influences of the changes in these unobservable characteristics. However, by comparing siblings, light can be shed on the effect of survey time point, which was time-variant within households. Similar to the estimates from Model 1 for the overall sample, within the same families, children who were surveyed in the post-policy waves were more likely to attend preschools than their older siblings who were surveyed in 2010. Four-, five-, and six-year-olds were more likely to attend preschools than 3-year-olds. Parents seemed to prioritize their older children's going to preschool. They may also have viewed their younger children as "not ready" for preschool institutions and may therefore have chosen to care for them at home.

Discussion

This study used the CFPS data to describe trends in 3- to 6-year-olds' preschool attendance and examine the associations among family SES (indicated by maternal education and family income), geographic region of residence, and preschool attendance, during a period of considerable government attention and investment in preschool education. Our analysis leverages newly available, large-scale, nationwide survey data with multiple demographic characteristics and thus provides a comprehensive examination of factors associated with preschool attendance. Aside from an increase in 3- to 6-year-old children's preschool attendance rates from 2010 to 2016,we observed larger increases in the rates for those of less educated mothers, those from rural areas, and those living in the less economically-developed Western region than for other children. While the associations among urbanicity, maternal education, and preschool attendance decreased, living in rural

areas and having mothers with lower levels of formal education still reduced the likelihood of preschool attendance, after policy implementation. We discuss our findings in relation to previous studies and the Chinese context and state the implications for policies designed to enhance preschool attendance.

We found that cohorts surveyed in 2012, 2014 and 2016 were more likely to attend preschools than were the children surveyed in 2010, after adjusting for a variety of demographic and contextual factors. Among 4- to 6-year-olds, larger increases in attendance rates were observed for those (i) who lived in rural areas; (ii) had mothers who had not studied beyond primary education; and, (iii) were from the Western region, compared to their more advantaged peers. Notably, there were overlaps among the increases in the rates for children from lower-SES families, rural areas, and the Western region because the Western region had a larger rural population and lower average of maternal education. One would expect the Chinese government's efforts in building preschools and increasing preschool affordability, especially the priority accorded to rural areas and the Central and Western regions, to have partially accelerated preschool attendance. Previous research has found that children from lower-SES backgrounds showed a larger increase in enrollment after governments implemented a targeted approach to enhance preschool attendance (Cascio & Schanzenbach, 2013; Greenberg, 2010). For instance, the free public preschool programs in Georgia and Oklahoma in the United States brought a sharp increase in preschool attendance for children of mothers without a high school diploma, but a smaller increase for those of more educated mothers (Cascio & Schanzenbach, 2013). At the same time, we cannot rule out the potential influences of other contextual and educational factors. Between 2010 and 2016, China experienced stable economic growth, due to which local governments might have become more financially capable of supporting preschool education. Increases in average family income, adult education, and women's employment may have boosted

demand for formal childcare and investment in preschool education. The Chinese government's effort at improving preschool quality may have also made parents more willing to send children to preschools, as they may have felt the quality of preschool education was better than in previous years.

Living in urban areas and having a higher level of maternal education were associated with a higher likelihood of preschool attendance, but the strengths of these associations decreased from 2010 to 2016. Again, it is noteworthy that the association between urbanicity and preschool attendance is confounded with the relation between maternal education and preschool attendance. Nevertheless, the advantage of living in urban areas and having more educated mothers to preschool attendance remained. There are many possible reasons for these findings. First, preschool supply in less-resourced areas may have continued to be low, and issues that reduce preschool attendance (e.g., inconvenient public transport, difficulty in teacher recruitment, the low value accorded to preschool education) may have persisted (Yoshikawa & Kabay, 2015). Further, the rural Western areas have a large share of less educated parents and lower-income families (Xie & Zhou, 2014), and families with the lowest income levels tend to be concentrated in agricultural and remote areas, wherein there is an insufficient number of preschools (Shen & Li, 2013). In addition, lower family income may reduce economic investment in children and less educated parents may have not believed that preschool education will bring benefits for their children (Kildan, 2013). Our findings underscore the importance of continued government focus and funding to enhance preschool attendance rates in rural areas and the Western region. The first task to be accomplished might be investigating, identifying, and removing barriers to preschool attendance.

