

# **The Impact of Afterschool Childcare on the “First-grade Wall”: Labor Supply of Mothers with School Age Children in Japan**

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**Abstract:** We use the data from the “Longitudinal Survey of Adults in the 21st Century” in Japan to examine whether an increase in the availability of afterschool childcare encourages women with primary school age children to participate in the labor market. Our analysis indicates that increase in the regional availability of afterschool childcare significantly promotes mothers’ labor force participation and retention of both fulltime and part-time jobs. The recent expansion of afterschool childcare in Japan is expected to increase full-time and part-time labor force participation by 2.51% and 2.39%, respectively, which is a significant impact on the female labor force participation in Japan.

**Keywords:** Female Labor Supply, Afterschool Childcare, Retention of Jobs

**JEL Classification Number:** D190, J130, J290

## **1. Introduction**

We use the data from the “Longitudinal Survey of Adults in the 21st Century” (survey years: 2002 to 2011), which is conducted by Japan’s Ministry of Health, Labour and Welfare (MHLW) to examine whether an increase in the availability of afterschool childcare encourages women with primary school age children to participate in the labor

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The following provided assistance with this research: Japan Society for the Promotion of Science (JSPS) Grants-in-Aid for Scientific Research 24530258, 15K03517, 15K03502, Joint Usage and Research Center Programs for 2015 by Hitotsubashi University’s Institute of Economic Research and the Shikishima Gakujutsu/Bunka Shinko Zaidan Foundation.

We would like to thank Yukiko Abe, Setsuya Fukuda, Tomoko Kishi, Yukinobu Kitamura, Naomi Kodama, Naoki Makita, Masaaki Mizuochi, and Taro Ohno for their helpful suggestions. Naturally, the authors are responsible for any error in this paper.

market<sup>1</sup>. We focus on the supply volume of afterschool childcare in each prefecture as an indicator of availability in the region. We examine the effects of availability of afterschool childcare on the labor force participation of mothers with primary school age children and mothers' decision to retain a job before and after the firstborn child enters primary school.

It is wellknown that Japanese mothers face difficulty in working when their children start their first grade of primary school. This phenomenon is known as the “first-grade wall.” The first-grade wall refers to the fact that it is relatively easy to combine child-raising and work when preschoolers are looked after by formal daycare services, since daycare for preschoolers are normally open till relatively late hours (about 5 to 7 pm), and do not take long breaks, such as summer vacations. However, primary schoolchildren finish school early (between 2 pm and 3 pm) and have long summer vacations. Thus, in the absence of necessary facilities to take care of them, mothers are forced to drop out of the labor supply.

According to the MHLW, the number of waitlisted children for afterschool childcare rose from 5,851 in 2002 to 9,945 in 2014. According to another survey conducted by the Liaison Council of Afterschool Care (LCAC) in Japan in 2014, the number of potential enrollees, that is, the waitlisted children including those that seek afterschool childcare but do not register for the waiting list, are estimated at 400,000.<sup>2</sup> Against this background, the Japanese Government in 2014 declared the amendment calling for an expansion in afterschool childcare to accommodate an additional 300,000 children by the end of fiscal year 2019.<sup>3</sup> However, the effects of afterschool childcare on mothers' labor force participation have not yet been empirically examined. Therefore, we investigate whether enhancing the provision of afterschool childcare will have positive effects on mothers' labor supply and retention of jobs. Further, we examine the size of the effects of the policy to increase the supply of afterschool childcare.

This paper is structured as follows. Section 2 provides a literature review on childcare and female labor force participation. Section 3 examines the effects of afterschool childcare on: (a) the decision of mothers to work with school age children and (b) the decision to retain a job after their children start school. Section 4 concludes with a summary of the empirical findings and a discussion on the policy implications.

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<sup>1</sup>“Afterschool childcare”refers to formal afterschool childcare provided by local authorities under the supervision of the government and local authorities. This paper does not focus on afterschool childcare provided by the private sectors such as afterschool prep courses or private lessons or informal care provided by family members such as grandparents or relatives.

<sup>2</sup>Source: “Survey of State of Implementation of Afterschool Childcare” by LCAC as on May 1, 2013 ([www.2s.biglobe.ne.jp/Gakudou/2013kasyosuu.pdf](http://www.2s.biglobe.ne.jp/Gakudou/2013kasyosuu.pdf)).

