The Effects of Paid Leave Policies on Work and Elder Care

Soohyun Kim

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Abstract

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This dissertation consists of three papers studying the relationship between paid leave policies and work and informal care outcomes among older workers. Paper one investigates whether different types of paid leave provided by employers are associated with the supply of elder care. Paper two examines the role of paid leave in determining labor market outcomes for older workers with a family member who experiences a health decline. Paper three analyzes the case in South Korea -- how leave policies influence labor market outcomes for older workers with a spouse who experiences a health decline.

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Introduction

Compared to other developed countries, the United States is relatively young but it has the largest number of elderly people aged 65 and over (Ortman, Velkoff, & Hogan, 2014). The number is projected to nearly double from 43.1 million in 2012 to 83.7 million in 2050, as baby boomers age (Ortman et al., 2014). With increases in longevity and disability alongside this massive growth of older population, the demand for elder care is expected to dramatically soar.

Around ten percent of the US population are engaged in some form of elder care either as older adults in need of care or as elder caregivers. In 2015, there were approximately 14 million people aged 65 and over in need of elder care and 21 million family caregivers of the elderly (Osterman, 2017). Family caregivers, in the vast majority women in a household, have been the major source of unpaid informal care for elders in the US. Despite the high number of informal caregivers, the supply of family caregiving has been in downturn over the past three decades primarily due to the increase in women's labor force participation, the changes in family structures, and the rise in older adults living outside household (Stone, 2015). Moreover, approximately two in three family caregivers are now in the labor force, mostly working full time (US Bureau of Labor Statistics, 2019c). Compared to the past, more women participate in the labor force as full time into their sixties (Goldin & Katz, 2018). These trends transforming the shape of family caregiving suggest an emerging "care crisis" in elder care if the society does not respond to the growing needs of work-life support of the family caregivers.

At present, the public supports available to family caregivers in the US vary state to state. At the federal level, legislated in 1993, the Family and Medical Leave Act (FMLA) provides up to 12 weeks of leave per year for family and medical reasons. It was introduced to address the tension between work and care of family caregivers, and provide the basic standard across the

country. Yet, utilization of the FMLA is limited among family caregivers with elder care responsibilities because the law only permits time off work *without* pay. At a state level, 8 state governments (California, New Jersey, Rhode Island, New York, Washington, Connecticut, Oregon, and Massachusetts) and D.C. have passed a paid family leave law to ensure more family caregivers are covered financially during leave, to varying degrees.

To what extent do these state level variations matter for addressing the work-life balance of the many informal caregivers in the United states? To date, how paid family leave affects work and care of family caregivers have been studied mainly focusing on working parents with a newborn (e.g. Bartel, Rossin-Slater, Ruhm, Stearns, & Waldfogel, 2015; Han, Ruhm, & Waldfogel, 2009; Rossin-Slater, Ruhm, & Waldfogel, 2013a). Studies analyzing the impacts of California's paid family leave consistently find that the policy is more likely to benefit employment, health and wellbeing of working mothers and their child than to harm it (Bartel, Baum, Rossin-Slater, Ruhm, & Waldfogel, 2014). In addition, an assessment of Rhode Island's Temporary Caregiver Insurance shows little evidence of significant impacts on employers (Bartel, Rossin-Slater, Ruhm, & Waldfogel, 2016). Although limited to the experiences of a few states, these results imply that the state paid family leave is effective in supporting the work-life balance of family caregivers.

The absence of public policy for paid leave for family caregiving and the inadequacy of relevant policy analysis on elder care are two points in common across the US and South Korea. South Korea is one of the fastest aging high-income countries but one which has not taken into account the fact that the work-life issues continue throughout the life course until recently. It enacted unpaid family care leave in 2012 that offers time off from work, up to 90 days a year. However, as with the FMLA, the access and take-up of the unpaid leave provided by the

government remain low; employees with the need to provide care mainly rely on paid leave provided through employers.

In both countries, while the extensive literature on elder care provision by family members has focused on studying the relationship between caregiving and work and health outcomes[1] of the caregivers, only a handful of studies examined the causal relationship. Moreover, research on relevant work-life policies for family caregivers for older relatives is scarce. As the elderly populations in both countries expand, the demand for the scientific evidence of the effects of paid family leave for family caregivers not only with young children but also with older adults will be growing. Findings from such studies will be conducive to establish a national standard for paid family leave that helps the caregivers manage their job and elder care without concerns over lost job or earnings during leave.

The three studies in this dissertation investigate the impacts of paid leave policies on work and care of family caregivers or people who may be caregivers because they have a family member who has experienced a health decline. Throughout the dissertation I define family caregivers as family members who aid frail relatives (i.e. parents, parents-in-law, spouses, or partners) aged 65 and over with their various (instrumental) activities of daily living. Paper 1 looks at the effect of paid family leave policies on care provision of family caregivers. Paper 2 examines the effects of elder care and paid family leave on the short-term and the long-term labor market outcomes of older people with a family member who experiences a health decline in the US. Paper 3 studies the effects of elder care and leave policies on labor market outcomes for older people with a spouse who experiences a health decline in South Korea.

[1] Research on the health effects of elder care accounts for a substantial part of the literature on family caregiving, but it will not be discussed because it is beyond the scope of this paper.

My empirical analysis is structured based on the stress process model by Pearlin, Mullan, Semple, and Skaff.[2] This model provides a contextual understanding of the process that caregivers go through – from the primary stressors (disease and disabilities) to ultimate caregiver outcomes (health and well-being), which could vary to a considerable extent by the resources and risk factors in the person's situation. The disease and disabilities of a family member initiate the need to provide care in the first place. As time goes by, caregiving activities form the secondary stressors, a spillover into the caregivers' work, family relationships, personal finance, or sense of self, and the stress cumulated throughout the process leads to poor health and well-being. The caregiving support and coping resources available buffer against the adverse impacts of the stressors at every stage. This study examines the effects of paid leave policies – as such support and resources – on work and care for employed caregivers, along with the demographic and socioeconomic factors that might affect those outcomes.

[2] Pearlin, L. I., Mullan, J.T., Semple, S.J., & Skaff, M. M. (1990). Caregiving and the stress process: An overview of concepts and their measures. *The Gerontologist, 30*, 583-594. doi: 10.1093/geront/30.5.583

Paper 1: Relationship Between Paid Leave Access and Elder Care Provision

Abstract

Many older workers depend on employers' paid leave policy to meet their need for balancing work and elder care responsibilities in the US, where the FMLA provides only unpaid leave. Nevertheless, the relationship between employer-provided paid leave and elder care has been underexamined. Using the American Time Use Survey and its Leave Module, I examine the relationship between paid leave access and elder care provision among workers aged 45 or over and how the relationship differs by socioeconomic characteristics. Having access to paid leave for elder care is associated with the increased probability of providing any care, with a larger effect on less-than-daily care, while access to any other types of paid leave show no such relationship. More educated, non-Whites or Hispanics, and higher-wage earners are more likely to provide any care when paid leave for elder care is available. Although the findings are descriptive, the results highlight the unmet need for paid leave to care for older adults for the disadvantaged under the current policy framework.

Introduction

Population ageing is taking place all around the world, and the US is not an exception. By 2030, one in five people in the US will be an older adult as all baby boomers turn age 65 or over (US Census Bureau, 2017). Subsequently, the demand for elder care will increase: the number of disabled aged 65 or over is estimated to be about 22 million in 2030, and 24 million in 2040 (Osterman, 2017). Relative to this growing demand, the supply side of elder care provided by

family and friends is unlikely to increase as much because the caregiver pool, primarily of those aged 45 or over, is invariable, and most of them are in the labor force. In 2017/18, nearly two in three (62.8%) unpaid care providers aged 15 and older were employed and 75.8% of them worked full time (US Bureau of Labor Statistics, 2019c).

Working caregivers are required to ensure their caregiving compatible with their work as support from work is not always available. A national survey on long-term caregivers at age 40 or over shows that about half (47%) of the employed report difficulties maintaining a balance between work and elder care responsibilities. While 48% find their caregiving role is very or extremely supported, some caregivers have severe impacts at work including different treatment by management and colleagues, exclusion from a promotion opportunity, and a change in their roles or responsibilities (AP-NORC, 2017). Working caregivers are involved in a wide variety of everyday tasks from helping with daily living activities in a household to medical care like their non-working peers, but they spend less time providing care mainly due to their time constraint (NAC-AARP, 2015). It suggests that many working caregivers are compromising their caregiving commitments with work responsibilities on a day-to-day basis.

The current policy framework does not sufficiently support elder care providers at work. To date, the unpaid Family and Medical Leave Act (FMLA) is the only federal policy that supports working caregivers (Bookman & Kimbrel, 2011). At the state level, only eight state governments are either providing or planning to provide state paid family leave programs. In the absence of relevant public policy, provision of paid family leave largely remains at individual employers' discretion which is made mostly available to high-income earners in large establishments.

Understanding the effects of paid family leave on elder care provision among working caregivers is an important policy question because it could maintain or increase the current level of informal care as well as the labor supply from older workers. However, how paid family leave affects caregiving among elder care providers in the labor force has scant research evidence. In this study, I use a nationally representative sample of workers aged 45 or over from the American Time Use Survey (ATUS) and its Leave Module to examine the relationship between access to employer-provided paid leave for different reasons and elder care provision. I find that having access to paid leave to care for an older adult is associated with an increase in providing any care, particularly care provided less often than daily. Subgroup analyses show that the relationship between paid leave access and any care is larger for those with at least some college education, non-Whites or Hispanics, or median or higher wage earners. These findings relate to recent literature suggesting the effects of paid family leave on increased family caregiving (Arora & Wolf, 2018; Skira, 2015).

Current Policy Framework on Paid Family Leave in the US

The US public policies on paid family leave for working caregivers are somewhat restricted. The federal FMLA offers a maximum of 12 weeks of job-protected leave without wage replacement for eligible workers nationwide, subject to work requirements. Those who have worked at least 1,250 hours in an establishment with more than 50 employees for 12 months are eligible to claim the unpaid leave for family and medical reasons. With the restrictions applied, only about six in ten wage and salary workers in the private sector are eligible for the FMLA (Klerman, Daley, & Pozniak, 2014). The assistance provided by the law is further limited for caregivers for an older adult under the narrow definition of an eligible family and the leave spell (Clancy et al., 2020).

The public paid family leave programs are currently carried out at the state level in California, New Jersey, Rhode Island, New York, Washington, and District of Columbia, and planned to be introduced in Connecticut, Massachusetts, and Oregon between 2021 and 2022. California Paid Family Leave pays the highest wage replacement of those state programs, which covers 60 to 70% of the weekly salary of the leave claimants (State of California, n.d., see Rossin-Slater and Uniat, 2019 for more details). Many people living in other states without a state policy on paid family leave may receive paid leave from their employers, if anything. The provision, duration, and wage replacement rate of time off from work vary depending on individual employers' policy.

Therefore, access to paid family leave overall is minimal and unequally distributed between workers. In 2019 less than 20% of all private and government employees received paid family leave from their employers (US Bureau of Labor Statistics, 2019b). Paid leave access in private industry was lower for the workers in the lowest wage quartile, in small establishments with less than 50 employees, and working part time (US Bureau of Labor Statistics, 2013). It also differs by race and ethnicity; Hispanics have less access to paid family leave than non-Hispanic Whites even after controlling for their job characteristics and demographics (Bartel et al., 2019).

How the Lack of Paid Family Leave Affects Elder Care

The limited access to paid family leave is closely related to the unmet need for leave to care for older adults. According to a 2012 report on FMLA, 59% of the employees in the private sector were eligible for FMLA and those who needed but did not take leave for family and medical reasons accounted for 5%. Caring for a parent, spouse or child with a health condition was the second most common reason that accounted for nearly 40% of the unmet needs for leave

(Klerman et al., 2014).[3] In 2016, the need for leave was still visible - about 16% of the respondents needed or wanted but did not take leave for family and medical reasons in the past two years (Pew Research Center, 2017). In both reports, the primary reason for not taking unpaid leave is an inability to afford to lose earnings during leave, followed by fear of losing a job. The unmet need for paid family leave is more prevalent among women, non-Whites, less educated (some college or less), and low-income employees, and those with young children, who are least likely to purchase paid assistance.

Without general availability of paid leave for elder care, a majority (73%) of working caregivers aged 40 or older used their sick leave, vacation, or personal time when they need time off to provide care. Use of unpaid leave (39%), time off by other means (8%), or flexible hours, including self-employment, (5%) was relatively uncommon. Those who took paid leave for caregiving with any wage replacement accounted for only 12% of the working caregivers. Among the caregivers who missed work due to elder care, 34% said the time off work was not enough to provide the care needed. Those who were in fair or poor health were more likely than their peers in good or better health to report that the time off for care was insufficient (AP-NORC, 2017).

Research Evidence on the Relationship Between Paid Family Leave and Elder Care

Research evidence on paid family leave to care for older adults is scarce. Arora and Wolf (2018) find that paid family leave reduced nursing home use among older adults at age 65 or over in California using longitudinal administrative data. Their multivariate difference-in-

[3] The most common reason for unmet needs for leave was the employee's own illness (49.7%). Own illness and parent's, spouse's or child's health condition were the two predominant reasons for unmet needs for leave, amounting to nearly 90%.

difference estimates show that the state paid family leave decreased the elderly nursing home usage by 0.5 to 0.7 percentage points during the 1999-2008 time period. They imply that increased informal care from a family member with access to paid family leave in California could be the underlying mechanism of the reduction in nursing home use for people aged 65 or over, without stretching their analyses to this end.

Skira (2015) is the only one relevant study that examines the relationship between paid leave and the amount of elder care provided. She estimates the effects of unpaid leave, paid leave, and carer allowances on caregiving and labor market outcomes for daughters ages between 40 and 72 who have a potential elder care recipient (mother), using the Health and Retirement Study. Her policy simulation results show that paid leave induces higher take-up rate and subsequently more intensive care provision than unpaid leave, with a larger increase under higher wage replacement option. However, these results are rather suggestive because the study defines the duration of leave policies as two years, which is longer than actual paid leave in the US. Also, the study does not inform us about how men caregivers respond to paid leave policy.

Research on paid parental leave indicates that paid family leave is likely to increase the amount of care provided. The findings show that paid family leave increases the leave-taking among the working mothers and fathers of infants (Bartel, Rossin-Slater, Ruhm, Stearns, & Waldfogel, 2018; Rossin-Slater, Ruhm, & Waldfogel, 2013b). The impacts of paid family leave are consistently larger for parents of color with less education and low income than their comparison group. However, it has not been investigated whether paid family leave could similarly increase caregiving for those with elder care responsibilities and with a larger increase for disadvantaged groups.

In this study, I expect paid leave, provided by the employer, to have a positive association with elder care, similar to that shown in the previous literature on the state paid family leave. As missing work to provide care is quite common (7 out of 10 working caregivers at age 40 or over), one would likely use the paid time off that is designated for elder care purposes if need be, instead of other types of leave. But because employed caregivers who work 30 hours or more are less likely than those who work less or do not work at all to be the primary caregiver (NAC-AARP, 2020), the positive relationship could be stronger for less frequent, and therefore less intensive care, than regular and intensive care. The effects of employer-provided paid leave for the disadvantaged might not be as strong as that of the state policy given that access to and generosity of such employer benefits is unevenly distributed by workers' standing in the labor market.

Determinants of Elder Care Provision

In addition to public policy, the socioeconomic characteristics of individuals are also relevant to their choice of elder care provision, as reviewed in Bauer and Sousa-Poza (2015) and Clancy et al. (2020). Gender, education, and race/ethnicity are not only related to access to paid family leave but also associated with elder care provision.

Gender is an important factor that predicts the likelihood of being an elder care provider within a family. In theory, the intrinsic difference between men and women results in the gender differentials in specialized human capital. This difference affects the returns to the human capital through the hours worked and wage, which again reinforces the gendered division of labor (Becker, 1985, 1998). Although this theory regards childbirth and care as the principal cause of the intrinsic difference, it holds for elder care. Women have been the primary family caregivers by tradition and still are more likely than men to provide care for frail elderly (Carmichael &

Charles, 2003; Carmichael & Ercolani, 2016; NAC-AARP, 2015). Women caregivers are likely to spend more time in care, perform a higher number of care tasks, and have heavier caring burden than men caregivers (Carmichael & Charles, 2003; Pinquart & Sörensen, 2006). They are therefore more susceptible to negative impacts of caregiving on employment, work hours, and wage (Carmichael & Ercolani, 2016; Crespo & Mira, 2014; Dentinger & Clarkberg, 2002; Johnson & Lo Sasso, 2006; Van Houtven, Coe, & Skira, 2013) and mental and physical health (Coe & Van Houtven, 2009; Pinquart & Sörensen, 2006).

Education likewise is a significant predictor of elder care provision. Individuals with less education are assumed to be more likely than those with more education to provide care for older adults. In fact, the national statistics show that bachelor's or higher degree holders are involved in elder care as much as their peers with high school or less education. In the NAC-AARP survey, 36% of the caregivers for an older adult aged 50 or over are with college or more education and 35% are with high school or less education (NAC-AARP, 2015). In the latest ATUS, the college or more group accounts for 43% of the unpaid elder care providers, outnumbering the high school or less group by nearly 10% (US Bureau of Labor Statistics, 2019c). An explanation is that the more educated workers are more likely to have a job with employer benefits that enable work and care simultaneously, compared to their less educated peers (Clancy et al., 2020).

Race and ethnicity also affect the choice of elder care provision of an individual, rather through the different baselines of caregivers' individual characteristics and cultural norms of care. Non-White caregivers are on average younger, have lower socioeconomic status, and have poorer physical health. They are also more likely than their White peers to feel obliged to provide care for parents and indeed provide more parental care than spousal care (Fingerman,

VanderDrift, Dotterer, Birditt, & Zarit, 2011; Pinquart & Sörensen, 2005, 2011). Although non-Hispanic non-White caregivers are believed to receive more informal support, they are less likely to use formal support and show a greater need for formal support services compared to non-Hispanic White caregivers (Dilworth-Anderson, Williams, & Gibson, 2002; Pinquart & Sörensen, 2005).

Taken together, the literature reviewed suggest that the current policy situation allowing limited access to paid family leave to a selective group of workers hardly meets the need of all employed caregivers, let alone those with less privileged jobs. Wider access to paid family leave is assumed to increase the supply of elder care provision, as shown in California's example, but the evidence has been scant. This study addresses this knowledge gap by examining the relationship between paid leave access and elder care provision by types of leave using a large and nationally representative data source. Heterogeneity by gender, education, race/ethnicity, and wage is also explored.

Methods

Data

I use data from the ATUS and its Leave Module, annually collected by US Bureau of Labor Statistics since 2003. The ATUS is a nationally representative annual survey that randomly selects a person aged 15 or over from households completing the Current Population Survey. It keeps time records of all kinds of everyday activities of the individuals, including paid work, child care, elder care, volunteering, and socializing. In addition to the time-use data, the true value of using the ATUS in this study lies in its unique Leave Module. The ATUS Leave Module is a rare data source that offers the most comprehensive and direct information on paid

leave possible. It has specific measures for access to and use of paid and unpaid leave for different reasons in one's current job.

I pool all the ATUS Leave Modules available to date, which are in 2011, 2017, and 2018, and attach the individual characteristics from the main ATUS. My sample consists of the Leave Module respondents who are at the age of 45 or over and employed by someone else. I focus on relatively old workers, assuming their larger likelihood of providing elder care than child care. The age of an individual is considered to be an available proxy because the ATUS does not have direct measures indicating the needs for providing care, for example, the health status of an older relative or distance between the potential care recipient and the caregivers. I exclude those who have any physical or cognitive disabilities to ensure one's availability to provide help. Finally, my full sample includes 3,475 wage and salary workers aged 45 or over who do not have their own disabilities. The subsample who have provided care in the 3 months before the survey are 813 employed workers.

Table 1-1 reports descriptive statistics of the full sample and the sub-sample who provided any care. 23.7 percent of 3,475 workers in my sample provided any care for an older adult in the last 3 months. Conditioning on any care, people are most likely to provide elder care several times a month or less. 64.9% of older workers have access to any kinds of paid leave. By type, the rate of access is highest for paid vacation (62.4%) and lowest for paid leave for elder care (28.5%).

In my analysis of the relationship between paid leave access and elder care, I measure elder care provision, the outcome variable, using any care provided for older adults, the frequency of care, and time providing care.

For the full sample, any care is coded as 1 if an individual provided any care or assistance for an older person in the last 3 months, excluding financial assistance or caregiving as part of a paid job. How often the person provided care is grouped into three ordinal categories: no care at all, less than daily care, and daily care. An individual takes the value of zero if one did not provide any care in the last 3 months; 1 if one provided care less often than daily; and 2 if one provided care on a daily basis.