There has been inconsistent evidence regarding the association between family income and preschool attendance, both in China and in other cultural contexts (Bainbridge,

Meyers, Tanaka, & Waldfogel, 2005; Giddings et al., 2007; Gong et al., 2015; Hewitt & Walter, 2014). Prior to policy implementation, a study focusing on nine provinces in Central and Western China detected a positive relation between family income and the likelihood of preschool attendance (Gong et al., 2015). Our results showed a positive association between family income and preschool attendance for the overall sample and the Eastern sample, but not the Central and Western samples. The non-significant association in the Central and Western regions may partly be explained by the relatively small income inequality within these two regions and the government's provision of preschool subsidies to low-income families. Wong, Luo, Zhang, and Rozelle (2013) reported that preschool attendance for children from lower-income families in rural China increased by 35% when families were provided tuition waivers and cash transfers that were conditional upon preschool attendance. The reasons for the significant association between family income and preschool attendance in the Eastern region are complex. The greater variations in family income in the Eastern region may have created a larger SES-based inequality in preschool attendance. This is particularly true when taking into account migrant workers, whose children (migrant children) move to urban areas with their parents, but are not able to access publicly funded urban kindergartens due to China's strictly enforced household registration system (*hukou*). Public kindergartens are usually open only to children with local *hukou* registration, making migrant children ineligible to attend, while private kindergartens often charge tuition fees that are relatively unaffordable for migrant workers. It remains to be seen whether migrant children in urban cities and the Eastern region have a reduced likelihood of preschool attendance. Additional research is also needed to understand better the role that family income plays in preschool attendance in different parts of the country.

Some contextual factors that were related to parent education, family income, and geographic region of residence might also have increased or decreased the use of preschool

education. We found that parents who expected their children to earn a bachelor's degree were more likely to send them to preschools, while the use of grandparental childcare significantly reduced the likelihood of preschool attendance. Parents' decisions about whether to send children to preschool might also be influenced by their analyses of current costs against future benefits (Delprato et al., 2016), as well as social and human capital issues underpinning economic hardship, such as parental aspirations and the value placed on education (Lareau, 2001). Less educated parents have been found to be less appreciative of the value of preschool education (Kildan, 2013). Influenced by Confucianism, Chinese parents place a high value on academic learning and expect preschool education to set the foundation for (high) academic achievement in primary school (Sun & Rao, 2017). However, contemporary Chinese preschools have transformed from traditional whole-group academic instruction to play-based learning (Hu, Fan, Leong, & Li, 2015). While parents from higher-SES groups tend to see the value of the new approaches to early childhood education (Hu, Yang, & Ieong, 2016), parents with relatively low education might not be aware of the advantages of play-based learning, nor see the value of sending their children to preschools to spend most of their time "just playing," rather than engaging in early academic learning. Our findings may have implications for policies designed to promote preschool attendance by children from lower-SES families. The barriers to preschool attendance seem to go beyond financial issues. While preschool subsidies may incentivize parents to send their children to preschool (Wong et al., 2013), other home characteristics, such as the use of grandparental childcare and parent's expectations regarding preschool education, should also be considered (El-Attar, 2007; Küçükturan & Altun, 2017).

