論　　文

An Analysis of the Labor Supply of Childcare Providers*

By Yukiko ASAI and Akiei JIBIKI**

Abstract

Many countries report a shortage of licensed childcare providers. To address this issue, the Japanese government gradually increased subsidies for private childcare facilities beginning in 2013, intending for the subsidies to be passed on to workers' wages. Key to the reforms was linking subsidies to the average experience of childcare providers at the facility. In this paper, we examine survey data of licensed childcare providers in Tokyo to study the impacts of the policy and the determinants of the labor supply of childcare providers. We first estimate the pass-through of subsidies to hourly wages and find a 7% increase in the hourly wage. We next examine the impact of this increase in wages on labor supply and find that the share of childcare providers intending to separate decreased by 5 percentage points from the initial level of 26%. Our results imply a large labor supply elasticity of 2.7 and suggest that the subsidies potentially reduced worker shortages through greater retention. We next explore the average reservation wages among those still intending to separate after the reforms in order to provide additional insights into how much wages would need to increase to induce more workers to remain in their jobs. Strikingly, we find that 90% of childcare workers' reservation wage was higher than the market wage of childcare providers. Our results suggest that many more workers could be retained with modestly higher wages.

JEL Classification Codes: J8, J21

Keywords: Licensed Childcare Provider, Labor Supply, Wage, Subsidy

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保育士の処遇改善と労働供給

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＜要旨＞

保育士不足が問題となっている。保育士の離職率を引き下げるため、政府は 2013 年から 2019 年にかけて保育士の処遇改善を目的とした補助金の増額を段階的に行なってきた。この加算は、民間保育所が対象となり、各保育所における保育士の平均勤続年数に紐付けて支給された。本研究では、東京都保育士実態調査を用いて、保育士の処遇改善が労働供給に及ぼす影響を検証した。第一に、処遇加算が実際に保育士の賃金に反映されているかを検証したところ、保育士の時間あたり賃金が 7％上昇していることが明らかになった。第二に、保育士の時間あたり賃金の上昇が労働供給に及ぼした影響を検証したところ、保育士の離職意向が 5％ポイント減少（処遇改善前の平均 26%から 19%の減少）していることが明らかになった。労働供給弾力性は 2.7 と非常に弾力的であり、処遇加算が離職率を引き下げた可能性を示唆している。第三に、保育士の離職率をさらに引き下げるために、今後賃金の引き上げが必要であるかを検証した。離職意向のある保育士について、留保賃金と市場賃金を比較したところ、保育士の 90%で留保賃金が市場賃金を上回っていた。この結果は、保育士の賃金をさらに引き上げることで、保育士の労働供給を増やすことができる可能性を示唆している。

JEL Classification Codes: J8, J21

Keywords: 保育士、労働供給、賃金、処遇改善

1. Introduction

Demand for subsidized childcare outstrips supply in many of Japan's largest cities.[1] A growing number of parents are struggling to find a spot at subsidized childcare facilities, potentially affecting parental labor supply decisions. Parents may need to rely on more expensive childcare arrangements, or, in some cases, parents give up their employment to take care of their children, a burden which falls more heavily on mothers. Key to the shortage is a lack of qualified workers at the current wage: according to the Ministry of Health, Labour, and Welfare (2019), the jobs-to-applicants ratio for childcare providers in January 2019 was 3.86 to 1.

A growing body of research finds that childcare availability increases maternal labor supply.[2] By the same logic, shortages of childcare slots will hold back female labor supply. Japan has one of the lowest rates of maternal labor force participation among OECD countries.[3] To its credit, the Japanese government has recognized this challenge and implemented a number of policies to expand the supply of childcare since the 1990s. Nevertheless, the expansion of childcare has lagged behind accelerating demand.

A number of supply-side issues are behind the shortage. There are two main types of childcare facilities in Japan: public and private. Public facilities are run by the government, and workers are compensated according to the civil servants wage scale. Only 1/5 of childcare providers in Tokyo work for a public facility, meaning that the large majority of childcare providers work for private facilities.[4] To ensure the quality of childcare provision, the government highly regulates both public and private facilities. Government subsidies for private facilities are tied to accreditation from the central government and the municipality, creating a sizable barriers to entry (Zhou, 2009). Private childcare facilities' revenues derive from both subsidies and user fees, both of which are set by the government. The central government and municipalities provide subsidies based on the "price" of childcare, which is calculated based on the following three criteria: (1) the age and number of children in the facility, (2) the size of the facility, and (3) the geographical area. Subsidies cover about 60-80% of childcare facilities' costs, and user fees pay for the remainder. The monthly fee per child

[1] See, for example, Japanese Ministry of Health, Labour and Welfare, "Current status and problems in childcare," https://www8.cao.go.jp/kisei-kaikaku/suishin/meeting/wg/hoiku/20170922/170922hoiku02.pdf (in Japanese).
[2] Studies on the relationship between childcare availability and maternal employment include Gelbach (2002), Berlinski and Galiani (2007), Baker et al. (2008), Cascio (2009), Datta Gupta and Simonsen (2010), Fitzpatrick (2010), Goux and Maurin (2010), Havnes and Mogstad (2011), Fitzpatrick (2012), Cascio et al. (2015), Givord and Marbot (2015), Haeck et al. (2015), Asai et al. (2015), Cornelissen et al. (2018), and Yamaguchi et al. (2018). According to a survey by Japan's Cabinet Office (2014), 71.6% of women indicated that the availability of childcare was a necessary condition for them to remain employed.
[3] The maternal employment rate in Japan is lower than other OECD countries. According to the OECD, the employment rate for mothers with children up to three years of age in 2005 in Japan was 29.8%, approximately 30 percentage points lower than the average for OECD countries. The female employment rate in 2005 for those aged 25 to 49 in the same year was 65.7%, approximately 10 percentage points lower than the OECD average.
[4] See, https://www.fukushihoken.metro.tokyo.lg.jp/kodomo/shikaku/30hoikushichousa.files/730shukeihyou.pdf, page 193 (in Japanese).

charged to users depends on the child's age, the region in which a facility is located, parents' household income, and the number of siblings in the household, based on formulas set by local facilities.

Private childcare facilities pay their labor costs from their revenues, which are highly constrained by the "price" of childcare set by the government. Therefore, the conventional price mechanism does not work in the childcare labor market (Yamashige, 2018). On average, childcare providers' wages are significantly lower than those of other occupations despite the excess demand for labor, suggesting that subsidies and/or user fees are too low. Low wages discourage new entry into the profession. Moreover, until the reforms we study, subsidies to private facilities were not tied to workers' characteristics, such as their experience. Many jobs offer "returns to experience," where the wage increases in line with tenure in the job. When facilities' revenues are not tied to worker characteristics, offering higher pay to more experienced staff is difficult. Since the ratio of childcare providers to children is constrained by regulations, this limits any tradeoff between wages and employment. The lack of returns to experience may explain high separation rates. In Tokyo, only 60% of licensed childcare providers are currently working, and 29% of job leavers indicate that low wages are the major reason for leaving their job (Tokyo Metropolitan Government, 2018).

Beginning in 2013, Japan's central government gradually increased subsidies for private childcare facilities. For the first time, the subsidies were determined based on the average experience of childcare providers in each facility. The increase in subsidies ranged from 3 to 13% in 2013. The government further increased subsidies by 2% in 2015, another 2% in 2017, and another 1% in 2019. Therefore, this reform provided a large incentive for childcare facilities to retain workers and to increase wages to attract experienced workers.

