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Abstract

Using unique data from a Japanese survey, this paper examines whether flexible work arrangements targeted specifically at workers with caregiving responsibilities under the Child Care and Family Care Leave Act help family caregivers reconcile paid work with care provision. The regression results suggest that access to caregiver leave, which allows family caregivers to take a continuous leave of up to 93 days, is negatively and significantly associated with the probability of leaving one's job within one year of the onset of demand for parental care. This alleviating effect of access to caregiver leave remains robust even in the longer term and in a specification where we take into account the possible endogeneity of care provision to the labor supply decision. The findings of this paper thus suggest that the caregiver leave introduced pursuant to the Act in Japan helps meet the need of family caregivers to take a certain period of time off from work to make the necessary arrangements for accommodating the sudden and unexpected demand for elderly care in their daily lives.

***JEL classification codes*:** J14; J22
***Keywords*:** elderly care; informal care; flexible work; labor supply; long-term care; Japan

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1. Introduction

Japan is the most aged society in the world, and population aging is expected to progress even further. The share of the elderly aged 75 and above in the total population is expected to reach about 18% in 2025 when the generation born during Japan's first baby boom (1947-49) reaches the age of 75.[2] Given that the need for medical and long-term care tends to start rising around the age of 75, this is likely to pose considerable socioeconomic challenges to the country, the so-called "2025 Problem."

Japan has also been observing significant changes in family structure with a downward trend in the marriage rate as well as in the parent-child co-residence rate over the past few decades (Niimi, 2016). These demographic trends are likely to reduce the availability of family members to provide elderly care and to impose a greater burden on a smaller number of family caregivers per elderly person. At the same time, the labor force participation rate of women, who have traditionally taken up the primary role of elderly care in Japan, has been increasing over time (it increased from about 57% in 1990 to about 73% in 2020 among women aged 15-64) and has become more comparable with that of other developed countries.[3] This is likely to increase the number of family members who need to combine paid work with caregiving responsibilities in Japan.

Indeed, one of the government's current policy agendas is to create a society where no one has to leave work to provide elderly care. According to the 2017 Employment Status Survey, about 99,000 people left work during the past year because of caregiving responsibilities.[4] Note that while the majority (about 76% in 2017) of them are women, a non-trivial number of men also leave work to provide care today, reflecting the recent diversification of family caregivers due to the aforementioned changes in family structure in Japan.

The labor supply decisions of family caregivers not only affect their lives but also have important implications for companies and society as a whole (Schneider et al., 2013). Exiting the labor market in order to provide care can cause serious financial costs to

[2] Population Statistics 2021, National Institute of Population and Social Security Research (available at http://www.ipss.go.jp/syoushika/tohkei/Popular/Popular2021.asp?chap=2)
[3] Based on historical data on labor force participation rate by age group from the Statistics Bureau of Japan (available at https://www.stat.go.jp/data/roudou/longtime/03roudou.html#hyo_2).
[4] Statistics Bureau of Japan (available at https://www.e-stat.go.jp/stat-search/files?page=1&toukei=00200532&tstat=000001107875)

family caregivers as it is likely to affect their lifetime income not only by making them forgo the income they could be earning but also by reducing their pension entitlements, thereby increasing the risk of facing economic difficulties in later life. Employers are also likely to bear the cost as they lose firm-specific human capital and need to shoulder the cost of hiring and training replacement workers. At the same time, the withdrawal of family caregivers from the labor market could result in the shrinkage of the labor force and thus a reduction in tax revenues.

To address the increasing demand for elderly care and to support working family caregivers, Japan has introduced a support system for family caregivers, the major components of which are a long-term care insurance (LTCI) program and the Child Care and Family Care Leave Act. The latter, which was introduced in 1995 and became effective in 1999, is the focus of this paper. The main objective of the Act was to allow employees with family members in need of care to take time off from work in order to make the necessary arrangements to enable them to subsequently combine work and care provision. Since its introduction, the Act has gone through a number of amendments to better respond to the requirements of employees with caregiving responsibilities and to prevent them from leaving their jobs.

While efforts to provide flexible work environments are increasingly being made not only in Japan but also in many other countries, there is very little evidence on the effectiveness of flexible work environments in retaining workers with caregiving responsibilities. Previous research on elderly care provision tends to focus more on the effect of providing elderly care and that of the provision of formal care services on family caregivers' labor market outcomes. Moreover, the few studies that look at the implications of flexible work environments for the labor supply decisions of family caregivers consider mainly the case of more general flexible work arrangements that are available not only to workers with caregiving responsibilities but also to other workers. This is presumably because, unlike Japan, not many countries have a system to ensure that employers offer flexible work arrangements designed specifically for working caregivers.

In the case of the literature on Japan as well, the majority of research assesses whether the use of formal care services provided under the LTCI program helps alleviate the adverse effect of providing elderly care on family caregivers' labor supply. By contrast, to the best of the author's knowledge, there is no previous work that assesses the effectiveness of the Child Care and Family Care Leave Act in preventing workers with

caregiving responsibilities from leaving their jobs. Since providing flexible work environments entails some costs to employers, it is important to assess empirically the effectiveness of such arrangements.

Using unique data from a Japanese survey, this paper tries to fill this gap in the literature by analyzing the relationship between having access to flexible work arrangements and the ability to combine paid work and caregiving responsibilities. Given that Japan is relatively unique in ensuring that employers offer flexible work arrangements targeted specifically at workers with caregiving responsibilities, examining the case of Japan allows me to pay particular attention to the cases of such arrangements. Since workers with caregiving responsibilities may require different types of flexibility from other workers, it would be interesting to assess whether the arrangements introduced pursuant to the Act in Japan are effective in preventing workers from leaving their jobs to provide elderly care.

The rest of the paper is organized as follows. Section 2 provides a conceptual framework for analyzing the effect of providing elderly care on the labor supply of family caregivers. Section 3 briefly describes the existing support system for family caregivers in Japan. Section 4 reviews the relevant literature. Section 5 explains the estimation strategy. Section 6 describes the data and the variables included in the empirical model. Section 7 presents the estimation results. Section 8 summarizes the main findings and discusses some policy implications.