Our findings indicate that preschool attendance rates were much lower for 3-year-olds than for older children. This is consistent with global data indicating that 3-year-olds have lower average preschool attendance rates than their older counterparts (UNESCO, 2016), and

that such age difference was especially large in less-resourced areas (UNESCO, 2017). The lower rate for 3-year-olds reflects the government's current prioritizing of the older age group. Moreover, the CFPS data revealed a decrease in preschool attendance rates in 2016, with the largest decrease being found among 3-year-olds. This may be related to the numbers of births in the country. The preschool-aged children in the 2016 wave were born between 2010 and 2013, a period when China experienced a larger increase in birth rates than in the years in which the children surveyed in the 2010, 2012, and 2014 waves were born (NBS, 2018). There were more preschool-aged children in 2016 than in previous years and preschools may have allocated their limited places to 4- to 6-year-olds, as they would be entering primary school sooner. Given the inconsistent evidence regarding the advantages and disadvantages of starting center-based preschool education early (Loeb, Bridges, Bassok, Fuller, & Rumberger, 2007; Zhang & Xin, 2012) and the limited funding available for childcare, other forms of early intervention programs – such as community-based parenting education programs, home-based preschools, and child-to-child approaches – may be used to promote the development of children under 3 years of age (Britto et al., 2017). Moreover, the number of preschool-aged children is expected to grow in the coming years, due to the Chinese government's 2016 decision to eliminate the One-Child Policy to allow couples to have two children.[3] Our findings highlight the importance of continuous government efforts to create preschool places to meet the demands of increasing numbers of children.

This study has revealed trends in preschool attendance and associations among family SES, geographic location of residence, and preschool attendance, at the national level in China. Some limitations of the study should be noted. First, the CFPS was not designed to evaluate preschool education; therefore, there were some constraints when using it to

[3] The One-Child Policy was a population policy aimed at controlling population growth in China by allowing each couple to have only one child. It was enacted in 1978 and ended in 2016.

investigate preschool attendance. The sample size was small relative to the total Chinese population and did not include data from several Western provinces, inhabited mainly by ethnic minority groups; therefore, the data lacked representativeness. Moreover, the cross-sectional analysis did not take into account children whose presences in the analytic sample were more than once across the four waves of data, making the differences seem stronger than they should. The question used to obtain information on preschool attendance in Wave 2010 was different from that in the three later waves. Nevertheless, we assumed that the two questions generated equal responses and were measured equally, which might cause estimation bias. The CFPS data only allowed us to use a binary-coded variable to reflect rural-urban difference in preschool attendance, a distinction that may not be powerful enough to detect inequalities in family income and parent education, which may vary from town to town in rural areas, and from district to district in urban areas. A more precise demarcation of urbanicity (e.g., urban area, suburban, town, county, rural area) may provide more accurate results. When examining differences in preschool attendance, a more comprehensive picture of the factors influencing preschool attendance may emerge if the analysis considers migrant children. Last, the household fixed-effects model, by comparing children's pre-policy preschool attendance to their younger siblings' post-policy attendance, suggests parents might have treated their second child differently, possibly because of the policy; hence, the effect of between-child variation – the child's birth order – warrants further examination.

Second, while our analyses detected that children who were surveyed after the policy were more likely to attend preschools, regardless of family SES and geographic region of residence, we cannot conclude that the changes in preschool attendance were a direct result of the new preschool education policies. Unexamined factors – such as demographic changes, economic growth, and government effort at increasing preschool quality – may have jointly accelerated preschool attendance. Additional research on the relation between policy

implementation (e.g., increases in public funding, preschool subsidy, preschool availability in communities) and preschool attendance would boost our confidence in the findings.

Finally, it should be noted that attending a preschool does not guarantee positive gains for children. High-quality preschool experiences bring benefits, while low-quality preschool education may have little positive effect (Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2011). We could not directly test any quality indicators for the preschools the sampled children attended, because the CFPS did not collect the needed data. Careful and systematic research is needed to understand the quality level of preschools and address which demographic and contextual factors affect children's access to high-quality preschool education.