In this paper, we investigate the effect of these increased subsidies to private facilities on hourly wages and labor supply. We rely on a unique survey of licensed childcare providers in Tokyo. The survey frame includes current and past providers at both public and private facilities. In addition to current workers, the survey frame includes those who left their job and those who were licensed but never worked as a childcare provider. The survey consisted of two waves: 2013 and 2018. The 2013 data may already reflect some of the effects of the 2013 reform due to the timing of the 2013 survey, which warrants some caution in interpreting wages and labor supply levels in 2013. However, the period between 2013 and 2018 contains additional variation, as subsidies increased another 4% following the 2015 and 2017 reforms.

We first investigate the intention to separate of currently employed workers. The main research design we employ is the difference-in-differences framework. As discussed above, salaries at public facilities follow civil servants' salaries and therefore were not affected by the reforms, providing a control group. We begin by comparing outcomes for current childcare providers who work at private facilities ("treated"), with those at public facilities ("control"). We also examine job leavers and never workers to estimate reservation wages, calculated from desired hourly wages.

Our main findings are as follows. We find that the subsidies were passed through to workers, who received a roughly 7% increase in hourly wages when comparing the 2018 and 2013 survey waves. Over this same period, the intention to separate decreased by five percentage points from the baseline level of 26%. The reduction in the intention to separate suggests that the increase in subsidies reduced worker shortages relative to a situation in which subsidies remained unchanged. We also explore how high wages should be to retain currently employed workers who intend to separate and induce other available childcare providers to work. To this end, we use a question in the survey about desired salaries and hours, which can be regarded as indicating the reservation wage. We find that current workers with the intention to separate seek a wage 1.8 times higher than the current wage rate. Job leavers and never workers with a license demand a wage that is 3 times higher. This suggests it is cheaper to increase the wages of those who intend to separate rather than draw in job leavers and never workers.

This paper proceeds as follows. Section 2 describes the institutional background of the childcare market in Japan. Section 3 provides details of the reforms in the childcare worker market. Section 4 discusses the dataset used in this paper. Section 5 lays out the empirical strategy, while Sections 6 and 7 present our results. Section 8 concludes.

2. Institutional Background

In this section, we further discuss the childcare market in Japan, provide a brief background on the shortage of childcare providers, and discuss the reforms we focus on.

2.1 Background on Subsidized Childcare in Japan

Japan has provided high-quality universal childcare for children under the age of 6 since the 1970s. The childcare program consists of full-time childcare facilities, with subsidies from the central and municipal governments covering 60-80% of the cost. Because government-certified childcare is heavily subsidized and of high quality, many parents would like to use it, resulting in excess demand. The government recognized the shortage of childcare facilities in the early 1990s and introduced the Angel Plan (1994-1999) and the New Angel Plan (2000-2004), which included an expansion of child-care capacity and an extension of childcare service hours to include weekends and holidays.[5] In 2003, the government enacted the “Basic Act for Measures to Cope with Society with Declining Birthrate” (sic) to further increase childcare capacity. While these three measures increased the number of child-care facilities, they have failed to address the accelerating demand for childcare. Every year, about 20,000 children are on a wait list to enroll in childcare. Among waitlisted children, 87% were aged

[5] See, https://www8.cao.go.jp/shoushi/shoushika/whitepaper/measures/w-2009/21webhonpen/html/i1210000.html (in Japanese) for details.

0-2 years.[6] Excess demand is concentrated among children 0-2 years of age in part because the required child-staff ratio is higher than for older children.

One of the reasons why the supply of childcare does not meet the demand for childcare is that it is not easy for new firms to enter the childcare market because of strict government regulations to ensure quality. For example, each facility needs to meet the 1:3 staff to child ratio and needs to provide at least 1.65 ㎡ of floorspace for each 0 year-old child.

2.2 The Labor Market for Childcare Providers

In Japan, childcare workers need to obtain a government license, which can take 2-4 years, so that it is not easy to quickly increase the stock of childcare workers. There are two ways to obtain a license. The first is to gain a degree from a 4-year university, 2-year college, or professional school specializing in childcare training. Approximately 3/4 of current childcare providers have obtained their license this way. The second is to take the childcare provider exam, which is conducted 1-2 times a year and is very difficult to pass. According to the Ministry of Health, Labour and Welfare, over the past 20 years, only around 20% of applicants have passed the exam.[7] Thus, becoming a childcare provider requires a substantial investment in education. However, as will be explained in Section 4.3, childcare providers' return to this education is relatively small compared to other occupations.[8]

3. The 2013, 2015, and 2017 Policy Reforms

This section discusses the key reforms we investigate in this paper.

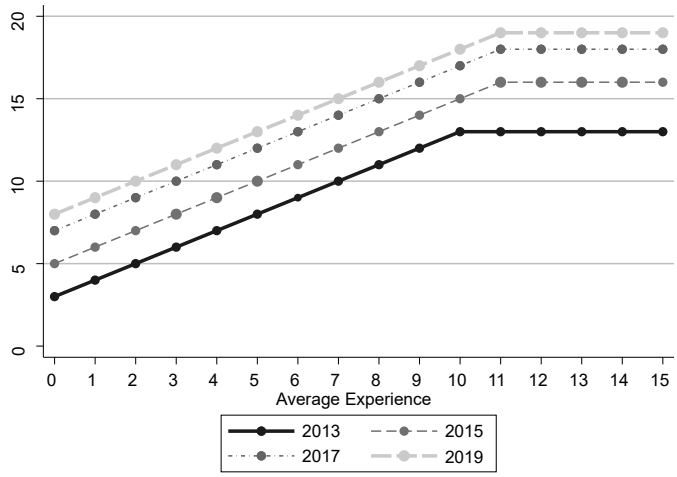
Starting from 2013, the Japanese government implemented a reform that gradually increased subsidies to private childcare facilities. Importantly, these reforms only applied to private childcare facilities but not public childcare facilities since, as mentioned, workers at public facilities are paid based on the pay scale of civil servants. The subsidy rates were determined based on the average experience of childcare providers at each facility. This increased subsidy provided an incentive for childcare facilities to retain experienced workers.

Figure 1 shows the percentage increase in subsidies by average worker experience at childcare facilities. The solid line for 2013 shows that subsidies increased between 3 and 13% depending on the average experience of childcare workers at a facility as a result of the reforms implemented in April 2013.[9] In April 2015, an additional 2% subsidy was added with the launch of a new policy, the

[6] See https://www.mhlw.go.jp/content/11922000/000678692.pdf (in Japanese) for details.
[7] See https://www.mhlw.go.jp/content/11907000/000661531.pdf (in Japanese) for details.
[8] According to the Basic Survey on Wage Structure, childcare providers' starting hourly wage is only about 1,000 yen (≈ 10 U.S. dollars). The wage-age profile for childcare providers is similar to that of salesclerks at department stores, who do not require higher education and certification of their skills.
[9] The 2013 wage subsidies were originally introduced as a 1-year program. This subsidy consisted of two parts: a part to increase the wages of childcare providers, and another part to help cover facilities' costs. We excluded the subsidies intended for facility-related costs from the figure. Details of the 2013 reform can be found at

"Comprehensive Support System for Children and Childrearing." The subsidy increase brought about by this reform is shown by the dashed line in the figure.[10] In April 2017, to further increase the wages of childcare providers, another 2% was added, represented by the dotted line in the figure.[11] Thus, the 2015 and 2017 reforms brought about a total increase of 4% in the subsidy. Finally, in April 2019, another 1% was added to the subsidy, represented by the long dash line in the figure.