<sup>3</sup> The 2014 amendment to the *Nihon Saikō Senryaku* (“Japan Revitalization Strategy”)

## **2. Related Literatures**

Most previous studies on mothers' labor supply have focused on mothers with children in preschool. For example, most empirical analyses pertaining to women retaining a job are related to the major life events of marriage and childbirth (Higuchi, 2009; Sakamoto, Morita, and Kimura, 2013). Although various studies in Japan and the US have examined the use of childcare services and mothers' labor supply, they mostly focus on the effects of childcare services in the case of preschoolers (Heckman, 1974; Blau and Robins, 1989; Leibowitz, Klerman, and Waite, 1992; Michalopoulos, Robins, and Garfinkel, 1992; Connelly, 1992; Ribar, 1995; Kimmel, 1998; Yamada, Yamada, and Chaloupka, 1987; Shigeno and Ohkusa, 1999; Shimizutani and Noguchi, 2004; Yoshida and Mizuochi, 2005; Asai, Kambayashi, and Yamaguchi, 2014; Lee and Lee, 2014).

On the other hand, studies that focus specifically on formal afterschool childcare are quite scarce. Hand and Baxter (2013) examine the use of childcare services for schoolage children and the factors that determine it in Australia. Aizer (2004) analyzes the relationship between children's afterschool activities and delinquency, underscoring the importance of improving policies for schoolage children. This study will be the first to investigate the effects of afterschool childcare on mothers' labor supply, in particular, in Japan.

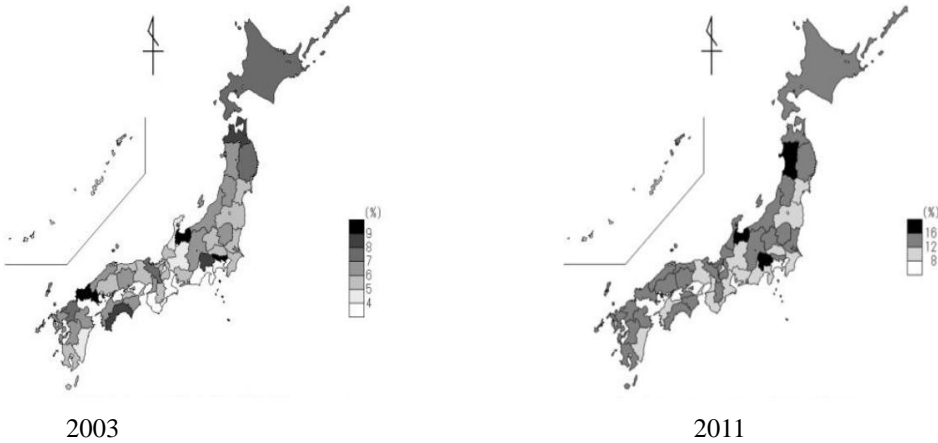
## **3. Empirical Strategy**

We conduct two types of estimation to examine whether an increase in the availability of afterschool childcare encourages mothers with primary schoolage children to participate in the labor market. First, we analyze whether regional afterschool childcare availability has a positive effect on the labor supply of mothers whose firstborn child is in a lower grade of primary school. Second, we examine whether the availability of regional afterschool childcare enables mothers who have worked for a year before their firstborn child started primary school to remain at the workplace.

We use data from the Longitudinal Survey of Adults in the 21st Century (LSA) conducted by the MHLW. The LSA is a series of follow-up surveys that have tracked the same individuals annually since 2002. Its samples include adult males and females aged 20 to 34 (as of October 31, 2002) and their spouses. Our analysis uses the data from the LSA surveys 1 to 10, which were conducted from 2002 to 2012 respectively. To capture the regional availability of afterschool childcare, we use the supply volume of afterschool childcare in a given prefecture, that is, higher the supply of afterschool childcare in a prefecture where a sample resides, the higher is its availability in the prefecture for the given sample. Thus, we use the enrolment ratio (the number of children enrolled in afterschool childcare to the number of children in primary school) of each prefecture as an

indicator of the supply volume<sup>4</sup>. The data of the enrolment ratio is collected from the survey done by LCAC and the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in Japan.<sup>5</sup>

**Figure 1: Distribution of Afterschool Childcare Enrollment Ratio (2003 and 2011)**



Source: Created by the authors based on the data from the “Survey of State of Implementation of Afterschool Childcare” by the Liaison Council of Afterschool Childcare

It can be observed from figure 1, which illustrates the distribution of the enrollment ratio for the years 2003 and 2011, that the enrolment ratio has increased in the nine years from 2003 to 2011. There exists a large variation among the enrolment ratios of different prefectures. Therefore, we anticipate that these differences in the availability of afterschool childcare affect the labor supply of mothers.