Conclusions

This study revealed an acceleration in 3- to 6-year-olds' preschool attendance and narrower regional and SES-based gaps in preschool attendance since the Chinese government embarked on national policies to enhance preschool attendance. At the same time, low family SES and living in rural areas were factors consistently associated with lower odds of preschool attendance, and the proportion of 3-year-olds attending preschools remained relatively small. From a public policy perspective, persistent disparities argue for continued national- and local-level government efforts at increasing preschool attendance. Empirical studies should be conducted to examine whether preschool expansion leads to reduced preschool quality and whether the current preschool education system is effective in promoting child development.

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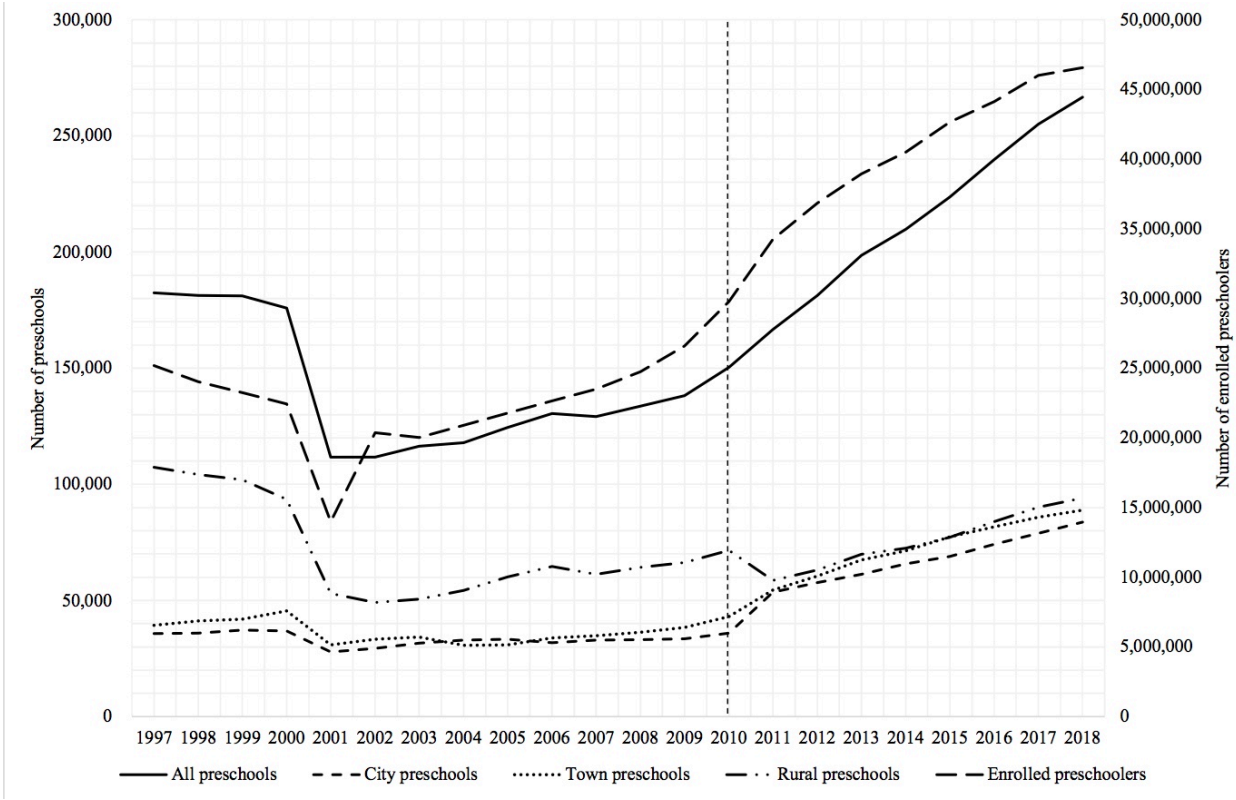


Figure 1. Numbers of preschools and enrolled preschoolers from 1997 to 2018 in China. *Note.* Data were extracted from Educational Statistics Yearbooks of China (1998-2019).