Figure 1: Percentage Increase in Subsidies, by Average Worker Experience at Childcare Facilities after the 2015, 2017 and 2019 reforms



Source: Cabinet Office of Japan.
Note: The figure shows the percentage increase in subsidies by average worker experience at childcare facilities after the 2015, 2017, and 2019 reforms.

4. Data

The dataset we use for our analysis is the Survey of Licensed Childcare Providers in Tokyo (Tokyoto Hoikushi Jittai Chosa) conducted by the Tokyo Metropolitan Government in 2013 and 2018.[12] The government sent a questionnaire to the universe of licensed childcare providers who received or renewed their licenses in Tokyo in the last five years, regardless of their current employment status. The 2013 survey wave was conducted from the last week of August to the first week of September. The 2018 wave was conducted in the first two weeks of August. Since the first reform was implemented in April 2013, the August 2013 survey therefore partly reflects the first five months of the new regime.

https://www.mhlw.go.jp/web/t_doc?dataId=00tb5050&dataType=1&pageNo=4 and https://www.mhlw.go. jp/web/t_doc?dataId=00ta9144&dataType=1&pageNo=1 (in Japanese).

[10] Details of the 2015 reform can be found at https://www8.cao.go.jp/shoushi/shinseido/law/kodomo3houan/ pdf/seisyourei/h270331/k49-honbun.pdf (in Japanese).

[11] Details of the 2017 reform can be found at https://www8.cao.go.jp/shoushi/shinseido/law/kodomo3houan/pdf/seisyourei/ h290331/kaiseigo_honbun.pdf (in Japanese).

[12] See https://www.fukushihoken.metro.tokyo.lg.jp/kodomo/shikaku/25chousa.html (in Japanese).

A major benefit of the survey is that it allows us to distinguish between childcare providers who are currently working, left their job, or never worked as a childcare provider. The survey asks currently employed workers about their employment contract, the type of facility they work for (e.g., whether it is certified by the central government or the Tokyo government), the management type of the facility they work for (e.g., public or private), the districts (23 special wards, city, town/village, islands, or other (outside of Tokyo)), their experience, and their tenure. The survey also provides information on working hours per week and the annual income, from which we calculate the hourly wage.

The survey also asks whether respondents intend to leave their job. Respondents are asked to choose from the following: (1) no intention to separate, (2) intend to separate to move to another job, and (3) intend to separate for marriage, childbirth, or other personal reasons. The survey further asks those intending to separate to provide more detailed reasons. We group the 15 possible responses into the following four categories: (1) marriage, childbirth, elderly care, (2) low pay, (3) excessive hours, and (4) other (relationship with co-workers, relationship with parents, job fit, interested in other jobs).

The total number of respondents was 15,369 in 2013 and 15,358 in 2018. The response rates were 54.7% in 2013 and 35.7% in 2018. Despite the relatively low response rates, we did not find a serious non-response bias in the survey, as we discuss in Section 4.1.

4.1 Analysis of Potential Selection Bias

In this section, we examine non-responses. To do so, we look at the characteristics of survey respondents and compare them with the characteristics of the population of licensed childcare providers in Tokyo. The Tokyo Metropolitan Government provided us with datasets containing the universe of licensed childcare providers who received or renewed their license in Tokyo in the last five years. The survey was sent to childcare providers who were on this registry.

Table 1 shows the means and standard deviations of variables for the basic characteristics of childcare providers based on the universe of childcare providers in Tokyo and in the Survey of Licensed Childcare Providers in Tokyo. Despite the relatively low response rate of the survey, the differences in the means are relatively small. For example, the geographical distribution of survey respondents in terms of their area of residence reflects the population distribution quite well. For instance, both in the surveys and the population around 50% live in the 23 wards of Tokyo. The same generally applies to the age distribution. The only noticeable difference between the survey and the population registry is that the survey underrepresents the age group of 25-29-year-olds by about 5-6 percentage points and overrepresents the 40-44 and 45-49 age groups by about 2 percentage points. Moreover, for 2013, the share of childcare providers who obtained their license through school is about 4 percentage points lower in the survey than in the population.

To address the potential bias arising from such discrepancies, we create sample adjustment

weights, which are calculated as N/n, where N denotes the number of individuals in the population and n denotes the number of individuals in the sample. All the analyses below use these weights when calculating descriptive statistics and running regressions.

Table 1: Descriptive Statistics of Survey Respondents and Population of Childcare Providers in 2013 and 2018

	(1) 2013 Population		(2) 2013 Survey		(3) 2018 Population		(4) 2018 Survey	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Female=1	0.930	(0.255)	0.915	(0.279)	0.931	(0.253)	0.946	(0.226)
Age	33.251	(10.696)			35.667	(11.908)		
Age Categories								
20-24	0.232	(0.422)	0.224	(0.417)	0.206	(0.404)	0.194	(0.395)
25-29	0.260	(0.439)	0.194	(0.396)	0.205	(0.404)	0.156	(0.362)
30-34	0.148	(0.355)	0.141	(0.348)	0.130	(0.337)	0.121	(0.327)
35-39	0.101	(0.301)	0.111	(0.314)	0.118	(0.323)	0.123	(0.329)
40-44	0.087	(0.281)	0.111	(0.314)	0.098	(0.298)	0.117	(0.321)
45-49	0.072	(0.258)	0.090	(0.286)	0.086	(0.280)	0.107	(0.309)
50-54	0.052	(0.222)	0.066	(0.248)	0.068	(0.251)	0.091	(0.287)
55-59	0.027	(0.161)	0.036	(0.185)	0.049	(0.215)	0.058	(0.233)
60-64	0.014	(0.119)	0.018	(0.133)	0.025	(0.155)	0.023	(0.150)
65-69	0.006	(0.077)	0.007	(0.086)	0.011	(0.105)	0.009	(0.095)
70 or above	0.002	(0.046)	0.002	(0.049)	0.004	(0.064)	0.002	(0.048)
Area								
Tokyo 23 Wards	0.505	(0.500)	0.489	(0.500)	0.508	(0.500)	0.514	(0.500)
Tokyo Cities	0.363	(0.481)	0.364	(0.481)	0.338	(0.473)	0.349	(0.477)
Tokyo Villages/Islands	0.002	(0.043)	0.010	(0.101)	0.001	(0.033)	0.008	(0.087)
Outside Tokyo	0.130	(0.337)	0.128	(0.335)	0.153	(0.360)	0.130	(0.336)
Certification								
Licensed through a program	0.791	(0.406)	0.751	(0.433)	0.618	(0.486)	0.613	(0.487)
Observations	31617		15369		46586		15358	

Sources: The Population Registry of Licensed Childcare Providers in Tokyo, Survey of Licensed Childcare Providers in Tokyo.

Note: The table shows the means and standard deviations of each variable. “2013 Population” shows the means and standard deviations for all registered childcare providers in 2013. “2013 Survey” shows those for survey respondents in 2013. “2018 Population” shows the means and standard deviations for all registered childcare providers in 2018. “2018 Survey” shows those for survey respondents in 2018.

4.2 Descriptive Statistics

Before moving on to our main empirical strategy, we present descriptive statistics from the data. The analysis below will focus on licensed childcare providers aged 20-59 that are full-time employees with a permanent contract.

