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To cite this article: Hiroataka Ito & Isamu Yamamoto (2021): Do comprehensive and diverse childcare services affect women's labour supply and well-being?, Applied Economics Letters, DOI: [10.1080/13504851.2021.1887802](https://doi.org/10.1080/13504851.2021.1887802)

To link to this article: <https://doi.org/10.1080/13504851.2021.1887802>



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Published online: 08 Mar 2021.



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Do comprehensive and diverse childcare services affect women's labour supply and well-being?

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ABSTRACT

This paper estimates the effect of comprehensive and diverse regional childcare services on Japanese women's labour participation and well-being. On the basis of a sequence of childcare policies introduced in the early 2000s in Japan, we apply the difference-in-differences method. Our empirical results show that these services had positive heterogeneous effects on women's labour supply in terms of extensive and intensive margins, depending on their employment type. Furthermore, we find a mixed result that the availability of such childcare services deteriorated the subjective well-being of regular employees possibly due to the increased working hours, but improved that of nonregular employees possibly due to the increased participation in the labour market.

KEYWORDS

Quality/variety of childcare services; women's employment; women's health condition; difference-in-differences

JEL CLASSIFICATION

J13; J18



1. Introduction

The effects of childcare policies on women's labour supply have been an important topic in several developed countries. In many developed countries where the birth rate is declining, it is an important policy-target to keep the size of labour force. Based on the facts that women have lower employment rates than men, and that mothers usually spend more time on childcare than fathers¹ (Guryan, Hurst, and Kearney 2008; Kalenkoski, Ribar, and Stratton 2005), encouraging women to enter labour market by offering childcare services is becoming more crucial.

The literature in this area has focused mainly on two aspects² childcare subsidies and expanding the capacity of childcare centres. On the other hand, primarily due to data limitations it remains empirically unclear how variations in the types and quality of childcare services affect women's labour supply (Blau and Hagy 1998; Hofferth and Wissoker 1992; Kornstad and Thoresen 2007).³ For example, high-quality childcare services, such as those offering long opening hours and flexible

services for emergency needs of the child or parents, would better match the working conditions of jobs available to women. However, parents would not use a low-quality childcare service even when it is available, decreasing their labour supply in consequence. It might also negatively affect women's sense of well-being by narrowing the choices of available jobs, thus distorting optimal use of the potential labour supply.

The purpose of this study is to provide empirical evidence of the impact of the variety and quality of childcare services on women's labour supply and on their well-being. Our identification strategy relies on a sequence of childcare policies conducted in the early 2000s in Japan. The Japanese government established the 'Law for Measures to Support the Development of the Next Generation (LMSDN)' in 2003 – a law that ordered every local government to create a childcare policy for the periods 2005–2009 and 2010–2014. The plan was required to include various childcare services such as temporary/

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¹In Japanese case, for example, among those who have children less than 6 years old, the average time of childcare per day is 3 hours and 45 minutes for women while 49 minutes for men (Survey on Time Use and Leisure Activities, 2016).

²See Baker, Gruber, and Milligan (2008), Black et al. (2014), Fitzpatrick (2010), and Lefebvre and Merrigan (2008) as examples.

³For example, Kornstad and Thoresen (2007) consider a discrete choice model for labour supply and use of childcare, where mothers take into account a number of pecuniary and nonpecuniary attributes of jobs and childcare, such as working hours, wage rates, and type of work for jobs, and quality of staff, opening hours, and childcare fees.

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short-stay childcare services, in-home childcare services, and so on. For the ‘General Childcare-Support for Model-Municipalities (GCSMM)’ programme conducted in 2004, 49 local governments⁴ were chosen as model regions, based on the contents of their plans for the first period (2005–2009). Because the planned childcare services in these 49 model regions were qualified as comprehensive, diverse, and high quality by the Japanese government, it is inferred that women in these model regions had opportunities to enjoy a variety of high-quality childcare services.

The series of childcare policies provides a quasi-experimental framework for this study. First, the childcare services were planned and conducted according to the LMSDN requirements. Thus, they can be regarded as exogenous to prevent an endogeneity problem in our estimation. Second, the GCSMM programme allows us to identify which local government’s childcare plan was comprehensive, diverse, and of high quality based on whether it was chosen as a model region. Thus, it is possible for us to estimate the effects of comprehensive and diverse childcare services on women’s labour supply and well-being by comparing the outcomes for women who live in model regions with those who do not.