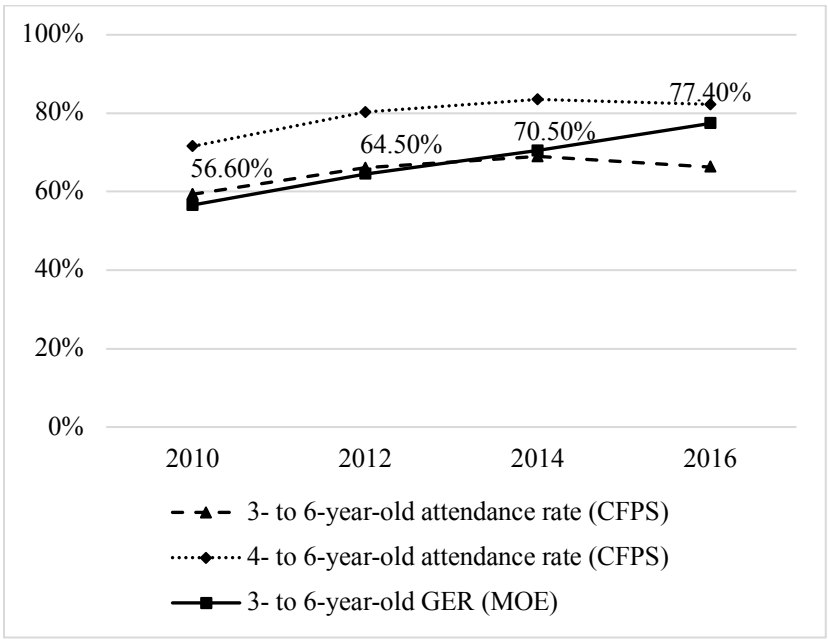
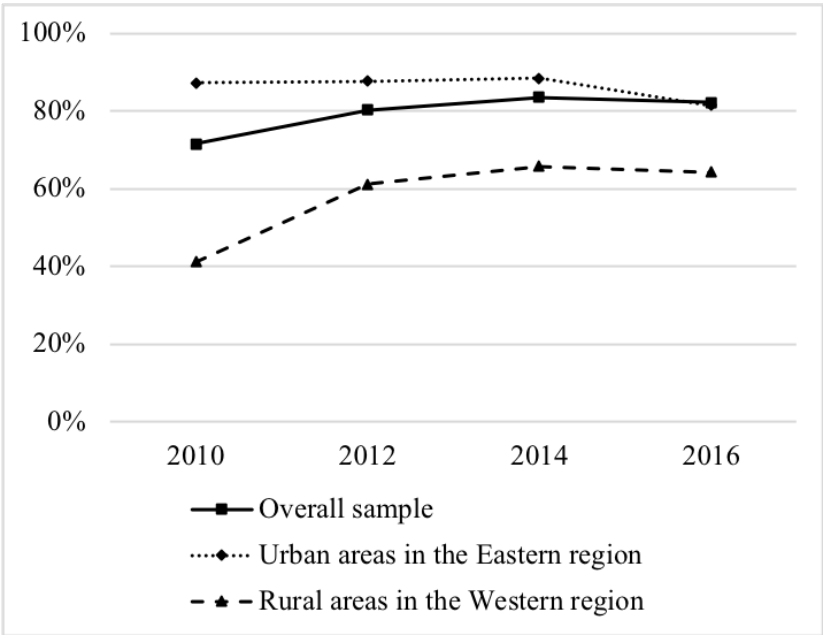
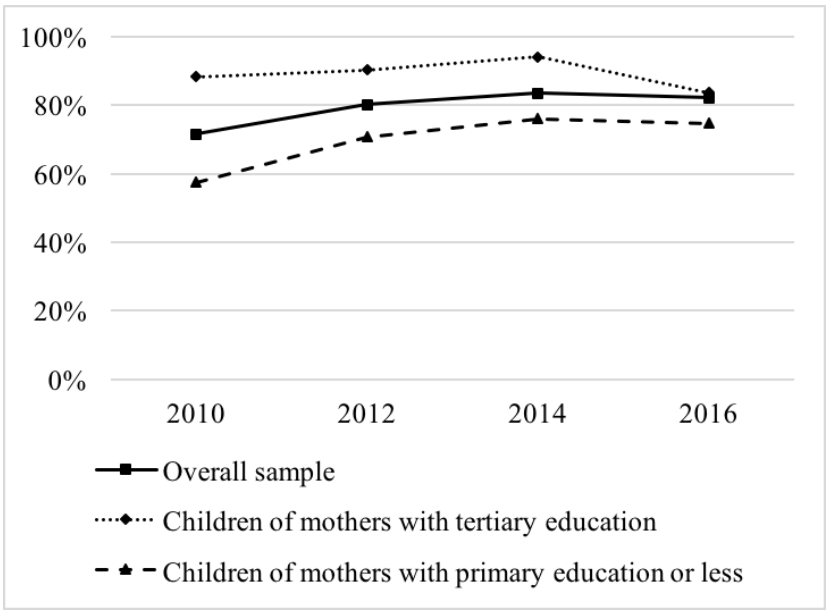