Table 2: Descriptive Statistics, Current Workers, 2013

	(1) Private		(2) Public		(3) Difference	
	Mean	SD	Mean	SD	Mean	t
Outcomes						
Log Hourly Wage	6.94	0.45	7.19	0.47	0.26***	(12.98)
Intention to Separate	0.26	0.44	0.16	0.37	-0.09***	(-6.58)
Reason (1): Job-to-Job Transition	0.24	0.43	0.14	0.35	-0.10***	(-6.98)
Reason (1): Labor Force Exit	0.02	0.14	0.02	0.14	0.00	(0.19)
Reason (2): Marriage/Childbirth	0.11	0.32	0.08	0.28	-0.03***	(-2.65)
Reason (2): Low Pay	0.20	0.40	0.08	0.27	-0.12***	(-10.64)
Reason (2): Long Hour	0.18	0.38	0.09	0.29	-0.08***	(-7.23)
Reason (2): Other	0.17	0.37	0.11	0.31	-0.05***	(-4.21)
Characteristics						
Experience	4.19	3.79	5.22	5.48	1.42***	(6.26)
Female=1	0.90	0.30	0.92	0.27	0.01	(1.09)
Married=1	0.27	0.44	0.30	0.46	0.04**	(2.19)
Child under 6	0.11	0.31	0.13	0.34	0.04***	(2.76)
Age						
20-24	0.41	0.49	0.33	0.47	-0.07***	(-3.84)
25-29	0.30	0.46	0.43	0.50	0.12***	(6.54)
30-34	0.13	0.33	0.13	0.33	0.01	(0.39)
35-39	0.06	0.24	0.06	0.24	-0.00	(-0.05)
40-44	0.04	0.19	0.03	0.17	-0.01*	(-1.76)
45-49	0.03	0.18	0.02	0.13	-0.02***	(-3.22)
50-54	0.02	0.15	0.01	0.11	-0.01**	(-2.17)
55-59	0.01	0.10	0.00	0.06	-0.01	(-1.63)
Area						
Tokyo 23 Wards	0.51	0.50	0.61	0.49	0.09***	(4.87)
Tokyo Cities	0.42	0.49	0.29	0.45	-0.13***	(-7.21)
Tokyo Villages/Islands	0.00	0.04	0.00	0.03	0.00	(0.03)
Outside Tokyo	0.07	0.25	0.09	0.29	0.03**	(2.43)
Certification						
Licensed through a certification program	0.89	0.31	0.91	0.29	0.02	(1.43)
Education						
University	0.23	0.42	0.48	0.50	0.24***	(13.14)
2-Year College	0.38	0.49	0.23	0.42	-0.14***	(-8.37)
Others	0.39	0.49	0.29	0.46	-0.10***	(-5.57)
Facility Type						
Central Government Certified	0.69	0.46	0.83	0.38	0.15***	(9.63)
Tokyo Government Certified	0.12	0.33	0.00	0.05	-0.12***	(-21.21)
Kodomoen	0.02	0.15	0.00	0.03	-0.02***	(-7.74)
For-profit=1	0.19	0.40	0.00	0.00	-0.20***	(-30.05)
Observations	3589		847		4482	

Source: Survey of Licensed Childcare Providers in Tokyo.

Note: The table shows the means and standard deviations of variables. "Difference" shows the difference in the means and t-statistics for the difference. The sample used for the analysis is licensed childcare providers aged 20-59 that are full-time employees with a permanent contract. Sample adjustment weights are used in the estimations.

Table 2 presents the means and standard deviations of the variables for childcare providers in private and public facilities in 2013, the first year for which we have survey data. Column (3), "Difference," reports the difference in the means and t-statistics for the difference. Starting with the log hourly wage, we find that this was 6.94 (≈1,033 yen) in private childcare facilities and 7.19 (≈ 1,326 yen) in public facilities, indicating that wages are about 30% higher in the latter. While the wages of

workers in public facilities are higher than those of workers in private facilities, they still lag behind the national average wage of other occupations. Next, we look at the shares of those intending to leave their job. We find that 26% of workers in private facilities say they intend to leave their job, while the corresponding figure for those working in public facilities is 16%. This difference may reflect the wage differences between private and public facilities.

The next few rows show the reasons why workers intend to leave their job. While the intention to separate in order to exit the labor force is only 2% for workers at both private and public facilities, the intention to separate to switch to another job (job-to-job transition) is higher among those at private facilities (24%) than those at public facilities (14%). Again, this suggests that dissatisfaction with the low level of pay is the primary reason for wanting to leave. The Reason (2) variables represent respondents answers to the multiple choice questions regarding why they want to separate. Among workers in private facilities, 20% answered that they intended to leave due to low pay. Moreover, there is a 12 percentage point difference in the intention to leave due to low pay between workers in private and public facilities. The means also reveal a 9 percentage point difference in the intention to leave due to long hours. The next few rows report the means for various variables representing workers' characteristics. We find that workers in private facilities are less experienced, more likely to be in their early 20s, less likely to be located in the 23 wards of Tokyo, and less likely to have a university degree.

4.3 The Determinants of the Wages for Childcare Providers

Before we examine the relationship between the subsidies for childcare facilities and the wages of childcare providers as well as the link between childcare providers' wages and their intention to separate, we examine the determinants of the wages for childcare providers. To do so, we regress the log of hourly wages on a number of variables using the survey of licensed childcare providers in Tokyo conducted in 2013. The coefficients on the education variables provide information on the return to education for childcare providers.

The results are shown in Table 3. In the estimation using the full sample (column (1)), the coefficient on the university dummy indicates that the wages of university graduates are only 3% higher than those of 2-year college graduates. Meanwhile, the subsample estimation results show that among permanent workers in private facilities, the university premium is only 4.6% (column (2)), while in the remaining subsample estimations it is insignificant. These results suggest that the return to education for childcare providers is relatively low compared to other occupations. For example, using the Basic Survey on Wage Structure, Kambayashi et al. (2008) estimate that the return to university education for full-time female workers in 2003 was approximately 47%, and the return to 2-year college education was 31% (compared to the reference group of junior high school graduates, who received 9 years of schooling).