II. Data/methodology

The data used for our empirical analysis are household panel data from the *Japan Household Panel Survey* (JHPS/KHPS) provided by the Keio Household Panel Survey, a nationwide longitudinal survey on households undertaken annually, at the end of January,

every year since 2004. We use data from the 2004–2012 waves, and our primary sample consists of married woman under the age of 40.⁵

The geographic information in JHPS/KHPS allows us to identify whether respondents live in model regions or not. Our approach is to conduct a DD analysis in both nonmatching and matching framework, regarding those in model regions as the treatment group and the others as the control group.⁶ To account for the lag in implementing the childcare policies, we separate our sample periods 2004–2012 into three subperiods: 2004–2006, 2007–2009, and 2010–2012. We compare the differences in the outcome variables to the baseline pre-period 2004–2006, when the effects of the new childcare policies had not yet appeared. The outcome variables are employment dummies (employment, regular employment, and nonregular employment), weekly working hours, and subjective health condition.⁷ Following the guidance by Daw and Hatfield (2018) on when to incorporate matching to avoid biases from the matching DD analysis, we check pre-period differences in outcome variables between treatment and control groups and interpret an either of non-matching or matching result according to the pre-period differences. In the matching DD, to control for different factors that might affect labour supply and health conditions, we compute the propensity scores of the treatment group using covariates that do not have pre-period differences between two groups according to the guidance by Daw and Hatfield (2018), which are age, education, and parents living together dummy.⁸ Descriptive statistics for the variables used in the estimation are shown in Table 1.

⁴The total numbers of local governments in Japan were 3100 on 1 April 2004.

⁵The mean age of mothers giving birth to their first child in Japan was 28.3 in 2004 (Resource: Vital Statistics). Note also that the spouses of the survey respondents are also included in our analysis to secure the sample size. Respondents who moved between model and nonmodel regions are excluded from our analysis to prevent an endogeneity problem caused by these movements.

⁶One possible endogeneity problem in this context is that model regions made active and diverse plans for childcare policies based on the locals’ strong motivation to work. The DD analysis mitigates this problem by removing unobservable and time-invariant effects from the samples. Another possible problem arises when other childcare policies, especially expanding childcare capacity, are different between model and nonmodel regions. In this regard, we checked the trend of coverage rate (total quotas of childcare centres divided by the number of populations under 6) for both regions using municipality-level data. Specifically, we confirmed that a simple regression of coverage rate on interaction of treatment dummy with years, including years’ and municipalities’ fixed effects, shows no statistical significance, and that the DD estimates would be less likely to be confounded by effects of childcare capacity.

⁷A nonregular employee is a worker with a fixed-term contract, including part-time/temporary/short-time/dispatched workers, etc. To assess health condition, JHPS/KHPS asks respondents to rate their subjective health condition on a scale from 1 (very good) to 5 (very bad). We create a Subjective Good Health dummy that takes a value of 1 if the respondent answers the questions with a value of either 1 or 2.

⁸In deriving propensity scores, we use Epanechnikov as a kernel function with a bandwidth of 0.06. Note that for the DD estimation, we use a common support condition.

Table 1. Descriptive statistics.

	2004–06		2007–09		2010–12	
	Treatment	Control	Treatment	Control	Treatment	Control
Emp Dummy	0.342 (0.475)	0.470 (0.499)	0.448 (0.499)	0.551 (0.498)	0.558 (0.499)	0.549 (0.498)
Regular Emp Dummy	0.104 (0.306)	0.162 (0.369)	0.078 (0.269)	0.176 (0.381)	0.158 (0.367)	0.204 (0.403)
Nonregular Emp Dummy	0.223 (0.417)	0.293 (0.455)	0.364 (0.483)	0.360 (0.480)	0.400 (0.492)	0.335 (0.472)
Weekly Working Hours	7.831 (14.680)	12.972 (17.790)	9.787 (14.520)	14.833 (17.710)	13.744 (16.530)	14.444 (17.340)
Subjective Good Health	0.684 (0.466)	0.629 (0.483)	0.691 (0.464)	0.610 (0.488)	0.628 (0.486)	0.559 (0.497)
Age	32.840 (4.331)	32.869 (4.215)	34.000 (3.882)	33.986 (3.807)	35.211 (3.185)	34.688 (3.337)
University Dummy	0.149 (0.356)	0.128 (0.335)	0.156 (0.364)	0.140 (0.347)	0.168 (0.376)	0.140 (0.348)
Junior-College Dummy	0.309 (0.463)	0.286 (0.452)	0.338 (0.474)	0.254 (0.436)	0.368 (0.485)	0.265 (0.442)
Parents Living Together Dummy	0.199 (0.400)	0.234 (0.424)	0.151 (0.360)	0.209 (0.407)	0.105 (0.309)	0.168 (0.374)
Observations	3842					

Note: Numbers in parentheses are standard deviations. The top 1% of weekly working hours are excluded as outliers.