2. Conceptual framework

Empirical analyses of the employment effect of providing elderly care are based mainly on the standard labor market participation decision where labor market participation is observed if and only if the offered wage exceeds the reservation wage (Heitmueller and Inglis, 2007). It is thus hypothesized that the effect of caregiving on labor supply will be the net impact of two opposing forces, namely substitution and income effects (Carmichael and Charles, 1998, 2003). With time being scarce, caregiving responsibilities tend to increase family caregivers' reservation wages and reduce their labor supply (substitution effect) while greater expenditures associated with elderly care may reduce their disposable incomes and induce them to remain in the labor market (income effect).

Apart from these two main effects, there are also respite and discrimination effects

(Carmichael and Charles, 1998, 2003). The respite effect exists when family caregivers desire to take a break from caregiving responsibilities through engagement in employment. The respite effect is likely to reduce the reservation wage and counteract the substitution effect with regard to the decision on labor market participation. As for the discrimination effect, family caregivers may experience discrimination at work in terms of wages and/or promotion because of their greater flexibility requirements and lower reliability due to caregiving commitments (e.g., higher absence and sickness rates) and thus reduce their labor supply. Even without such discrimination, family caregivers themselves might prefer jobs with less demanding responsibilities and more flexible work arrangements, which enable them to combine work with caregiving responsibilities (Carmichael and Charles, 1998).

In sum, the employment effect of providing elderly care is theoretically ambiguous and is an empirical question as it depends on the size of each effect. However, as far as the implications of flexible work arrangements for family caregivers' labor supply decisions are concerned, we can reasonably hypothesize that such arrangements reduce caregivers' likelihood of exiting the labor market or changing jobs by accommodating their flexibility requirements and easing time scarcity. This is the key hypothesis examined in this paper. Note that the way elderly care provision affects family caregivers' labor supply decisions also depends on other factors, including, among other things, the level of required care, the degree of caregiving intensity, how strongly family caregivers are attached to the labor market in the first place, and the availability of formal care services. The implications of these factors for family caregivers' labor market outcomes will also be examined in the empirical analysis.

3. Support system for family caregivers in Japan

One of the Japanese government's current policy agendas is to create a society where no one has to leave work to provide elderly care, as noted earlier. To address the increasing demand for elderly care and to support working family caregivers, Japan has introduced a support system for family caregivers, the major components of which are a long-term care insurance (LTCI) program and the Child Care and Family Care Leave Act.

The Child Care and Family Care Leave Act, which is the focus of this paper, was

introduced in 1995 and became effective in 1999.[5] The main objective of the Act was to allow employees with family members in need of care to take time off from work in order to make the necessary arrangements to enable them to subsequently combine work and care provision.[6] As such, when the Act was introduced, it initially allowed employees to take a continuous leave only once for up to 93 days. However, to address the low take-up rate of this caregiver leave and to better respond to the requirements of employees with family members in need of care, a number of amendments were subsequently made in 2002, 2005, 2009, and 2016. Under the current system, employees are entitled to take caregiver leave in up to 3 installments totaling 93 days per family member in need of care.

In addition to caregiver leave, employees are currently entitled to avail themselves of "time off for caregivers," whereby they are allowed to take up to 5 days per year (or 10 days per year in the case of employees who have more than one family member in need of care) and to take such leave in half-day increments. They can also avail themselves of an exemption from overtime work until the end of the episode of caregiving. Furthermore, employees are entitled to adjust their working hours for up to three years starting on the date of their first application for taking such measures. Toward this end, employers are required to offer one of the following measures: the shortening of working hours, a flextime system, staggered working hours, or alternatively financial assistance for the use of formal care services.

The effectiveness of flexible work arrangements introduced pursuant to the Child Care and Family Care Leave Act in preventing workers with caregiving responsibilities from leaving their jobs is particularly important in the case of Japan. The Japanese labor market remains rather rigid and opportunities for mid-career employment are relatively limited in comparison with other Western societies. This implies that the cost of leaving one's job to meet the demand for long-term care is particularly high in Japan. This paper therefore tries to assess the effectiveness of the flexible work arrangements described above in helping family caregivers reconcile paid work with caregiving responsibilities.

4. Literature review

There has been a growing literature that examines the employment effect of providing

[5] See Niimi (2016) for the description of the LTCI program.
[6] See Ikeda (2016, 2017) for more details on the Child Care and Family Care Leave Act and recent amendments thereto.

elderly care in recent decades.[7] The results from empirical studies have been somewhat mixed, but more consensus has been reached on the adverse effect of caregiving on labor supply for (particularly female) intensive caregivers and co-residential caregivers (e.g., Ciccarelli and Van Soest, 2018; Ettner, 1995; Heitmueller, 2007; Kotsadam, 2012; Lilly, Laporte, and Coyte, 2010; Nguyen and Connelly, 2014).

As far as previous studies using Japanese data are concerned, most studies find a negative effect of caregiving on family caregivers' labor supply (e.g., Fukahori et al., 2015; Niimi, 2018; Sugawara and Nakamura, 2014; Yamada and Shimizutani, 2015). As a result, many existing studies on Japan examine whether the LTCI program helps alleviate the adverse employment effect of providing elderly care. While some studies find that the LTCI program helps alleviate the negative employment effect of caregiving (e.g., Niimi, 2018; Shimizutani et al., 2008; Sugawara and Nakamura, 2014), others find a limited or no effect (e.g., Fukahori et al., 2015; Yamada and Shimizutani, 2015). On the other hand, Fu et al. (2017) show that while the introduction of the LTCI program initially had a positive effect on family caregivers' labor market participation, the subsequent amendment of the LTCI program that reduced benefits for recipients with mild care needs had a negative effect instead.

Despite the growing literature on the employment effect of providing elderly care as well as policy interest in promoting flexible work environments, there is little evidence on the effectiveness of workplace flexibility in helping family caregivers reconcile paid work with caregiving responsibilities. Japan is no exception despite the government's continuous efforts over the past two decades to ensure that workplaces offer flexible work arrangements to accommodate the needs of workers with caregiving responsibilities.