Table 3: Determinants of the Log Hourly Wage of Childcare Providers

	(1) All	(2) Private Permanent	(3) Public Permanent	(4) Private Temporary	(5) Public Temporary
Experience	0.009**	0.023***	0.048***	-0.002	-0.000
	(0.004)	(0.005)	(0.012)	(0.005)	(0.008)
Experience2	0.000	0.000	-0.001	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female=1	-0.050**	-0.091***	0.075	-0.026	-0.050
	(0.023)	(0.024)	(0.092)	(0.066)	(0.101)
Education (Ref: 2-Year College)					
University	0.032*	0.046**	0.056	-0.006	0.074
	(0.017)	(0.024)	(0.039)	(0.033)	(0.065)
Others	-0.002	-0.018	0.004	-0.003	0.125***
	(0.013)	(0.020)	(0.045)	(0.020)	(0.038)
Age (Ref: 55-59)					
20-24	-0.205***	-0.213***	-0.082	-0.110*	-0.107
	(0.032)	(0.066)	(0.289)	(0.061)	(0.086)
25-29	-0.107***	-0.141**	0.058	-0.112**	-0.200**
	(0.031)	(0.066)	(0.290)	(0.047)	(0.085)
30-34	-0.070**	-0.108*	0.022	-0.066*	-0.242***
	(0.030)	(0.065)	(0.295)	(0.038)	(0.087)
35-39	-0.042	-0.095	0.081	-0.075**	-0.142**
	(0.030)	(0.067)	(0.290)	(0.037)	(0.066)
40-44	-0.048*	-0.105	0.010	-0.046	-0.138**
	(0.029)	(0.069)	(0.282)	(0.034)	(0.063)
45-49	-0.053*	-0.122*	0.258	-0.062*	-0.086
	(0.029)	(0.068)	(0.270)	(0.037)	(0.064)
50-54	-0.008	-0.131	0.178	0.032	-0.060
	(0.033)	(0.089)	(0.261)	(0.041)	(0.061)
Area (Ref: Outside of Tokyo)					
Tokyo 23 Wards	0.082***	0.068**	-0.056	0.105***	0.243***
	(0.020)	(0.033)	(0.047)	(0.032)	(0.042)
Tokyo Cities	0.037*	0.047	-0.054	0.059*	0.028
	(0.020)	(0.032)	(0.047)	(0.032)	(0.054)
Tokyo Villages/Islands	-0.015	0.000	-0.123	0.002	-0.126
	(0.057)	(0.087)	(0.095)	(0.103)	(0.114)
Employment Type (Ref: Fulltime and Temporary)					
Fulltime and Permanent	0.243***				
	(0.015)				
Part-time and Temporary	0.014				
	(0.020)				
Type of Facility:	-0.166***				
Private=1	(0.015)				
Central Government Certified	0.031**	0.022	-0.001	0.053**	0.013
	(0.015)	(0.024)	(0.051)	(0.022)	(0.033)
Tokyo Government Certified	-0.035	-0.058	-0.372**	0.027	-0.072
	(0.029)	(0.041)	(0.154)	(0.039)	(0.106)
Kodomoen	-0.060*	-0.113***	-0.509***	0.023	
	(0.034)	(0.042)	(0.065)	(0.061)	
For-profit=1	-0.128***	-0.148***		-0.091***	
	(0.021)	(0.029)		(0.028)	
Constant	6.942***	7.048***	6.916***	6.779***	6.919***
	(0.048)	(0.080)	(0.306)	(0.081)	(0.139)
R-squared	0.140	0.099	0.234	0.037	0.122
No. of observations	6248	3000	704	1809	735

Source: Survey of Licensed Childcare Providers in Tokyo in 2013.

Note: The sample used in this table is licensed childcare providers aged 20-59 that are full-time employees with a permanent contract. Column (1) includes all workers, columns (2)-(3) include workers who are regularly employed and with a permanent contract, and columns (4)-(5) include workers who are not on a permanent contract. All models are estimated using ordinary least squares (OLS). Robust standard errors in parentheses. Sample adjustment weights are used in the estimations.

Next, the first two rows of Table 3 show the return to experience for childcare providers. The coefficients on the experience variables (number of years and square of the number of years) in column (1) show that the return to experience is only 0.9% and that there is no indication that there is a non-linear relationship between wages and experience. The return to experience for permanent workers in private facilities (column (2)) is 2.3%, while that for permanent workers in public facilities (column (3)) is 4.8%. This result is consistent with the fact that salaries at public facilities follow civil servants' salaries, so that their salaries increase with experience. On the other hand, the salaries of workers in private facilities are constrained by the amount of government subsidies and are not tied to workers' experience.[13] Low returns to experience likely act as a disincentive to continue to work as a childcare provider in a private facility. Yet, recent studies show that childcare provider experience has a positive impact on child development (Chetty et al., 2011; Fujisawa and Nakamuro, 2017), suggesting that it is important to provide childcare providers in private facilities with an incentive to continue working.

The results for the return to experience for workers on temporary contracts in private facilities (column (4)) and public facilities (column (5)) indicate that hourly wages of temporary workers do not increase with experience. This result is consistent with the findings of Shimizutani and Noguchi (2005), who estimated the hourly wage of childcare providers using a 2002 survey from the Kanto Region and three other prefectures.

Turning to the estimation results for the remaining variables, these show that hourly wages tend to be lower among younger workers and tend to be higher in the 23 wards of Tokyo. Full-time permanent workers were paid 24.3% more than full-time temporary contract workers. Next, the coefficient on the dummy for private facilities shows that hourly wages at private facilities are 16.6% lower than those at public facilities. Meanwhile, the coefficient on the for-profit dummy shows that for-profit facilities pay 15% less than nonprofit facilities.

5. Empirical Strategy

We are interested in the link between the subsidies for childcare facilities and the wages of childcare providers as well as the link between childcare providers' wages and their intention to separate. Our primary research design compares childcare workers' wages and their intention to separate in private facilities in 2018 ("post") with 2013 (just at the beginning of the treatment). To deal with confounding factors, such as macro-economic and other aggregate shocks that might affect the variables we are

[13] The return to experience for childcare providers is relatively low compared to other occupations. Conducting a so-called "extended" Mincer regression with tenure variables, which makes it possible to estimate the effects of experience and tenure separately, Kambayashi et al. (2008), for example, found that the return to experience is 1.2% and the return to tenure is 4.2%. Note that the Survey of Licensed Childcare Providers asks only about the longest tenure in workers' careers, not the tenure at the current employer. We therefore cannot decompose the impact captured by our experience variable into the contribution of tenure and of experience.

interested in, we use childcare workers in public facilities as the control group. As mentioned, workers in private facilities are regarded as the treatment group, i.e., those affected by the reforms, while workers in public facilities have not been affected by the reforms and therefore serve as the control group.

The difference-in-differences specification we use looks as follows:

$$y_i = \beta_1 Private_i + \beta_2 y2018_i + \gamma Private_i \times y2018_i + \delta \boldsymbol{X}_i + e_i \quad (1)$$

where y_i denotes individual i's log hourly wage or intention to separate, $Private_i$ takes 1 if a childcare provider works for a private childcare facility, and $y2018i$ takes 1 for 2018 data.

From 2013 to 2018, the number of childcare facilities increased, and so did the demand for childcare providers. It is therefore possible that the composition of childcare providers in terms of their characteristics and that of types of childcare facilities may have changed over time. To address this issue, we include variables representing childcare providers' characteristics and childcare facilities' characteristics, summarily denoted by $\mathbf{X}_i$, in Specification (1). Specifically, as variables representing childcare providers' characteristics, we use their age (age groups in five-year intervals), experience (in number of years), experience^2 (to check whether there is a non-linear relationship between wage and experience), a gender dummy (female), a dummy for their marital status, a dummy representing whether they have a child under the age of 6, license certification method (license through a certification program or national examination), and education dummies (university, 2-year college, and other).

As variables representing childcare facilities' characteristics, we use dummies for the geographical location of the facility (23 special wards of Tokyo, cities in the Tokyo Metropolis, villages/islands belonging to the Tokyo Metropolis, outside of Tokyo), dummies for the type of facility (certified by the national government, i.e., "Ninka Hoiku"; certified by the Tokyo Metropolitan Government, i.e., "Ninsho Hoiku"; nationally certified kindergartens/childcare facilities, i.e., "Kodomoen"; and other), and the type of organization (for-profit or non-profit). Note that we are unable to check for any trends before our observation period since only the two surveys are available. All the regressions below include the sample adjustment weights.

The survey asks respondents for the reason why they intend to separate from their job (if they do). We group reasons for intending to separate into two categories – (1) to change jobs (job-to-job transition) or (2) to exit from the labor force for personal or family reasons such as getting married, giving birth, etc. – and use a dummy variable for each as a dependent variable. The intention to separate in order to change jobs may reflect low wages. Workers are more likely to switch to another job if the offered wage in the other job is higher than their current wage. The intention to separate for personal or family reasons may indicate that workers choose not to work because the value of household production is higher than their current wage. To provide further evidence, we examine more

detailed reasons for the intention to separate. If low pay is the primary reason why workers intend to leave their job, we hypothesize that the effects of an increase in subsidies should primarily show up in the form of fewer workers intending to separate because of low pay and excessive hours.