Time providing care is defined conditioning on any care. It is measured by the sum of the minutes on a given day that an individual spends on caring or helping for an older household member or non-household member. Time providing care for household adults includes time spent on caring for and helping them. Time providing care for non-household adults adds time in travelling related to caregiving to caring and helping. Caring activities include offering physical help, providing medical care, and obtaining medical and care services. Helping activities consist of housework, cooking, shopping assistance, maintenance, and assistance with paperwork.

I define paid leave access as the receipt of paid leave provided by employers. I use a binary variable of whether an individual receives any paid leave at all on their job to measure access to any paid leave. If one receives any kinds of paid leave from their employer, the variable takes the value of 1 and otherwise 0. Similarly, access to a specific type of paid leave - for own illness or medical care, for illness or medical care for a family member, for elder care (primarily for the reasons of assisting the (instrumental) activities of daily living, except for an illness or medical care), paid vacation, and paid time off for errands or personal reasons - is coded to a separate binary variable. Paid leave related to childbirth and child care are excluded from the analyses based on the minimal share of people having a child under age 6 in the household (1.4%). It is important to note that these measures for access to employer-provided

leave are susceptible to a selection bias, in that workers with the needs for providing care may choose firms offering such leave.

Control variables include education (less than high school, high school or GED, some college, and college or more), sex, race/ethnicity (White non-Hispanic, Black non-Hispanic, Hispanic, and Other non-Hispanic), age, age squared, the presence of a spouse or partner in household, the presence of a child under age 18 in household, the hourly wage, and the receipt of any unpaid leave from employers.

Analytical Strategy

I examine the relationship between paid leave access and elder care provision with a regression model, using the following equation:

$$Y_i = \beta_0 + \beta_1 PL_i + \delta_1 \sum X_i + e_i$$

where *Y* denotes any care and the frequency of care (full sample) and time of care (subsample with any care experience) of individual *i*, *PL* indicates access to each type of paid leave, *X* is the set of control variables including the demographics, hourly wage, and unpaid leave receipt. β_1 is the estimated association between paid leave access and elder care outcomes. All models also control for the year and state effects with robust standard errors clustered at the state level. ATUS Leave Module weights are applied to all analyses.

As any care and the frequency of care are categorical outcomes, I estimate a logit model and an ordered logit model, respectively, and calculate the marginal effects. Time of care is estimated using an OLS regression model.

The second set of analyses repeat the same model for gender, education, race/ethnicity, and the wage subgroups. Education (high school or less vs some college or more) and race/ethnicity (White non-Hispanic vs Black, Hispanics, and others) are redefined into two categories for subgroup analyses to ease the concern about the size of subgroups. The wage subgroups are categorized by the median hourly wage of $18.58 in 2018 (US Bureau of Labor Statistics, 2019a).

Results

Table 1-2 reports the relationship between paid leave access and elder care for older workers. Column 1 presents logit results for any care provided in the last three months for the full sample, and the following Columns show ordered logit results for care frequency (Columns 2-4) and OLS results for time (Columns 5-7) for those who provided care. Looking at the first column, having access to paid leave of any type is not related to any care. However, paid leave for elder care is a notable exception: older workers having access to such leave are 6 percentage points more likely to have provided any care than their counterparts without access, controlling for the demographics and job characteristics. Paid leave is associated a 4.2 percentage point increase in care given less than daily and a 1.4 percentage point increase in care given daily. Conditioning on any care, there is no significant relationship between paid leave access and time in elder care.

Subgroup Analyses

The subgroup results by gender are shown in Table 1-3. Having access to paid leave for elder care shows a positive relationship with any care for both men and women, particularly with less frequent care than daily care. Men and women are both more likely to provide any care (6.5

percentage points for men, 6.0 percentage points for women) when paid leave for elder care is available at workplace. However, in Panel A for men, having access to paid leave for elder care is associated with an approximately 11-minute decrease in time spent providing care for older adults, particularly for older adults living outside the household.

Table 1-4 presents results by the educational subgroup. For those who have high school or less education, paid leave access is associated with the reduced probability of elder care provided less frequently than daily (4.1 percentage points). On the other hand, those with some college or more education are more likely to provide any care and less than daily care provision for older adults (9.8 and 7.6 percentage points, respectively), when they have access to paid leave for elder care. Looking at the detailed level of education in four categories – less than high school, high school (including GED), some college, and college or more – it reveals that the most educated subgroup is the driver of the increase in any care associated with access to paid leave for elder care: the college-or-more subgroup show an 11.7 percentage-point increase in the likelihood of providing any care with leave access. [4]

By the racial/ethnic subgroups, Panel A of Table 1-5 shows that elder care provision for White non-Hispanics is not associated with paid leave access, overall. In Panel B, non-Whites (Black or other races) or Hispanics having access to paid leave for elder care are more likely to provide any care (9.5 percentage points) and less than daily care (6.8 percentage points), driven mainly by Blacks and Hispanics ($p<.10$). Paid leave for family illness also shows a positive relationship with care provision (5.2 percentage points), with a significant increase in daily care (1.3 percentage points). Again, this increase is notable for Hispanics.

[4] Results will be provided upon request.

Results by hourly wage rate are presented in Table 1-6. Wage is defined as low wage if the hourly wage rate is below the median hourly wage of $18.58 in 2018 (US Bureau of Labor Statistics, 2019a). Panel A shows that paid leave access for elder care is positively associated with median or higher wage earners' likelihood of providing any care (8.8 percentage points) although the overall relationship by types of leave is weak. Nevertheless, in Panel B, elder care provision among workers earning below the median wage does not differ by access to any types of paid leave.

Sensitivity Checks

In the data, access to employer-provided paid leave shows a clear downhill gradient by wage from paid leave with full pay to no leave at all. Although all models control for the receipt of unpaid leave, unobserved heterogeneity among older workers who differ in access to paid/unpaid leave might affect the findings. To investigate the issue, I repeat the analyses for those who have access to both paid and unpaid leave and to paid leave only. Table 1-7 shows that the size and pattern of the coefficients tend to increase as the sample selection criteria change, suggesting a stronger association between all types of paid leave and an increase in caregiving for workers have better paid leave access.

I also change the reference period for the outcome measure of any care from three months to the day before the interview. Limiting the elder care experience to yesterday is likely to single out a subset of people who provide care more regularly than occasionally. This model additionally includes a control for whether the day when care was given was a weekday or weekend, to control for the tendency that employed caregivers provide more care on weekends than on weekdays (US Bureau of Labor Statistics, 2019c). Column 1 of Table 1-8 shows that paid leave for elder care no longer shows a significant relationship with any care as the reference

period is shortened, although its coefficient is positive and larger than other types of paid leave. As expected, the effect of paid leave for elder care is larger on daily care than less-than-daily care for this group. It indicates that the relationship between paid leave access and caregiving depends on how the reference period of elder care is defined.

Finally, I consider the possible change in sample composition across the years as the ATUS Leave Module has a 6-year gap between the first and second data collection. Table 1-9 shows the separate regression results for each year. Although the 2017 estimates are somewhat different, the relationship between paid leave for elder care and any care is consistent for both years 2011 and 2018.

Discussion and Conclusion

Paid family leave in the US has not been studied widely for older workers who are most likely to provide care for frail older adults. I examine the relationship between access to paid leave provided by employers and elder care provision for older workers aged 45 or over. Using unique data about paid leave access, I show that having access to paid leave for elder care is associated with an increase in the probability of providing any care for an older adult by approximately 6 percentage points. Most of this increase is in care provided less than daily (4.2 percentage points) rather than care provided daily (1.4 percentage points). This correlation between paid leave for elder care and any care varies by education, race/ethnicity, and wage: some college or more educated, non-Whites/Hispanics, or median or higher wage earners are more likely to provide any care when they have access to paid leave for elder care, compared to their counterparts.

The positive relationship between paid leave for elder care and any care suggests that the policy has the potential to fulfill the unmet need for working caregivers. The findings on the stronger relationship with less frequent care than daily care indicate that the leave policy could help older workers initiate less intensive care or help for an older adult in need of temporary assistance, according to its definition of elder care excluding care for an illness or medical care. On the other hand, paid leave for elder care is not associated with the amount of time of care for those who have provided any care. It is uncertain why the intensive margin of care supply is less responsive to the leave policy than the extensive margin. A possible explanation is that having any care experience might help a caregiver to find a care routine which works well with their work schedule regardless of the leave access. Alternatively, from the demand side, the care recipient's need for help could be reasonably predictable such that the caregiver could deal with it without taking leave.

The subgroup results show the mixed relationships between employer-provided paid leave and caregiving for the disadvantaged in the labor force. Access to paid leave for elder care is related to the increased care for non-Whites/Hispanics, mostly Hispanics, suggesting that the employer policy is likely to meet the unmet needs for those racial/ethnic groups. At the same time, paid leave for elder care is positively related to any care among the most educated and high-income earners. For the less educated, paid sick leave and paid vacation show negative association with any care and less routine care, only to suggest that the lower educated do not necessarily use such leave for caregiving purposes. These results are highly likely to reflect the disparities in access to and generosity of paid leave at work, given that college-educated and higher income workers receive more generous employer benefits than their less educated and lower-income earning counterparts (NAC-AARP, 2015). However, my results show not much

gender difference, except that paid leave for elder care is negatively related to men's time in care. This is partly because in my analysis sample men without leave access on average spend more time in care than men with leave access (16.05 vs. 6.46), having more cases at the upper end who provided care for more than 100 minutes.

It is also possible that paid leave together with the inequality in caregiving might push the less-educated and lower-income to spread themselves too thin when the need for providing care arises, given their limited resources to provide care relative to their better-off counterparts. The caregivers' stress could negatively impact the quality of care as well as the unmet needs and health risks for care among the care recipients unless the care receiving elders have alternative care supports (Schulz et al., 2020). Paid leave policies that are nondiscriminatory of the disadvantaged in the labor market could be more effective in promoting informal care as well as reducing the socioeconomic gap in care provision.

A limitation of the study is that the data do not distinguish the relationship of the care recipients to the workers who provided care, and thus might be include friends or neighbors who may not be covered by policies. Another limitation is that some significant covariates are not available in the data, for instance, physical or mental needs of an older adult for receiving care or the availability of alternative care support or services. In addition, in the absence of an exogenous source of identification, the estimates for the effect of paid leave are subject to unobserved endogeneity bias, for example, the potential selection of workers with elder care responsibilities into employers providing paid family leave. Thus, the results are descriptive. Also, the cross-sectional data is not the best source to understand the caregiving activities in transition – either at the beginning or the end of care provision. Estimates using more detailed data and using longitudinal data will be subjects of future research.

Table 1-1: Descriptive statistics

	Full sample	Those who provided any care
Any care	0.237	-
Daily care	-	0.183
Weekly care	-	0.382
Monthly care	-	0.435
Care time	-	11.39
For HH member	-	2.947
For non-HH member	-	8.442
Female	0.533	0.618
Less than HS	0.092	0.051
HS or GED	0.396	0.377
Some college	0.281	0.309
College or more	0.231	0.263
White non-Hispanic	0.658	0.758
Black non-Hispanic	0.150	0.149
Hispanic	0.145	0.078
Other non-Hispanic	0.048	0.015
Married/cohabiting	0.667	0.672
Age	55.21	55.35
Child age <18	0.195	0.202
Hourly wage	21.07	21.04
Unpaid leave	0.852	0.879
Observations	3,475	813

Notes. The table presents the descriptive statistics of the ATUS Leave Module respondents aged 45 or over. ATUS Leave Module weights are applied.

Table 1-2: Relationship between paid leave access and elder care provision

Paid leave for	Any care	No care	Less than daily care	Daily care	Care time	Time for HH member	Time for a non-HH member
Any reasons	-0.016	0.020	-0.015	-0.005	4.320	-0.080	4.399
	(0.020)	(0.019)	(0.015)	(0.005)	(5.679)	(1.554)	(5.025)
Own illness	-0.020	0.022	-0.017	-0.005	6.434	0.366	6.069
	(0.020)	(0.020)	(0.015)	(0.005)	(5.317)	(1.340)	(4.693)
Family illness	0.003	0.001	-0.001	-0.000	2.998	0.491	2.507
	(0.019)	(0.018)	(0.013)	(0.004)	(5.963)	(1.333)	(5.569)
Eldercare	0.059**	-0.056**	0.042**	0.014**	-1.246	-0.699	-0.547
	(0.021)	(0.021)	(0.016)	(0.005)	(5.827)	(1.328)	(5.477)
Vacation	-0.023	0.025	-0.019	-0.006	3.502	-0.560	4.062
	(0.017)	(0.016)	(0.012)	(0.004)	(5.353)	(1.416)	(4.816)
Errands/personal	0.004	-0.001	0.001	0.000	3.129	0.111	3.019
	(0.022)	(0.021)	(0.016)	(0.005)	(5.538)	(1.392)	(5.094)
Observations	3,475	3,475	3,475	3,475	813	813	813

Notes. The table reports the regression results of paid leave access on elder care outcomes by types of leave. Estimates of any care and care frequency are the marginal effects after a logit and ordered logit model, respectively. Care frequency is defined as 0 if one did not provide any care; 1 if one provided care less than daily; and 2 if daily. Care time is estimated by an OLS model conditioning on any care. All models control for the demographics (education, sex, race/ethnicity, age, age squared, a spouse or partner present, and a child under age 18 present), wage, the receipt of unpaid leave, year and state dummies. Standard errors are clustered at the state level. ATUS Leave Module weights are applied. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 1-3: Relationship between paid leave access and elder care provision: By gender

Paid leave for	Any care	No care	Less than daily care	Daily care	Care time	Time for HH member	Time for a non-HH member
Panel A: Men							
Any reasons	0.015	-0.009	0.007	0.002	-1.192	1.067	-2.259
	(0.027)	(0.028)	(0.022)	(0.006)	(6.578)	(2.059)	(6.198)
Own illness	-0.007	0.012	-0.010	-0.003	6.665	0.212	6.453
	(0.027)	(0.027)	(0.022)	(0.006)	(5.115)	(0.985)	(5.003)
Family illness	-0.002	0.010	-0.008	-0.002	-6.489	-0.181	-6.308
	(0.021)	(0.021)	(0.016)	(0.004)	(8.729)	(1.406)	(8.949)
Eldercare	0.065**	-0.058*	0.046*	0.012*	-11.145*	0.542	-11.687*
	(0.024)	(0.023)	(0.018)	(0.006)	(5.008)	(1.587)	(5.568)
Vacation	0.011	-0.008	0.006	0.002	1.095	1.374	-0.280
	(0.027)	(0.027)	(0.021)	(0.006)	(6.517)	(2.058)	(6.009)
Personal	0.034	-0.034	0.027	0.007	-0.990	1.073	-2.063
	(0.026)	(0.027)	(0.021)	(0.006)	(6.487)	(1.610)	(6.742)
Observations	1,551	1,551	1,551	1,551	280	280	280
Panel B: Women							
Any reasons	-0.037	0.035	-0.025	-0.009	6.298	-1.655	7.953
	(0.029)	(0.027)	(0.020)	(0.007)	(7.488)	(2.503)	(6.671)
Own illness	-0.025	0.021	-0.016	-0.006	7.249	0.012	7.238
	(0.035)	(0.033)	(0.024)	(0.009)	(7.618)	(2.466)	(6.595)
Family illness	0.014	-0.016	0.012	0.004	9.927	1.160	8.767
	(0.029)	(0.027)	(0.020)	(0.007)	(9.242)	(2.442)	(8.288)
Eldercare	0.060*	-0.063*	0.046*	0.017*	4.653	-1.695	6.348
	(0.029)	(0.028)	(0.021)	(0.007)	(9.776)	(2.190)	(8.910)
Vacation	-0.047	0.045	-0.033	-0.012	3.760	-2.338	6.098
	(0.025)	(0.024)	(0.018)	(0.007)	(7.158)	(2.088)	(6.304)
Personal	-0.018	0.019	-0.014	-0.005	5.758	-2.069	7.827
	(0.035)	(0.032)	(0.024)	(0.009)	(7.486)	(2.121)	(6.667)
Observations	1,924	1,924	1,924	1,924	533	533	533

Notes. This table reports the regression results of access to paid leave on elder care provision by gender. Estimates of any care and care frequency are the marginal effects after a logit and ordered logit model, respectively. Care frequency is defined as 0 if one did not provide any care; 1 if one provided care less than daily; and 2 if daily. Care time is estimated by an OLS model conditioning on any care. All models control for the demographics (education, sex, race/ethnicity, age, age squared, a spouse or partner present, and a child under age 18 present), wage, the receipt of unpaid leave, year and state dummies. Standard errors are clustered at the state level. ATUS Leave Module weights are applied. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 1-4: Relationship between paid leave access and elder care provision: By education

Paid leave for	Any care	No care	Less than daily care	Daily care	Care time	Time for HH member	Time for a non-HH member
Panel A: High school or less							
Any reasons	-0.052	0.057*	-0.041*	-0.016	11.970	2.128	9.841
	(0.026)	(0.025)	(0.017)	(0.008)	(14.276)	(2.891)	(13.134)
Own illness	-0.054*	0.052*	-0.038*	-0.014	12.722	1.187	11.535
	(0.027)	(0.025)	(0.018)	(0.008)	(12.199)	(2.057)	(11.503)
Family illness	-0.022	0.023	-0.017	-0.006	9.004	1.245	7.759
	(0.030)	(0.029)	(0.021)	(0.008)	(14.480)	(2.029)	(14.361)
Eldercare	0.012	-0.010	0.007	0.003	9.682	-0.234	9.916
	(0.037)	(0.035)	(0.025)	(0.010)	(17.141)	(1.862)	(17.237)
Vacation	-0.047	0.053*	-0.038*	-0.015	8.132	-0.186	8.317
	(0.026)	(0.023)	(0.016)	(0.008)	(14.231)	(2.650)	(13.212)
Personal	-0.002	0.003	-0.002	-0.001	13.018	0.378	12.641
	(0.035)	(0.033)	(0.024)	(0.009)	(15.399)	(1.109)	(15.054)
Observations	1,460	1,460	1,460	1,460	290	290	290
Panel B: Some college+							
Any reasons	0.016	-0.017	0.014	0.004	-0.662	-0.969	0.307
	(0.023)	(0.022)	(0.017)	(0.005)	(3.721)	(2.201)	(2.541)
Own illness	0.020	-0.019	0.015	0.004	2.158	-0.206	2.364
	(0.024)	(0.024)	(0.019)	(0.005)	(3.611)	(2.036)	(2.643)
Family illness	0.033	-0.032	0.025	0.007	-1.004	-0.817	-0.187
	(0.024)	(0.022)	(0.017)	(0.005)	(3.576)	(1.940)	(2.984)
Eldercare	0.098***	-0.099***	0.076***	0.022***	-8.285	-2.438	-5.847
	(0.027)	(0.027)	(0.021)	(0.007)	(4.284)	(2.142)	(3.389)
Vacation	-0.005	-0.001	0.000	0.000	1.289	-0.631	1.920
	(0.020)	(0.019)	(0.015)	(0.004)	(4.015)	(2.022)	(3.110)
Personal	0.011	-0.008	0.007	0.002	-2.697	-0.874	-1.824
	(0.029)	(0.028)	(0.022)	(0.006)	(4.921)	(2.064)	(4.091)
Observations	2,015	2,015	2,015	2,015	523	523	523

Notes. This table reports the regression results of access to paid leave on elder care provision by education. Estimates of any care and care frequency are the marginal effects after a logit and ordered logit model, respectively. Care frequency is defined as 0 if one did not provide any care; 1 if one provided care less than daily; and 2 if daily. Care time is estimated by an OLS model conditioning on any care. All models control for the demographics (education, sex, race/ethnicity, age, age squared, a spouse or partner present, and a child under age 18 present), wage, the receipt of unpaid leave, year and state dummies. Standard errors are clustered at the state level. ATUS Leave Module weights are applied. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 1-5: Relationship between paid leave access and elder care provision: By race/ethnicity