Figure 2. Preschool attendance rates obtained from the CFPS based on parent reports and from MOE based on school reporting. Data labels for MOE figures are provided.



(a)



(b)

Figure 3. Preschool attendance rates for 4- to 6-year-olds during 2010 and 2016 by geographic region of residence (a) and the level of maternal education (b).

Table 1

Sample Demographics

	Overall	Rural	Urban	Eastern region	Central region	Western region
Sample size	9,271	5,930	3,341	3,142	3,157	2,972
Child gender (Male, %)	53.14	53.64	52.26	51.53	55.02	52.86)
Age (M/SD)	4.40 (1.10)	4.40 (1.10)	4.40 (1.09)	4.40 (1.10)	4.38 (1.09)	4.41 (1.10)
Age 3 (%)	27.53	27.61	27.39	27.56	27.84	27.15
Age 4 (%)	25.85	26.09	25.44	25.24	26.51	25.81
Age 5 (%)	26.02	25.33	27.24	26.61	25.75	25.67
Age 6 (%)	20.60	20.98	19.93	20.59	19.89	21.37
Primary caregivers in daytime: Grandparents	36.64	38.72	32.95	34.44	38.17	37.35
Father's education (M/SD)	8.32 (4.07)	7.42 (3.81)	9.96 (4.02)	9.37 (3.79)	8.81 (3.49)	6.70 (4.42)
Mother's education (M/SD)	7.59 (4.41)	6.38 (4.11)	9.72 (4.10)	8.82 (4.09)	8.21 (3.85)	5.64 (4.63)
Household income (M/SD)	51,073.45 (80,825.83)	41,669.48 (52,152.11)	68,801,21 (114,094.10)	67,192.76 (113,497.40)	49,564.44 (54,128.03)	37,045.30 (58,804.37)
Parent expects the child to get a bachelor's degree (%)	79.83	76.38	86.05	83.09	81.36	74.74
Father works outside hometown (%)	18.49	22.43	11.48	15.52	21.67	18.28
Mother works outside hometown (%)	12.70	16.11	6.70	9.08	15.68	13.41
Urbanicity (Rural, %)	36.04	/	/	54.42	61.96	76.18
Eastern region	33.89	28.84	42.86	/	/	/
Central region	34.05	32.98	35.95	/	/	/
Western region	32.06	38.18	21.19	/	/	/