6. Results

This section presents our main results examining the hourly wage and intention to separate of childcare providers employed at the time of the surveys.

6.1 Effect of Subsidies on Childcare Providers' Wages

Columns (1) and (2) in Table 4 show the main results from Specification (1), where the outcome is the log hourly wage. We are interested in the interaction between the dummy for 2018 and the "Private" dummy, which takes on the value 1 for workers employed in a private childcare facility. The "Base" model shows the interaction between the 2018 dummy and the "Private" dummy. The "Controls" model includes the variables for worker characteristics and childcare facility characteristics defined in section 5.

We find an approximately 7% increase in the hourly wage of workers in private childcare facilities after the reforms relative to workers in public facilities. The results are similar in the specifications with and without controls, suggesting that the results are not driven by changes in worker and facility characteristics over time. The result implies a relatively high rate of pass-through of the subsidies to wages.

6.2 Effect of Wage Increases on the Intention to Separate

Columns (3) and (4) in Table 4 report the effect of the reforms on the intention to separate. We find a 5 percentage point decrease in the intention to separate relative to workers in public facilities from the pre-reform mean of 26%. The results with and without controls are virtually the same.

Combining this result with our finding on the wage above implies a labor supply elasticity of 2.7(= 0.19/0.07). This labor supply elasticity is quite large, implying childcare workers are very sensitive to changes in the wage.

We next probe deeper into the reasons for the intention to separate. Table 5 shows the effect of the reforms on the intention to separate either due to switching jobs or stopping to work. For simplicity, we report only the results including controls. Column (1) shows the intention to separate in order to switch jobs. The coefficient on the interaction term suggests that the intention to separate has dropped by 4.4 percentage points from the pre- reform level of 24%. On the other hand, we observe no effect on the intention to separate in the case of those who want to stop working (column (2)). These results are consistent with our hypothesis that childcare providers in private facilities would

be less likely to intend to separate for another job after the reforms.

Table 6 examines the reason for the intention to separate using the multiple-choice question. Column (2) shows the results for the intention to separate due to low pay. There was a 4.8 percentage point decrease in the intention to separate from the initial level of 20%. Column (3) shows the results for the intention to separate due to excessive hours. There was a 4.7 percentage point decrease in the intention to separate from the initial level of 18%. On the other hand, we see a small and insignificant effect on the intention to separate due to marriage or childcare (Column (1)).

Table 4: Effect of the Reforms on the Log Hourly Wage and the Intention to Separate

	(1)	(2)	(3)	(4)
	Log Wage		Intention	
	Base	Controls	Base	Controls
2018	-0.024	-0.051*	0.072***	0.084***
	(0.027)	(0.026)	(0.019)	(0.019)
Private	-0.245***	-0.165***	0.099***	0.094***
	(0.020)	(0.020)	(0.015)	(0.016)
2018 × Private	0.068**	0.072**	-0.051**	-0.050**
	(0.030)	(0.029)	(0.021)	(0.021)
Controls		Yes		Yes
R-squared	0.016	0.093	0.005	0.026
No. of observations	9612	9579	10387	10339

Source: Survey of Licensed Childcare Providers in Tokyo.

Note: Coefficients from Specification (1). All regressions compare workers in 2013 and 2018. "2018" is a dummy variable that takes on the value 1 for data in 2018. "Private" is a dummy variable that takes on the value 1 if a worker works for a private childcare facility and 0 otherwise. "2018 × Private" shows the interaction of these two dummy variables, which represents the treatment effect of the increase in subsidies for workers in private childcare facilities. All models are estimated using OLS and include the variables for worker and facility characteristics. Robust standard errors in parentheses. Sample adjustment weights are used in the estimations.

Table 5: Effect of the Reforms on the Intention to Separate due to Switching Jobs or to Stop Working

	(1)	(2)
	Job-to-Job Transition	Labor Force Exit
2018	0.077***	0.007
	(0.018)	(0.007)
Private	0.094***	0.000
	(0.015)	(0.006)
2018 × Private	-0.044**	-0.006
	(0.020)	(0.008)
Controls	Yes	Yes
R-squared	0.026	0.005
No. of observations	10339	10339

Source: Survey of Licensed Childcare Providers in Tokyo.

Note: Coefficients from Specification (1). All regressions compare workers in 2013 and 2018. "2018" is a dummy variable that takes on the value 1 for data in 2018. "Private" is a dummy variable that takes on the value 1 if a worker works for a private childcare facility and 0 otherwise. "2018 × Private" shows the interaction of these two dummy variables, which represents the treatment effect of the increase in subsidies for workers in private childcare facilities. All models are estimated using OLS and include the variables for worker and facility characteristics. Robust standard errors in parentheses. Sample adjustment weights are used in the estimations.

Table 6: Intention to Separate: Multiple-Choice Question

	(1) Marriage Childbirth	(2) Low Pay	(3) Excess Hour	(4) Other
2018	0.042***	0.076***	0.092***	0.083***
	(0.014)	(0.015)	(0.016)	(0.017)
Private	0.032***	0.105***	0.077***	0.060***
	(0.012)	(0.013)	(0.013)	(0.013)
2018 × Private	-0.005	-0.048***	-0.047***	-0.036*
	(0.016)	(0.017)	(0.018)	(0.019)
Controls	Yes	Yes	Yes	Yes
R-squared	0.017	0.035	0.024	0.025
No. of observations	10448	10448	10448	10448

Source: Survey of Licensed Childcare Providers in Tokyo.

Note: Coefficients from Specification (1). All regressions compare workers in 2013 and 2018. "2018" is a dummy variable that takes on the value 1 for data in 2018. "Private" is a dummy variable that takes on the value 1 if a worker works for a private childcare facility and 0 otherwise. "2018 × Private" shows the interaction of these two dummy variables, which represents the treatment effect of the increase in subsidies for workers in private childcare facilities. All models are estimated using OLS and include the variables for worker and facility characteristics. Robust standard errors in parentheses. Sample adjustment weights are used in the estimations.

7. Analysis of Reservation Wage

Despite the gradual increase in the wages of childcare providers, approximately one-third of licensed childcare providers were still not working at the going wage in 2018, and around one quarter of workers still indicated that they intended to separate.

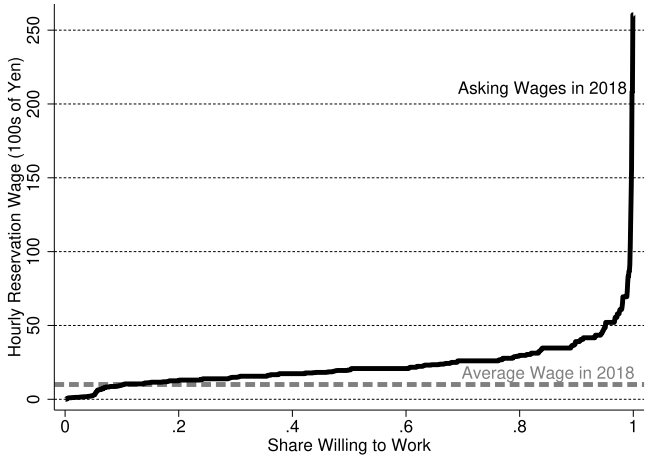
In this section, we provide suggestive evidence on how much the wage might need to increase to induce more childcare providers to stay in work. We examine respondents' reservation wage, which is the lowest wage rate that would make a person indifferent between working and not working. Labor supply theory suggests that if the market wage is below a person's reservation wage, the person will not work. A rise in the market wage increases the opportunity cost of not working, raising the relative cost of household production.