Paid leave for	Any care	No care	Less than daily care	Daily care	Care time	Time for HH member	Time for a non-HH member
Panel A: White non-Hispanic							
Any reasons	-0.033	0.033	-0.025	-0.008	7.779	1.150	6.628
	(0.028)	(0.027)	(0.021)	(0.007)	(8.189)	(1.839)	(7.390)
Own illness	-0.049	0.047	-0.036	-0.011	9.452	0.972	8.481
	(0.027)	(0.026)	(0.020)	(0.006)	(7.169)	(1.512)	(6.424)
Family illness	-0.020	0.022	-0.017	-0.005	4.825	0.959	3.865
	(0.024)	(0.022)	(0.017)	(0.005)	(7.938)	(1.403)	(7.507)
Eldercare	0.046	-0.044	0.033	0.010	-0.039	-0.377	0.339
	(0.026)	(0.025)	(0.019)	(0.006)	(8.029)	(1.549)	(7.567)
Vacation	-0.045	0.045	-0.034	-0.011	5.927	0.059	5.869
	(0.025)	(0.024)	(0.019)	(0.006)	(7.895)	(1.729)	(7.173)
Personal	-0.016	0.019	-0.014	-0.004	3.669	-0.908	4.577
	(0.028)	(0.028)	(0.022)	(0.007)	(7.469)	(1.293)	(6.995)
Observations	2,173	2,173	2,173	2,173	564	564	564
Panel B: Non-White or Hispanic							
Any reasons	0.007	-0.003	0.003	0.001	-3.740	-3.242	-0.498
	(0.026)	(0.025)	(0.018)	(0.006)	(4.425)	(3.341)	(2.325)
Own illness	0.028	-0.024	0.017	0.006	-0.593	-0.467	-0.127
	(0.024)	(0.023)	(0.018)	(0.005)	(2.966)	(2.228)	(1.878)
Family illness	0.052*	-0.048*	0.036	0.013*	-1.874	-0.795	-1.079
	(0.025)	(0.023)	(0.018)	(0.005)	(4.584)	(3.331)	(3.257)
Eldercare	0.095*	-0.094*	0.068*	0.027**	0.959	-1.763	2.722
	(0.040)	(0.037)	(0.028)	(0.010)	(5.591)	(2.331)	(4.954)
Vacation	0.011	-0.008	0.006	0.002	-4.512	-3.305	-1.207
	(0.025)	(0.023)	(0.017)	(0.006)	(4.698)	(3.346)	(2.792)
Personal	0.041	-0.041	0.030	0.011	0.204	3.912	-3.709
	(0.035)	(0.031)	(0.023)	(0.008)	(5.528)	(3.604)	(3.009)
Observations	1,302	1,302	1,302	1,302	249	249	249

Notes. This table reports the regression results of access to paid leave on elder care provision by race and ethnicity. Estimates of any care and care frequency are the marginal effects after a logit and ordered logit model, respectively. Care frequency is defined as 0 if one did not provide any care; 1 if one provided care less than daily; and 2 if daily. Care time is estimated by an OLS model conditioning on any care. All models control for the demographics (education, sex, race/ethnicity, age, age squared, a spouse or partner present, and a child under age 18 present), wage, the receipt of unpaid leave, year and state dummies. Standard errors are clustered at the state level. ATUS Leave Module weights are applied. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 1-6: Relationship between paid leave access and elder care provision: By wage

Paid leave for	Any care	No care	Less than daily care	Daily care	Care time	Time for HH member	Time for a non-HH member
Panel A: Median or above							
Any reasons	-0.015	0.011	-0.009	-0.002	-1.533	-0.127	-1.405
	(0.043)	(0.043)	(0.035)	(0.008)	(4.518)	(1.191)	(4.523)
Own illness	-0.026	0.021	-0.018	-0.004	4.802	1.179	3.622
	(0.034)	(0.034)	(0.028)	(0.006)	(3.909)	(1.121)	(3.684)
Family illness	-0.010	0.007	-0.005	-0.001	-4.398	0.504	-4.902
	(0.026)	(0.024)	(0.020)	(0.004)	(5.987)	(1.550)	(6.441)
Eldercare	0.088**	-0.091**	0.074**	0.016*	-6.883	0.021	-6.904
	(0.032)	(0.031)	(0.024)	(0.008)	(4.178)	(0.775)	(4.397)
Vacation	-0.015	0.010	-0.008	-0.002	-0.925	-0.100	-0.824
	(0.038)	(0.038)	(0.031)	(0.007)	(4.471)	(1.116)	(4.381)
Personal	0.018	-0.021	0.017	0.004	-7.118	0.379	-7.497
	(0.030)	(0.030)	(0.025)	(0.005)	(5.879)	(0.729)	(5.856)
Observations	1,532	1,532	1,532	1,532	364	364	364
Panel B: Below median							
Any reasons	-0.005	0.010	-0.007	-0.003	5.994	0.356	5.638
	(0.025)	(0.024)	(0.017)	(0.007)	(8.342)	(3.354)	(6.091)
Own illness	0.001	0.003	-0.002	-0.001	7.074	0.203	6.871
	(0.026)	(0.025)	(0.017)	(0.008)	(8.165)	(3.025)	(6.066)
Family illness	0.038	-0.029	0.020	0.009	9.142	0.192	8.951
	(0.027)	(0.026)	(0.018)	(0.008)	(9.345)	(3.045)	(7.331)
Eldercare	0.052	-0.042	0.029	0.013	3.851	-2.004	5.854
	(0.034)	(0.032)	(0.022)	(0.010)	(10.712)	(2.317)	(9.319)
Vacation	-0.016	0.021	-0.014	-0.006	2.278	-1.625	3.903
	(0.022)	(0.021)	(0.015)	(0.006)	(7.770)	(2.918)	(6.057)
Personal	0.003	0.004	-0.003	-0.001	7.638	-0.613	8.251
	(0.033)	(0.032)	(0.022)	(0.010)	(9.240)	(2.245)	(8.146)
Observations	1,943	1,943	1,943	1,943	449	449	449

Notes. This table reports the regression results of access to paid leave on elder care provision by wage. Estimates of any care and care frequency are the marginal effects after a logit and ordered logit model, respectively. Care frequency is defined as 0 if one did not provide any care; 1 if one provided care less than daily; and 2 if daily. Care time is estimated by an OLS model conditioning on any care. All models control for the demographics (education, sex, race/ethnicity, age, age squared, a spouse or partner present, and a child under age 18 present), wage, the receipt of unpaid leave, year and state dummies. Standard errors are clustered at the state level. ATUS Leave Module weights are applied. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 1-7: Sensitivity checks by accessibility to paid leave

Paid leave for	Any care	No care	Less than daily care	Daily care	Care time
Panel A: All older workers (N=3,475)					
Any reasons	-0.016	0.020	-0.015	-0.005	4.320
	(0.020)	(0.019)	(0.015)	(0.005)	(5.679)
Own illness	-0.020	0.022	-0.017	-0.005	6.434
	(0.020)	(0.020)	(0.015)	(0.005)	(5.317)
Family illness	0.003	0.001	-0.001	-0.000	2.998
	(0.019)	(0.018)	(0.013)	(0.004)	(5.963)
Eldercare	0.059**	-0.056**	0.042**	0.014**	-1.246
	(0.021)	(0.021)	(0.016)	(0.005)	(5.827)
Vacation	-0.023	0.025	-0.019	-0.006	3.502
	(0.017)	(0.016)	(0.012)	(0.004)	(5.353)
Personal	0.004	-0.001	0.001	0.000	3.129
	(0.022)	(0.021)	(0.016)	(0.005)	(5.538)
Panel B: Older workers who have access to both paid and unpaid leave (N=1,867)					
Own illness	-0.046	0.042	-0.034	-0.009	7.799
	(0.033)	(0.033)	(0.026)	(0.007)	(4.793)
Family illness	0.007	-0.003	0.002	0.001	-0.368
	(0.028)	(0.028)	(0.022)	(0.006)	(8.119)
Eldercare	0.083***	-0.081**	0.064**	0.017**	-1.976
	(0.025)	(0.025)	(0.020)	(0.006)	(6.629)
Vacation	-0.077	0.071	-0.056	-0.015	-3.328
	(0.060)	(0.051)	(0.041)	(0.011)	(7.356)
Personal	0.009	-0.007	0.006	0.002	-0.834
	(0.022)	(0.022)	(0.018)	(0.005)	(5.854)
Panel C: Older workers who have access to any paid leave only (N=312)					
Own illness	0.285*	-0.327**	0.261**	0.067*	-39.580
	(0.114)	(0.105)	(0.086)	(0.028)	(121.973)
Family illness	0.059	-0.079	0.063	0.015	15.097
	(0.084)	(0.083)	(0.067)	(0.017)	(32.805)
Eldercare	0.059	-0.102	0.082	0.020	-10.315
	(0.059)	(0.069)	(0.054)	(0.016)	(20.326)
Vacation	0.228	-0.287*	0.230*	0.057	71.221
	(0.168)	(0.128)	(0.104)	(0.030)	(79.646)
Personal	-0.013	0.013	-0.010	-0.002	-7.280
	(0.074)	(0.070)	(0.057)	(0.014)	(46.523)

Notes. This table reports the regression results of access to paid leave on elder care provision by accessibility to paid leave. Estimates of any care and care frequency are the marginal effects after a logit and ordered logit model, respectively. Care frequency is defined as 0 if one did not provide any care; 1 if one provided care less than daily; and 2 if daily. Care time is estimated by an OLS model conditioning on any care. All models control for the demographics (education, sex, race/ethnicity, age, age squared, a spouse or partner present, and a child under age 18

present), wage, the receipt of unpaid leave, year and state dummies. Standard errors are clustered at the state level. ATUS Leave Module weights are applied. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 1-8: Sensitivity checks using the reference period of any care as yesterday

Paid leave for	Any care yesterday	No care yesterday	Less than daily care	Daily care	Care time
Any reasons	-0.007	0.007	-0.003	-0.004	10.630
	(0.009)	(0.009)	(0.004)	(0.005)	(15.720)
Own illness	-0.007	0.007	-0.003	-0.004	18.322
	(0.010)	(0.010)	(0.004)	(0.006)	(12.991)
Family illness	-0.001	0.001	-0.000	-0.001	11.283
	(0.011)	(0.011)	(0.004)	(0.006)	(14.532)
Eldercare	0.018	-0.018	0.007	0.011	7.475
	(0.012)	(0.012)	(0.005)	(0.007)	(15.552)
Vacation	-0.006	0.005	-0.002	-0.003	19.629
	(0.008)	(0.009)	(0.004)	(0.005)	(15.350)
Personal	-0.002	0.001	-0.000	-0.001	28.368
	(0.011)	(0.011)	(0.005)	(0.006)	(22.700)
Observations	3,475	3,475	3,475	3,475	182

Notes. This table reports the regression results of access to paid leave on elder care provision using the reference period of any care as yesterday. Estimates of any care and care frequency are the marginal effects after a logit and ordered logit model, respectively. Care frequency is defined as 0 if one did not provide any care; 1 if one provided care less than daily; and 2 if daily. Care time is estimated by an OLS model conditioning on any care yesterday. All models control for the demographics (education, sex, race/ethnicity, age, age squared, a spouse or partner present, and a child under age 18 present), wage, the receipt of unpaid leave, data collected during weekends or holidays, year and state dummies. Standard errors are clustered at the state level. ATUS Leave Module weights are applied. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 1-9: Sensitivity checks by survey year

Paid leave for	Any care	No care	Less than daily care	Daily care	Care time
Panel A: 2011 Sample (N=1,346)					
Any reasons	0.013	-0.017	0.013	0.004	3.866
	(0.029)	(0.032)	(0.023)	(0.008)	(6.646)
Own illness	0.006	-0.012	0.009	0.003	4.167
	(0.030)	(0.032)	(0.024)	(0.008)	(6.272)
Family illness	0.027	-0.026	0.020	0.007	-2.097
	(0.029)	(0.030)	(0.022)	(0.008)	(10.167)
Eldercare	0.087***	-0.090***	0.067***	0.023**	-9.429*
	(0.026)	(0.027)	(0.020)	(0.008)	(4.234)
Vacation	0.011	-0.016	0.012	0.004	2.577
	(0.027)	(0.029)	(0.022)	(0.008)	(6.247)
Personal	0.033	-0.040	0.030	0.010	6.533
	(0.032)	(0.034)	(0.025)	(0.009)	(5.514)
Panel B: 2017 Sample (N=1,125)					
Any reasons	-0.013	0.019	-0.015	-0.005	19.570
	(0.039)	(0.040)	(0.030)	(0.010)	(19.208)
Own illness	-0.016	0.021	-0.016	-0.005	22.338
	(0.034)	(0.033)	(0.025)	(0.008)	(17.621)
Family illness	-0.033	0.038	-0.029	-0.009	23.833
	(0.039)	(0.037)	(0.027)	(0.009)	(20.939)
Eldercare	-0.010	0.017	-0.013	-0.004	18.230
	(0.044)	(0.041)	(0.031)	(0.010)	(25.767)
Vacation	-0.019	0.023	-0.017	-0.005	14.847
	(0.036)	(0.035)	(0.027)	(0.009)	(18.186)
Personal	-0.001	0.005	-0.004	-0.001	15.826
	(0.038)	(0.036)	(0.027)	(0.009)	(19.497)
Panel C: 2018 Sample (N=1,004)					
Any reasons	-0.066	0.067	-0.050	-0.017	-5.274
	(0.036)	(0.036)	(0.027)	(0.009)	(4.659)
Own illness	-0.059	0.059	-0.044	-0.015	-2.645
	(0.034)	(0.033)	(0.025)	(0.008)	(4.557)
Family illness	0.004	-0.004	0.003	0.001	-8.899
	(0.030)	(0.029)	(0.022)	(0.008)	(6.744)
Eldercare	0.093**	-0.093**	0.069**	0.024**	-7.218
	(0.030)	(0.030)	(0.022)	(0.009)	(6.873)
Vacation	-0.077*	0.071*	-0.053*	-0.018*	-5.557
	(0.033)	(0.034)	(0.026)	(0.009)	(4.619)
Personal	-0.036	0.034	-0.026	-0.009	-7.939
	(0.028)	(0.027)	(0.020)	(0.007)	(7.127)

Notes. This table reports the regression results of paid leave access on elder care provision by survey year. Estimates of any care and care frequency are the marginal effects after a logit and ordered logit model, respectively. Care frequency is defined as 0 if one did not provide any care;

1 if one provided care less than daily; and 2 if daily. Care time is estimated by an OLS model conditioning on any care. All models control for the demographics (education, sex, race/ethnicity, age, age squared, a spouse or partner present, and a child under age 18 present), wage, the receipt of unpaid leave, year and state dummies. Standard errors are clustered at the state level. ATUS Leave Module weights are applied. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

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Appendix Table 1-1: Access to paid leave for elder care

	Leave access	Observations
Total	0.285	3,475
Men	0.266	1,551
Women	0.301	1,924
High school or less	0.239	1,460
Less than high school	0.120	306
High school	0.267	1,154
Some college or more	0.328	2,015
Some college	0.319	1,143
College or more	0.340	872
White non-Hispanic	0.318	2,173
Non-White/Hispanics	0.221	1,302
Black	0.262	653
Hispanic	0.161	503
Other	0.274	146
Below median wage	0.223	1,943
Median wage or above	0.360	1,532

Notes. The table reports the average rate of access to paid leave for elder care from the ATUS Leave Module respondents aged 45 or over. ATUS Leave Module weights are applied.

Paper 2: Effects of Paid Leave Policies on Labor Market Outcomes for Older Workers with Elder Care Responsibilities

Abstract

Working caregivers for older relatives have received little attention from the research on paid family leave, and how paid family leave affects their labor supply is widely unknown. I study the relationship between paid leave and labor market outcomes for older workers, who need to provide elder care, using the RAND Health and Retirement Study from 1998 through 2014. Two types of paid leave are examined: paid leave provided through employer policy and paid leave provided through state government policy. My fixed-effects estimates show that the health deterioration of a spouse or a parent, representing one's need for providing elder care, is associated with a contemporaneous decrease in labor force participation and employment for women and full-time employment and hours worked in the short term for men. Employer-provided paid leave has a positive relationship with women's labor force participation and weeks worked contemporaneously and men's labor market outcomes in the long run. State-provided paid leave is positively associated with hours worked and full-time employment for women with some college degree in the short term but negatively associated with hours worked for those with college or more education. For men, the state policy shows a positive relationship with contemporaneous full-time employment for men with college or more education.

Introduction

Most people who provide care for an elderly relative are currently in the labor market. In 2017-2018, 62.8% of approximately 40 million elder care providers aged 15 or older were

employed, of which nearly 75.8% worked full-time (US Bureau of Labor Statistics, 2019c). According to a recent nationally representative survey, 47% of adults aged 40 and older who have provided long-term care report difficulty balancing work and care responsibilities (AP-NORC, 2017). Working caregivers have changed working days or hours (38%), switched from working full time to part time (8%), quit a job (9%), or retired early (10%) to provide care. The negative impacts of caregiving on work have been similarly found in some earlier nationwide surveys on working caregivers for older adults (NAC-AARP, 2015; Witters, 2011).

Caregivers for older adults who are in their middle or old age, in general, are at a high risk of leaving the workforce if they fail to juggle the competing demands for elder care and work and not making a comeback even after the caregiving responsibilities end (Gonzales, Lee, & Brown, 2017; Lilly, Laporte, & Coyte, 2007; Skira, 2015). Early retirement, particularly among the workers with lower socioeconomic status, could result in old-age poverty, which more than 20% of American elderly aged 65 and over are facing (OECD, 2018). Government labor market policies might improve retention of older workers by providing leave directly or by influencing the policies of employers. As an exemplar, the FMLA is the only policy measure that directly supports workers with care responsibilities. But the latest report on the FMLA indicates that the unpaid leave policy serves their needs insufficiently (Klerman et al., 2014). Inability to meet living costs during *unpaid* leave is the most cited reason among family caregivers with unmet needs for leave.

Most empirical studies on caregiving for an older relative show adverse effects of providing elder care on the caregiver's labor supply. Women who provide informal care are likely to reduce their labor force participation (Jacobs, Van Houtven, Laporte, & Coyte, 2015), employment (Butrica & Karamcheva, 2014), and hours of work (Bakker et al., 2013; Jacobs et

al., 2015; Johnson & Lo Sasso, 2006; Lilly et al., 2007) and retire early (Dentinger & Clarkberg, 2002; Jacobs, Van Houtven, Laporte, & Coyte, 2017; Van Houtven et al., 2013). Once those women leave the labor market due to caregiving responsibilities, their chance of returning to work or increasing work hours after the care spell is low (Skira, 2015). On the other hand, men caregivers tend to show lower employment (Butrica & Karamcheva, 2014; Van Houtven et al., 2013) but slower retirement (Dentinger & Clarkberg, 2002) than men without caregiving responsibilities. Nevertheless, no previous research has studied how providing care influences work in the longer term or looked at the relationship by socioeconomic status.

Another gap in the literature is that relatively little is known about how paid family leave is associated with the labor supply of workers with caregiving responsibilities. Paid family leave is potentially important: if older workers have access to paid leave when they have the immediate need to provide care, they might not necessarily quit their jobs in order to either provide care on their own or arrange elder/healthcare services and supports. If paid leave is absent, older workers might choose to reduce their work due to the caregiving responsibilities and eventually give up on their jobs as caregiving continues. To date, only two studies have investigated the relationship between paid family leave and labor market outcomes for older workers with care responsibilities. Saad-Lessler and Bahn (2017) use a difference-in-difference-in-differences model and find that California's paid family leave increased labor force participation and full-time employment for caregivers in the short run and the long run. These effects of CA-PFL were heterogeneous by sex, household income, caregiving spell, and age of a caregiver. Using a difference-in-difference approach, Kang et al. (2019) also find a positive effect of California's paid family leave on work for older women with a disabled family member, with larger effect for those who are 45-54, near poor (100-200% of poverty level), and with

college or higher degree. However, the former study is subject to endogeneity bias as it uses the sample of people who are already providing care. The latter one neither includes men nor tests the policy effects in the longer term.

In this study, I look at how care responsibilities and paid family leave affect labor market outcomes for older workers with elder care responsibilities in the short term and the long term using a finite distributed lag model (FDL) with individual fixed effects. The FDL model is useful in estimating the lagged and cumulative effects of the leave policy on the labor market outcomes (Wooldridge, 2016). A negative change in health of a spouse/partner or a parent/parent-in-law that increases the need for providing care is used to mimic an experiment that randomly assigns the demand for elder care. In estimating the effects of paid leave policies, two types of policies are considered: 1) the employer policy and 2) the state policies in California, New Jersey, and Rhode Island. The potential moderating effects of paid leave for older workers with caregiving responsibilities are estimated by a model that includes an interaction between the change in health of an adult family member and access to paid leave (whether through a state law or through an employer policy).

Methods

Data

The Health and Retirement Study (HRS) is a biennial longitudinal survey of Americans aged 50 or over that started in 1992 by the University of Michigan. It collects extensive information on health and healthcare use, demographics, employment, income and wealth, family/social relationships, and well-being in old age. Using this original HRS data, the RAND Center for the Study of Aging links across the datasets and provides their own version of HRS

data products, including the individual- and household-level longitudinal files and imputed income, wealth, and expenditures files. In this study, I merge the policy variables from the Core HRS Data and the geographic variables from the Restricted HRS Data to the RAND HRS Longitudinal and Family Data. I limit my sample to the years between 1998 and 2014 because some covariates for parents from the RAND HRS Family Data are not available outside this timeframe. I use the years 2002 through 2014 in the regression because of the lagged explanatory variables.

My analysis sample consists of women and men 1) under age 60, 2) employed, and 3) had a spouse/partner or a living mother/father/mother-in-law/father-in-law in the baseline year, 1998, or on their first interview after 1998. For simplicity, I will call a spouse or partner as a spouse and a parent or parent-in-law as a parent. I exclude those living in care facilities or having their own serious health conditions that might affect work (a disability that inhibits working, any ADLs, and dementia or Alzheimer's disease). Individuals who were self-employed or with only one observation throughout the panel are also excluded. The final sample includes 7,289 observations from 1,665 uniquely identified women and 6,551 observations from 1,479 uniquely identified men.