Table 2. Effects of childcare services on each employment rate.

Employment	Regular Employment										
	Level		Diff	Diff-in-Diff		Level		Diff	Diff-in-Diff		
	Treatment	Control	(a) – (b)	(from 2004–06)		Treatment	Control	(a) – (b)	(from 2004–06)		
	(a)	(b)		Nonmatching	Matching	(a)	(b)		Nonmatching	Matching	
2004–06	0.342 (0.475)	0.470 (0.499)	–0.128*** (0.0314)			2004–06	0.104 (0.306)	0.162 (0.369)	–0.0579*** (0.0207)		
2007–09	0.448 (0.499)	0.551 (0.498)	–0.103** (0.0431)	0.0247 (0.0533)	0.0217 (0.0566)	2007–09	0.078 (0.269)	0.176 (0.381)	–0.0978*** (0.0247)	–0.0399 (0.0323)	–0.0283 (0.0338)
2010–12	0.558 (0.499)	0.549 (0.498)	0.00888 (0.0546)	0.137** (0.0630)	0.125 (0.0863)	2010–12	0.158 (0.367)	0.204 (0.403)	–0.0457 (0.0406)	0.0122 (0.0456)	–0.0289 (0.0561)
Nonregular Employment											
	Level		Diff	Diff-in-Diff							
	Treatment	Control	(a) – (b)	(from 2004–06)							
	(a)	(b)		Nonmatching	Matching						
2004–06	0.223 (0.417)	0.293 (0.455)	–0.0696** (0.0278)								
2007–09	0.364 (0.483)	0.360 (0.480)	0.00316 (0.0416)	0.0727 (0.0500)	0.0524 (0.0547)						
2010–12	0.400 (0.492)	0.335 (0.472)	0.0652 (0.0536)	0.135** (0.0603)	0.157** (0.0716)						

Note: Numbers in parentheses are standard deviations in 'Level' and robust standard errors in 'Diff' and 'Diff-in-Diff.'
Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

III. Empirical results and discussion

Employment rate

Table 2 shows the estimation results of both non-matching and propensity score matching DD for employment rate, where 'Level' represents the employment rates for the treatment and control

groups of nonmatched samples. Our focus is on the 'Diff-in-Diff' columns, where the Average Treatment effect on the Treated (ATT) of various childcare services is shown.⁹

We see that the employment rate for the treatment group is statistically lower than that for the control group in the 2004–2006 period. Given these pre-

⁹To check the parallel trends assumption for DD analysis, we regressed each outcome on interaction of treatment dummy with years, including years' and individual fixed effects, and found no statistical significance in pre-treatment period. For a further assessment of the parallel trends assumption, we performed a placebo test, where women who was in 50s and 60s in model regions were regarded as a fake treatment group. This placebo test shows no significant result in each employment rates, indicating less possibility that trends of women's labour supply were different between model and nonmodel regions.

period differences in the outcome variables, we can regard the unmatching ‘Diff-in-Diff’ columns in Table 2 as unbiased estimates according to the guidance by Daw and Hatfield (2018). Then, we see significantly positive estimates of nonmatching ATT for all employment and nonregular employment in the 2010–12 period. The estimates indicate that the model region’s childcare services increased the employment or nonregular employment rate by approximately 14 percentage points.

On the contrary, we do not observe any positive effects in the regular employment group. One possible explanation is that there is a relatively high fixed cost or a barrier to entering the labour market as a regular employee, so that it might be hard to work as a regular employee even if various childcare services offered more flexible choices with respect to the available jobs.

Working hours

The effects of childcare services on working hours are shown in Table 3, where the most notable result is for the subset of regular employees, where we can confirm the pre-period difference so that we focus on the nonmatching results. The DD results are positive in both 2007–2009 and 2010–2012 period, and show significant effect in nonmatching case. Thus, we can understand that

childcare services in the model regions might have allowed regular employee women to increase their working hours. The ATT indicates that the increase is about 6 to 9 h per week; therefore, roughly speaking, women working as regular employees could have an additional day to work each week. Combining the results of Table 2, we infer that childcare services in model regions had positive effects for those who were already working as regular employees at an intensive margin, but not in an extensive sense.