To measure the reservation wage, we rely on the following survey question: "How much would you like to be paid to continue to work?" We examine the reservation wage separately among the following three groups: (1) providers working at the time of the survey with the intention to separate, (2) former childcare providers not working at the time of the survey (job leavers), and (3) licensed providers who had never worked at a childcare facility (never workers). The self-reported reservation wage is available for both 2013 and 2018 in the case of job leavers and never workers; however, for those working and intending to separate, it is available only for 2018. The higher the reservation wage, the lower is the probability that an individual will accept a job or remain in the current job.

Figure 2 plots the (inverted) cumulative distribution function for reservation wages among all licensed childcare providers, including those who have since separated or never worked. We can think of this as providing suggestive evidence on the labor supply curve for childcare workers. Strik-

ingly, only around 10% of childcare workers report a reservation wage that is at or below the average wage in 2018. Consistent with our finding of an elastic labor supply elasticity of 2.7, the curve is also quite elastic over much of the distribution, consistent with the idea that workers are very responsive to changes in the wage. According to the figure, doubling the share of those willing to work from 0.1 to 0.2 (a 100% increase) could be achieved by increasing the hourly wage from around 1,000 yen to 2,800 yen, a 180% increase.

Figure 2: Asking Wages versus Average Wage in 2018



Source: The Survey of Licensed Childcare Providers in Tokyo 2018.
Note: The figure plots the (inverted) cumulative distribution function of reservation wages among all licensed childcare providers, including those who have since separated or never worked.

We can separately examine the reservation wages of those intending to separate, leavers, and never workers. We begin by providing descriptive statistics on reservation wages, and then regress reservation wages on worker characteristics (and characteristics of the facilities in which they work if they work) to examine the determinants of reservation wages. Note that this analysis tells us about the average reservation wages of these groups, which differs from the effect of a marginal increase in wages implied by our estimate of the labor supply elasticity.

7.1 Current Providers with the Intention to Separate

Table 7 shows the means and standard deviations of the reservation wages and other characteristics for providers with the intention to separate based on the 2018 survey. The table indicates that the log hourly wage of workers in private facilities is 6.89 (≈ 982 yen) on average, while the log hourly reservation wage is 7.48 (≈ 1,772 yen). The gap between the log hourly wage and the log hourly reservation wage is quite large, 0.59 log points, which equates to ≈ 800 yen (about 8 dollars). The level of wages for workers in public facilities is higher than that in private facilities. For workers in public facilities, the gap between the log hourly wage and the log hourly reservation wage is similarly

large, 0.60 log points, ≈ 938 yen (ca. 9 dollars). This gap indicates that current workers with the intention to separate would likely remain employed if the wage was approximately 1.8 times higher than the current rate.

Table 7: Descriptive Statistics: Current Childcare Providers Intending to Separate Due to Unsatisfactory Wage (2018)

	(1) Private		(2) Public		(3) Difference	
	Mean	SD	Mean	SD	Mean	t
Outcomes						
Log Hourly Wage	6.89	0.76	7.04	0.82	0.16***	(2.62)
Log Hourly Reservation Wage	7.48	0.76	7.64	0.76	0.18***	(3.19)
Characteristics						
Experience	4.05	3.78	5.99	6.15	2.37***	(5.00)
Female=1	0.95	0.21	0.95	0.22	-0.01	(-0.74)
Married=1	0.39	0.49	0.47	0.50	0.06	(1.62)
Child under 6	0.17	0.38	0.22	0.41	0.05*	(1.75)
Age						
20-24	0.32	0.47	0.27	0.44	-0.05	(-1.55)
25-29	0.29	0.46	0.32	0.47	0.03	(0.94)
30-34	0.13	0.33	0.16	0.37	0.02	(0.89)
35-39	0.09	0.28	0.11	0.32	0.03	(1.31)
40-44	0.06	0.24	0.07	0.25	0.01	(0.56)
45-49	0.05	0.21	0.03	0.17	-0.02	(-1.36)
50-54	0.04	0.20	0.02	0.14	-0.03**	(-2.53)
55-59	0.02	0.14	0.03	0.16	0.01	(0.70)
Area						
Tokyo 23 Wards	0.53	0.50	0.56	0.50	0.04	(1.13)
Tokyo Cities	0.36	0.48	0.29	0.46	-0.06*	(-1.90)
Tokyo Villages/Islands	0.00	0.04	0.00	0.02	-0.01	(-1.17)
Outside Tokyo	0.11	0.32	0.15	0.36	0.03	(1.19)
Certification						
Licensed through a certification program	0.76	0.42	0.84	0.36	0.09***	(3.02)
Education						
University	0.24	0.43	0.40	0.49	0.14***	(4.13)
2-Year College	0.27	0.44	0.25	0.43	-0.01	(-0.29)
Others	0.49	0.50	0.35	0.48	-0.13***	(-3.73)
Facility Type						
Central Government Certified	0.66	0.47	0.78	0.42	0.11***	(3.56)
Tokyo Government Certified	0.08	0.27	0.01	0.11	-0.07***	(-6.09)
Kodomoen	0.06	0.24	0.05	0.22	-0.01	(-0.48)
For-profit=1	0.31	0.46	0.00	0.00	-0.31***	(-22.39)
Observations	1093		221		1314	

Source: Survey of Licensed Childcare Providers in Tokyo.

Note: The table shows the means and standard deviations of variables. "Difference" shows the difference in the means and t-statistics for the difference. The sample used for the analysis is licensed childcare providers aged 20-59 that are full-time employees with a permanent contract with the intention to separate. Sample adjustment weights are used in the estimations.

Table 8 shows the determinants of the reservation wage. Column (1) presents the results for workers in private facilities. Interestingly, the reservation wage is increasing in experience. Even though the reforms provided childcare facilities with more subsidies for workers with experience, this result suggests that more may be needed. Among all workers who intend to separate, the results show that higher wages may be needed to retain younger workers.

Table 8: Determinants of the Reservation Wage

	(1) Log Res.Wage Private	(2) Log Res.Wage Public
Experience	0.041**	-0.029
	(0.020)	(0.027)
Experience2	-0.002	0.002*
	(0.001)	(0.001)
Female=1	-0.058	-0.268
	(0.137)	(0.174)
Married=1	0.050	0.170
	(0.064)	(0.148)
Child under 6	-0.038	0.141
	(0.079)	(0.166)
Age (Ref: 55-59)		
20-24	0.373**	0.398*
	(0.174)	(0.222)
25-29	0.415**	0.490**
	(0.172)	(0.197)
30-34	0.402**	0.439**
	(0.176)	(0.194)
35-39	0.236	0.310
	(0.177)	(0.248)
40-44	0.152	0.505**
	(0.181)	(0.203)
45-49	0.307*	0.080
	(0.179)	(0.415)
50-54	0.438**	0.348**
	(0.179)	(0.175)
Area (Ref: Outside of Tokyo)		
Tokyo 23 Wards	0.071	0.317*
	(0.091)	(0.180)
Tokyo Cities	0.060	0.091
	(0.098)	(0.185)
Tokyo Villages/Islands	0.202	-0.213
	(0.184)	(0.228)
Licensed through a certification program	-0.118	0.003
	(0.074)	(0.195)
Education (Ref: 2-Year College)		
University	0.083	0.053
	(0.071)	(0.140)
Others	0.021	-0.099
	(0.069)	(0.187)
Type of Facility:		
Central Government Certified	0.012	0.229
	(0.069)	(0.179)
Tokyo Government Certified	0.097	0.445
	(0.093)	(0.345)
Kodomoen	0.009	0.277
	(0.102)	(0.208)
For-profit=1	-0.030	
	(0.054)	
Constant	7.049***	7.012***
	(0.260)	(0.371)
Controls	Yes	Yes
R-squared	0.025	0.127
No. of observations	1091	221

Source: Survey of Licensed Childcare Providers in Tokyo.