Table 2-1 reports descriptive statistics of the analysis sample in the baseline year 1998. The number of observations fluctuates throughout the observed period reflecting the addition of new cohorts in 2004 and 2010. Those who joined the survey after the baseline account for 22.3% of women’s and 26.4% of men’s observations in total, most of whom entered in 2004. Their baseline characteristics did not significantly differ from the existing survey participants except that the newer cohort are more educated.

On average, a majority (88.1% of women, 93.3% of men) had a spouse and over 60% had a parent between 2002 and 2014. Approximately 84% experienced a health decline of the spouse or the parent, gradually increasing over time from less than 80% in the base year. A little more than a half of the older workers had access to paid leave provided by employers (51.4% of women, 53.8% of men) and around 9% had access to paid family leave provided by the state government (8.8% of women, 8.9% of men).

Estimation

I use an individual fixed effects model to estimate the effects of paid leave policies on labor market outcomes for those who have a health event of a spouse or a parent. My analyses begin with examining the contemporaneous effects of such health events:

$$Y_{it} = \beta_0 + \beta_1 H_{it} + \gamma' X_{it} + \theta_i + \delta_t + \rho_s + u_{it} \quad \ldots\ldots \quad (1)$$

In the model, *Y* is a labor market outcome for individual *i* in year *t*. The outcome measures include labor force participation, employment, retirement, hours and weeks worked, working full time, and wage/salary income. Wage and salary income is expressed in 2014 dollars using Consumer Price Index adjustment and then logged.

H is a binary variable indicating the onset of any health conditions of a spouse or a living parent that increased the need for care over the last two-year period. For a spouse, the health conditions include intermittent (nursing home or hospital stays) and lasting conditions (new conditions including high blood pressure, diabetes, cancer, lung disease, heart problem, stroke, psychological problem, and arthritis, work disability, worse self-reported health, any IADLs, and ADLs, or memory-related diseases). The health conditions for a parent include lasting conditions (ever lived in a nursing home, need care, cannot be left alone, or memory-related diseases). I

assign the value of 1 from the first time when the spouse or parent had a health condition and once it is set to 1, it remains at 1 in the succeeding years.

X is a set of control variables that includes the individual characteristics (education, race/ethnicity, marital status, age, age squared, self-rated health, Social Security or Social Security Disability Insurance receipt, veteran status, youngest child under age 18, number of children, grandparenting responsibilities and homeownership), the spouse's employment status, and the parent's co-residence status.[5] The model also includes the individual fixed effects (θ) to control for the unobserved heterogeneity within an individual over time and the year (δ) and state dummies (ρ) to control for the time trend and the state-specific characteristics.

In this equation, the coefficient β_1 captures the effects of the health event on the current labor market activities.

To estimate the subsequent changes in labor market outcomes due to the health event of a spouse or parent, I add two lags of the health event to the initial specification as follows:

$$Y_{it} = \beta_0 + \beta_1 H_{it} + \beta_2 H_{it-2} + \gamma' X_{it} + \theta_i + \delta_t + \rho_s + u_{it} \quad \ldots\ldots \quad (2)$$

$$Y_{it} = \beta_0 + \beta_1 H_{it} + \beta_2 H_{it-2} + \beta_3 H_{it-4} + \gamma' X_{it} + \theta_i + \delta_t + \rho_s + u_{it} \quad \ldots\ldots \quad (3)$$

The coefficients of interest are β_2 and β_3, which measure the changes in the outcomes after two years and four years, respectively, from the onset of the health event, given the HRS is a biennial study.

[5] I also specify a saturated model with a full set of controls including the characteristics of the individual, those of the spouse (education, race/ethnicity, age, age squared, employment, Social Security or Social Security Disability Insurance receipt, and veteran status), and those of all living parents (co-residence, age, age squared, marital status, child living within 10 miles, and care receipt from any siblings). However, I prefer the simpler model as the results from the saturated model and the parsimonious model are nearly identical.

Similarly, I estimate the effects of paid leave policies on labor market outcomes using individual fixed effects by introducing an interaction term between the health event and the policy. For the analysis of the contemporaneous effects, I use the following equation:

$$Y_{it} = \beta_0 + \beta_1 H_{it} + \beta_2 P_{it} + \beta_3 H_{it} \cdot P_{it} + \gamma' X_{it} + \theta_i + \delta_t + \rho_s + u_{it} \quad \ldots\ldots \quad (4)$$

where *P* denotes the provision of paid leave policy. Two types of paid leave policy are examined: employer-provided leave and state-provided leave. Paid leave provided by an employer takes the value of 1 if an individual receives paid vacation or paid sick days from the current job. State paid leave policy is measured by an individual's residency that takes the value of 1 if one lived in California in 2004 or after, New Jersey in 2009 or after, and Rhode Island in 2014. The coefficient β_3 is the estimated contemporaneous effect of paid leave on labor market outcomes for those with a spouse or parent with a health shock the same year.

I add two lags of each of the main effects of the health event and the policy and their interactions to equation (4) to measure the short-term and long-term effects of paid leave policies.

$$Y_{it} = \beta_0 + \beta_1 H_{it} + \beta_2 P_{it} + \beta_3 H_{it} \cdot P_{it} + \beta_4 H_{it-2} + \beta_5 P_{it-2} + \beta_6 H_{it-2} \cdot P_{it-2} + \gamma' X_{it} + \theta_i + \delta_t + \rho_s + u_{it} \quad \ldots\ldots \quad (5)$$

$$Y_{it} = \beta_0 + \beta_1 H_{it} + \beta_2 P_{it} + \beta_3 H_{it} \cdot P_{it} + \beta_4 H_{it-2} + \beta_5 P_{it-2} + \beta_6 H_{it-2} \cdot P_{it-2} + \beta_7 H_{it-4} + \beta_8 P_{it-4} + \beta_9 H_{it-4} \cdot P_{it-4} + \gamma' X_{it} + \theta_i + \delta_t + \rho_s + u_{it} \quad \ldots\ldots \quad (6)$$

The coefficients β_6 and β_9 in these models indicate the delayed changes in the labor market outcomes attributable to paid leave when an individual's spouse or parent had the health event two years and four years ago, respectively. The RAND HRS person-level analysis weight is applied throughout the analyses.

Results

I present the results for the regressions of the health deterioration of a spouse or a parent and two types of paid leave policy on labor market outcomes, followed by the results of subgroup analyses by education. The results provided in this section are from the models with two lags, which are similar to the ones without the lags. Detailed results from all specifications, including without lags and with one lag, are presented in the Appendix A.

Effects of the Onset of Health Conditions of a Spouse or a Parent

I start by looking at how the health event of a spouse or a parent affects the labor market outcomes for older workers.

Table 2-2 reports the regression results of the effect of the health decline of an adult family member on women's labor market outcomes. The health event is related to a significant decrease in women's labor force participation by 5.2 percentage points and employment by 5.3 percentage points in the same year when it happened. However, it did not show the persisting effects on women's outcomes in the short term and the long term. Although the coefficients for the two lags are not significant, they suggest some older women were likely to return to the labor market two and four years after the health event.

Looking at men's results, Table 2-3 shows that the health decline of an adult family member is associated with decreased full-time work for men by 5.6 percentage points contemporaneously, which did not carry over to the following interview after two or more years. In the short term, the health event shows a negative association with hours worked by approximately 2 hours a week. However, the coefficients for the two lags imply that men's labor

market activities were likely to be affected by a family member's health event for two years and not fully recovered even after four years.

Effects of Paid Leave Policies

Next, I analyze how paid leave policy affects labor market outcomes for older workers when the health decline of their spouse or parent occurs. In this subsection, I examine two types of paid leave policy – one provided by an employer and another by a state government.

Table 2-4 presents the effects of employer-provided leave on women's labor market outcomes. The policy is related to an increase in labor force participation by 7.2 percentage points and weeks worked by 3.6 weeks for older women when their spouse or parent had a health condition for the first time. The main effects for the policy are positive and significant contemporaneously and in the short term, indicating a strong relationship between access to paid leave and women's labor market activities this year and two years after. However, most of these effects decrease or disappear when interacted with the health event.

The pattern for men considerably differs from that for women. Table 2-5 shows that paid leave provided by employers is positively associated with men's labor market outcomes in the long term. Access to employer-provided paid leave four years ago when the spouse or parent had a first health decline is associated with increased men's labor force participation, hours and weeks worked, and wage/salary income this year, and decreased retirement. The coefficients for the policy show the positive and strong contemporaneous associations with men's outcomes overall, but they vanish in the interaction terms.

I now repeat the similar analyses for the state paid family leave. The effects of paid leave on women's labor market outcomes are shown in Table 2-6. The estimates show that women's

outcomes were not affected by the state paid leave when they had a health decline of a spouse or parent. The results were similar for men (Table 2-7). I believe these null results of state-provided leave may be primarily due to the small numbers of respondents covered by state paid leave laws. I will discuss this issue more in the conclusion section.

Subgroup Analyses by Education

Health event and labor market outcomes

The association between the health decline of a spouse or parent and labor market outcomes differs by education. Table 2-8 reports the association among women by three educational subgroups: High school or less, some college, and college or more. Women with high school or less education are likely to leave the labor force the same year when they have the health event of a spouse or a parent by 9.8 percentage points. However, women with college or more education are more likely to increase their labor force participation and weeks worked and less likely to retire 2 or more years after the health event, compared to their counterparts without such an event.

In Table 2-9, men respond to the spouse or parent's health deterioration in an opposite way. Men with high school or less education are likely to increase their labor market activities which lead to higher wage with a family member's health decline in the present. In contrast, the some-college subgroup tends to reduce their labor market activities contemporaneously. Similarly, men with college or more education are likely to decrease their employment and wage/salary income in the same year when the health decline of a spouse or a parent happens.

Paid leave and labor market outcomes

Table 2-10 reports the associations between employer-provided paid leave and labor market outcomes for each educational subgroup. Panel A shows that women with high school or less education are likely to reduce work weeks by approximately 4.3 weeks 2 years after their spouse or parent had a health deterioration, despite their access to paid leave at that time. In contrast, the employer policy shows a positive contemporaneous relationship with labor force participation by 1.4 percentage points for women with some college education when they have the health decline of a family member.

In Table 2-11, paid leave by employers is positively associated with labor market outcomes only for the most educated men in the long term. The college-or-more subgroup are likely to increase their overall labor market activities 4 years after the health decline of a family member if paid leave was available then, suggesting that having access to paid leave at the workplace can help highly educated men stay in the labor market in the future.

Women's results for state-provided paid family leave are shown in Table 2-12. The state policy shows the positive relationship with hours of work, which increase by approximately 7.6 hours per week, and working full time, which increases notably by 21.5 percentage points, for those with some college education 2 years after the onset of a spouse or parent's health decline.

In Table 2-13, the state paid family leave is positively related to working full time, with a remarkable increase of 26.9 percentage points, for men with college or more education contemporaneously. As with the employer policy, the most educated are the only group that is responsive to government policy.

Discussion and Conclusion

I examine how paid leave is associated with labor market outcomes for older workers with elder care responsibilities due to the health deterioration of a spouse or a parent. To better understand the dynamic relationship between paid leave and the outcomes, I take a distributed lag approach with fixed effects using the longitudinal data. I estimate how the family member's health decline influences labor market outcomes before analyzing the role of paid leave, separately as an employer policy and as a state policy. Results show that a spouse or parent's health decline is related to a decrease in the labor supply of older workers. For those who encounter the health event, employer-provided paid leave shows a positive relationship with labor market outcomes, whereas state-provided paid leave seems unrelated. Why my findings on the state paid family leave are inconsistent with the previous literature that discovers the positive effects of California's paid family leave on labor market outcomes for older caregivers is presumably related to the tiny number of respondents in the treated states compared to the massive number of zeros in the comparison states. The fixed effects model with lags might not be the best estimation strategy when it is required to exploit numbers of cases in the few treated states.

At the same time, the associations between paid leave and labor market outcomes show heterogeneity by gender. In terms of gender differentials, employer-provided paid leave is positively associated with women's outcomes contemporaneously. For men, the overall increases across all labor market outcome measures stand out in the long run after a 4-year delay. The positive association between the employer benefit and labor market outcomes is straightforward, but it is unclear why the policy effects take place at the different timing between men and women.

In subgroup analyses by education, the results show that both types of paid leave are likely to benefit older workers with at least some college education. If paid leave is available when a family member's health declines, women with some college education are likely to increase their market activities. However, the employer-provided leave shows a negative association with weeks worked among the high school-or-less educated with a 2-year lag and the state-provided leave does so with hours worked for the college-or-more educated with a 4-year lag. It might be possible that the need to provide care could affect these groups more greatly than some-college group somehow, and the leave policies could not soften those impacts effectively. For men, it was consistent that paid leave policies are likely to increase the labor supply of the most educated. These results are congruous with the previous finding that California's paid family leave shows no positive effects for older women with less education, probably due to low public awareness or inadequate wage replacement (Kang et al., 2019). Through what underlying mechanism the state paid family leave influences the labor supply of older women and men differently, particularly by their socioeconomic status, needs further investigation in the future.

This study has several limitations. I use paid vacation and paid sick days to measure employer-provided leave. If a worker had access to unpaid time off from work or different kinds of employer benefits that support elder care, which are not available in my data, my results would be subject to omitted variable bias. A second limitation is that my measure of a spouse or parent's health deterioration is turned on for the first time it happened and lasts throughout the observed period. If a spouse or parent had experienced a decline in health more than one time during the period analyzed, the later health shock would have also affected the caregivers' decision on their labor supply. Because most of the conditions included in my health measure are gradually worsening conditions, I hope using the onset of health deterioration could be most

critical to one's labor market activities in the short term and the long term. Another limitation is that I use a static model rather than a dynamic model. Although a finite distributed lag model is best suited to estimate the long-run changes in the outcomes, some might argue that a dynamic model is superior in that it is free from serial correlation. I would agree that an individual's choice in the labor market at present is likely to be affected by their employment and wages in the past, and it is worth testing a dynamic model in a future study. However, I address the concern over serial correlation by using an exogenous policy as the explanatory variable.

Table 2-1: Descriptive statistics

	Women		Men	
	Baseline	Average	Baseline	Average
In labor force	1.000	0.748	1.000	0.777
Employed	1.000	0.680	1.000	0.673
Retired	0.000	0.226	0.000	0.222
Hours worked	25.92	37.11	30.87	42.335
Weeks worked	33.87	48.87	36.28	49.88
Full time	0.492	0.734	0.564	0.864
Wage/salary income	32,943	53,549	49,982	77,753
Employer-provided paid leave	0.800	0.514	0.859	0.538
State paid family leave	0.000	0.088	0.000	0.089
Spouse or parent with health conditions	0.768	0.841	0.781	0.839
Spouse or partner present	0.887	0.881	0.933	0.933
Parent or parent-in-law present	0.629	0.622	0.611	0.636
Less than high school	0.106	0.051	0.145	0.081
High school	0.406	0.307	0.321	0.268
Some college	0.249	0.296	0.236	0.233
College or more	0.238	0.346	0.298	0.418
White non-Hispanic	0.861	0.853	0.833	0.837
Black non-Hispanic	0.070	0.071	0.047	0.063
Hispanic	0.047	0.051	0.090	0.071
Other non-Hispanic	0.022	0.025	0.030	0.030
Age	55.67	60.58	57.07	61.52
Self-reported health (fair or poor)	0.078	0.057	0.096	0.0774
Veteran	0.003	0.007	0.517	0.416
Number of children	3.079	2.753	3.139	2.783
Youngest child < age 18	0.069	0.031	0.106	0.081
Homeownership	0.819	0.866	0.793	0.840
Grandparenting	0.188	0.210	0.196	0.210
Spouse or partner employed	0.623	0.515	0.601	0.513
Mother co-residing	0.042	0.028	0.024	0.013
Father co-residing	0.003	0.004	0.011	0.004
Mother-in-law co-residing	0.007	0.005	0.019	0.015
Father-in-law co-residing	0.002	0.003	0.005	0.005

Notes. The table summarizes the characteristics of those who were younger than 60, employed, and had a spouse or parent in the base year 1998 (due to the lagged explanatory variables) and the average in 2002-2014. The baseline characteristics of the sample included after 1998 were similar to those in 1998 except for higher education level. The total number of observations is 7,289 for women and 6,551 for men. Wage and salary income is presented in the 2014 dollars. The RAND HRS person-level analysis weight is applied.

Table 2-2: Regression results of change in a spouse or parent's health conditions on labor market outcomes for women

	In labor force	Employed	Retired	Hours worked	Weeks worked	Full time	Log wage/ salary income
Health $_t$	-0.052*	-0.053*	0.035	-0.618	-1.411	0.023	-0.224
	(0.022)	(0.025)	(0.021)	(1.021)	(1.255)	(0.026)	(0.269)
Health $_{t-2}$	0.022	-0.002	-0.024	0.408	0.232	-0.004	-0.031
	(0.017)	(0.020)	(0.017)	(0.704)	(0.960)	(0.019)	(0.212)
Health $_{t-4}$	0.010	0.008	-0.005	0.230	0.509	-0.002	0.114
	(0.017)	(0.020)	(0.017)	(0.812)	(0.910)	(0.020)	(0.203)
Married or cohabiting	-0.052	-0.061	0.011	-1.346	-2.676	0.015	-1.642*
	(0.061)	(0.074)	(0.066)	(3.112)	(3.652)	(0.069)	(0.784)
Age	0.162***	0.134***	-0.137***	4.152***	7.077***	0.086**	1.479***
	(0.029)	(0.032)	(0.029)	(1.231)	(1.521)	(0.030)	(0.332)
Age squared	-0.001***	-0.001***	0.001***	-0.030**	-0.052***	-0.001*	-0.010***
	(0.000)	(0.000)	(0.000)	(0.009)	(0.011)	(0.000)	(0.002)
Fair or poor self-rated health	0.021	-0.007	-0.012	-0.310	-0.367	0.017	-0.158
	(0.023)	(0.024)	(0.023)	(1.081)	(1.361)	(0.025)	(0.250)
Youngest child age <18	-0.041	-0.042	0.059	-3.021	-2.718	-0.052	-0.879
	(0.031)	(0.037)	(0.032)	(1.775)	(2.038)	(0.047)	(0.449)
Number of children	-0.005	-0.001	0.003	-0.081	-0.370	-0.016	-0.051
	(0.012)	(0.012)	(0.012)	(0.601)	(0.731)	(0.013)	(0.127)
Homeownership	-0.013	-0.013	0.036	-1.775	0.055	-0.020	-0.148
	(0.038)	(0.045)	(0.039)	(2.079)	(2.212)	(0.051)	(0.513)
Grandparenting	-0.014	-0.022	0.016	-1.391*	-0.598	-0.032	-0.278
	(0.017)	(0.019)	(0.017)	(0.710)	(0.845)	(0.019)	(0.192)
SP employed	0.049	0.006	-0.036	-0.642	0.818	-0.025	1.273
	(0.050)	(0.061)	(0.051)	(2.824)	(2.803)	(0.063)	(0.722)
SP not employed	-0.029	-0.056	0.046	-2.850	-2.879	-0.073	0.548
	(0.050)	(0.061)	(0.052)	(2.800)	(2.826)	(0.063)	(0.712)
Mom co-residing	-0.013	0.013	0.025	1.326	0.916	-0.020	0.371
	(0.050)	(0.062)	(0.050)	(2.559)	(2.780)	(0.073)	(0.625)
Mom not co-residing	0.028	0.027	-0.016	1.114	0.287	-0.002	0.309
	(0.027)	(0.030)	(0.027)	(1.093)	(1.335)	(0.030)	(0.310)
Pop co-residing	0.338*	0.332*	-0.385***	14.805**	15.625*	0.376***	3.778**
	(0.139)	(0.137)	(0.110)	(4.956)	(6.529)	(0.106)	(1.217)

Pop not co-residing	0.050	0.030	-0.059	0.981	1.920	-0.003	0.174
	(0.030)	(0.035)	(0.031)	(1.403)	(1.802)	(0.039)	(0.381)
Mom-in-law co-residing	0.100	0.094	-0.076	4.267	1.338	0.093	0.740
	(0.081)	(0.084)	(0.080)	(3.425)	(3.743)	(0.097)	(0.953)
Mom-in-law not co-residing	0.033	0.019	-0.021	0.802	0.701	-0.007	0.065
	(0.028)	(0.030)	(0.026)	(1.291)	(1.517)	(0.031)	(0.305)
Pop-in-law co-residing	0.147	0.036	-0.140	7.690	6.398	0.016	-0.518
	(0.125)	(0.186)	(0.123)	(4.898)	(5.374)	(0.184)	(2.825)
Pop-in-law not co-residing	-0.035	-0.011	0.044	-0.037	0.055	0.000	0.057
	(0.033)	(0.039)	(0.032)	(1.635)	(1.846)	(0.038)	(0.425)
Constant	-3.953***	-3.368**	4.089***	-90.905*	-175.506**	-2.179	-39.745**
	(1.101)	(1.182)	(1.076)	(45.503)	(56.846)	(1.124)	(12.317)
R-squared	0.673	0.662	0.654	0.693	0.665	0.695	0.677