Subjective health condition

Table 4 shows the effects on women’s subjective health condition. First, looking at the results for regular employees, we can confirm pre-period difference in the outcome variable so that we focus on the matching DD results. Then, we see that the subjective health condition of regular employees deteriorated by approximately 36 percentage points according to nonmatching DD results. This adverse effect of regular employees may have been caused by the increase in working hours confirmed in Table 3. On the other hand, the results for nonregular employees where there is no pre-period difference show that the subjective health condition improved significantly, by approximately 35 percentage points, under the model regions’ childcare

Table 3. Effects of childcare services on working hours.

	Weekly Working Hours (<i>N</i> = Employee)					Weekly Working Hours (<i>N</i> = Regular Employee)					
	Level		Diff	Diff-in-Diff		Level		Diff	Diff-in-Diff		
	Treatment (a)	Control (b)	(a) – (b)	(from 2004–06)		Treatment (a)	Control (b)	(a) – (b)	Nonmatching	Matching	
2004–06	24.963 (-16.120)	29.108 (-15.490)	-4.145** (1.887)			2004–06	39.235 (-8.482)	44.441 (-7.963)	-5.206** (2.078)		
2007–09	23.158 (-13.790)	28.424 (-14.650)	-5.267*** (1.931)	-1.121 (2.700)	-3.677 (3.281)	2007–09	44.571 (-3.910)	43.754 (-8.925)	0.817 (1.593)	6.023** (2.618)	6.872** (3.286)
2010–12	25.771 (-14.170)	28.238 (-14.080)	-2.467 (2.182)	1.678 (2.883)	0.0110 (4.255)	2010–12	45.545 (-8.165)	41.656 (-6.576)	3.889 (2.464)	9.095*** (3.218)	12.24*** (3.532)
	Weekly Working Hours (<i>N</i> = Nonregular Employee)										
	Level		Diff	Diff-in-Diff							
	Treatment (a)	Control (b)	(a) – (b)	Nonmatching	Matching						
2004–06	21.458 (-15.840)	22.526 (-12.900)	-1.068 (2.135)								
2007–09	20.306 (-11.940)	22.837 (-12.100)	-2.531 (1.812)	-1.463 (2.801)	-3.830 (3.052)						
2010–12	19.892 (-9.419)	21.823 (-11.910)	-1.931 (1.742)	-0.863 (2.755)	-0.287 (3.238)						

Note: Numbers in parentheses are standard deviations in ‘Level’ and robust standard errors in ‘Diff’ and ‘Diff-in Diff.’
Statistical significance: ****p* < 0.01, ***p* < 0.05, **p* < 0.1.

Table 4. Effects of childcare services on subjective health condition.

Subjective Good Health (<i>N</i> = <i>Employee</i>)					Subjective Good Health (<i>N</i> = <i>Regular Employee</i>)						
Level		Diff	Diff-in-Diff		Level		Diff	Diff-in-Diff			
Treatment	Control		(from 2004–06)		Treatment	Control		(from 2004–06)			
(a)	(b)	(a) – (b)	Nonmatching	Matching	(a)	(b)	(a) – (b)	Nonmatching	Matching		
2004–06	0.663 -(0.475)	0.641 -(0.480)	0.0218 (0.0523)		2004–06	0.786 -(0.418)	0.620 -(0.486)	0.165** (0.0833)			
2007–09	0.696 -(0.464)	0.616 -(0.487)	0.0797 (0.0592)	0.0580 (0.0790)	0.0794 (0.0934)	2007–09	0.750 -(0.452)	0.614 -(0.488)	0.136 (0.131)	-0.0290 (0.155)	-0.108 (0.162)
2010–12	0.635 -(0.486)	0.575 -(0.495)	0.0600 (0.0718)	0.0383 (0.0888)	0.0864 (0.112)	2010–12	0.400 -(0.507)	0.593 -(0.493)	-0.193 (0.134)	-0.358** (0.158)	-0.280 (0.225)

Subjective Good Health (<i>N</i> = <i>Nonregular Employee</i>)					
Level		Diff	Diff-in-Diff		
Treatment	Control		(from 2004–06)		
(a)	(b)	(a) – (b)	Nonmatching	Matching	
2004–06	0.600 -(0.494)	0.657 -(0.475)	-0.0570 (0.0669)		
2007–09	0.679 -(0.471)	0.615 -(0.487)	0.0636 (0.0676)	0.121 (0.0952)	0.0746 (0.117)
2010–12	0.730 -(0.450)	0.564 -(0.497)	0.166** (0.0806)	0.223** (0.105)	0.352*** (0.120)

Note: Numbers in parentheses are standard deviations in 'Level' and robust standard errors in 'Diff' and 'Diff-in Diff.'
 Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

services according to the matching results. These results are intuitive in that childcare services in model regions improved nonregular employee's well-being by providing women with access to a variety of high-quality childcare services.