The few studies that look at the implications of flexible work environments for family caregivers' labor supply decisions have so far produced mixed results. On the one hand, Pavalko and Henderson (2006) find that, among female workers with caregiving responsibilities in the United States, those in jobs with access to flexible working hours, unpaid family leave, and paid sick or vacations days are more likely to remain employed and to maintain working hours over a two-year period. In addition, Schneider et al. (2013) find in the case of Austria that flexible work arrangements facilitate the attachment of female workers, though not male workers, to their jobs and to the labor market. On the

[7] See Bauer and Spousa-Poza (2015) and Lilly et al. (2007) for a comprehensive survey of the literature on the employment effect of caregiving.

other hand, Henz (2006) shows in the case of women in the United Kingdom (UK) that decisions to provide care and to exit the labor market are not affected by the flexibility of their jobs.

Other studies indirectly suggest the need for flexible work arrangements to help family caregivers remain in their jobs. For example, Fevang et al. (2012) find for both sons and daughters in Norway a rise in social security dependency, particularly in the form of sickness insurance payments, around the time of their lone parent's demise. According to Fevang et al. (2012), apart from limited access to social security payments to care for a parent at home in the terminal stage, workers in Norway were entitled to only 20 days of unpaid leave to provide elderly care during the time period analyzed (1993-2005). They therefore suggest that children tend to avoid this costly option by taking sick leave instead. Similarly, Loken et al. (2017) show that while the expansion of formal care provision as a result of the reform in 1998 had no effect on the extensive margin of labor supply in Norway, it had a significant and negative effect on daughters' use of paid sick leave, particularly among daughters with no siblings. They thus suggest that daughters with caregiving responsibilities may have been accustomed to using sick leave prior to the reform, with or without the knowing cooperation of the physician, in order to free up time to provide parental care since paid leave for one's own illness or disability is more generous than caregiver leave in Norway.

As for research on the determinants of providing care, Bryan (2012) finds that flextime and the ability to reduce working hours are positively associated with the number of hours of care provision in the UK, suggesting that workplace flexibility helps working family caregivers reconcile paid work with caregiving responsibilities. By contrast, Nguyen and Connelly (2017) find that workers' perceptions about work flexibility has no impact on their subsequent decisions to provide care in any capacity in Australia.

This brief review of the literature underscores the limited number of relevant studies and their mixed results, suggesting that we know little about whether flexible work environments actually prevent family caregivers from leaving their jobs despite policy interest in establishing a flexible workplace. Using unique data from a Japanese survey, this paper tries to address this gap in the literature. Note also that existing studies have so far looked only at the case of flexible work arrangements that are available not only to workers with caregiving responsibilities but also to other workers. On the other hand, Japan is relatively unique in instituting flexible work arrangements targeted specifically

at workers with caregiving responsibilities under the Child Care and Family Care Leave Act. Examining the case of Japan therefore allows me to assess the implications of such arrangements for the first time, at least to the best of the author's knowledge.

5. Estimation strategy

To test the hypothesis of whether flexible work arrangements help reduce caregivers' likelihood of leaving their jobs, the employment status of individual *i* can be modeled as follows:

$$y_i^* = \beta' X_i + \gamma c_i + \theta' F_i + \varepsilon_i \quad (1)$$

$$y_i = 1 \; if \; y_i^* > 0 \quad (2)$$

$$y_i = 0 \; otherwise \quad (3)$$

where y_i^* is an unobserved latent variable. The observed variable y_i takes the value 1 if the individual left the job within one year of the time when his/her family member became in need of care and the value 0 otherwise. X_i is a vector of individual characteristics, c_i is the caregiving status of the individual, and F_i is a vector of flexible work arrangements offered at the individual's workplace.

One of the key methodological challenges of analyzing the employment effect of caregiving is that care provision is potentially endogenous to the process determining labor supply. Nevertheless, previous studies reach mixed conclusions regarding the endogeneity of caregiving, with several studies finding little evidence of endogeneity and treating caregiving as exogenous (e.g., Bolin et al., 2008; Kotsadam, 2012; Nguyen and Connelly, 2014; Niimi, 2018), particularly when unobserved individual fixed effects are taken into account using panel data (e.g., Ciani, 2012; Ciccarelli and Van Soest, 2018; Meng, 2013; Van Houtven et al., 2013).

Taking into account the findings of previous studies, the empirical analysis will be based mainly on the estimation of the above model as a probit model in which the caregiving status of the individual is treated as exogenous. However, as a robustness check, I also estimate the following recursive bivariate probit model that takes into account the endogeneity of the caregiving status of the individual:

$$y_i^* = \beta_y' X_i + \alpha c_i + \theta_y' F_i + \varepsilon_{yi} \quad (4)$$

$$c_i^* = \beta_c' X_i + \theta_c' F_i + \gamma' Z_i + \varepsilon_{ci} \quad (5)$$
$$E(\varepsilon_y) = E(\varepsilon_c) = 0 \quad (6)$$
$$Var(\varepsilon_y) = Var(\varepsilon_c) = 1 \quad (7)$$
$$Cov(\varepsilon_y, \varepsilon_c) = \rho \quad (8)$$

where y_i^* and c_i^* are unobserved latent variables. We observe $y_i = 1$ if $y_i^* > 0$ and $y_i = 0$ otherwise and $c_i = 1$ if $c_i^* > 0$ and $c_i = 0$ otherwise. Equations (4)-(8) imply that the employment status (*y*) of individual *i* depends on his/her caregiving status (*c*) and other variables (*X* and *F*), and caregiving status (*c*) depends on the same variables as those used in the employment status equation (*X* and *F*) and variables (*Z*) that uniquely determine it. If the two decisions on labor supply and caregiving are independent, the two probit equations can be estimated separately.

It should be noted that the availability of flexible work arrangements at work, which is captured by F_i in equation (1), might also be endogenous to the labor supply decision. It would have been ideal if I could exploit the exogeneous nature of the series of revisions made to the Child Care and Family Care Leave Act. However, the cross-sectional dimension of the data used for the empirical analysis did not allow me to do so.[8] On the other hand, as explained below, since the variables for the availability of flexible work arrangements at work are constructed using information at the time when the demand for parental care arose, which tends to occur unexpectedly, rather than when the respondent took up the role of caregiver, the issue of endogeneity may not be so serious unless people change their jobs in anticipation of possible demand for parental care in the future. Nevertheless, as a robustness check, equation (1) is also estimated using the sample of those who have been working for the same company for 5 years or longer to eliminate such a possibility.