Notes. The table reports the fixed-effects estimates for the labor market outcomes associated with the health decline of a spouse or parent based on 7,289 women who were under age 60, employed, and had a spouse/partner or a parent/parent-in-law at baseline from the 2002-2014 RAND HRS. Reference groups for each control variable is: not married or cohabiting; good, very good, or excellent health; do not have the youngest child under age 18; do not own home; do not provide care for a grandchild; do not have a spouse; and do not have a living parent. The wage/salary income is adjusted to the 2014 dollars and then logged. Individual fixed effects, year and state dummies are included across all models. Entries in parentheses are robust-cluster standard errors at an individual level. The RAND HRS person-level analysis weight is applied. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 2-3: Regression results of change in a spouse or parent's health conditions on labor market outcomes for men

	In labor force	Employed	Retired	Hours worked	Weeks worked	Full time	Log wage/ salary income
Health $_t$	0.002	-0.035	-0.004	-0.571	-0.924	-0.056*	-0.392
	(0.026)	(0.029)	(0.026)	(1.220)	(1.395)	(0.027)	(0.301)
Health $_{t-2}$	-0.032	-0.044	0.031	-2.263*	-2.026	-0.030	-0.456
	(0.022)	(0.023)	(0.022)	(1.043)	(1.167)	(0.023)	(0.253)
Health $_{t-4}$	-0.010	-0.001	0.010	0.167	-0.866	0.003	0.107
	(0.018)	(0.019)	(0.018)	(0.736)	(0.868)	(0.019)	(0.219)
Married or cohabiting	-0.083	-0.116	0.074	-1.662	-5.476	-0.083	-1.221
	(0.059)	(0.066)	(0.059)	(3.278)	(3.599)	(0.068)	(0.750)
Age	0.062	0.091**	-0.054	1.503	3.369	0.021	0.768
	(0.033)	(0.035)	(0.033)	(1.577)	(1.753)	(0.035)	(0.401)
Age squared	-0.001*	-0.001*	0.001*	-0.011	-0.026*	-0.000	-0.005
	(0.000)	(0.000)	(0.000)	(0.011)	(0.013)	(0.000)	(0.003)
Fair or poor self-rated health	-0.001	-0.000	0.009	0.664	-2.137	0.033	0.202
	(0.020)	(0.022)	(0.019)	(1.100)	(1.278)	(0.026)	(0.268)
Youngest child age <18	-0.092**	-0.080*	0.094**	-3.788*	-4.854**	-0.033	-1.163**
	(0.029)	(0.032)	(0.029)	(1.559)	(1.693)	(0.034)	(0.372)
Number of children	-0.005	0.008	0.008	-0.212	0.214	-0.009	-0.042
	(0.013)	(0.012)	(0.012)	(0.518)	(0.624)	(0.012)	(0.133)
Homeownership	0.020	-0.011	-0.022	-1.617	1.657	0.032	0.271
	(0.035)	(0.039)	(0.035)	(1.656)	(1.772)	(0.039)	(0.450)
Grandparenting	-0.008	-0.006	0.009	-0.360	0.227	0.002	-0.179
	(0.016)	(0.018)	(0.016)	(0.790)	(0.908)	(0.018)	(0.209)
SP employed	0.097*	0.100	-0.096*	2.283	4.739	0.111*	1.287*
	(0.040)	(0.052)	(0.040)	(1.948)	(2.573)	(0.045)	(0.578)
SP not employed	-0.024	0.002	0.021	-2.399	-0.347	0.028	0.229
	(0.043)	(0.054)	(0.042)	(2.025)	(2.631)	(0.046)	(0.593)
Mom co-residing	-0.081	0.028	0.083	0.762	0.778	-0.002	-0.136
	(0.113)	(0.101)	(0.113)	(4.983)	(4.079)	(0.105)	(1.097)
Mom not co-residing	0.053	0.071*	-0.050	2.520*	3.108*	0.047	0.687
	(0.030)	(0.032)	(0.030)	(1.197)	(1.547)	(0.029)	(0.356)
Pop co-residing	-0.135	-0.191	0.137	-6.762	-10.852	-0.224	-2.683*
	(0.142)	(0.127)	(0.142)	(6.897)	(6.943)	(0.124)	(1.341)

Pop not co-residing	0.089**	0.119***	-0.087*	4.201**	4.046*	0.080*	1.131**
	(0.035)	(0.034)	(0.035)	(1.625)	(1.796)	(0.037)	(0.379)
Mom-in-law co-residing	0.099*	0.120*	-0.100*	3.432	5.267	0.130	1.190*
	(0.050)	(0.053)	(0.050)	(2.443)	(2.728)	(0.067)	(0.565)
Mom-in-law not co-residing	0.074*	0.038	-0.073*	3.247*	3.439*	0.043	0.542
	(0.029)	(0.030)	(0.029)	(1.333)	(1.581)	(0.030)	(0.325)
Pop-in-law co-residing	0.097	0.120	-0.096	9.142	11.509	0.102	1.446
	(0.127)	(0.115)	(0.127)	(4.710)	(6.034)	(0.155)	(1.245)
Pop-in-law not co-residing	-0.007	-0.004	0.009	-0.288	-1.316	0.001	0.144
	(0.031)	(0.035)	(0.031)	(1.423)	(1.721)	(0.032)	(0.395)
Constant	-0.466	-2.065	1.191	6.085	-40.851	0.648	-14.990
	(1.230)	(1.290)	(1.217)	(59.906)	(65.346)	(1.323)	(14.956)
R-squared	0.629	0.651	0.632	0.688	0.645	0.685	0.652

Notes. The table reports the fixed-effects estimates for labor market outcomes associated with the health decline of a spouse or parent based on 6,551 men who were under age 60, employed, and had a spouse/partner or a parent/parent-in-law at baseline from the 2002-2014 RAND HRS. Reference groups for each control variable is: not married or cohabiting; good, very good, or excellent health; do not have the youngest child under age 18; do not own home; do not provide care for a grandchild; do not have a spouse; and do not have a living parent. The wage/salary income is adjusted to the 2014 dollars and then logged. Individual fixed effects, year and state dummies are included across all models. Entries in parentheses are robust-cluster standard errors at an individual level. The RAND HRS person-level analysis weight is applied. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 2-4: Regression results of employer-provided paid leave on labor market outcomes for women with a spouse or parent's health deterioration

	In labor force	Employed	Retired	Hours worked	Weeks worked	Full time	Log wage/ salary income
Health $_t$	-0.078**	-0.042	0.049	-0.160	-2.430	0.042	0.106
	(0.030)	(0.032)	(0.028)	(1.222)	(1.490)	(0.031)	(0.326)
Paid leave $_t$	0.349***	0.561***	-0.335***	23.123***	24.759***	0.564***	6.363***
	(0.037)	(0.039)	(0.036)	(1.548)	(1.869)	(0.042)	(0.405)
Health $_t$ *PL $_t$	0.072*	0.014	-0.048	0.532	3.604*	0.001	-0.252
	(0.036)	(0.038)	(0.035)	(1.516)	(1.837)	(0.041)	(0.403)
Health event $_{t-2}$	0.034*	0.004	-0.034	0.915	1.575	0.002	-0.014
	(0.017)	(0.020)	(0.019)	(0.717)	(0.964)	(0.020)	(0.212)
Paid leave $_{t-2}$	0.083***	0.061**	-0.087***	2.559**	4.197***	0.076**	0.915***
	(0.020)	(0.021)	(0.020)	(0.941)	(1.035)	(0.025)	(0.221)
Health $_{t-2}$ *PL $_{t-2}$	-0.012	0.008	0.010	-0.162	-1.671	0.003	0.100
	(0.021)	(0.023)	(0.021)	(0.976)	(1.130)	(0.027)	(0.248)
Health event $_{t-4}$	0.015	0.023	-0.012	0.535	0.939	0.021	0.186
	(0.022)	(0.022)	(0.020)	(0.775)	(1.052)	(0.020)	(0.217)
Paid leave $_{t-4}$	-0.003	0.008	-0.013	0.782	-0.641	0.013	0.081
	(0.021)	(0.023)	(0.020)	(0.866)	(1.066)	(0.024)	(0.222)
Health $_{t-4}$ *PL $_{t-4}$	0.006	-0.010	0.001	-0.035	0.118	-0.022	0.037
	(0.024)	(0.026)	(0.023)	(0.912)	(1.214)	(0.025)	(0.246)
R-squared	0.748	0.783	0.723	0.807	0.784	0.799	0.799

Notes. The table reports the fixed-effects estimates for labor market outcomes associated with the health decline of a spouse or parent based on 7,289 women who were under age 60, employed, and had a spouse/partner or a parent/parent-in-law at baseline from the 2002-2014 RAND HRS. All models control for one's marital status, age, age squared, health, youngest child under age 18, the number of children, homeownership, and grandparenting responsibilities; spouse's employment; parent's/parent-in-law's co-residence status; individual fixed effects, year and state dummies. The wage/salary income is adjusted to the 2014 dollars and then logged. Entries in parentheses are robust-cluster standard errors at an individual level. The RAND HRS person-level analysis weight is applied. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 2-5: Regression results of employer-provided paid leave on labor market outcomes for men with a spouse or parent's health deterioration

	In labor force	Employed	Retired	Hours worked	Weeks worked	Full time	Log wage/ salary income
Health $_t$	0.021	-0.021	-0.015	-0.077	-0.082	-0.041	-0.352
	(0.036)	(0.039)	(0.036)	(1.404)	(1.762)	(0.031)	(0.375)
Paid leave $_t$	0.423***	0.636***	-0.404***	25.989***	29.894***	0.683***	6.860***
	(0.036)	(0.038)	(0.037)	(1.735)	(1.780)	(0.034)	(0.416)
Health $_t$ *PL $_t$	-0.028	-0.007	0.013	-0.299	-0.982	-0.008	0.110
	(0.037)	(0.038)	(0.038)	(1.697)	(1.833)	(0.035)	(0.406)
Health event $_{t-2}$	-0.033	-0.022	0.029	-1.568	-0.953	-0.025	-0.258
	(0.027)	(0.022)	(0.027)	(1.067)	(1.310)	(0.021)	(0.244)
Paid leave $_{t-2}$	0.026	0.035	-0.032	0.622	-0.294	0.023	0.519*
	(0.028)	(0.024)	(0.028)	(1.022)	(1.213)	(0.021)	(0.262)
Health $_{t-2}$ *PL $_{t-2}$	0.021	0.000	-0.015	0.490	0.250	0.032	0.045
	(0.030)	(0.025)	(0.030)	(1.161)	(1.384)	(0.023)	(0.281)
Health event $_{t-4}$	-0.066*	-0.048*	0.065*	-2.029*	-4.239***	-0.035	-0.485
	(0.026)	(0.024)	(0.026)	(0.970)	(1.135)	(0.023)	(0.273)
Paid leave $_{t-4}$	-0.032	-0.039	0.031	-2.049*	-2.671*	-0.009	-0.632*
	(0.025)	(0.021)	(0.025)	(0.849)	(1.080)	(0.024)	(0.258)
Health $_{t-4}$ *PL $_{t-4}$	0.071*	0.050	-0.070*	2.458*	3.997**	0.032	0.693*
	(0.028)	(0.025)	(0.028)	(0.991)	(1.261)	(0.026)	(0.299)
R-squared	0.707	0.801	0.708	0.808	0.780	0.842	0.800

Notes. The table reports the fixed-effects estimates for labor market outcomes associated with the health decline of a spouse or parent based on 6,551 men who were under age 60, employed, and had a spouse/partner or a parent/parent-in-law at baseline from the 2002-2014 RAND HRS. All models control for one's marital status, age, age squared, health, youngest child under age 18, the number of children, homeownership, and grandparenting responsibilities; spouse's employment; parent's/parent-in-law's co-residence status; individual fixed effects, year and state dummies. The wage/salary income is adjusted to the 2014 dollars and then logged. Entries in parentheses are robust-cluster standard errors at an individual level. The RAND HRS person-level analysis weight is applied. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 2-6: Regression results of state paid family leave on labor market outcomes for women with a spouse or parent's health deterioration

	In labor force	Employed	Retired	Hours worked	Weeks worked	Full time	Log wage/ salary income
Health $_t$	-0.052*	-0.058*	0.033	-0.476	-1.221	0.025	-0.293
	(0.023)	(0.026)	(0.022)	(1.048)	(1.292)	(0.026)	(0.280)
Paid leave $_t$	-0.014	-0.070	0.023	0.625	2.551	0.013	-0.504
	(0.051)	(0.068)	(0.058)	(2.845)	(3.553)	(0.066)	(0.808)
Health $_t$ *PFL $_t$	0.004	0.053	0.009	-2.311	-3.002	-0.037	0.606
	(0.046)	(0.071)	(0.056)	(2.825)	(3.459)	(0.070)	(0.789)
Health event $_{t-2}$	0.022	0.002	-0.022	0.373	0.521	-0.006	0.019
	(0.017)	(0.020)	(0.017)	(0.696)	(0.982)	(0.019)	(0.209)
Paid leave $_{t-2}$	0.018	0.086	0.015	0.783	2.163	-0.004	0.991
	(0.050)	(0.102)	(0.064)	(3.283)	(3.417)	(0.100)	(1.067)
Health $_{t-2}$ *PFL $_{t-2}$	-0.000	-0.066	-0.034	0.505	-3.541	0.027	-0.870
	(0.047)	(0.100)	(0.059)	(3.431)	(3.292)	(0.092)	(1.082)
Health event $_{t-4}$	0.010	0.010	-0.004	0.294	0.379	-0.001	0.143
	(0.018)	(0.020)	(0.017)	(0.835)	(0.927)	(0.020)	(0.203)
Paid leave $_{t-4}$	0.028	0.002	-0.050	1.746	-0.824	0.003	0.262
	(0.042)	(0.059)	(0.057)	(2.378)	(3.063)	(0.060)	(0.644)
Health $_{t-4}$ *PFL $_{t-4}$	0.021	-0.006	-0.017	-1.524	2.500	-0.025	-0.281
	(0.036)	(0.057)	(0.046)	(2.168)	(3.050)	(0.060)	(0.628)
R-squared	0.673	0.662	0.655	0.693	0.665	0.695	0.678

Notes. The table reports the fixed-effects estimates for labor market outcomes associated with the health decline of a spouse or parent based on 7,289 women who were under age 60, employed, and had a spouse/partner or a parent/parent-in-law at baseline from the 2002-2014 RAND HRS. All models control for one's marital status, age, age squared, health, youngest child under age 18, the number of children, homeownership, and grandparenting responsibilities; spouse's employment; parent's/parent-in-law's co-residence status; individual fixed effects, year and state dummies. The wage/salary income is adjusted to the 2014 dollars and then logged. Entries in parentheses are robust-cluster standard errors at an individual level. The RAND HRS person-level analysis weight is applied. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 2-7: Regression results of state paid family leave on labor market outcomes for men with a spouse or parent's health deterioration

	In labor force	Employed	Retired	Hours worked	Weeks worked	Full time	Log wage/ salary income
Health $_t$	0.006	-0.036	-0.008	-0.790	-1.091	-0.062*	-0.402
	(0.026)	(0.030)	(0.026)	(1.252)	(1.435)	(0.027)	(0.309)
Paid leave $_t$	0.071	-0.029	-0.069	-4.750	-2.995	-0.117	-0.596
	(0.061)	(0.077)	(0.061)	(3.026)	(3.907)	(0.089)	(0.851)
Health $_t$ *PFL $_t$	-0.077	0.012	0.077	4.269	2.806	0.134	0.133
	(0.065)	(0.074)	(0.065)	(2.965)	(3.840)	(0.095)	(0.821)
Health event $_{t-2}$	-0.033	-0.042	0.032	-2.305*	-1.986	-0.031	-0.446
	(0.023)	(0.023)	(0.023)	(1.060)	(1.189)	(0.023)	(0.258)
Paid leave $_{t-2}$	-0.154	-0.054	0.150	-3.662	-2.344	-0.082	-0.299
	(0.085)	(0.054)	(0.085)	(2.519)	(2.613)	(0.064)	(0.685)
Health $_{t-2}$ *PFL $_{t-2}$	0.051	-0.048	-0.050	-0.451	-1.981	-0.006	-0.404
	(0.078)	(0.053)	(0.078)	(2.662)	(2.756)	(0.071)	(0.662)
Health event $_{t-4}$	-0.009	-0.001	0.010	0.199	-0.759	0.002	0.123
	(0.018)	(0.020)	(0.018)	(0.753)	(0.881)	(0.020)	(0.224)
Paid leave $_{t-4}$	0.087	0.058	-0.087	5.983	5.450	0.072	0.715
	(0.065)	(0.064)	(0.065)	(3.213)	(3.605)	(0.065)	(0.606)
Health $_{t-4}$ *PFL $_{t-4}$	-0.036	-0.000	0.035	-2.200	-3.043	-0.024	-0.280
	(0.063)	(0.067)	(0.063)	(3.089)	(3.543)	(0.067)	(0.682)
R-squared	0.630	0.651	0.633	0.689	0.645	0.686	0.652

Notes. The table reports the fixed-effects estimates for labor market outcomes associated with the health decline of a spouse or parent based on 6,551 men who were under age 60, employed, and had a spouse/partner or a parent/parent-in-law at baseline from the 2002-2014 RAND HRS. All models control for one's marital status, age, age squared, health, youngest child under age 18, the number of children, homeownership, and grandparenting responsibilities; spouse's employment; parent's/parent-in-law's co-residence status; individual fixed effects, year and state dummies. The wage/salary income is adjusted to the 2014 dollars and then logged. Entries in parentheses are robust-cluster standard errors at an individual level. The RAND HRS person-level analysis weight is applied. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 2-8: Regression results of change in a spouse or parent's health conditions on labor market outcomes for women – by education

	In labor force	Employed	Retired	Hours worked	Weeks worked	Full time	Log wage/ salary income
Panel A: High school or less							
Health $_t$	-0.098**	-0.068	0.048	-0.638	-2.346	0.012	-0.358
	(0.038)	(0.043)	(0.034)	(1.752)	(2.287)	(0.045)	(0.438)
Health $_{t-2}$	-0.011	-0.031	0.025	0.451	0.689	0.014	-0.135
	(0.031)	(0.034)	(0.030)	(1.178)	(1.618)	(0.032)	(0.340)
Health $_{t-4}$	-0.033	-0.045	0.039	-1.217	-1.109	-0.041	-0.372
	(0.028)	(0.030)	(0.026)	(1.063)	(1.511)	(0.028)	(0.305)
R-squared	0.688	0.681	0.673	0.690	0.674	0.691	0.693
Panel B: Some college							
Health $_t$	-0.067	-0.053	0.050	-1.666	-3.873	0.031	-0.185
	(0.041)	(0.048)	(0.040)	(1.786)	(2.248)	(0.042)	(0.514)
Health $_{t-2}$	0.014	0.010	-0.042	0.072	-0.612	-0.030	0.074
	(0.026)	(0.031)	(0.030)	(1.085)	(1.401)	(0.028)	(0.351)
Health $_{t-4}$	0.006	0.023	0.007	-1.108	-0.934	-0.001	0.100
	(0.028)	(0.034)	(0.028)	(1.186)	(1.482)	(0.032)	(0.339)
R-squared	0.685	0.671	0.658	0.703	0.686	0.728	0.686
Panel C: College or more							
Health $_t$	0.005	-0.040	-0.002	0.466	1.811	0.035	-0.082
	(0.031)	(0.039)	(0.031)	(1.696)	(1.865)	(0.045)	(0.424)
Health $_{t-2}$	0.072*	0.033	-0.073**	0.831	0.887	0.004	0.132
	(0.029)	(0.039)	(0.028)	(1.328)	(1.870)	(0.038)	(0.416)
Health $_{t-4}$	0.064*	0.042	-0.068*	2.967	3.870*	0.033	0.515
	(0.031)	(0.035)	(0.031)	(1.709)	(1.633)	(0.039)	(0.383)
R-squared	0.677	0.662	0.667	0.714	0.666	0.692	0.680

Notes. The table reports the fixed-effects estimates for labor market outcomes associated with the health decline of a spouse or parent based on 7,289 women who were under age 60, employed, and had a spouse/partner or a parent/parent-in-law at baseline from the 2002-2014 RAND HRS. All models control for one's marital status, age, age squared, health, youngest child under age 18, the number of children, home ownership, grandparenting responsibilities, spouse's employment, parent's and parent-in-law's co-residence status, individual fixed effects, and year and state dummies. The wage and salary income is adjusted to the 2014 dollars and then logged. Entries in parentheses are robust-cluster standard errors at an individual level. The RAND HRS person-level analysis weight is applied. The numbers of observations are 2,999, 2,047, and 2,243 for the high school or less, some college, and college or more groups, respectively. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 2-9: Regression results of change in a spouse or parent's health conditions on labor market outcomes for men – by education