IV. Conclusion

Overall, we found that access to comprehensive, high-quality, and diverse regional childcare services had positive heterogeneous effects on women's labour supply in extensive and intensive margins, depending on the employment type. We also found a mixed result for the effects of these services on working women's subjective health condition. The recent literature focusing on childcare availability and maternal employment shows that the effects of childcare depend on household structure, mothers' characteristics, and propensity to use childcare (Asai, Kambayashi, and Yamagushi 2015; Yamaguchi, Asai, and Kambayashi 2018). Especially, their results indicate that the childcare rationing rule is important in that the heterogeneous effects of childcare use is larger for those who are less likely to have slots in childcare centre. On the other hand, our analysis indicates that enhancing the quality and variety of childcare services could be effective policy treatments

in addition to expanding childcare availability. Finally, the main limitation of our analysis is that since no quantitative criteria of selecting model regions were provided by the government, we could not quantify how different each childcare service was between model and nonmodel regions and which specific childcare service was effective in women's labour supply. We leave these important aspects for future work.

Acknowledgments

We thank Charlotte Bartels, Daniele Checchi, Dean Lillard, Collin McKenzie, and Patricia McManus for helpful discussions and comments at JHPS and JHPS-CNEF Data Users Conference. We are also thankful for feedback from Yoshio Higuchi. Note that any errors in this paper are attributable solely to us.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This research was supported by Grand-in-Aid for Scientific Research from the Ministry of Education, Culture, Sports, Science and Technology, Japan [No. 18K01659 and No. 17H06086]. The micro data of the 'Keio Household Panel Survey' were provided by the Panel Data Research Center at Keio University.

References

- Asai, Y., R. Kambayashi, and S. Yamagushi. 2015. "Childcare Availability, Household Structure, and Maternal Employment." *Journal of the Japanese and International Economics* 38: 172–192.
- Baker, M., J. Gruber, and K. Milligan. 2008. "Universal Child Care, Maternal Labor Supply, and Family Well-Being." *Journal of Political Economy* 116 (4): 709–745. doi:10.1086/591908.
- Black, S. E., P. J. Devereux, K. V. Loken, and K. G. Salvanes. 2014. "Care or Cash? The Effect of Child Care Subsidies on Student Performance." *Review of Economics and Statistics* 96 (5): 824–837. doi:10.1162/REST_a_00439.
- Blau, D. M., and A. P. Hagy. 1998. "The Demand for Quality in Child Care." *Journal of Political Economy* 106 (1): 104–146. doi:10.1086/250004.
- Daw, J. R., and L. A. Hatfield. 2018. "Matching and Regression to the Mean in Difference-in-Differences Analysis." *Health Services Research* 53 (6): 4138–4156. doi:10.1111/1475-6773.12993.
- Fitzpatrick, M. D. 2010. "Preschoolers Enrolled and Mothers at Work? The Effects of Universal Prekindergarten." *Journal of Labor Economics* 28 (1): 51–85. doi:10.1086/648666.
- Guryan, J., E. Hurst, and M. Kearney. 2008. "Parental Education and Parental Time with Children." *Journal of Economic Perspective* 22 (3): 23–46. doi:10.1257/jep.22.3.23.
- Hofferth, S. L., and D. A. Wissoker. 1992. "Price, Quality, and Income in Child Care Choice." *Journal of Human Resources* 27 (1): 70–111. doi:10.2307/145913.
- Kalenkoski, C. M., D. C. Ribar, and L. S. Stratton. 2005. "Parental Child Care in Single-Parent, Cohabiting, and Married-Couple Families: Time-Diary Evidence from the United Kingdom." *American Economic Review: Papers and Proceedings* 95 (2): 194–198. doi:10.1257/000282805774670176.
- Kornstad, T., and T. O. Thoresen. 2007. "A Discrete Choice Model for Labor Supply and Childcare." *Journal of Population Economics* 20 (4): 781–803. doi:10.1007/s00148-005-0025-z.
- Lefebvre, P., and P. Merrigan. 2008. "Child-Care Policy and the Labor Supply of Mothers with Young Children: A Natural Experiment from Canada." *Journal of Labor Economics* 26 (3): 519–548. doi:10.1086/587760.
- Yamaguchi, S., Y. Asai, and R. Kambayashi. 2018. "Effects of Subsidized Childcare on Mother's Labor Supply under a Rationing Mechanism." *Labour Economics* 55: 1–17. doi:10.1016/j.labeco.2018.09.002.