6. Data

6.1 The Survey

The data used for the empirical analysis come from the Survey on Work and Long-term Family Care conducted by the Japan Institute for Labour Policy and Training in February

[8] In addition, the main component of the Act, namely caregiver leave of up to 93 days, was already part of the Act when it was introduced in 1995 and became effective in 1999. Since the sample consists only of those whose family members became in need of care in April 2000 or later, it was not possible to make use of the introduction of the Act as an identification strategy.

2019. The survey collected cross-sectional retrospective data on the provision of long-term care, employment, and socioeconomic characteristics for a sample of men and women who provided long-term care in the past or were providing it at the time of the survey. Note that only those whose family members became in need of care in April 2000 (when the mandatory public LTCI program was introduced in Japan) or later were included in the sample. In other words, all respondents faced a demand for long-term care at some point in time during the period between April 2000 and February 2019.

The respondents were restricted to those aged 20-69 at the end of the episode of the need for long-term care within the family (or at the time of the survey if respondents were still providing long-term care then). To ensure the representativeness of the sample, the sample of 4,000 observations was constructed so that their employment rate and composition of employment status by age and gender as well as their occupational composition would approximate those of respondents with caregiving responsibilities who were included in the nationally representative sample of the 2017 Employment Status Survey, a survey that is conducted by the Statistics Bureau of Japan every five years.

For the present analysis, I use data for the sample whose family members were no longer in need of care at the time of the survey either because their health conditions improved or because they passed away (2,402 observations). For this sample, detailed questions regarding the situation at home as well as at work of respondents during the initial stage of the episode of the need for long-term care within the family (i.e., during the first three months since the respondent's family member became in need of care) were included in the questionnaire. Such information helps identify the key determinants of labor supply decisions made by family caregivers when they faced a demand for providing care. Since the key hypothesis of this analysis is that flexible work arrangements help reduce caregivers' likelihood of leaving their jobs, I restrict the estimation sample to those who were in employment when his/her family member became in need of care (1,678 observations). I further restrict the sample to those whose family member who became in need of care was either the respondent's parent or parent-in-law (1,334 observations).

One of the key limitations of the data is that I have no respondents who did not face a demand for long-term care in the sample. We therefore need to interpret the results with some caution. Despite this limitation, since the data contain detailed information on caregiving conditions and the availability of flexible work arrangements targeted at employees with caregiving responsibilities under the Child Care and Family Care Leave

Act, the data are still well-suited for the purpose of the present analysis.

6.2 Empirical specification

Dependent variables

As explained in Section 5, I estimate equation (1) as a probit model. The description of the dependent and explanatory variables is provided in the Appendix. The dependent variable is a dichotomous variable that takes the value 1 if the respondent left his/her job within one year of the time when his/her parent/parent-in-law became in need of care and the value 0 otherwise. As a robustness check, and to examine whether the effectiveness of flexible work arrangements in preventing family caregivers from leaving their jobs remains even in the longer term, I also construct two alternative dependent variables that indicate whether the respondent left his/her job within two and three years, respectively, of the onset of demand for parental care.

According to Table 1, about 11% of the sample left their jobs, out of which about 27% moved to another job and about 73% left the labor market altogether, during the one year since the time when the respondent's parent/parent-in-law became in need of care. Given these multiple outcomes, I could have considered estimating a multinomial logit model instead of a probit model. However, due to the small number of observations who moved to another job during the first one year since the occurrence of demand for parental care, the empirical analysis was conducted by estimating a probit model in which I do not distinguish between those who moved to another job and those who left the labor market altogether. The table also shows that about 16% and 21% of the sample left their jobs within two and three years, respectively, of the onset of demand for parental care. These figures seem to suggest that the risk of family caregivers leaving their jobs rises as the need to provide long-term care prolongs, although the figures in Table 1 include those who left their jobs for reasons other than care provision.

Explanatory variables

As far as the explanatory variables are concerned, all of the explanatory variables reflect the situation during the initial stage of the episode of demand for parental care. This is partly because, for the sample used for this analysis (i.e., respondents whose family members were no longer in need of care at the time of the survey), only information on

caregiving and working conditions that respondents were facing at the initial stage of the episode of demand for parental care was collected.

Table 1. Descriptive statistics

	Mean	Standard deviation
Dependent variables		
Left the job within 1 year	0.11	
Left the job within 2 years	0.16	
Left the job within 3 years	0.21	
Flexible work arrangements		
Caregiver leave	0.19	
Time off for caregivers	0.16	
Exemption from overtime work	0.08	
Flexible working hours	0.24	
Subsidies for formal care use	0.04	
Caregiving conditions		
Main caregiver	0.48	
Care recipient being female	0.60	
Care recipient living alone	0.17	
Started using formal care services within 3 months	0.36	
Respondent's employment		
Employment status		
Regular	0.45	
Irregular	0.39	
Self-employed (including family workers)	0.16	
Number of years worked	14.47	11.79
Number of years worked squared	348.34	461.52
Log of the number of working hours	1.97	0.36
Task sharing	0.78	
Firm size (100 employees or more)	0.49	
Likes his/her job	0.37	
Feeling physical fatigue due to work	0.10	
Feeling psychological stress due to work	0.14	
Respondent's socioeconomic characteristics		
Female	0.57	
Age	50.35	8.42
Age squared	2606.06	816.04
University graduate	0.37	
Married	0.65	
Log of income other than his/her own	3.77	2.86
Instruments for recursive bivariate probit model		
Number of siblings	1.56	1.09
No. of observations	1,334	

Source: Calculations based on data from the Survey on Work and Long-term Family Care.

The main explanatory variables of interest are those variables that capture the availability of flexible work arrangements targeted at employees with caregiving responsibilities at the workplace where the respondent was employed when his/her parent/parent-in-law became in need of care. Given that users may differ from nonusers of these arrangements in a systematic way, using information on the availability, instead of the actual use, of these arrangements helps address the issue associated with the nonrandom selection of users. In addition, since these variables capture the situation at the time when the respondent's parent/parent-in-law became in need of care rather than when the respondent took the role of caregiving, respondents are unlikely to have self-selected into jobs that provide flexible work arrangements targeted at employees with caregiving responsibilities prior to the occurrence of demand for parental care. Nevertheless, as a robustness check, I also estimate equation (1) restricting the sample to those who have been working for the same company for 5 years or longer.