	In labor force	Employed	Retired	Hours worked	Weeks worked	Full time	Log wage/ salary income
Panel A: High school or less							
Health $_t$	0.080	0.142**	-0.080	5.044**	6.078**	0.052	1.571**
	(0.044)	(0.050)	(0.044)	(1.835)	(2.182)	(0.048)	(0.482)
Health $_{t-2}$	-0.021	-0.033	0.021	-1.659	-0.522	-0.021	-0.143
	(0.040)	(0.044)	(0.040)	(1.733)	(2.107)	(0.040)	(0.476)
Health $_{t-4}$	0.023	0.027	-0.023	0.648	1.114	0.014	0.464
	(0.028)	(0.032)	(0.028)	(1.233)	(1.507)	(0.034)	(0.351)
R-squared	0.644	0.655	0.644	0.694	0.664	0.695	0.646
Panel B: Some college							
Health $_t$	-0.094	-0.164**	0.086	-7.387**	-7.322**	-0.163**	-1.762***
	(0.050)	(0.052)	(0.050)	(2.246)	(2.768)	(0.055)	(0.504)
Health $_{t-2}$	-0.058	-0.048	0.056	-1.700	-1.790	-0.030	-0.394
	(0.039)	(0.042)	(0.039)	(1.947)	(2.177)	(0.049)	(0.447)
Health $_{t-4}$	-0.037	0.025	0.037	-0.361	-0.968	0.015	0.084
	(0.037)	(0.039)	(0.038)	(1.472)	(1.835)	(0.043)	(0.422)
R-squared	0.619	0.638	0.630	0.703	0.648	0.696	0.664
Panel C: College or more							
Health $_t$	-0.005	-0.081*	0.005	-0.302	-1.936	-0.070	-0.890*
	(0.037)	(0.041)	(0.037)	(1.841)	(1.996)	(0.041)	(0.449)
Health $_{t-2}$	-0.023	-0.033	0.022	-3.249	-2.758	-0.039	-0.596
	(0.035)	(0.033)	(0.035)	(1.765)	(1.823)	(0.034)	(0.399)
Health $_{t-4}$	-0.019	-0.035	0.021	0.660	-2.241	-0.017	-0.158
	(0.027)	(0.031)	(0.027)	(1.178)	(1.252)	(0.029)	(0.374)
R-squared	0.653	0.686	0.654	0.704	0.662	0.695	0.680

Notes. The table reports the fixed-effects estimates for labor market outcomes associated with the health decline of a spouse or parent based on 6,551 men who were under age 60, employed, and had a spouse/partner or a parent/parent-in-law at baseline from the 2002-2014 RAND HRS. All models control for one's marital status, age, age squared, health, youngest child under age 18, the number of children, home ownership, grandparenting responsibilities, spouse's employment, parent's and parent-in-law's co-residence status, individual fixed effects, and year and state dummies. The wage and salary income is adjusted to the 2014 dollars and then logged. Entries in parentheses are robust-cluster standard errors at an individual level. The RAND HRS person-level analysis weight is applied. The numbers of observations are 2,628, 1,506, and 2,417 for the high school or less, some college, and college or more groups, respectively. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 2-10: Regression results of employer-provided paid leave on labor market outcomes for women with a spouse or parent's health deterioration – by education

	In labor force	Employed	Retired	Hours worked	Weeks worked	Full time	Log wage/ salary income
Panel A: High school or less							
Health $_t$ *PL $_t$	0.023	0.016	0.033	0.558	1.491	0.032	-0.419
	(0.059)	(0.062)	(0.056)	(2.535)	(3.009)	(0.065)	(0.645)
Health $_{t-2}$ *PL $_{t-2}$	-0.057	-0.052	0.068	-3.037	-4.296*	-0.067	-0.697
	(0.037)	(0.039)	(0.036)	(1.593)	(1.880)	(0.047)	(0.422)
Health $_{t-4}$ *PL $_{t-4}$	0.000	0.007	0.006	1.153	1.488	-0.016	0.116
	(0.035)	(0.041)	(0.032)	(1.372)	(1.768)	(0.043)	(0.358)
R-squared	0.763	0.793	0.740	0.817	0.795	0.803	0.808
Panel B: Some college							
Health $_t$ *PL $_t$	0.138*	0.081	-0.110	2.880	5.162	0.089	0.570
	(0.067)	(0.069)	(0.066)	(2.264)	(3.428)	(0.076)	(0.736)
Health $_{t-2}$ *PL $_{t-2}$	-0.016	0.053	0.018	1.712	3.325	0.074	0.400
	(0.035)	(0.042)	(0.042)	(1.708)	(1.908)	(0.047)	(0.445)
Health $_{t-4}$ *PL $_{t-4}$	-0.020	-0.064	0.007	-0.217	-0.059	0.009	0.023
	(0.043)	(0.049)	(0.042)	(1.574)	(2.201)	(0.043)	(0.445)
R-squared	0.771	0.802	0.732	0.822	0.817	0.829	0.823
Panel C: College or more							
Health $_t$ *PL $_t$	0.067	-0.038	-0.076	-2.385	2.698	-0.109	-0.847
	(0.063)	(0.066)	(0.063)	(2.614)	(2.978)	(0.066)	(0.700)
Health $_{t-2}$ *PL $_{t-2}$	0.018	0.023	-0.023	1.298	-3.727	0.017	0.495
	(0.036)	(0.038)	(0.036)	(1.716)	(1.994)	(0.042)	(0.420)
Health $_{t-4}$ *PL $_{t-4}$	0.021	-0.005	0.004	-1.803	-1.955	-0.062	-0.167
	(0.046)	(0.041)	(0.047)	(1.605)	(2.293)	(0.039)	(0.452)
R-squared	0.737	0.775	0.725	0.807	0.767	0.784	0.788

Notes. The table reports the fixed-effects estimates for labor market outcomes associated with the health decline of a spouse or parent based on 7,289 women who were under age 60, employed, and had a spouse/partner or a parent/parent-in-law at baseline from the 2002-2014 RAND HRS. All models control for one's marital status, age, age squared, health, youngest child under age 18, the number of children, home ownership, grandparenting responsibilities, spouse's employment, parent's and parent-in-law's co-residence status, individual fixed effects, and year and state dummies. The wage and salary income is adjusted to the 2014 dollars and then logged. Entries in parentheses are robust-cluster standard errors at an individual level. The RAND HRS person-level analysis weight is applied. The numbers of observations are 2,999, 2,047, and 2,243 for the high school or less, some college, and college or more groups, respectively. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 2-11: Regression results of employer-provided paid leave on labor market outcomes for men with a spouse or parent's health deterioration – by education

	In labor force	Employed	Retired	Hours worked	Weeks worked	Full time	Log wage/ salary income
Panel A: High school or less							
Health $_t$ *PL $_t$	0.003	-0.038	-0.003	-1.481	0.073	0.028	0.094
	(0.062)	(0.073)	(0.062)	(2.585)	(3.340)	(0.063)	(0.867)
Health $_{t-2}$ *PL $_{t-2}$	0.048	0.044	-0.048	1.517	0.671	0.030	0.026
	(0.046)	(0.041)	(0.046)	(1.752)	(2.146)	(0.035)	(0.511)
Health $_{t-4}$ *PL $_{t-4}$	0.030	0.031	-0.035	2.961	3.163	-0.026	0.301
	(0.049)	(0.040)	(0.049)	(1.530)	(1.851)	(0.047)	(0.459)
R-squared	0.723	0.793	0.723	0.803	0.782	0.835	0.773
Panel B: Some college							
Health $_t$ *PL $_t$	-0.022	0.034	-0.038	0.491	1.685	-0.057	0.454
	(0.075)	(0.070)	(0.085)	(2.827)	(3.827)	(0.061)	(0.737)
Health $_{t-2}$ *PL $_{t-2}$	0.014	-0.047	0.018	-1.197	-2.566	0.012	-0.068
	(0.056)	(0.047)	(0.058)	(2.026)	(2.723)	(0.045)	(0.483)
Health $_{t-4}$ *PL $_{t-4}$	0.036	0.007	-0.018	1.099	3.754	-0.003	0.299
	(0.060)	(0.055)	(0.062)	(2.368)	(2.971)	(0.048)	(0.551)
R-squared	0.720	0.807	0.722	0.835	0.802	0.864	0.831
Panel C: College or more							
Health $_t$ *PL $_t$	-0.063	0.000	0.065	0.269	-2.982	-0.012	0.167
	(0.056)	(0.058)	(0.056)	(2.804)	(2.790)	(0.056)	(0.620)
Health $_{t-2}$ *PL $_{t-2}$	0.019	-0.006	-0.020	1.271	2.036	0.044	0.101
	(0.052)	(0.041)	(0.052)	(2.010)	(2.291)	(0.035)	(0.446)
Health $_{t-4}$ *PL $_{t-4}$	0.125**	0.083*	-0.124**	2.877	5.190*	0.089*	1.257*
	(0.043)	(0.041)	(0.043)	(1.617)	(2.079)	(0.037)	(0.502)
R-squared	0.715	0.821	0.716	0.812	0.786	0.848	0.821

Notes. The table reports the fixed-effects estimates for labor market outcomes associated with the health decline of a spouse or parent based on 6,551 men who were under age 60, employed, and had a spouse/partner or a parent/parent-in-law at baselined from the 2002-2014 RAND HRS. All models control for one's marital status, age, age squared, health, youngest child under age 18, the number of children, home ownership, grandparenting responsibilities, spouse's employment, parent's and parent-in-law's co-residence status, individual fixed effects, and year and state dummies. The wage and salary income is adjusted to the 2014 dollars and then logged. Entries in parentheses are robust-cluster standard errors at an individual level. The RAND HRS person-level analysis weight is applied. The numbers of observations are 2,628, 1,506, and 2,417 for the high school or less, some college, and college or more groups, respectively. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 2-12: Regression results of state paid family leave on labor market outcomes for women with a spouse or parent's health deterioration – by education

	In labor force	Employed	Retired	Hours worked	Weeks worked	Full time	Log wage/ salary income
Panel A: High school or less							
Health $_t$ *PFL $_t$	-0.010	0.117	0.026	0.430	2.459	0.026	1.034
	(0.122)	(0.146)	(0.113)	(4.645)	(6.659)	(0.117)	(1.584)
Health $_{t-2}$ *PFL $_{t-2}$	0.103	-0.081	-0.073	-2.786	-6.448	-0.059	-0.670
	(0.086)	(0.170)	(0.083)	(3.052)	(3.905)	(0.069)	(1.560)
Health $_{t-4}$ *PFL $_{t-4}$	0.032	0.200	-0.047	0.990	10.828	-0.014	1.962
	(0.049)	(0.117)	(0.057)	(3.444)	(8.424)	(0.067)	(1.259)
R-squared	0.690	0.683	0.675	0.692	0.675	0.691	0.695
Panel B: Some college							
Health $_t$ *PFL $_t$	0.064	0.079	-0.021	0.304	-1.212	0.049	0.827
	(0.089)	(0.105)	(0.128)	(4.045)	(6.733)	(0.068)	(0.983)
Health $_{t-2}$ *PFL $_{t-2}$	0.061	0.040	-0.192	7.615*	5.323	0.215**	-0.060
	(0.109)	(0.075)	(0.146)	(3.344)	(5.034)	(0.077)	(0.816)
Health $_{t-4}$ *PFL $_{t-4}$	0.052	-0.029	-0.018	1.340	-1.376	0.078	-0.621
	(0.071)	(0.063)	(0.098)	(3.078)	(3.533)	(0.081)	(0.812)
R-squared	0.686	0.672	0.659	0.704	0.688	0.729	0.687
Panel C: College or more							
Health $_t$ *PFL $_t$	-0.056	0.002	0.028	-3.015	-5.248	-0.060	0.412
	(0.053)	(0.103)	(0.046)	(3.382)	(2.706)	(0.118)	(1.133)
Health $_{t-2}$ *PFL $_{t-2}$	-0.042	-0.060	0.063	0.031	-5.325	-0.010	-0.743
	(0.060)	(0.189)	(0.056)	(6.907)	(5.338)	(0.188)	(2.120)
Health $_{t-4}$ *PFL $_{t-4}$	-0.013	-0.179	0.007	-9.571*	-1.481	-0.187	-2.041
	(0.062)	(0.105)	(0.061)	(4.237)	(2.914)	(0.145)	(1.170)
R-squared	0.681	0.664	0.670	0.717	0.668	0.693	0.682

Notes. The table reports the fixed-effects estimates for labor market outcomes associated with the health decline of a spouse or parent based on 7,289 women who were under age 60, employed, and had a spouse/partner or a parent/parent-in-law at baseline from the 2002-2014 RAND HRS. All models control for one's marital status, age, age squared, health, youngest child under age 18, the number of children, home ownership, grandparenting responsibilities, spouse's employment, parent's and parent-in-law's co-residence status, individual fixed effects, and year and state dummies. The wage and salary income is adjusted to the 2014 dollars and then logged. Entries in parentheses are robust-cluster standard errors at an individual level. The RAND HRS person-level analysis weight is applied. The numbers of observations are 2,999, 2,047, and 2,243 for the high school or less, some college, and college or more groups, respectively. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 2-13: Regression results of state paid family leave on labor market outcomes for men with a spouse or parent's health deterioration – by education

	In labor force	Employed	Retired	Hours worked	Weeks worked	Full time	Log wage/ salary income
Panel A: High school or less							
Health $_{t}$ *PFL $_{t}$	-0.047	-0.014	0.047	3.070	7.835	-0.063	-0.053
	(0.110)	(0.409)	(0.109)	(25.806)	(17.787)	(0.588)	(4.637)
Health $_{t-2}$ *PFL $_{t-2}$	0.179	0.034	-0.181	1.802	5.810	0.099	0.151
	(0.111)	(0.076)	(0.111)	(3.046)	(4.970)	(0.072)	(0.863)
Health $_{t-4}$ *PFL $_{t-4}$	0.051	-0.030	-0.053	-0.110	0.672	0.007	-0.187
	(0.066)	(0.050)	(0.065)	(2.105)	(3.114)	(0.054)	(0.560)
R-squared	0.645	0.655	0.644	0.695	0.665	0.696	0.646
Panel B: Some college							
Health $_{t}$ *PFL $_{t}$	-0.023	-0.017	0.021	4.928	2.745	-0.091	-0.393
	(0.117)	(0.103)	(0.118)	(4.289)	(5.741)	(0.118)	(1.075)
Health $_{t-2}$ *PFL $_{t-2}$	-0.102	-0.158	0.110	-6.548	-10.100	-0.030	-1.669
	(0.080)	(0.119)	(0.080)	(5.210)	(5.420)	(0.126)	(1.350)
Health $_{t-4}$ *PFL $_{t-4}$	-0.127	0.004	0.127	-3.057	-2.488	-0.039	-0.266
	(0.131)	(0.131)	(0.131)	(4.049)	(5.379)	(0.124)	(1.396)
R-squared	0.622	0.641	0.633	0.707	0.651	0.696	0.665
Panel C: College or more							
Health $_{t}$ *PFL $_{t}$	-0.046	0.090	0.046	5.996	6.510	0.269*	0.899
	(0.083)	(0.093)	(0.083)	(4.096)	(4.857)	(0.117)	(1.117)
Health $_{t-2}$ *PFL $_{t-2}$	0.123	0.015	-0.123	3.472	0.979	0.003	0.671
	(0.126)	(0.069)	(0.126)	(3.902)	(3.608)	(0.122)	(1.019)
Health $_{t-4}$ *PFL $_{t-4}$	-0.019	0.002	0.018	-4.151	-4.688	-0.059	-0.599
	(0.095)	(0.109)	(0.095)	(5.751)	(5.801)	(0.111)	(1.100)
R-squared	0.656	0.688	0.656	0.705	0.664	0.698	0.682

Notes. The table reports the fixed-effects estimates for labor market outcomes associated with the health decline of a spouse or parent based on 6,551 men who were under age 60, employed, and had a spouse/partner or a parent/parent-in-law at baseline from the 2002-2014 RAND HRS. All models control for one's marital status, age, age squared, health, youngest child under age 18, the number of children, home ownership, grandparenting responsibilities, spouse's employment, parent's and parent-in-law's co-residence status, individual fixed effects, and year and state dummies. The wage and salary income is adjusted to the 2014 dollars and then logged. Entries in parentheses are robust-cluster standard errors at an individual level. The RAND HRS person-level analysis weight is applied. The numbers of observations are 2,628, 1,506, and 2,417 for the high school or less, some college, and college or more groups, respectively. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

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Paper 3: Effects of Leave Policies on Labor Market Outcomes of Married Older Workers in South Korea

Abstract

Despite the widespread concern over population aging and growing demand for care, policy support for caregivers in the labor force has consisted of nothing but leave policy. I examine the relationship between leave policy available for working caregivers and their labor market outcomes in the short term and the long term using the Korean Longitudinal Study of Aging (KLoSA) 2010-2018. I estimate 1) the relationship between the need for providing spousal care and labor market outcomes for the entire sample and then 2) the association between the leave policy and labor market outcomes for workers who have caregiving needs. For the leave policy, employer-provided paid leave and public unpaid leave are estimated separately. I use an individual fixed effects model with distributed lags. The need for caregiving, measured by a spouse's health deterioration, is associated with the decreased labor supply for women and retirement for men contemporaneously. Among those who work, paid leave provided by employers shows a positive relationship with women's employment but a negative association with men's labor supply. Unpaid leave provided by the government shows no meaningful relationship with working caregivers' labor market outcomes overall.

Introduction

South Korea's rigid work culture combined with the second longest hours of work among the high-income countries (OECD, 2020) has posed a challenge to the care capacity of the workers with a family member in need of care. Considering the speed of population aging and

the consequent increase in demand in elder care, the Korean government legislated family care leave in 2012 to support working caregivers in balancing their work and care responsibilities. Older workers with elder care responsibilities have received relatively less attention than their younger counterparts with childcare responsibilities until the law was enacted because the extremely low fertility has been the country's biggest concern with regard to its population aging. Likewise, little is known about how the need for providing care for an older family member is related to the labor supply of workers and how the leave policy could affect the relationship.

Only two recent studies have so far found the negative association between elder care and labor market outcomes but with less consensus on gender differences. Ham (2017) estimates the relationship between informal care and labor market participation using a fixed effects model. She finds that informal care is likely to reduce labor force participation for older workers, with a larger effect for men. However, women who provide informal care are likely to increase their hours of work. Choi and Ahn (2019) similarly find the negative relationship between informal care and employment and months worked. In terms of months worked, their fixed effects estimates were greater for women, high school or less educated, unpaid family workers, caregivers for a parent-in-law, and average household income or above. However, both studies may be biased by endogeneity concern because they use the ADL or IADL care provision as the independent variable, and none of them take into account the new law that allows time off from work to care for a family member, without pay.

In this study, I examine the association between a leave policy and labor market outcomes for older workers with a spouse in need of care. I use a longitudinal survey of the

nationally representative sample of the population aged 45 or over between 2010 and 2018. I focus on married women and men under age 65.

My analyses are twofold. First, I explore the relationship between a spouse's health deterioration and labor market outcomes for all married individuals. Next, I restrict my sample to those who were working for wages and estimate the association between a leave policy and labor market outcomes. For a comparison purpose, I study paid leave provided by employers along with unpaid leave provided by the government. Across the analyses, I use a distributed lag model with the individual fixed effects to estimate the association between the policy and the outcomes not only contemporaneously but also in the longer term. To understand gender differences, I run the models separately for women and men.

In the following section, I provide an overview of the family care leave policy before moving on to data analyses.

Family Care Leave

Family care leave, enacted in 2012, allows workers to take unpaid time off from work to provide care for an immediate family member (a spouse, parent, or child) or a parent-in-law in need of care due to an illness, accident, or frailty with up to 90 days per annum. It must exceed 30 days each time one claims the leave. To be eligible, a worker should have been employed by the same employer for more than a year and be proved to be the sole caregiver within the family. Although unpaid, the leave spell counts as equivalent to regular workdays.

Awareness and use of family care leave remain low among employers, based on the latest national survey on employers (Korean Women's Development Institute, 2019). As of 2017, 27.0% of the employers were aware of the policy, of which only 29.9% reported that their

employees could use the time off without difficulty. Only 4.0% of the employers who could manage to grant workers leave without difficulty had the history of leave claims. On top of that, there was a sharp gradient in awareness and use of the policy by establishment sizes. Large establishments with 300 or more employees were more aware of family care leave, more able to grant employees the leave without difficulty, and had higher claim records of leave than small establishments with less than 10 employees.