Table 2

Descriptive Information on Preschool Attendance Rates from 2010 to 2016

	Overall sample	2010	2012	2014	2016
Sample size	9,261	2,297	2,209	2,258	2,507
Attendance rate (%)					
Overall sample	65.19	59.34	66.09	69.00	66.33
Boys	65.11	58.45	65.38	69.28	67.43
Girls	65.29	60.40	66.89	68.68	65.13
3-year-olds	27.78	24.58	32.78	31.04	22.69
4-year-olds	66.67	56.72	67.23	71.35	70.90
5-year-olds	83.00	73.32	85.46	87.22	85.49
6-year-olds	90.84	85.69	92.27	93.36	92.87
Rural areas	59.93	48.76	62.34	64.19	64.03
Urban areas	74.53	76.36	78.70	76.44	69.45
Eastern region	68.97	68.68	70.79	68.32	68.32
Central region	74.09	66.32	75.16	79.48	75.37
Western region	51.75	42.16	51.27	58.56	54.87

Table 3

Logistic Estimates for the Likelihood of Preschool Attendance

	Model 1		Model 2							
	Total sample (n = 9,261)		Total sample (n = 9,261)		Eastern (*n* = 3,138)		Central (*n* = 3,153)		Western (*n* = 2,970)	
	B (S.E.)	OR	B (S.E.)	OR	B (S.E.)	OR	B (S.E.)	OR	B (S.E.)	OR
Wave 2012	0.80 (0.09)***	2.24	1.06 (0.10)***	2.89	0.90 (0.20)***	2.46	1.32 (0.19)***	3.74	1.05 (0.16)***	2.86
Wave 2014	0.81 (0.09)***	2.25	1.05 (0.11)***	2.86	0.55 (0.21)**	1.73	1.46 (0.20)***	4.31	1.27 (0.17)***	3.56
Wave 2016	0.52 (0.08)***	1.68	0.99 (0.11)***	2.69	0.66 (0.20)**	1.93	1.28 (0.20)***	3.60	1.18 (0.17)***	3.25
Mom. Edu.	0.06 (0.01)***	1.07	0.10 (0.02)***	1.11	0.08 (0.03)*	1.08	0.01 (0.03)	1.01	0.11 (0.03)***	1.12
Log income	0.13 (0.03)***	1.13	0.18 (0.07)**	1.20	0.27 (0.11)*	1.31	-0.04 (0.16)	0.96	0.16 (0.11)	1.17
Urban	0.60 (0.08)***	1.82	1.35 (0.14)***	3.86	0.87 (0.23)***	2.39	1.60 (0.25)***	4.95	1.87 (0.28)***	6.49
Child age (Age 4)	2.19 (0.08)***	8.89	2.21 (0.08)***	9.12	2.05 (0.13)***	7.77	2.44 (0.13)***	11.47	2.07 (0.15)***	7.92
Child age (Age 5)	3.43 (0.09)***	30.81	3.46 (0.09)***	31.82	3.56 (0.16)***	35.16	3.79 (0.18)***	44.26	3.11 (0.16)***	22.42
Child age (Age 6)	4.37 (0.12)***	79.11	4.42 (0.12)***	83.10	4.17 (0.20)***	64.72	5.25 (0.31)***	190.57	4.19 (0.18)***	66.02
Child gender (Male)	-0.02 (0.06)	0.98	-0.01 (0.06)	0.99	-0.02 (0.10)	0.98	-0.02 (0.11)	0.98	-0.01 (0.10)	0.99
Use of grandparental care	-0.59 (0.07)***	0.56	-0.61 (0.07)***	0.54	-0.63 (0.12)***	0.53	-0.75 (0.12)***	0.47	-0.50 (0.11)***	0.61
Parent expects the child to get a bachelor's degree	0.29 (0.08)***	1.33	0.28 (0.08)**	1.32	0.21 (0.15)	1.23	0.30 (0.15)*	0.74	0.38 (0.13)**	1.46
Father works outside hometown	-0.04 (0.10)	0.96	0.01 (0.10)	1.01	-0.10 (0.18)	0.90	-0.06 (0.18)	0.94	0.11 (0.17)	1.12
Mother works outside hometown	0.13 (0.12)	1.14	0.09 (0.12)	1.09	0.06 (0.23)	1.06	0.36 (0.21)	1.43	-0.01 (0.20)	0.99
Wave 2012 × Mom. Edu.	/		-0.01 (0.02)	0.99	-0.05 (0.05)	0.95	0.05 (0.05)	1.05	-0.01 (0.04)	0.99
Wave 2014 × Mom. Edu.	/		-0.05 (0.02)*	0.95	-0.02 (0.05)	0.98	0.02 (0.05)	1.02	-0.03 (0.04)	0.97
Wave 2016 × Mom. Edu.	/		-0.07 (0.02)**	0.93	-0.05 (0.04)	0.95	0.05 (0.05)	1.05	-0.08 (0.04)	0.92
Wave 2012 × Log income	/		-0.06 (0.08)	0.94	-0.12 (0.15)	0.89	0.16 (0.18)	1.17	-0.10 (0.14)	0.90
Wave 2014 × Log income	/		-0.08 (0.09)	0.92	-0.18 (0.15)	0.84	0.12 (0.20)	1.13	-0.03 (0.15)	0.97
Wave 2016 × Log income	/		-0.09 (0.09)	0.91	-0.25 (0.17)	0.78	0.07 (0.20)	1.07	0.03 (0.15)	1.03
Wave 2012 × Urban	/		-0.76 (0.21)***	0.47	-0.86 (0.33)**	0.42	-0.81 (0.36)*	0.44	-0.42 (0.47)	0.66
Wave 2014 × Urban	/		-0.75 (0.19)***	0.47	-0.57 (0.30)	0.57	-1.30 (0.35)***	0.27	-0.65 (0.36)	0.52
Wave 2016 × Urban	/		-1.33 (0.18)***	0.26	-1.41 (0.29)***	0.24	-1.44 (0.32)***	0.24	-1.28 (0.35)***	0.28

