



Childcare availability and fertility: Evidence from municipalities in Japan[☆]



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ABSTRACT

In this paper, we estimated the effect of childcare availability on fertility using Japanese municipal-level *Census* and *Vital Statistics* data from 2000 to 2010, carefully handling several potential sources of bias. We found that an increase in childcare availability in Japan from 2000 to 2010 led to a small but significant increase in the fertility rate of women aged 25–39 living in regions where the propensity for women to work is high, but had no significant effect in other regions. Our results demonstrate the importance that government pay attention to regional heterogeneity when formulating childcare policy and also suggest that a combination of better access to childcare, together with other pro-family measures, is needed to support Japanese women in the early-career demands of balancing work and family.

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1. Introduction

In contemporary Japan, childcare centers have taken on an increasingly important role in helping women to achieve their goals for both career and family. In response to an unprecedented low fertility rate and its potential impact on an already aging population, the Japanese government in the mid-1990s began to intensively promote a policy of increased public childcare availability as a means of encouraging family formation by improving the work-life balance of young families. Recent evidence suggests that this strategy may be working, as the fertility rate in the last decade has begun to improve. The crucial public policy question, however, is whether this upturn in Japan's fertility rate is due to government childcare policy or some other factor. That is the research question of this study.

Other research on fertility in Japan suggests that public policy may have an effect. A recent study on the relationship between fertility and female labor force participation shows that improved childcare availability increases both, thus possibly harmonizing these two desirable policy goals (Griffen et al., 2015). Using births of twins as a natural experiment, they investigate the effect of fertility on maternal employment, finding that the presence of children younger than six in the household is negatively associated with maternal labor supply. This suggests that supporting child-rearing for couples with preschool children may increase maternal labor force participation, and increasing childcare availability may, at the margin, increase the birthrates of women who work outside the home.

The broader literature on childcare availability and fertility, however, has not yet achieved a research consensus, with some studies showing a significantly positive effect (Baizán, 2009; Del Boca, 2002; Richter et al., 1994) while others show no such relationship (Hank and Kreyenfeld, 2003; Mason and Kuhlthau, 1992; Wong and Levine, 1992). Methodological differences contribute to this ambiguity, particularly in how studies treat unobservable variables. Rindfuss et al. (2007) and Rindfuss et al. (2010) note that variables may be present that affect both childcare availability and fertility but which are themselves unobservable in the data. The reported statistics on public childcare availability, for instance, are outcomes of decision-making processes under which governments

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make choices considering factors such as childcare demand and economic conditions. The inputs of the decision-making processes are not visible in the reported statistics, however, and so if these unobservable variables are somehow correlated with inputs in a couple's fertility decisions, this could lead to biased estimates. As an example, fertility rates tend to be higher in areas where the work-family conflict is less salient and also where maternal employment is most socially accepted. These two relationships may yield positive estimates of the impact of childcare availability on fertility even when such a relationship does not, in fact, exist. Further, as [Asai et al. \(2015\)](#) find that observed positive cross-sectional correlations between maternal employment and childcare availability in Japan are due not to any causal relationship but instead to regional characteristics, great care has been taken in this study to control for any unobservable variables in our estimates of the impact of childcare availability on fertility.

While [Asai et al. \(2015\)](#) caution about potentially spurious positive effects resulting from cross-sectional data, other studies not using cross-sectional data also show strong positive effects of childcare availability on fertility. Using German data, [Bick \(2016\)](#) develops a life-cycle model to simulate the effect of increasing the supply of subsidized childcare for children younger than three, demonstrating that an increase in childcare availability has a positive effect on the fertility decision. He also finds, however, that this positive effect is canceled out by the raised tax rate necessary to finance the policy, which highlights the importance of policy financing. Further, in an empirical study of a major German childcare reform, [Bauernschuster et al. \(2016\)](#), using county-level data on fertility and childcare availability and a difference-in-differences technique, find statistically significant positive effects of childcare availability on fertility, with a 10 percentage point increase in public childcare coverage leading to an increase of 1.2 newborns per 1000 women.