The low take-up rate does not necessarily reflect the great need for leave among all workers due to care for a spouse or a grandchild, mainly those who are in their middle and old age (Kim, An, & Um, 2018). According to a report on worker work-life balance, workers' level of awareness was larger than employers' the same year: in 2017, on average, 35.6% of wage/salary workers aged 13 or over were aware of the family care leave policy. The awareness level was the highest among those who were 40-49 years old as 42.4% of them recognized the policy (Statistics Korea, 2017). Nevertheless, the 30-day minimum must pose a considerable challenge of taking family care leave without pay. Workers in small or medium establishments are more likely to quit the job than use the leave because they cannot afford it, which explains their lower claim records compared to large establishments. Together with the lower limit on duration and the lack of wage replacement, the stigma to taking a month-long time off from work could also play a substantial role. Given that the retaliation for taking maternity leave is not uncommon, older workers might claim the leave at their peril. In any case, employers have the right to deny a worker's claim to the leave if the worker's absence is considered to interrupt normal operations of the business.

All in all, workers would probably prefer using their annual paid holidays or paid sick days to taking unpaid family care leave. The current Labor Standard Act states that an individual,

working for an employer with 5 or more employees, earns 15 days of annual paid holidays if the person fulfills 80% or more of yearly attendance. Although the provision of sick days depends on the bylaw of a business, including its duration and wage replacement, workers might choose to take the sick days to provide care for an older family member if their employer offers paid sick days.

The law has recently undergone a revision to allow workers to take an unpaid day off for reasons of family caregiving up to 10 days out of 90 days, without any fixed minimum duration, effective from January 1, 2020. This change was not considered in this study because data spanning to 2020 is not available at present.

Methods

Data

I use the Korean Longitudinal Study of Aging (KLoSA) between 2010 and 2018. The KLoSA is a nationally representative survey of people at age 45 or over in South Korea, which collects data on health, work, socioeconomic conditions, and family transfers every two years since 2006. As a sister study of the Health and Retirement Study (HRS) in the US, the general structure of the dataset is similar to the HRS. However, the Korean version does not offer the demographics and health data from a respondent's spouse, parent, and parent-in-law, unlike the US version that collects the data extensively from both the respondent couple and their parents. Therefore, I limit my sample to married people whose spouses also participated in the survey with a unique individual ID. I define the base year as 2006 but use the years 2010 through 2018 because 2010 was the first wave of data that could be included in the analyses allowing two lags of my explanatory variables for health and leave policies.

My sample includes all individuals who were married and under age 65 at baseline. I identify a married individual as a person whose spouse also participates in the survey and therefore has data about his or her own health conditions in detail. I put a cap of 65 on age, consistent with the previous literature and considering the extremely late average effective retirement age, 72.2 for women and 72 for men (OECD, 2018). I exclude those who were self-employed or had their own difficulty performing activities of daily living (ADL) or dementia, which might impede caregiving to a spouse. My final analysis sample include 4,160 observations from 1,170 uniquely identified women and 4,207 observations from 1,122 uniquely identified men. This sample is used for the analyses of a spouse's health decline. For the analyses of leave policy, I use a subgroup who were employed in the base year. There are 816 observations for women (224 IDs) and 1,778 observations for men (461 IDs).

I allow samples to be replenished over time in my analyses. Those who were interviewed after 2010 account for 1.63% of women and 1.45% of men, indicating a negligible impact on the baseline characteristics of the entire sample.

The outcomes of interest are labor market outcomes, including labor force participation, employment, retirement, full time, and monthly earnings. I consider an individual is in the labor force if the person is working or seeking a job. I define employment as being employed by someone else for wage/salary or self-employed. Full time refers to working 36 hours or more a week. All labor market measures, except for earnings, are the binary variables that take the value of 1 if an individual is in the labor force status being asked at the time of the interview and 0 otherwise. Monthly earnings are the total post-tax salary and wage income at an individual level. All figures for earnings are presented in units of 10,000 2017 Korean Won (KRW) (which is

equivalent to approximately 8.25 USD) adjusted for the inflation using the CPI adjustment and then logged for the regression analyses.

I use a spouse's health conditions as a proxy measure for the need for providing care for a spouse to reduce the endogeneity concern that might arise when I single out those who are already providing care. To construct a spouse's health conditions, I extract the health variables from each one within a married couple and copy the data to one's partner. I define a spouse's health decline if a respondent's spouse has limitations in everyday activities due to chronic or acute diseases, ADL difficulties, disability working, or cognitive problems. I code the variable as 1 in the year when it first takes place, to mark the onset of the event, and all the following years in order to test for longer run effects.

I study two types of leave policy -- paid leave provided by employers and unpaid leave legislated by the government -- limiting my sample to employees working for wage/salary. Employer-provided leave is indicated 1 if any paid vacation or paid sick days are given to an employee. Unpaid leave takes the value of 1 if the interview was carried out in August 2012, when the national law came into effect, or after, and 0 before then.

Table 3-1 presents the descriptive statistics for my analysis sample. In the sample, 43.4% of women were in the labor force, mainly working for wage and earning 352 (USD 2,867) a month in the base year. They have, on average, an approximately 45.2% chance of facing a husband's health decline between 2010 and 2018. 87.7% of men were in the labor force, equally likely working for wage or self-employed, earning 1,552 (USD 12,643) per month at baseline. 60.5% of men experienced a wife's health decrease during the observed period. Among those who were wage/salary workers at baseline, 16.3% of women and 25.3% of men had access to

employer-provided leave. Access to unpaid family care was available to 77.5% of women and 77.4% men, on average, throughout the observed period.

Estimation Strategy

I begin by estimating the relationship between the decline in a spouse's health and one's labor market outcomes. I estimate a fixed effect model without and with lags to understand the contemporaneous and delayed effects of the health event, respectively.

$$Y_{it} = \beta_0 + \beta_1 H_{it} + \gamma' X_{it} + \theta_i + \delta_t + \lambda_r + u_{it} \quad \ldots\ldots \quad (1)$$

$$Y_{it} = \beta_0 + \beta_1 H_{it} + \beta_2 H_{it-2} + \gamma' X_{it} + \theta_i + \delta_t + \lambda_r + u_{it} \quad \ldots\ldots \quad (2)$$

$$Y_{it} = \beta_0 + \beta_1 H_{it} + \beta_2 H_{it-2} + \beta_3 H_{it-4} + \gamma' X_{it} + \theta_i + \delta_t + \lambda_r + u_{it} \quad \ldots\ldots \quad (3)$$

Y indicates the labor force status (in the labor force, employed, working for wage, self-employed, retired, or working full time) or logged monthly earnings of individual *i* at time *t*, *H* is the measure of the onset of a spouse's health decline, *X* is the set of characteristics of the individual and his or her spouse, θ is individual fixed effects, δ and λ are the year and region dummies. The individual control variables comprise education, self-reported health, age, age squared, grandparenting, homeownership, the youngest child under age 18, number of children, and the spouse control variables include education, employment, age under 60, and age squared. All regressions are run separately for women and men. Standard errors are clustered at the individual level.

Starting from equation (1) without lags, β_1 estimates the contemporaneous effects of the health event on labor market outcomes. Adding the lags, β_2 represents the short-term effects of the health event that occurred two years ago on labor market outcomes this year. Likewise, β_3

indicates the long-term effects of the health event four years ago on the outcomes this year. The sum of β_1, β_2, and β_3 is the long-run propensity that indicates the cumulative effects of the health event on the changes in outcomes assuming that the health event is permanent.

Next, I estimate the effects of leave policy on labor market outcomes for those who were working for wage/salary at baseline. I specify an individual fixed effects model without and with lagged treatment. To study how the leave policy influences the outcomes for those who have the need for caregiving for a spouse, I add the interaction term between the health event and the leave provision.

$$Y_{it} = \beta_0 + \beta_1 H_{it} + \beta_2 P_{it} + \beta_3 H_{it} \cdot P_{it} + \gamma' X_{it} + \theta_i + \delta_t + \lambda_r + u_{it} \quad \ldots\ldots \quad (4)$$

$$Y_{it} = \beta_0 + \beta_1 H_{it} + \beta_2 P_{it} + \beta_3 H_{it} \cdot P_{it} + \beta_4 H_{it-2} + \beta_5 P_{it-2} + \beta_6 H_{it-2} \cdot P_{it-2} + \gamma' X_{it} + \theta_i + \delta_t + \lambda_r + u_{it} \quad \ldots\ldots \quad (5)$$

$$Y_{it} = \beta_0 + \beta_1 H_{it} + \beta_2 P_{it} + \beta_3 H_{it} \cdot P_{it} + \beta_4 H_{it-2} + \beta_5 P_{it-2} + \beta_6 H_{it-2} \cdot P_{it-2} + \beta_7 H_{it-4} + \beta_8 P_{it-4} + \beta_9 H_{it-4} \cdot P_{it-4} + \gamma' X_{it} + \theta_i + \delta_t + \lambda_r + u_{it} \quad \ldots\ldots \quad (6)$$

P denotes the provision of leave policy for individual *i* at time *t*. I analyze employer-provided paid leave policy and public unpaid leave policy separately using the same specification.

Across the specifications, the coefficient for the interaction term is the estimated effect of leave policy on labor market outcomes. β_3, β_6, and β_9 are the coefficients of interest, representing the contemporaneous, 2-year short-term, and 4-year long-term effects, respectively. The sum of the three coefficients indicates the total effect of the permanent policy change.

In the following section, I will discuss the results from the final specifications with two lags. Results from the model without lags were similar to the ones with lags. All results, including those from the other two models without lags and with a lag, are provided in the Appendix B.

Results

Effects of the Onset of a Spouse's Health Deterioration

Table 3-2 reports the estimated changes in women's labor market outcomes associated with a spouse's health deterioration. In row 1, women's earnings are likely to decrease by 43.1 percentage points ([$e^{-0.564}$-1] *100) contemporaneously when their husband experiences a health decline. At the 10% significance level, labor force participation and working, particularly for wage, also show the contemporaneous negative relationship with the health event. The coefficients in row 3 indicate a negative relationship between the decline in a spouse's health and women's labor market participation and employment in the long-run. Women who experienced their husband's health decline 4 years ago are less likely to be in the labor force and employed this year, compared to their counterparts without a change in husband's health (p<.10).

Table 3-3 indicates a positive contemporaneous association between the spouse's health decline and the changes in men's retirement. Men who experienced a wife's health deterioration are more likely to retire contemporaneously than those who did not by approximately 6.9 percentage points.

Effects of Leave Policies

Now I restrict my sample to wage/salary workers at baseline for the analyses of the relationship between the changes in labor market outcomes and the changes in leave policy. The

policy effect for those who had a spouse's health deterioration is estimated by the interaction between the leave policy and the health event.

I start by looking at the results of paid leave provided by employers for women with a spouse's health deterioration. Table 3-4 shows that the employer-provided paid leave is associated with a 15.4 percentage-point increase in employment the same year when the spouse had a health decline. The main effects of the policy indicate that paid leave provided by employers is positively related to women's labor market outcomes not only in the same period of time but also in the longer run.

On the contrary, Table 3-5 shows that employer-provided paid leave is negatively related to working full time and earnings contemporaneously for men who experienced the wife's health decline. The interaction term at time *t* suggests the employer policy's negative association with the outcomes overall. The relationship is likely to last for the short term in that retirement is increased by 9.4 percentage points 2 years after the health decline of a wife when paid leave was available ($p<.10$). However, the main effects of the policy indicate the strong associations between paid leave and men's labor market outcomes in the same year as well as in the short run, even stronger than women.

Tables 3-6 and 3-7 repeat the same analyses for unpaid leave offered by the government. In Table 3-6, unpaid leave is not related to labor market outcomes for women with the need for providing spousal care. The main effects of the policy suggest that the association between unpaid leave and labor market outcomes is positive in the short term but negative in the long term. However, the positive relationships in the short term do not significantly buffer the negative impact of the health event when the policy is combined with a spouse's health deterioration.

Table 3-7 also shows that unpaid leave is not associated with the labor market outcomes for men with the spouse's health decline except for contemporaneous earnings. This is most likely an indicator for those still employed when the spouse experiences a health decline because it is unlikely that leave without pay contributes to earnings. The main effects of unpaid leave are strongly positive in the short term but negative in the long term, suggesting a similar pattern with women.

Discussion and Conclusion

The need for providing care for a spouse due to health deterioration is associated with a decrease in older people's labor market outcomes, particularly earnings. However, its specific relationship with the outcomes differs by gender. A spouse's health decline is likely to decrease women's earnings, due to the decreased labor force participation and employment, while it increases men's retirement contemporaneously. Results for women seem predictable given their primary role in caregiving within a family. In contrast, it is interesting that men tend to withdraw instantly from the labor force due to caregiving for a spouse. An explanation for men's immediate retirement could be that a much larger share of men was in the labor market employed by someone else than women at baseline and thus had a workplace to retire from. And a wife's needs for care could trigger early retirement for her husband, whose retirement year is approaching.

The relationship between employer-provided paid leave and labor market outcomes for those with a spouse's health decline also differs by gender. Paid leave provided by employers is a marker of good jobs and as such is positively associated with women's employment. However, the employer policy shows a negative relationship with men's working full time and earnings contemporaneously. The positive effect on women's employment could be because many of them are already working part-time, and therefore the policy affects their labor supply at the extensive

margin. On the other hand, men who are more likely to work full time than women might choose to reduce their work at an intensive margin to provide spousal care.

The effects of unpaid leave provided by the government on labor market outcomes for women with a spouse's health decline are not significant, although the policy is, in general, positively associated with women's labor market activities in the short run. The absence of significant interactions may reflect the fact that the change in the proportion of women employees having paid leave remains mostly static over the observed period, indicating a slim chance of meaningful variations to use after the differencing. Results are similarly muffled for men who had the health deterioration for a spouse, except for a positive relationship with monthly earnings concurrently. The overall weak effects of unpaid leave on the labor supply of older workers are not unexpected because time off from work without pay for more than a month would be enormously expensive to afford for an average worker whose spouse cannot contribute to the household.

Overall, I fail to detect any short-term and long-term relationship between leave policy and labor market outcomes for older workers with the need for spousal care, presumably due to small sample size and lack of variation in the policy. This research question could remain subject to future research using a larger sample.

A limitation of this study is that my measure for paid leave through employer policy might not take into account annual paid holidays mandated by the Labor Standard Act. I construct a summary indicator for paid leave by combining paid vacation and paid sick days. However, it is unclear from the questionnaire whether the survey respondents are asked to count the paid holidays awarded after a year's work among the paid vacation provided by employers during the data collection process. If not, the responses to paid vacation most likely record one's summer vacation.

A second limitation is that the need for providing care for a parent or parent-in-law is not considered due to a lack of data on the parent's health conditions. Parental caregiving carries considerable weight in the labor supply decision of an adult child or child-in-law, particularly a daughter or daughter-in-law in the Korean culture (Do et al., 2015). Another limitation is that subgroup analyses by socioeconomic status were not feasible due to the small sample size. Describing the effects of leave policies on labor market outcomes for those who have spousal care responsibilities and identifying the role of the policies in reducing the inequalities in the labor market could have important policy implications. Given the limitations in the data, my results are suggestive. I hope these issues could be addressed in future research.

Table 3-1: Descriptive statistics

	Women		Men	
	Baseline	Average	Baseline	Average
In labor force	0.434	0.458	0.877	0.758
Employed	0.324	0.349	0.837	0.730
Working for wage/salary	0.205	0.235	0.424	0.357
Self-employed	0.119	0.113	0.413	0.373
Retired	0.446	0.128	0.029	0.139
Full time	0.158	0.168	0.386	0.319
Monthly earnings	352	385	1,552	1,139
Employer-provided paid leave	0.469	0.163	0.656	0.253
Govt-provided unpaid family care leave	0.000	0.775	0.000	0.774
Spouse with health conditions	0.169	0.452	0.269	0.605
Elementary school	0.191	0.196	0.119	0.114
Junior high school	0.233	0.238	0.186	0.179
High school	0.464	0.457	0.453	0.450
College or more	0.112	0.109	0.242	0.256
Age	51.59	59.22	54.43	61.89
Self-reported health (fair or poor)	0.061	0.056	0.034	0.038
Homeownership	0.835	0.860	0.838	0.859
Youngest child age <18	0.179	0.031	0.175	0.033
Number of children	2.343	2.310	2.377	2.326
Grandparenting	0.000	0.056	0.000	0.034
Spouse characteristics				
Elementary school	0.119	0.120	0.222	0.218
Junior high school	0.149	0.165	0.245	0.235
High school	0.465	0.457	0.430	0.442
College or more	0.265	0.258	0.102	0.105
Employed	0.784	0.672	0.375	0.429
Age	55.20	62.82	51.43	58.91

Notes. This table reports the descriptive statistics of married people younger than 65 at baseline in 2006 (due to the lagged explanatory variables) and from the KLoSA 2010-2018. The numbers of observations are 4,160 for women and 4,207 for men. Access to leave policies are calculated based on those who were employed in the base year. Earnings are shown in 10,000 KRW adjusted to the 2017 level using the consumer price index.

Table 3-2: Regression results of change in a spouse's health conditions on labor market outcomes for women

	In labor force	Employed	Employed for wage	Self-employed	Retired	Full time	Log earnings
Health $_t$	-0.050†	-0.045†	-0.040†	-0.005	-0.028	-0.025	-0.564**
	(0.026)	(0.027)	(0.023)	(0.018)	(0.023)	(0.021)	(0.187)
Health $_{t-2}$	0.031	0.011	0.016	-0.005	0.025	0.016	0.021
	(0.025)	(0.024)	(0.022)	(0.018)	(0.025)	(0.019)	(0.172)
Health $_{t-4}$	-0.045†	-0.040†	-0.032	-0.008	0.015	-0.015	-0.170
	(0.025)	(0.023)	(0.022)	(0.012)	(0.024)	(0.020)	(0.166)
Junior high	-0.070	-0.073	-0.059	-0.015	0.354***	-0.054	-0.418
	(0.037)	(0.038)	(0.036)	(0.015)	(0.041)	(0.033)	(0.283)
High school	0.849***	0.829***	-0.125	0.953***	0.224	-0.053	-1.134*
	(0.094)	(0.081)	(0.066)	(0.035)	(0.162)	(0.065)	(0.484)
College+	0.884***	0.764***	-1.155***	1.919***	0.108	-0.049	-8.401***
	(0.101)	(0.090)	(0.074)	(0.044)	(0.167)	(0.071)	(0.552)
Fair/poor health	0.018	-0.000	-0.011	0.010	-0.039	-0.010	0.029
	(0.025)	(0.024)	(0.022)	(0.012)	(0.029)	(0.020)	(0.154)
Grandparenting	-0.084**	-0.070*	-0.051	-0.019	0.039	-0.041*	-0.001
	(0.028)	(0.027)	(0.027)	(0.010)	(0.041)	(0.019)	(0.156)
Homeownership	-0.022	-0.043	-0.039	-0.004	0.009	0.015	-0.079
	(0.037)	(0.036)	(0.033)	(0.018)	(0.031)	(0.030)	(0.246)
Child age <18	-0.068	-0.096	-0.018	-0.078*	0.033	-0.032	-0.235
	(0.059)	(0.061)	(0.048)	(0.039)	(0.043)	(0.040)	(0.374)
No. of children	-0.002	-0.027	-0.035	0.008	-0.011	-0.016	-0.201
	(0.025)	(0.025)	(0.023)	(0.015)	(0.020)	(0.018)	(0.158)
Age	-0.024	-0.016	-0.003	-0.013	-0.105***	-0.016	-0.015
	(0.027)	(0.026)	(0.026)	(0.017)	(0.028)	(0.021)	(0.185)
Age squared	-0.000	-0.000	0.000	-0.000	0.001***	0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
SP junior high	-1.076***	-0.996***	0.016	-1.011***	-0.232	-0.081	-0.254
	(0.086)	(0.076)	(0.057)	(0.032)	(0.179)	(0.055)	(0.391)
SP high school	-1.037***	-1.003***	0.001	-1.004***	0.098***	-0.050**	-0.126
	(0.023)	(0.022)	(0.022)	(0.015)	(0.021)	(0.018)	(0.163)
SP college +	-1.028***	-0.989***	0.013	-1.002***	0.207	-0.046	-0.169
	(0.079)	(0.063)	(0.045)	(0.025)	(0.154)	(0.049)	(0.321)
SP employed	-0.002	-0.065***	-0.043*	-0.022	-0.017	-0.017	-0.173
	(0.020)	(0.020)	(0.018)	(0.014)	(0.020)	(0.016)	(0.129)
SP age ≥ 60	0.018	-0.001	0.001	-0.002	0.018	-0.022	-0.085
	(0.023)	(0.022)	(0.020)	(0.014)	(0.021)	(0.018)	(0.152)
SP age squared	0.000	0.000	-0.000	0.000*	-0.000	-0.000	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
Constant	0.959	0.700	0.916	-0.217	2.326**	0.891	4.984
	(0.854)	(0.833)	(0.805)	(0.520)	(0.858)	(0.685)	(5.767)
R-squared	0.774	0.759	0.739	0.800	0.496	0.745	0.744