In the survey, respondents were asked whether the following arrangements were available to them at the time when the demand for parental care arose: caregiver leave, time off for caregivers, an exemption from overtime work, the shortening of working hours, a flextime system, staggered working hours, the possibility of remote work, and financial assistance for the use of formal care services. The answers that respondents could choose were "available," "not available," and "don't know." The variables that capture the availability of flexible work arrangements take the value 1 if the respondent's answer was "available" and zero otherwise. For the case of the shortening of working hours, a flextime system, staggered working hours, and the possibility of remote work, I construct one variable for the availability of flexible working hours that takes the value 1 if at least one of these four arrangements was available at the respondent's workplace. The coefficients on these variables allow me to test the hypothesis that flexible work arrangements help reduce caregivers' likelihood of leaving their jobs. Accordingly, I expect these variables to be negatively associated with the probability of the respondent leaving his/her job.

Since these variables are based on respondents' self-reporting, it may be possible that employees with a greater need for flexible work arrangements are more aware of the availability of such measures. This makes these variables potentially endogenous in the employment status equation (1), though less so than if I were to construct the variables based on the actual usage of flexible work arrangements offered at the respondent's workplace. Another point I should note is that, since not all respondents may have been

aware of the availability of flexible work arrangements and not all respondents actually availed themselves of such arrangements, the estimates obtained in this analysis should be considered as lower bounds on the impact of the availability of flexible work arrangements on family caregivers' labor supply decisions.

Table 1 shows that not all respondents had access to flexible work arrangements targeted at employees with caregiving responsibilities even though the Child Care and Family Care Leave Act had already become effective in 1999. This is partly because not all respondents were aware of their availability but more importantly because many of these arrangements were added and the eligibility of the Act was gradually expanded to irregular workers over time through a series of amendments to the Act. Recall that the data used for the empirical analysis are retrospective data and that the timing of the occurrence of demand for parental care varies among respondents. In the questionnaire, respondents were asked whether these arrangements were available *to them at the time when the demand for parental care arose.*

Apart from these main explanatory variables, a set of variables relating to the respondent's employment are included in the estimation model: employment status (regular, irregular, or self-employed (including family workers)), the number of years worked at the workplace where the respondent was employed and its square term, the logarithm of the average number of working hours per day, whether the respondent liked his/her job, and whether the respondent was feeling physical fatigue and/or psychological stress due to his/her work. Note that the variables for whether the respondent liked his/her job and for the number of years worked capture how strongly the respondent was attached to his/her job in the first place. I also include a variable for the size of the firm where the respondent was employed as a proxy for the availability of unmeasured benefits other than flexible work arrangements targeted at employees with caregiving responsibilities, which tend to be more generous at larger firms. Furthermore, I include a variable that equals one if the task for which the respondent was responsible was shared with other employees and zero otherwise. If the respondent was sharing the task with other employees, we would expect this to help him/her juggle caregiving responsibilities with paid work.

To control for caregiving conditions, I include a variable for whether the respondent was playing the role of main caregiver. Table 1 shows that about 48% of the sample took the role of main caregiver when their parent/parent-in-law became in need of care. Recall that all respondents in the sample faced a demand for parental care, but the degree of the

respondent's involvement in parental care provision varies among respondents. To capture this variation, I include in the estimation model a dummy variable for being the main caregiver.

Nevertheless, as discussed in Section 5, the decision to provide care (in this case, to take the role of main caregiver) might be endogenous to the labor supply decision. Hence, I estimate a recursive bivariate probit model as a robustness check. I use as an instrument for being the main caregiver a variable that indicates the number of siblings or siblings-in-law[9] that the respondent had depending on whether the care recipient was the respondent's parent or parent-in-law. This variable indicates the number of potential caregivers and it is expected to be correlated with the probability of the respondent taking the role of main caregiver while it is expected not to be correlated with the probability of the respondent leaving his/her job other than through the caregiving channel.

To control for other aspects of caregiving conditions, I also include a variable that captures the gender of the care recipient and a variable that indicates whether the care recipient was living alone. In addition, I include a variable for whether the care recipient started using formal care services within three months after he/she became in need of care. This control variable is potentially endogenous. For example, the respondent may have asked his/her parent/parent-in-law to use formal care services so that he/she would not have to quit the job. However, since the effectiveness of formal care services in preventing family caregivers from leaving their jobs is not the focus of this paper, I leave addressing the possible endogeneity of the formal care usage variable as an agenda for future research. In any case, I tried estimating the models without this variable, and the results remained largely unchanged.[10]

The rest of the explanatory variables include those that capture the respondent's socioeconomic characteristics, including his/her gender, age, educational attainment, marital status, and the log of household income other than the respondent's own income expressed in 2018 prices. Given that the demand for parental care arose at different points in time, I also include dummy variables for the year in which the demand for parental care occurred to control for macroeconomic effects as well as regional dummy variables to control for geographical heterogeneity.

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[9] The number of siblings here excludes those who have already passed away.

[10] The results for the regressions without the formal care usage variable are available from the author upon request.

7. Empirical results

7.1 Main results

The main regression results for the determinants of leaving one's job among employees with a demand for parental care are shown in terms of average marginal effects in Table 2. Model 1 includes only the basic explanatory variables whereas Model 2 also includes variables capturing the availability of flexible work arrangements targeted at employees with caregiving responsibilities at the respondent's workplace.

Based on the results for Model 1, being the main caregiver is positively and significantly associated with the probability of leaving his/her job within one year after his/her parent/parent-in-law becomes in need of care. It increases this probability by 4.2 percentage points. This is consistent with previous findings that caregiving tends to affect the labor market outcomes of intensive caregivers (e.g., Ciccarelli and Van Soest, 2018; Ettner, 1995; Heitmueller, 2007; Kotsadam, 2012; Lilly et al., 2010; Nguyen and Connelly, 2014; Niimi, 2018). The probability of leaving one's job is also positively and significantly associated with feeling psychological stress due to work, as expected.