For the first analysis, we use a multi-nominal logit model.

$$y_{j,i}^* = \alpha + \beta_{after} x_{after} + \beta_j x_i + \epsilon_i \tag{1}$$

$y = 1$  implies not working if  $y_{1,i}^* > y_{3,i}^*, y_{1,i}^* > y_{2,i}^*$   
 $y = 2$  implies working full-time if  $y_{2,i}^* > y_{3,i}^*, y_{2,i}^* > y_{0,i}^*$   
 $y = 3$  implies working part-time<sup>6</sup> if  $y_{3,i}^* > y_{2,i}^*, y_{3,i}^* > y_{0,i}^*$

<sup>4</sup> The enrollment ratio may represent the demand side of afterschool childcare. However, there were large amounts of waitlisted children throughout the period of our analysis. Thus, we assume the enrollment ratio as the upper limit of the supply of afterschool childcare in a given region.

<sup>5</sup> The figures for the number of children enrolled in afterschool childcare were obtained from the yearly editions of “Afterschool Childcare Information” by LCAC. The figures for the number of elementary school children were obtained from the yearly editions of the abovementioned source as well as the MEXT’s “Basic School Survey.”

<sup>6</sup>Part-time workers include self-employed worker.

where  $x_{after}$  is the availability of afterschool childcare that we focus on to capture its effects on mothers' decision to work. We chose "not working" as the baseline category to examine the differences in the effects of the availability of afterschool childcare on choosing working status and labor supply decision. Although mothers decide to work, they may adjust their working hours to avoid using afterschool childcare services. In that case, the supply of afterschool childcare does not affect labor supply decision of part-time workers.<sup>7</sup>

We use a sample of mothers with their firstborn child in a lower grade of primary school (aged 6 to 9 years). We examine whether  $\beta_{after}$  is positive and significant to reveal the effects of the availability of afterschool childcare on mothers' labor force participation. Further, we investigate the differences in the effects among mothers with different work statuses. We use information on the enrollment ratio from the year before the sample survey year to avoid the possible endogeneity of the availability of afterschool childcare and the decision to reside at a particular location or choose a particular work status.

The independent variable  $x_i$  includes the level of mother's education, mother's age when she had her firstborn child, father's income, grandparents living in the same household, time contributed by father toward housework (in minutes per weekdays), unemployment rate (for women aged 15 to 64), and perception of gender division of labor. The expected signs of the coefficients of  $x_i$  are as follows. Higher levels of education and giving birth to the firstborn child at a higher age may be associated with working in more specialized jobs, longer work experience, and higher costs incurred by quitting work. If the father's income is high, it can have a negative effect on the mother's labor force participation, irrespective of her income.

Grandparents living in the same household and the time contributed by the father toward housework are variables for childcare resources within the household; thus, they may encourage the mother to work. However, the effect of having a grandparent living in the household varies according to the gender of the grandparent and his/her relationship with the mother. Therefore, we use a dummy variable to indicate the maternal grandmother, maternal grandfather, paternal grandmother, or paternal grandfather living in the household.

Unemployment rate was used to control for the effect of labor market tightness as it has a

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<sup>7</sup> We conducted the interviews through a web survey in February 2015, with a target of 600 women having at least one schoolage child in Japan and obtained 585 valid responses. The interviews indicate that part-time working mothers tend to curtail their working hour still before their children return from school.

negative effect on mothers' labor supply. Regarding the perception of gender division of labor, the dummy variable takes a value of 1 if the respondent feels that earning an income should be the husband's responsibility and housework and child rearing should be the wife's responsibility, and 0, otherwise. Stronger feelings towards the gender division would have a negative effect on mothers' labor supply.