Notes. This table reports the fixed-effects estimates for labor market outcomes associated with the change in health conditions of a spouse based on 4,160 married women younger than 65 at baseline from the KLoSA 2010-2018. Reference group for each control variable is (in order): elementary school; good or excellent health; do not provide care for grandchildren; do not own home; do not have the youngest child younger than 18; SP elementary school; SP not employed; and SP under age 60. All models control for the region and year dummies and individual fixed effects. Earnings are in 10,000 KRW adjusted to the 2017 level and then logged. Standard errors are clustered at the individual level. † $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 3-3: Regression results of change in a spouse's health conditions on labor market outcomes for men

	In labor force	Employed	Employed for wage	Self-employed	Retired	Full time	Log earnings
Health $_{t}$	-0.000	-0.003	-0.014	0.011	0.069**	-0.010	-0.352
	(0.025)	(0.026)	(0.026)	(0.022)	(0.026)	(0.025)	(0.207)
Health $_{t-2}$	0.007	0.014	-0.017	0.031	-0.001	-0.004	0.127
	(0.026)	(0.026)	(0.027)	(0.019)	(0.023)	(0.026)	(0.206)
Health $_{t-4}$	0.020	0.017	0.032	-0.014	-0.018	0.018	0.052
	(0.021)	(0.022)	(0.023)	(0.018)	(0.022)	(0.022)	(0.182)
Junior high	1.176***	1.159***	1.476***	-0.317***	-1.471***	1.352***	10.292***
	(0.153)	(0.153)	(0.158)	(0.069)	(0.166)	(0.133)	(1.432)
High school	0.326*	0.322*	0.300*	0.022	-0.276	0.332*	1.364
	(0.132)	(0.128)	(0.124)	(0.034)	(0.149)	(0.130)	(1.192)
College +	0.277	0.265	0.544***	-0.279***	-0.571***	0.430**	3.145*
	(0.150)	(0.150)	(0.155)	(0.066)	(0.164)	(0.131)	(1.416)
Fair/poor health	-0.034	-0.018	-0.013	-0.005	0.026	0.001	0.354
	(0.031)	(0.032)	(0.031)	(0.025)	(0.034)	(0.029)	(0.228)
Grandparenting	0.027	0.015	0.006	0.009	0.039	0.000	0.100
	(0.046)	(0.045)	(0.045)	(0.026)	(0.042)	(0.042)	(0.335)
Homeownership	-0.044	-0.038	-0.033	-0.005	0.020	-0.027	-0.209
	(0.032)	(0.036)	(0.033)	(0.027)	(0.027)	(0.031)	(0.261)
Child age <18	-0.100***	-0.116**	-0.080	-0.036	0.079***	-0.119**	-0.403
	(0.028)	(0.036)	(0.041)	(0.033)	(0.022)	(0.044)	(0.347)
No. of children	-0.031	-0.042	-0.053*	0.011	0.010	-0.047	-0.345*
	(0.023)	(0.024)	(0.024)	(0.017)	(0.021)	(0.025)	(0.174)
Age	0.016	0.008	-0.012	0.020	-0.250***	-0.002	-0.213
	(0.026)	(0.027)	(0.025)	(0.023)	(0.025)	(0.023)	(0.207)
Age squared	-0.000	-0.000	0.000	-0.001*	0.002***	0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
SP junior high	-0.083*	-0.089*	-0.071	-0.017	-0.733***	-0.082*	-0.575
	(0.042)	(0.044)	(0.045)	(0.041)	(0.046)	(0.040)	(0.365)
SP high school	-0.721***	-0.722***	-0.841***	0.119	-0.018	-0.789***	-1.912
	(0.178)	(0.181)	(0.132)	(0.081)	(0.114)	(0.159)	(1.579)
SP college +	-1.141***	-1.353***	-1.208*	-0.145	0.135	-1.175*	-4.144
	(0.254)	(0.349)	(0.547)	(0.248)	(0.145)	(0.560)	(3.178)
SP employed	0.007	-0.003	-0.032	0.029	-0.011	-0.021	-0.018
	(0.020)	(0.021)	(0.022)	(0.019)	(0.019)	(0.020)	(0.162)
SP age ≥60	-0.005	-0.004	-0.013	0.009	0.026	-0.016	-0.414*
	(0.022)	(0.023)	(0.022)	(0.018)	(0.021)	(0.021)	(0.179)
SP age squared	-0.000	-0.000	-0.000	0.000	0.000	-0.001*	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
Constant	0.754	1.059	1.522	-0.463	7.239***	1.614*	7.416
	(0.848)	(0.891)	(0.848)	(0.734)	(0.810)	(0.790)	(6.877)
R-squared	0.691	0.685	0.742	0.846	0.555	0.759	0.726

Notes. This table reports the fixed-effects estimates for labor market outcomes associated with the change in health conditions of a spouse based on 4,207 married men younger than 65 at baseline from the KLoSA 2010-2018. Reference group for each control variable is (in order): elementary school; good or excellent health; do not provide care for grandchildren; do not own home; do not have the youngest child younger than 18; SP elementary school; SP not employed; and SP under age 60. All models control for the region and year dummies and individual fixed effects. Standard errors are clustered at the individual level. Earnings are in 10,000 KRW adjusted to the 2017 level and then logged. † $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 3-4: Regression results of employer-provided paid leave on labor market outcomes for women with a spouse's health deterioration

	In labor force	Employed	Retired	Full time	Log earnings
Health $_t$	-0.162†	-0.147†	0.029	-0.089	-1.492**
	(0.084)	(0.084)	(0.078)	(0.076)	(0.533)
Paid leave $_t$	0.141***	0.147***	-0.101**	0.149***	0.610
	(0.037)	(0.037)	(0.034)	(0.039)	(0.342)
Health $_t$ *PL $_t$	0.105	0.154*	-0.071	0.110	0.465
	(0.069)	(0.072)	(0.061)	(0.082)	(0.608)
Health event $_{t-2}$	-0.003	0.018	0.054	-0.015	-0.447
	(0.070)	(0.074)	(0.067)	(0.079)	(0.675)
Paid leave $_{t-2}$	-0.031	-0.038	0.006	0.010	1.279**
	(0.050)	(0.051)	(0.034)	(0.051)	(0.413)
Health $_{t-2}$ *PL $_{t-2}$	0.095	0.102	-0.035	0.106	-0.298
	(0.079)	(0.086)	(0.078)	(0.079)	(0.786)
Health event $_{t-4}$	-0.066	-0.054	0.001	-0.074	1.014†
	(0.062)	(0.061)	(0.063)	(0.066)	(0.567)
Paid leave $_{t-4}$	0.010	0.016	-0.073†	0.069†	0.713*
	(0.039)	(0.040)	(0.040)	(0.040)	(0.306)
Health $_{t-4}$ *PL $_{t-4}$	0.044	0.030	0.122	-0.004	0.532
	(0.092)	(0.094)	(0.101)	(0.090)	(0.650)
R-squared	0.688	0.697	0.515	0.736	0.677

Notes. This table presents the fixed-effects estimates for labor market outcomes associated with a spouse's health deterioration and employer-provided paid leave based on 816 married women who were younger than 65 and employed at baseline from the KLoSA 2010-2018. All models control for one's education, fair or poor health, grandparenting status, homeownership, the youngest child under age 18, the number of children, age, and age squared; the spouse's education, employment, age 60 or over, and age squared; the region and year dummies; and individual fixed effects. Standard errors are clustered at the individual level. Earnings are in 10,000 KRW adjusted to the 2017 level and then logged. † $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 3-5: Regression results of employer-provided paid leave on labor market outcomes for men with a spouse's health deterioration

	In labor force	Employed	Retired	Full time	Log earnings
Health $_{t}$	0.046	0.079	0.018	0.035	-0.316
	(0.073)	(0.073)	(0.079)	(0.076)	(0.692)
Paid leave $_{t}$	0.293***	0.327***	-0.188***	0.351***	1.796***
	(0.028)	(0.030)	(0.023)	(0.032)	(0.234)
Health $_{t}$ *PL $_{t}$	-0.115†	-0.121†	0.012	-0.177*	-1.223*
	(0.065)	(0.066)	(0.060)	(0.072)	(0.601)
Health event $_{t-2}$	-0.053	-0.096	-0.016	0.013	0.492
	(0.086)	(0.079)	(0.056)	(0.085)	(0.843)
Paid leave $_{t-2}$	0.043	0.033	-0.072**	0.037	1.203***
	(0.027)	(0.028)	(0.022)	(0.028)	(0.229)
Health $_{t-2}$ *PL $_{t-2}$	-0.017	0.021	0.094†	-0.055	-0.907
	(0.058)	(0.062)	(0.051)	(0.069)	(0.702)
Health event $_{t-4}$	0.045	0.066	-0.021	0.081	0.832
	(0.068)	(0.067)	(0.076)	(0.071)	(0.583)
Paid leave $_{t-4}$	0.017	0.018	-0.058**	0.039†	0.798***
	(0.023)	(0.024)	(0.021)	(0.023)	(0.213)
Health $_{t-4}$ *PL $_{t-4}$	0.014	0.013	0.025	-0.028	-0.158
	(0.063)	(0.074)	(0.065)	(0.082)	(0.580)
R-squared	0.638	0.643	0.559	0.721	0.654

Notes. This table presents the fixed-effects estimates for labor market outcomes associated with a spouse's health deterioration and employer-provided paid leave based on 1,778 married men who were younger than 65 and employed at baseline from the KLoSA 2010-2018. All models control for one's education, fair or poor health, grandparenting status, homeownership, the youngest child under age 18, the number of children, age, and age squared; the spouse's education, employment, age 60 or over, and age squared; the region and year dummies; and individual fixed effects. Standard errors are clustered at the individual level. Earnings are in 10,000 KRW adjusted to the 2017 level and then logged. † $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 3-6: Regression results of government-provided unpaid family care leave on labor market outcomes for women with a spouse's health deterioration

	In labor force	Employed	Retired	Full time	Log earnings
Health $_t$	-0.112	-0.097	0.011	-0.099	-1.188†
	(0.108)	(0.112)	(0.099)	(0.117)	(0.680)
Unpaid leave $_t$	0.114	0.182	0.468**	0.070	-3.900***
	(0.143)	(0.145)	(0.167)	(0.133)	(1.045)
Health $_t$ *UNPL $_t$	-0.020	-0.007	-0.009	0.051	-0.082
	(0.082)	(0.090)	(0.080)	(0.098)	(0.527)
Health event $_{t-2}$	-0.020	0.001	0.068	-0.049	-0.366
	(0.067)	(0.071)	(0.063)	(0.079)	(0.623)
Unpaid leave $_{t-2}$	0.041	0.068	-0.157**	0.115*	2.362***
	(0.052)	(0.051)	(0.054)	(0.050)	(0.452)
Health $_{t-2}$ * UNPL $_{t-2}$	0.003	-0.009	-0.046	0.072	-0.401
	(0.070)	(0.079)	(0.063)	(0.069)	(0.713)
Health event $_{t-4}$	-0.060	-0.070	0.086	-0.137	0.728
	(0.067)	(0.073)	(0.076)	(0.083)	(0.624)
Unpaid leave $_{t-4}$	-0.119*	-0.133*	0.004	-0.151**	-0.393
	(0.058)	(0.057)	(0.058)	(0.056)	(0.445)
Health $_{t-4}$ * UNPL $_{t-4}$	0.019	0.046	-0.019	0.030	0.645
	(0.071)	(0.073)	(0.055)	(0.095)	(0.742)
R-squared	0.679	0.685	0.518	0.731	0.688

Notes. This table presents the fixed-effects estimates for labor market outcomes associated with a spouse's health deterioration and government-provided unpaid leave based on 816 married women who were younger than 65 and employed at baseline from the KLoSA 2010-2018. All models control for one's education, fair or poor health, grandparenting status, homeownership, the youngest child under age 18, the number of children, age, and age squared; the spouse's education, employment, age 60 or over, and age squared; the region and year dummies; and individual fixed effects. Standard errors are clustered at the individual level. Earnings are in 10,000 KRW adjusted to the 2017 level and then logged. † $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 3-7: Regression results of government-provided unpaid family care leave on labor market outcomes for men with a spouse's health deterioration

	In labor force	Employed	Retired	Full time	Log earnings
Health $_t$	-0.020	0.036	0.077	-0.066	-1.967*
	(0.084)	(0.091)	(0.070)	(0.097)	(0.767)
Unpaid leave $_t$	0.169	0.200†	0.305**	0.133	-5.811***
	(0.108)	(0.109)	(0.106)	(0.107)	(0.923)
Health $_t$ *UNPL $_t$	0.022	-0.002	-0.040	0.054	1.509**
	(0.052)	(0.063)	(0.048)	(0.068)	(0.549)
Health event $_{t-2}$	-0.031	-0.038	0.029	0.028	0.225
	(0.084)	(0.078)	(0.055)	(0.081)	(0.766)
Unpaid leave $_{t-2}$	0.105**	0.100**	-0.224***	0.128***	3.251***
	(0.039)	(0.038)	(0.042)	(0.034)	(0.278)
Health $_{t-2}$ * UNPL $_{t-2}$	-0.022	-0.068	-0.049	-0.064	-0.885
	(0.053)	(0.061)	(0.050)	(0.058)	(0.539)
Health event $_{t-4}$	0.065	0.095	-0.009	0.071	0.340
	(0.069)	(0.068)	(0.081)	(0.072)	(0.643)
Unpaid leave $_{t-4}$	-0.140**	-0.158***	-0.003	-0.180***	-0.827**
	(0.043)	(0.043)	(0.042)	(0.040)	(0.300)
Health $_{t-4}$ * UNPL $_{t-4}$	0.006	0.043	0.022	0.053	1.038†
	(0.059)	(0.064)	(0.057)	(0.060)	(0.534)
R-squared	0.608	0.606	0.559	0.690	0.672

Notes. This table presents the fixed-effects estimates for labor market outcomes associated with a spouse's health deterioration and government-provided unpaid leave based on 1,778 married men who were younger than 65 and employed at baseline from the KLoSA 2010-2018. All models control for one's education, fair or poor health, grandparenting status, homeownership, the youngest child under age 18, the number of children, age, and age squared; the spouse's education, employment, age 60 or over, and age squared; the region and year dummies; and individual fixed effects. Standard errors are clustered at the individual level. Earnings are in 10,000 KRW adjusted to the 2017 level and then logged. † $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

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Conclusion

The growing number of older people aged 65 or over is one of the biggest demographic trends in recent decades that is poised to have implications not only for the older people themselves but also for those who are related to them. Currently, unpaid informal care provided by family members or friends accounts for a substantial share of the total amount of elder care provision, and most of those informal caregivers are middle- or old-aged people who are active in the labor market. Relative to mounting anxiety over the growing demand of elder care, policy support for these older workers with elder care responsibilities has been kept minimal and has been limited to leave policy for a family or medical reason if anything.

This dissertation aims to understand how the leave policy affects caregiving and work for older workers with the need for providing elder care, using the nationally representative data in the US and South Korea. My findings from the analyses of the US data suggest that paid leave is positively associated with informal care and labor supply from older workers. Specifically, paid leave provided by employers is likely to increase any informal care, particularly sporadic care, and labor market activities from older workers. State paid family leave also shows a positive relationship with labor market outcomes for the more educated. For both types of policy, the positive effects of paid leave were larger for those who have at least some college education. Results from the Korean data show that employer-provided paid leave is associated positively with women's labor supply but negatively with men's labor supply. They do not provide evidence to support a meaningful relationship between unpaid leave policy and labor market outcomes for workers with the need for providing spousal care.

Another goal of my dissertation was to describe the policy effects on labor market outcomes over time. Findings from paper two indicate that a spouse or a parent's health

deterioration hits one's labor supply immediately, whereas the buffering effects of paid leave for those with the caregiving responsibilities may appear later. Employer-provided leave is positively associated with men's labor market outcomes in the long term, although it is related to women's outcomes contemporaneously. State-provided leave shows a positive relationship with labor market outcomes with a 2-year delay for women with some college education. Paper three suggests the gender differentials in the time when the health decline of a spouse shows an association with labor market outcomes. That the effects of the leave policy on the labor supply of working caregivers come into sight after years of delay provides a vital implication about policy evaluation. If the effectiveness of leave policy on caregivers' labor supply is to be assessed based on the evidence referencing the relatively short period of time, the evaluation is likely to be biased by the data that captures the impacts of the policy insufficiently. My findings imply that an analysis of paid leave policy should consider a long-term period of more than 2 years to observe the entire set of effects of the policy on labor market outcomes.

My findings also point to gender differences in work outcomes in each country in response to the health deterioration of a spouse or parent and leave access. In the US, women and men respond to the need for providing care and paid leave policies in a pretty similar way, although the timing of the response and the specific outcome measures might differ. When a spouse or parent experiences a negative change in health, women are likely to reduce their labor supply at the extensive margins contemporaneously whereas men do the same at the intensive margins. These results perhaps reflect the fact that women are more likely than men to select into caregiving and provide more care, on average. When paid leave was available at the workplace, both women and men were likely to increase any care to an older care recipient, with a larger increase in intermittent care, and their labor supply. But women were likely to make their

decision in the labor force more promptly than men. The positive association still holds in terms of the state paid family leave for some educational subgroups, but again, the timing of the responses to the policy differs by gender. On the other hand, women and men in Korea show a similar pattern of decreased labor supply instantaneously when a spouse had a health deterioration, although women were likely to earn less while their male counterparts tended to retire. Regarding employer-provided paid leave, the gender difference was evident in that the association between the policy and labor market outcomes was positive for women but negative for men.

By comparison, results for women are almost comparable in the two countries. It is interesting to see that women in both countries showed an approximately 5 percentage-point decrease in their labor force participation concurrently with the increased need to provide care. But, women in the US show a decrease in working full time, indicating the different labor market situations between the two countries in which more women in middle and old age can hold down their full-time job in the US than Korea. The contemporaneously positive relationship between employer-provided leave and women's labor supply is found in both countries. In contrast, men's reaction to the need to provide care differs by country: men in the US reduced work in the intensive margin while men in Korea did so at the extensive margin. At the same time, the relationship between employer-provided leave and labor market outcomes was positive in the long term for men in the US but negative contemporaneously for their counterparts in Korea. Korean men's distinctive pattern of results could be explained by the situation of older men in Korea who might have accepted a strict gender norm for all their lives that family caregiving is women's work. The increased need for care from a wife creates confusion in men's identity as a caregiver and as a man and requires them to be on a steep learning curve for caregiving

activities.[6] By accepting spousal caregiving as their new job,[7] men might choose to resign their paid position and this transition might be facilitated by the availability of paid leave at work.

Nevertheless, my results do not support a conclusion that public paid family leave plays a role in reducing the inequalities in the labor market. An increase in labor market outcomes associated with paid leave is found among the some-college educated women and the college-or-more educated men. Labor market activities for those with high school or less education show no relationship with paid leave for both men and women. A possible explanation could be that assuming that those with less education are likely to work for a job at lower wage rates, the wage replacement lower than 100% during leave might not act as a strong incentive for workers having already low earnings to consider taking time off from work. But, most likely, the small number of the treated states with a paid family leave law could have affected these results. Whether the public policy on paid family leave is in favor of the disadvantaged workers with elder care responsibilities should be revisited in future research.

The findings of this dissertation have some implications for social work policy and practice. Across the three papers, the bottom line is that paid leave policies are positively related to work and care for older workers. Improving access to paid leave could have considerable utility not only at the individual level for those who need to fulfill commitments to both work and family but also at the society level for a country that needs to maintain the level of productivity and supply of informal care. At the same time, proper measures are required to be developed to reduce the negative perception of the policy among employers and minimize the

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impact of the absence of a worker on leave on small businesses. Endeavors to make the leave policy more flexible and increase public awareness of the leave policy should also be made to boost the use of leave. Particularly women with a low level of education seem to be most affected by caregiving responsibilities but least protected by the policy in the labor market. In order to support their caregiving without triggering an exit from the labor market, an alternative program, such as subsidy for caregiver services and supports, could be developed for this high-risk group of older workers.

The primary implication for social work practice is that the development and provision of programs for caregivers on leave may be required to support their assistance to the older family member's needs and handle possible conflicts between caregiver and care recipient as well as unexpected emergencies. If a caregiver needs to arrange elder care services and supports or professional medical care during time off from work, social work practitioners would be able to refer the person to the relevant sources. In case of a caregiver who provides elder care on his or her own, an agency could provide services in different forms (e.g. seminar, workshop, or home visit) to help caregivers understand the signs of worsening health, frailty, or cognitive diseases; communicate better with the care recipient; and deal with possible emergencies. Temporary on-demand self-care programs, such as respite care, meditation, or stress relief, for the caregivers during leave could also be offered.