On the other hand, the probability of leaving his/her job is negatively and significantly associated with the number of years worked at the workplace where the respondent was employed at the time when the demand for parental care arose. This suggests that family caregivers' attachment to their workplace reduces their likelihood of leaving their jobs, as expected. The probability of the respondent's leaving his/her job is also negatively and significantly associated with being self-employed or being a family worker. This can be explained by the fact that self-employment provides greater flexibility to working conditions than paid work, which makes it easier for family caregivers to accommodate the demand for elderly care in their daily lives.

Table 2. Main regression results

	Model 1		Model 2	
	Marginal effect	**S.E.**	**Marginal effect**	**S.E.**
Flexible work arrangements				
Caregiver leave			-0.076***	0.025
Time off for caregivers			0.040	0.045
Exemption from overtime work			-0.042	0.031
Flexible working hours			0.017	0.023
Subsidies for formal care use			-0.022	0.044
Caregiving conditions				
Main caregiver	0.042**	0.018	0.042**	0.018
Care recipient being female	0.015	0.018	0.014	0.018
Care recipient living alone	-0.055***	0.018	-0.055***	0.018
Started using formal care services within 3 months	-0.050***	0.016	-0.049***	0.016
Respondent's employment				
Employment status (regular)				
Irregular	0.019	0.024	0.006	0.025
Self-employed (including family workers)	-0.060***	0.021	-0.068***	0.021
Number of years worked	-0.003**	0.001	-0.003*	0.001
Log of the number of working hours	-0.004	0.029	-0.003	0.029
Task sharing	0.022	0.020	0.023	0.020
Firm size (100 employees or more)	-0.020	0.018	-0.015	0.018
Likes his/her job	0.022	0.018	0.024	0.018
Feeling physical fatigue due to work	-0.015	0.030	-0.017	0.030
Feeling psychological stress due to work	0.083**	0.037	0.092**	0.038
Respondent's socioeconomic characteristics				
Female	0.020	0.021	0.027	0.021
Age	0.002*	0.001	0.002*	0.001
University graduate	-0.030*	0.018	-0.024	0.018
Married	-0.048**	0.021	-0.049**	0.021
Log of income other than his/her own	4.33E-05	0.003	9.89E-05	0.003
Pseudo R^2	0.141		0.154	
No. of observations	1,334		1,334	

S.E. = standard error

Notes: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Year and regional dummies are included in all regressions.

Source: Estimation based on data from the Survey on Work and Long-term Family Care.

The results also suggest that if the care recipient starts using formal care services within three months after he/she becomes in need of care, his/her family caregiver is less likely to leave his/her job, underscoring the important role played by formal care services in reducing the burden of family caregivers. Moreover, the care recipient living alone is found to be negatively associated with the probability of the respondent's leaving his/her job. This suggests that as long as the care recipient is capable of living alone, the degree of care needs is small enough for family caregivers to be able to combine paid work with

caregiving responsibilities.

On the other hand, it is of concern to find that being married is negatively associated with the probability of leaving one's job, indicating that unmarried family caregivers are more likely to leave their jobs than their married counterparts. This, in turn, suggests that unmarried family caregivers are in a more vulnerable position when they face a demand for parental care because they may not be able to receive as much emotional and financial support from family members as married family caregivers do.

Turning to the results for Model 2, Table 2 shows that the estimation results hardly change from those for Model 1 even after adding to the estimation model the variables capturing the availability of flexible work arrangements targeted at employees with caregiving responsibilities. Table 2 shows that among the various types of flexible work arrangements, only caregiver leave is negatively and significantly associated with the probability of leaving one's job. Such a measure reduces the probability of leaving one's job by 7.6 percentage points.

Recall that under the Child Care and Family Care Leave Act, employees with caregiving responsibilities are allowed to take time off from work for a continuous period of up to 3 installments totaling 93 days per family member in need of care in order to make the necessary arrangements so that they can subsequently combine work and care provision. Unlike child care, demand for elderly care tends to arise unexpectedly and it can take some time for family members to make the necessary arrangements so that they can accommodate such needs without too much disruption to their daily lives. This caregiver leave measure seems to meet such needs of family caregivers and to help them organize themselves so that they can reconcile paid work with care provision.

As for the rest of the arrangements such as time off for caregivers or flexible working hours, the results suggest that they are not particularly effective in preventing family caregivers from leaving their jobs in order to provide elderly care. One possible explanation is that existing systems for all employees (e.g., paid leave and flexible working hours) can easily be substituted for such arrangements and thus that special measures for employees with caregiving responsibilities may not necessarily give them additional flexibility at work. As for the provision for an exemption from overtime work, the regression results suggest that it does not have a statistically significant association with the probability of leaving one's job either. However, since this provision was added

to the Child Care and Family Care Leave Act only recently through the 2016 amendment, it might be too soon to make any judgement on its effectiveness, and to do so certainly requires further investigation.

7.2 Robustness checks

The regression results so far have shown that among different types of flexible work arrangements introduced under the Child Care and Family Care Leave Act, caregiver leave helps prevent family caregivers from leaving their jobs within one year of the occurrence of demand for parental care. It would be interesting to examine whether this measure's effectiveness remains robust even in the longer term. I therefore re-estimate Model 2 in Table 2 using two alternative dependent variables that indicate whether the respondent left his/her job within two and three years, respectively, of the occurrence of demand for parental care. Table 3 (Models 3 and 4) shows that the negative and significant association between access to caregiver leave and leaving one's job is observed even in the longer term.

Moreover, to reduce the possibility of the respondent choosing a job in anticipation of the possible occurrence of demand for parental care in the future, I re-estimate Model 2 using the sample of those who have been working for the same company for 5 years or longer. The results, presented in Table 3 (Model 5), show the robustness of the effectiveness of caregiver leave.