Turning to Japan, numerous cross-sectional studies report a generally positive effect of childcare availability ([Higuchi et al., 2007](#); [Shigeno and Okusa, 1999](#); [Yoshida and Mizuochi, 2005](#)), but as these studies all treat childcare availability as an exogenous variable, the estimated results may not be free from endogeneity bias due to the unobservable factors discussed above. Other studies also have methodological limitations. [Lee and Lee \(2014\)](#), for example, find a causal relationship between childcare availability and the fertility decision, but their Granger-causality analysis does not permit a discussion of the impact. Meanwhile, [Toda \(2007\)](#) and [Unayama and Yamamoto \(2015\)](#) employ prefectural panel data and a fixed-effect model to control for time-invariant regional unobservable factors, but while [Toda \(2007\)](#) does not find any significant effects, this result could be an artifact of the limited variation in the model's annual fixed effect. [Unayama and Yamamoto \(2015\)](#), on the other hand, find a statistically significant positive effect of childcare availability on total fertility rate (TFR) but, as they control only for national trends, the result could be influenced by untreated regional trends. Also, since TFR is calculated as the sum of birthrates of different age groups, the estimated impact is somewhat difficult to interpret. Furthermore, none of the studies above address potential serial correlation of the error term, which would cause standard errors to be underestimated ([Bertrand et al., 2004](#)).

In this paper, in order to address these issues, we constructed a linear probability model derived from individual-level fertility decisions that controls for unobservable factors with municipality-level data extending over the ten year period from 2000 to 2010 during which a change in childcare policy created substantial regional variation in the growth rate of childcare availability. Specifically, using *Census* and *Vital Statistics* panel data for Japanese municipalities from 2000 to 2010, a first-difference (FD) estimation method was employed to ensure the estimated results were free from any potential endogeneity bias due to unobservable regional

time-invariant heterogeneity. Then, following [Bauernschuster and Schlotter \(2015\)](#), who find varying effects of childcare availability on maternal employment across a range of countries and attribute this to differences in childcare availability and potential demand for childcare across those countries, we investigated the heterogeneous treatment effects of childcare availability on fertility within Japan to identify the cities where higher childcare availability leads to a higher fertility rate.

After controlling for regional heterogeneity, we found that an increase in childcare availability does indeed have a significantly positive effect on fertility, though the impact is weak and observed only in regions with excess demand for childcare due to a high female workforce participation rate. In these regions, a 10 percentage point growth in childcare availability is estimated to increase births by 3 per 1000 women aged 25–39, or roughly 4% of the mean birthrate in 2000. This effect is especially robust for younger women aged 25–34. While the estimated results indicate that increasing childcare availability will not by itself achieve replacement-level fertility, they do justify this policy response and further suggest that implementation of policy should be based on a clear picture of the regional demand for childcare service across Japan.

The remainder of the paper is structured as follows: the next section discusses total fertility rate (TFR), childcare availability, and municipality characteristics in Japan, while [Section 3](#) presents the empirical model and identification strategies. [Section 4](#) describes the data and [Section 5](#) reports the main empirical results before and after considering heterogeneous treatment effects, and discusses the implications of these findings. [Section 6](#) presents several robustness checks, and [Section 7](#) concludes the paper.

2. Fertility rate and childcare availability in Japan

2.1. Recent trends in the total fertility rate (TFR) in Japan

A declining birthrate is one of the major demographic challenges that Japan has been facing since the 1970s with the end of a brief growth period of second-generation baby boomers born from 1971 to 1974. The total fertility rate (TFR)², a common index for representing births, hit an all-time low of 1.26 in 2005. However, since then, Japan's fertility rate has been slowly recovering and in 2013 revisited a level (1.43) last experienced in the mid-1990s ([Fig. 1](#)).

The recent upturn in TFR has not been limited to Japan, as it has also been observed in several European countries as well. However, it appears that Japan's increased fertility rate may be the "real thing" whereas in Europe it seems to be largely an artifact of the calculation method. TFR is calculated by aggregating the birthrates of different birth cohorts in any given year, so an increase in measured TFR can occur either because of a change in actual fertility or because of a shift in the timing of births over the lifespans of each cohort ([Bongaarts and Feeney, 1998](#); [Ryder, 1964](#)). For example, delayed onset of family formation and childrearing is a widely recognized phenomenon associated with women's social progress worldwide. For any given fertility level, this delayed childbirth will cause measured TFR to decrease initially but it will eventually rise by the end of the childbearing years of that cohort as the 'postponed' children are born. In studies of fertility, therefore, it is important to distinguish whether any measured change is due to an actual change in the number of children born to each woman or merely a temporal shift. [Goldstein et al. \(2009\)](#) find that

² The total fertility rate is the sum of the birthrates by birth cohort of women aged 15 through 49, and is equivalent to the number of children a woman would bear over her lifetime if she exhibited the average birthrate for women her age for each of those years (*Ministry of Health, Labour and Welfare*).

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