For the second analysis to investigate whether the availability of regional afterschool childcare enables mothers to remain at the workplace, we estimate the following model,

$$y_i^* = \alpha + \beta_{after} x_{after} + \beta_j x_i + \epsilon_i \tag{2}$$

We estimate (2) using a logit model with  $y_t=1$ , which denotes remain at their jobs, for the sample that has worked (part-time or fulltime) for one year before their firstborn child started primary school. To capture the effects particularly on fulltime workers, we estimate (2) with  $y_t=1$  (if  $y_i^* > 0$ ) if mothers remaining at their job as fulltime worker for the sample who had worker as fulltime one year before their firstborn child started primary school as well.

Among the independent variables of the second model, the key variable is the availability of afterschool childcare at the prefecture where the sample resides. In addition to the independent variables used in the model (1), we include the following variables: number of employees for whom the mother worked one year before the firstborn child started elementary school (less than 100 employees, 100 to 999 employees, 1,000 or more employees, and government agency) and whether the mother's employer offered childcare leave (yes = 1).

As for the number of employees, the larger the size, the higher the salary and the greater the costs of quitting. Moreover, the larger the company, the more generous the benefits and more well-developed the childcare assistance. Workplaces with a childcare leave system can be expected to have comprehensive childcare assistance measures in place, which may have a positive effect on mothers' decision to continue working.

#### **4. Empirical Results**

Before presenting the results of the estimation, we indicate the percentage of users of afterschool childcare and the female labor force participation before and after the firstborn child enters primary school. Table 1 indicates the caregivers of afterschool for firstborn children. The LSA data indicate that the rate of use of afterschool childcare is 20.0%. Among them, fulltime working mothers constitute the highest users (44.4%), followed by part-time workers (29.6%) and self-employed or family business employees (14.0%).

**Table 1: Use of Afterschool Childcare and Identity of Weekday Caregivers (Figures are in Percentages)**

	Afterschool childcare	Non-afterschool childcare	Mother	Father	Maternal grandparent	Paternal grandparent	Other family member/relative	Other (friend/Acquaintance)	No one	Unknown
Fulltime	44.4	9.2	2.6	0.5	3.6	3.6	2.2	1.0	8.7	54.4
Part-time	29.6	9.4	7.0	1.2	2.7	1.9	1.9	0.6	6.5	53.7
Self-employed/family business employee	14.0	13.7	13.0	3.8	3.1	1.5	3.2	0.0	0.0	41.9
Unemployed	4.7	12.3	12.2	1.1	0.5	1.3	0.5	0.2	4.4	53.8
Total	20.0	11.0	9.2	1.3	1.9	1.8	1.4	0.4	5.2	52.9

Note: Respondents could give multiple responses. The number of fulltime, part-time, self-employed, or family business employee, and unemployed mothers/respondents reporting the use of afterschool childcare is 1,443, 3,005, 658, 3,939, and 9,045, respectively. The corresponding number of respondents reporting the use of non-afterschool childcare is 196, 488, 131, 634, and 1,449 respectively.

Table 2 presents the descriptive statistics of the data used for estimation. Tables 3 and 4 present the estimation results for the mothers’ decision of labor supply and remaining at the workplace, respectively. Table 3 presents the estimation results of the multi-nominal logit analysis of the mothers’ decision to participate in the labor market (the baseline category is “not working”). The availability of afterschool childcare has a significant and positive effect on labor supply of both full-time and part-time working mothers. The marginal effects on full-time and part-time mothers are 0.00560 and 0.00533, respectively, thus the 1% increase in enrolment ratio has almost same effects on decision of labor supply as fulltime and as par-time or self-employed.

Other childcare resources such as grandparents and time contributed by father toward housework have positive effects on the probability of choosing fulltime work, but do not affect the decision to work part-time. In particular, care provided by both maternal and paternal grandmothers promote working fulltime, but those by grandfathers do not affect labor supply of mothers.

The fathers’ income has a negative effect on working part-time or being self-employed. Thus, the income effect has influence on choosing part-time or self-employed jobs, but not fulltime jobs. For the fulltime workers, higher education and longer work experience with a high cost for quitting jobs are significantly positive effects. The perception of gender division of labor has a negative effect on working fulltime but not on working part-time or being self-employed.