Table 3. Robustness check

	Model 3 (leaving one's job within 2 years)		Model 4 (leaving one's job within 3 years)		Model 5 (with the sample of those who have been working for the same firm for 5 years or longer)		Model 6 (without respondents who are self-employed)		Model 7 (without respondents who are aged 60 or older)	
	Marginal effect	**S.E.**	**Marginal effect**	**S.E.**	**Marginal effect**	**S.E.**	**Marginal effect**	**S.E.**	**Marginal effect**	**S.E.**
Flexible work arrangements										
Caregiver leave	-0.072**	0.035	-0.082**	0.039	-0.062**	0.028	-0.088***	0.028	-0.058**	0.028
Time off for caregivers	0.066	0.051	0.042	0.051	0.012	0.042	0.040	0.049	-0.002	0.042
Exemption from overtime work	-0.041	0.040	-0.035	0.046	-0.035	0.037	-0.033	0.039	-0.036	0.034
Flexible working hours	-0.029	0.025	-0.021	0.028	0.027	0.026	0.008	0.026	0.012	0.024
Subsidies for formal care use	-0.059	0.048	-0.094*	0.052	0.008	0.053	-0.014	0.054	-0.050	0.037
Pseudo R^2	0.137		0.138		0.175		0.157		0.159	
No. of observations	1,334		1,334		921		1,124		1,170	

S.E. = standard error

Notes: *** and ** denote statistical significance at the 1% and 5% levels, respectively. The other explanatory variables included in Model 2 in Table 2 as well as year and regional dummies are included in both regressions.

Source: Estimation based on data from the Survey on Work and Long-term Family Care.

The sample used for the empirical analysis includes respondents who are self-employed or family workers, but such respondents are less likely, if at all, to benefit from the flexible work arrangements introduced pursuant to the Child Care and Family Care Leave Act. Model 2 is therefore re-estimated without those who are self-employed or family workers, but the results remain robust (see Model 6 of Table 3). Furthermore, recall that the respondents of the survey were those aged 20-69 at the end of the episode of the need for long-term care within the family (or at the time of the survey if respondents were still providing long-term care then). However, for the present analysis, I restricted the estimation sample to respondents who faced a demand for parental care and were in employment at that time. This essentially causes the sample to consist of respondents of similar age groups. However, it is possible that the sample includes respondents who had already retired from their previous jobs and been re-employed at the time when the demand for parental care arose given that the compulsory retirement age in Japan is 60 and is in the process of being raised to 65. Such respondents might be less attached to the jobs and are more likely to leave their jobs in order to meet the demand for parental care regardless of the availability of flexible work arrangements at their workplace. Hence, Model 2 is re-estimated without respondents who are aged 60 or older. The results again remain robust (see Model 7 of Table 3).

Finally, in section 5, I discussed the possibility that taking the role of main caregiver may be endogenous to the labor supply decisions of family caregivers. I therefore estimate a recursive bivariate probit model as a robustness check. Table 4 shows the regression results. The Wald test for the correlation between the residuals of equations (4) and (5) suggests that the exogeneity of taking the role of main caregiver cannot be rejected. The test results thus suggest that being the main caregiver can be treated as exogenous and that the two decisions of taking the role of main caregiver and leaving one's job are independent. This, in turn, implies that the two probit equations can be estimated separately. It is nonetheless worth looking at the results shown in Table 4.

The regression results for the determinants of leaving one's job remain largely robust in the recursive bivariate probit model specification. As found in the probit model estimates, access to caregiver leave is negatively and significantly associated with the probability of leaving one's job. As for the results for the determinants of taking the role of main caregiver, the marginal effect of the instrument, namely the number of siblings, is statistically significant and has the expected sign. The test results also support its strength as an instrument.

Table 4. Recursive bivariate probit model estimation results

	Main caregiver		Leaving one's job	
	Marginal effect	**S.E.**	**Marginal effect**	**S.E.**
Instrument				
Number of siblings	-0.055***	0.013		
Flexible work arrangements				
Caregiver leave	0.063	0.055	-0.093***	0.032
Time off for caregivers	-0.061	0.057	0.052	0.048
Exemption from overtime work	-0.042	0.057	-0.043	0.038
Flexible working hours	-0.010	0.036	0.017	0.025
Subsidies for formal care use	0.163**	0.069	-0.043	0.047
Caregiving conditions				
Main caregiver			0.205*	0.122
Care recipient being female	0.156***	0.028	-0.008	0.025
Care recipient living alone	0.071**	0.034	-0.068***	0.022
Started using formal care services within 3 months	0.068**	0.027	-0.063***	0.020
Respondent's employment				
Employment status (regular)				
Irregular	0.020	0.036	0.004	0.026
Self-employed (including family workers)	0.035	0.042	-0.082***	0.027
Number of years worked	0.001	0.002	-0.003*	0.001
Log of the number of working hours	-0.094**	0.045	0.011	0.033
Task sharing	-0.064*	0.033	0.035	0.024
Firm size (100 employees or more)	0.002	0.029	-0.015	0.019
Likes his/her job	0.022	0.027	0.022	0.019
Feeling physical fatigue due to work	0.036	0.054	-0.023	0.032
Feeling psychological stress due to work	0.001	0.047	0.093**	0.038
Respondent's socioeconomic characteristics				
Female	0.115***	0.034	0.010	0.027
Age	0.010***	0.002	0.001	0.002
University graduate	0.011	0.028	-0.029	0.020
Married	-0.193***	0.029	-0.019	0.030
Log of income other than his/her own	0.010**	0.005	-0.001	0.004
ρ	-0.532 (0.309)			
Wald test of ρ=0	chi2(1) = 1.889			
Wald test of instruments' strength	chi2(1) = 18.21***			
No. of observations	1,334			

S.E. = standard error

Notes: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Year and regional dummies are included in all regressions.

Source: Estimation based on data from the Survey on Work and Long-term Family Care.

The regression results also suggest that women are more likely to take the role of main caregiver, as expected. The negative and significant marginal effect of being married suggests that the burden of elderly care tends to be shouldered more by unmarried people. This corroborates the findings shown in Table 2. Finally, as expected, the longer working

hours of the respondent reduces his/her likelihood of taking the role of main caregiver due presumably to time constraints.

8. Conclusion

By exploiting unique data from the Survey on Work and Long-term Family Care, this paper examined whether flexible work arrangements targeted at employees with caregiving responsibilities help family caregivers reconcile paid work with care provision in Japan. While efforts are currently being made in many countries to create flexible work environments, we know little about their effectiveness in accommodating the needs of workers with caregiving responsibilities. This paper tried to address this gap in the literature.