Note: The sample used for the analysis is licensed childcare providers aged 20-59 that are full-time employees with a permanent contract with the intention to separate. Robust standard errors in parentheses. Sample adjustment weights are used in the estimations.

7.2 Job Leavers and Never Workers

We next investigate the reservation wage among job leavers and never workers. Job leavers are licensed childcare providers who worked as childcare providers at some point but no longer did at the time of the survey, while never workers are licensed childcare providers who never worked as a childcare provider.

Table 9 shows the descriptive statistics for job leavers and never workers. The first row indicates that job leavers' log hourly reservation wage is 7.91 (≈ 2,724 yen) and that of never workers is 7.97 (≈ 2,892 yen). This is much higher than the hourly wage of employed workers shown in Table 2, which is 6.94 (≈ 1, 033 yen). This indicates that for job leavers and never workers to consider working as childcare providers, wages would have to be ≈ 3 times higher than the going rate.

Table 9: Descriptive Statistics: Job Leavers and Never Workers

	(1) Leaver		(2) Never Worker		(3) Difference	
	Mean	SD	Mean	SD	Mean	t
Log Hourly Reservation Wage	7.91	0.93	7.97	0.88	0.05***	(3.30)
Characteristics						
Female=1	0.95	0.22	0.93	0.26	-0.02***	(-3.95)
Married=1	0.70	0.46	0.50	0.50	-0.18***	(-20.65)
Child under 6	0.35	0.48	0.23	0.42	-0.09***	(-10.51)
Age						
20-24	0.09	0.28	0.23	0.42	0.14***	(22.79)
25-29	0.22	0.42	0.22	0.41	0.00	(0.52)
30-34	0.22	0.41	0.13	0.34	-0.07***	(-10.32)
35-39	0.16	0.36	0.13	0.34	-0.02**	(-2.51)
40-44	0.11	0.31	0.11	0.31	0.00	(0.03)
45-49	0.09	0.29	0.08	0.27	-0.02***	(-3.61)
50-54	0.06	0.25	0.06	0.23	-0.02***	(-3.54)
55-59	0.05	0.22	0.04	0.19	-0.02***	(-4.08)
Area						
Tokyo 23 Wards	0.44	0.50	0.52	0.50	0.08***	(8.26)
Tokyo Cities	0.32	0.47	0.32	0.47	-0.01	(-1.59)
Tokyo Villages/Islands	0.00	0.03	0.00	0.03	0.00	(0.50)
Outside Tokyo	0.23	0.42	0.16	0.36	-0.06***	(-8.77)
Certification						
Licensed through a certification program	0.77	0.42	0.53	0.50	-0.25***	(-30.40)
Education						
University	0.12	0.32	0.22	0.41	0.09***	(14.94)
2-Year College	0.36	0.48	0.17	0.38	-0.19***	(-23.16)
Others	0.52	0.50	0.61	0.49	0.10***	(11.08)
Observations	4482		8025		12592	

Source: The Survey of Licensed Childcare Providers in Tokyo

Note: The table shows the means and standard deviations of variables. "Difference" shows the difference in the means and t-statistics for the difference. The sample used for the analysis is job leavers and never workers. The sample adjustment weights are used in calculations.

Table 10 shows the determinants of the reservation wage for job leavers and never workers. Consistent with the literature on the reservation wage, marriage increases the required reservation wage substantially. Job leavers in their mid-20s and 30s ask for a 15-22% higher wage than older

leavers. Current wages may not be sufficient to compensate for the cost of childcare for young job leavers. The coefficient on the dummy for females indicates that men who left their job ask for a wage that is 15.7% higher than that of women. This indicates that current wage levels may not be sufficient to attract male potential childcare providers to return to a job, since they have better outside options. Hourly wages may need to increase more to encourage more men to work as childcare providers. Column (3) indicates that the reservation wage of job leavers is 9.8% lower than that of never workers.

Table 10: Determinants of Reservation Wage: Job Leavers and Never Workers

	(1) Res.Wage Leaver	(2) Never Worker	(3) Pool
Female=1	-0.157*	-0.081	-0.100*
	(0.072)	(0.047)	(0.039)
Married=1	0.170***	0.066	0.109***
	(0.040)	(0.035)	(0.026)
Child under 6	-0.107**	0.023	-0.033
	(0.037)	(0.032)	(0.024)
Age (Ref: 55-59)			
20-24	0.066	-0.039	0.006
	(0.094)	(0.071)	(0.054)
25-29	0.146*	0.061	0.098*
	(0.074)	(0.066)	(0.048)
30-34	0.215**	0.090	0.146**
	(0.071)	(0.065)	(0.048)
35-39	0.188**	0.103	0.143**
	(0.073)	(0.062)	(0.047)
40-44	0.141	0.092	0.117*
	(0.073)	(0.062)	(0.047)
45-49	0.080	0.064	0.071
	(0.075)	(0.064)	(0.049)
50-54	0.152*	0.021	0.070
	(0.077)	(0.067)	(0.050)
Area (Ref: Outside of Tokyo)			
Tokyo 23 Wards	-0.052	0.064	0.022
	(0.044)	(0.035)	(0.027)
Tokyo Cities	-0.021	0.011	-0.003
	(0.044)	(0.038)	(0.029)
Tokyo Villages/Islands	-0.028	0.297***	0.173*
	(0.173)	(0.086)	(0.084)
Licensed through a certification program	0.041	-0.037	-0.004
	(0.046)	(0.034)	(0.027)
Education (Ref: 2-Year College)			
University	-0.090	-0.042	-0.053
	(0.058)	(0.035)	(0.030)
Others	-0.025	-0.073	-0.050
	(0.036)	(0.038)	(0.026)
Leaver=1			-0.098***
			(0.021)
Constant	7.852***	7.995***	7.963***
	(0.118)	(0.089)	(0.069)
Controls	Yes	Yes	Yes
R-squared	0.012	0.010	0.010
No. of observations	4482	8024	12506

Source: The Survey of Licensed Childcare Providers in Tokyo

Note: The sample used for the analysis is job leavers and never workers. Robust standard errors in parentheses. The sample adjustment weights are used in calculations.

Low wages and better outside options are the major reason why “never workers” have never worked as a childcare provider. The survey asks about the reasons why respondents never worked as a childcare provider. Approximately 20% of never workers indicated that they could not find a job with a satisfactory wage. Moreover, 34% of never workers stated that they found a different job. Subsidies to increase the wages of childcare providers may induce more never workers to work as childcare providers.

8. Conclusion

This study examined a government reform that gradually increased the subsidies paid to private childcare facilities. We found that much of the increase in subsidies was passed on to workers in the form of higher wages. This increase in wages dramatically reduced the intention to separate by 5 percentage points (19%), driven by reductions in the intention to separate in order to switch jobs and in dissatisfaction due to “low pay” and “excessive hours.” Thus, the reforms appear to have been successful in increasing worker retention.

As childcare labor shortages remain, a key question is how to calibrate and target future reforms to retain workers. Strikingly, we find that 90% of childcare providers have higher reservation wages than the current wage. Overall, the labor supply curve of current workers appears quite elastic, suggesting that small additional increases in wages could substantially reduce job separation in the future.

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