**Table 2: Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
<b>The sample for Table 3</b>					
Working with school-age children	7113	0.553	0.497	0.000	1.000
Working as full-time with school-age children	7113	0.146	0.353	0.000	1.000
Working as part-time with school-age children	7113	0.320	0.467	0.000	1.000
High school graduate	7113	0.390	0.488	0.000	1.000
Technical college/junior college graduate	7113	0.375	0.484	0.000	1.000
University/graduate school graduate	7113	0.113	0.316	0.000	1.000
Father's income (log value)	7113	6.015	0.481	2.303	8.854
Hours of housework (weekdays, father)	7113	69.503	69.411	0.000	310.000
Parent living in household (grandfather of mother's side)	7113	0.059	0.236	0.000	1.000
Parent living in household (grandmother of mother's side)	7113	0.071	0.258	0.000	1.000
Parent living in household (grandfather of father's side)	7113	0.181	0.385	0.000	1.000
Parent living in household (grandmother of father's side)	7113	0.222	0.416	0.000	1.000
Age when firstborn child was born	7113	27.119	3.182	17.000	39.000
Unemployment rate	7113	4.507	0.445	3.900	5.200
Perception of gender division of labor	7113	0.118	0.322	0.000	1.000
Afterschool childcare (enrolled child ratio)	7113	8.475	2.936	2.925	18.405
<b>The sample for Table 4</b>					
Working before the firstborn enters primary schools	739	1.000	0.000	1.000	1.000
Working after the firstborn enters primary schools	739	0.919	0.273	0.000	1.000
Working as full-time before the firstborn enters primary schools	739	0.472	0.500	0.000	1.000
Working as full-time after the firstborn enters primary schools	739	0.332	0.471	0.000	1.000
High school graduate	739	0.367	0.482	0.000	1.000
Technical college/junior college graduate	739	0.390	0.488	0.000	1.000
University/graduate school graduate	739	0.123	0.329	0.000	1.000
Number of employees (100–999 employees)	739	0.340	0.474	0.000	1.000
Number of employees (1,000 or more employees)	739	0.122	0.327	0.000	1.000
Number of employees (government agency)	739	0.039	0.194	0.000	1.000
Father's income (log value)	739	5.916	0.461	2.890	7.560
Minutes of housework (weekdays, father)	739	87.777	77.193	0.000	300.000
Existence of childcare leave system	739	0.465	0.499	0.000	1.000
Parent living in household (grandfather of mother's side)	739	0.072	0.258	0.000	1.000
Parent living in household (grandmother of mother's side)	739	0.080	0.271	0.000	1.000
Parent living in household (grandfather of father's side)	739	0.217	0.412	0.000	1.000
Parent living in household (grandmother of father's side)	739	0.264	0.441	0.000	1.000
Age when firstborn child was born	739	27.318	3.232	18.000	36.000
Perception of gender division of labor	739	0.080	0.271	0.000	1.000
Unemployment rate	739	4.366	0.373	3.900	5.100
Afterschool childcare (enrolled child ratio)	739	8.781	2.734	3.671	17.138



**Table 3: Estimates for the Determinants of Labor Force Participation (firstborn child aged 6 to 9)**

	<b>Working as full-time</b>	<b>Working as part-time</b>
High school graduate	0.0173	0.0389**
Technical college/junior college graduate	0.0495***	0.0305
University/graduate school graduate	0.0797***	-0.0462*
Father’s income (log value)	-0.00351	-0.108***
Minutes of housework (weekdays, father)	0.000616***	-0.000114
Parent living in household (grandfather of mother's side)	-0.0201	0.101**
Parent living in household (grandmother of mother's side)	0.128***	-0.105***
Parent living in household (grandfather of father's side)	-0.0173	0.02
Parent living in household (grandmother of father's side)	0.0845***	1.23E-05
Age when firstborn child was born	0.00598***	-0.00874***
Unemployment rate	0.009	0.00568
Perception of gender division of labor	-0.107***	-0.0175
Afterschool childcare (enrolled child ratio)	0.00560***	0.00533***
Observations		7,113
Wald chi2		575.1
Pseudo R2		0.0447
Log pseudo likelihood		-6665.843

Note: Marginal effects are reported. Robust standard errors are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table 4 presents the estimation results of mothers’ decision to remain at their workplaces after their firstborn child starts primary school by using the logit model. The first column presents the estimation on remaining at the workplaces with any kind of work and the second column presents the decision of remaining at their workplace among fulltime working mothers. The results indicate that the availability of afterschool childcare encourages mothers to remain at their jobs as fulltime, part-time, or self-employed. The sizes of marginal effects are same for the different work statuses: 0.00549 for all working mothers and 0.00530 for fulltime working mothers. Thus, well-developed childcare assistance in the workplace is effective to promote mothers to continue their jobs.