Constant	-1.83 (0.20)***	0.16	-2.01 (0.20)***	0.13	-1.34 (0.25)***	0.26	-1.95 (0.24)***	0.14	-3.17 (0.26)***	0.04
Province-level variance (sd^2)	0.49		0.48							
County-level variance (sd^2)	0.62		0.61		0.72		0.55		1.20	
n of provinces	25		25							
n of children within provinces	34 - 1,485		34 - 1,485							
n of counties	358		358		164		115		78	
n of children within counties	1 - 260		1 - 260		1 - 166		1 - 152		1 - 260	

Note. B = Unstandardized coefficient. S.E. in parentheses = Standard error. OR = Odds ratio. *** $p < 0.001$. ** $p < 0.01$. * $p < 0.05$.

Table 4

Household Fixed-effects Estimates for Siblings within the Same Households

	B (S.E.)	OR
Wave 2012	0.66 (0.33)*	1.93
Wave 2014	1.02 (0.23)***	2.77
Wave 2016	0.83 (0.27)**	2.29
Log income	0.03 (0.11)	1.03
Child age (Age 4)	2.37 (0.32)***	10.70
Child age (Age 5)	3.91 (0.35)***	49.90
Child age (Age 6)	5.64 (0.44) ***	281.46
Child gender (Male)	0.12 (0.20)	1.13
Use of grandparent's care	-0.14 (0.26)	0.87
Parent expects the child to get a bachelor's degree	0.16 (0.26)	1.17
Father works outside hometown	0.25 (0.37)	1.28
Mother works outside hometown	0.13 (0.11)	1.14
n of households	319	
n of children within households	2 - 13	
n of children	1,330	

Note. 315 households dropped because the siblings within same households were both reported attending or not attending preschools. B = Unstandardized coefficient. S.E. in parentheses = Standard error. OR = Odds ratio.
*** $p < 0.001$. ** $p < 0.01$. * $p < 0.05$.