The regression results suggest that, among various types of flexible work arrangements, caregiver leave, which allows workers with caregiving responsibilities to take time off from work for a continuous period in up to 3 installments totaling 93 days, is found to be negatively and significantly associated with the probability of the respondent leaving his/her job within one year after his/her parent/parent-in-law becomes in need of care. This suggests that this measure, which is guaranteed under the Child Care and Family Care Leave Act, helps family caregivers maintain their jobs despite their caregiving responsibilities. This result remains robust in the longer term and in a different estimation model, namely in a recursive bivariate probit model in which taking the role of main caregiver is treated as endogenous, although its exogeneity could not be rejected by the test results.

The empirical analysis in this paper is, however, not without limitations. Given that the data used for the empirical analysis are cross-sectional retrospective data, I was able to examine the implications of access to flexible work arrangements for preventing family caregivers from leaving their jobs only for a relatively short period of time. Moreover, since the survey sample does not include respondents without a demand for long-term care because of the design of the survey, the results need to be interpreted with some caution. Furthermore, due to data limitations, the paper could not fully assess the effectiveness of flexible work arrangements in preventing workers with caregiving responsibilities from leaving their jobs in the long term and could only assess the short-term effectiveness (i.e., within one to three years of the onset of demand for parental care). Finally, given the relatively small size of the sample, it was not possible to do additional

analysis at the sub-sample level to examine, for example, whether we observe any difference in the effectiveness of caregiver leave in preventing workers from leaving their jobs to meet the demand for long-term care. This certainly merits further investigation in the future.

Despite these limitations, the findings of this paper have important policy implications. Japan is relatively unique in introducing a support system with various types of flexible work arrangements targeted specifically at workers with caregiving responsibilities so that family caregivers do not need to leave the labor market to provide elderly care. The fact that access to caregiver leave is found to be negatively associated with the probability of leaving one's job suggests that this type of leave meets the need of family caregivers to take time off from work for a certain period of time to make the necessary arrangements to enable them to accommodate the demand for elderly care in their daily lives. By contrast, the results suggest that such measures as time-off for caregivers or flexible working hours may not necessarily help family caregivers to the same extent as caregiver leave. One possible explanation is that general measures for all employees, such as paid leave or flexible working hours, can be substituted relatively easily for these measures and that they therefore do not necessarily give family caregivers additional flexibility at work.

In the case of child care, the type and degree of care required at each stage of the child's development tend to be fairly predictable and consistent among children. By contrast, elderly care is characterized by a great degree of variation and unpredictability in the nature and duration of care needs, which makes it difficult for policymakers and employers to design appropriate policies/programs to help family caregivers continue working at their paid jobs while providing elderly care. The findings obtained in the present analysis provide policymakers and employers in Japan as well as in other countries with some direction for designing support systems targeted specifically at workers with caregiving responsibilities as they prepare for the advent of an aging society.

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Appendix: Description of the Dependent and Explanatory Variables

Variable	Description
Dependent variable	
Left the job within 1 year (2 or 3 years)	Equals one if the respondent left his/her job within one year (2 or 3 years) of the time when the demand for parental care arose.
Flexible work arrangements	
Caregiver leave	Equals one if the caregiver leave (a leave of up to 93 days) was available to the respondent at his/her workplace at the time when the demand for parental care arose.
Time off for caregivers	Equals one if the respondent was entitled to take up to 5 days per year and to take such leave in half-day increments at the time when the demand for parental care arose.
Exemption from overtime work	Equals one if the respondent was entitled to be exempted from overtime work at the time when the demand for parental care arose.
Flexible working hours	Equals one if at least one of the four arrangements (the shortening of working hours, a flextime system, staggered working hours, or remote work) was available to the respondent at his/her workplace at the time when the demand for parental care arose.
Subsidies for formal care use	Equals one if the respondent was entitled to receive financial assistance for the use of formal care services from his/her workplace at the time when the demand for parental care arose.
Caregiving conditions	
Main caregiver	Equals one if the respondent was playing the role of main caregiver when the demand for parental care arose.
Care recipient being female	Equals one if the care recipient was female.
Care recipient living alone	Equals one if the care recipient was living alone.
Started using formal care services within 3 months	Equals one if the care recipient started using formal care services within three months after he/she became in need of care.
Respondent's employment	
Employment status	
Regular	Equals one if the respondent was working as a regular worker at the time when the demand for parental care arose.
Irregular	Equals one if the respondent was working as an irregular worker at the time when the demand for parental care arose.
Self-employed	Equals one if the respondent was self-employed (including family workers) at the time when the demand for parental care arose.
Number of years worked	The number of years that the respondent had worked at his/her workplace at the time when the demand for parental care arose.
Number of years worked squared	The square term of the number of years worked.

Variable	Description
Log of the number of working hours	The logarithm of the average number of the respondent's working hours per day at the time when the demand for parental care arose.
Task sharing	Equals one if the task for which the respondent was responsible was shared with other employees at the time when the demand for parental care arose.
Firm size (100 employees or more)	Equals one if the number of employees of the firm where the respondent was employed at the time when the demand for parental care arose was 100 or greater.
Likes his/her job	Equals one if the respondent liked the job he/she had at the time when the demand for parental care arose.
Feeling physical fatigue due to work	Equals one if the respondent was feeling physical fatigue due to work at the time when the demand for parental care arose.
Feeling psychological stress due to work	Equals one if the respondent was feeling psychological stress due to work at the time when the demand for parental care arose.
Respondent's socioeconomic characteristics	
Female	Equals one if the respondent is female.
Age	The respondent's age at the time the demand for parental care arose.
Age squared	The square term of the respondent's age.
University graduate	Equals one if the respondent has at least a college degree.
Married	Equals one if the respondent was married at the time the demand for parental care arose.
Log of income other than his/her own	The logarithm of household income excluding the respondent's income expressed in 2018 prices at the time the demand for parental care arose.
Regional dummies	Dummy variables for the region where the respondent resides
Year dummies	Dummy variables for the year in which the demand for parental care arose.
Instrument for recursive bivariate probit model	
Number of siblings	The number of siblings (siblings-in-law) excluding those who have already passed away of the respondent if the care recipient was his/her parent (parent-in-law).