**5. Discussion**

As the empirical results indicate that improvement of the regional availability of after school childcare significantly promotes the labor force participation of mothers whose firstborn child is in a lower grade of primary school, and enables them to retain their jobs after their firstborn child starts primary school. These results hold good for both fulltime and part-time working mothers.

According to the marginal effects in Table 3, the expansion in afterschool childcare, which accommodates an additional 300,000 children from fiscal years 2014 to 2019, is expected

to increase the labor force participation of fulltime and part-time working mothers by 2.51% and 2.39%, respectively.<sup>8</sup> These results indicate that the policy seems to have significant effects on female labor force participation in Japan.

**Table 4: Estimates for the Determinants of Remaining at the Workplace**

Dependent Variables	Remaining workplaces as full-time and part-time		Remaining workplaces as full-time	
	Full-time and Part-time		Full-time	
<b>Work status of samples when the firstborn enters primary schools</b>	(1)	(2)	(3)	(4)
High school graduate	0.0415*	0.0430**	-0.0388	-0.0226
Technical college/junior college graduate	0.0511**	0.0520**	-0.0476	-0.0296
University/graduate school graduate	0.0691*	0.0686*		
Employer size (100–999 employees)	0.0241	0.0257	-0.00308	-0.000232
Employer size (1,000 or more employees)	0.023	0.022	-0.00332	0.0059
Employer size (government agency)	0.0872	0.0869		
Father's income (log value)	-0.0402**	-0.0339**	0.0181	0.0205
Minutes of housework (weekdays, father)	9.66E-05	8.13E-05	-8.16E-05	-7.98E-05
Existence of childcare leave system	0.0462**	0.0430**	0.0484**	0.0329
Parent living in household (grandfather of mother's side)	-0.0135	-0.0145	-0.0554	-0.0427
Parent living in household (grandmother of mother's side)	0.0165	0.0149	0.0401	0.029
Parent living in household (grandfather of father's side)	-0.0433	-0.0418	-0.00178	0.000377
Parent living in household (grandmother of father's side)	0.0418	0.0393	0.0414*	0.0319
Age when firstborn child was born	0.00616**	0.00511**	0.00288	0.00176
Perception of gender division of labor	0.0445	0.0401	-0.0173	-0.0247
Unemployment rate	0.00424	0.0076	-0.0227	-0.0197
Afterschool childcare (enrolled child ratio)		0.00549*		0.00530**
Observations	739	739	251	251
Wald chi2	44.45	51.4	24.41	35.03
Prob> chi2	0.000169	2.55E-05	0.0408	0.00243
Pseudo R2	0.0841	0.091	0.213	0.257
Log pseudolikelihood	-190.6	-189.2	-42.49	-40.15

Note: Marginal effects are reported. Robust standard errors are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

<sup>8</sup> We calculate them by assuming the number of schoolchildren as 6.7 million, which is in accordance with the MEXT's Basic School Survey.

Our interview survey indicates that large number of part-time working and non-working mothers have a need for temporary childcare, such as only during summer vacations.<sup>9</sup> Thus, the availability of more flexible options is more effective in encouraging mothers to work, which, in turn, may lower the costs of afterschool childcare as compared to the costs of daily-based care, and increase its availability.

The following limitations should be overcome in future research. First, although we focused on the formal afterschool childcare provided by local authorities under the supervision of the government and local authorities, afterschool childcare provided by the private sectors, such as afterschool prep courses or private lessons, can be taken into account. Second, the analyses in our paper were limited to the firstborn children and can be expanded to include the second and third children. Third, a study should be conducted to understand the relationship between afterschool childcare and academic performance.

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<sup>9</sup> See footnote 7.

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