The Caregiving Penalty: Caring for Sick Parents and the Gender Pay Gap

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The aging of the population is increasing the demand for adult caregiving. In most of the world, care for the elderly and sick is provided almost exclusively by families and, within families, by women. This paper studies the impact of adult caregiving on gender inequality in the labor market. Using administrative data from Chile, we leverage variation in a parental health shock –the first cancer hospitalization of a parent– to examine who bears the burden of adult caregiving. After a parental health shock, daughters but not sons experience a reduction in employment and earnings. A parental health shock creates a caregiving penalty –the effect of the shock on daughters relative to sons– of 12% on earnings, increasing the overall gender pay gap by 9%. These penalties affect women even if they earn more than their partners or brothers, suggesting that gender norms influence the distribution of adult caregiving. Additionally, penalties are concentrated among women who are mothers, suggesting a correlation across the life cycle between care given to children and then to aging parents.

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In 2019, one in six people provided unpaid care to a relative or friend with a sickness or disability (OECD 2021b)[1]. The demand for adult caregiving is rising rapidly due to population aging. Today, there are approximately seven working-age people for every person aged 65 years or over. In 2050, this number will fall to only three (UN 2023). In most places, adult caregiving is almost exclusively provided by families. Thus, the burden of balancing paid work against the well-being of an aging or sick loved one will only grow over time. Yet, even within families, the burden of caregiving is not born equally: over 75% of caregivers are women (ILO 2019). Female caregivers are also more likely to be primary caregivers and to provide more hours of total care than male caregivers (AARP 2009). The impending rise in adult caregiving has the potential to amplify existing gender inequalities.

However, assessing the relationship between adult caregiving and gender inequalities is challenging due to the nature of unpaid care. Unpaid care is often referred to as "invisible work", as it is rarely measured (Heggeness 2023). While survey data has provided valuable information about informal care, these settings usually lack sources of quasi-random variation that can be leveraged to address selection bias.[2][3] In the case of motherhood, it is standard to use the timing of the first birth to assess the impact of children on women's labor market outcomes. However, adult caregiving can arise from various circumstances and it can be provided by different people, making it harder to identify abrupt changes in care provision.

This paper studies how adult caregiving affects gender inequalities in the labor market. To overcome the previous challenges, we focus on the most frequent caregiving relationship among adults: adult children caring for a parent (Table 1).[4] For identification, we leverage

[1]Share of informal carers providing daily or weekly care among the population aged 50 and over.

[2]See Carmichael and Charles (1998) and Carmichael and Charles (2003).

[3]For example, unemployment increases the probability of providing care (Fischer et al. 2022), while employment and earnings reduce the willingness to provide care (Carmichael et al. 2010). Thus, not accounting for selection might significantly overstate the impact of caregiving on labor market outcomes (Heitmueller 2007) Additionally, self-reported caregiving might be subject to justification bias. In self-reported health status, justification bias refers to respondents overstating their level of disability or health problems in order to justify non-employment and welfare receipt (Black et al. 2017; Dobkin et al. 2018). A similar bias might be present in self-reported caregiving.

[4]Parent care is also the most frequent type of caregiving among mid-life caregivers in European OECD countries (OECD 2021b) and in the US (Wagner and Takagi 2010).

variation in the occurrence and timing of an unexpected parental health shock that increases the need for parental care. We define a parental health shock as the first cancer hospitalization experienced by a parent. Using a differences-in-differences event study framework, we assess how the employment and earnings of working-age sons and daughters evolve after a parental health shock.

We study this question in Chile, a country undergoing a rapid process of population aging, where, like most countries, adult caregiving falls almost exclusively on families. Chile spends 0.02% of its GDP on long-term care, and public and private provisions combined cover less than 5% of the target population.[5] In global perspective, countries with a broad provision of formal adult care –whether public or private– are the exception rather than the norm (Lloyd-Sherlock 2014; Feng 2019). The Chilean context offers a good representation of how most countries, especially low and middle-income countries, are facing rising adult caregiving demands: relying almost exclusively on families for care provision.

We focus on cancer for two reasons. First, cancer has become the major contributor to disease burden worldwide, and projections forecast that the global cancer burden will continue to grow in the next decades (Kocarnik et al. 2022).[6] In Chile, cancer accounts for almost half of the population requiring palliative care (Pérez-Cruz et al. 2023). Second, cancer constitutes an unexpected and severe health event that rapidly increases care demand, which we leverage for identification (Gupta et al. 2015). Cancer onsets an ongoing and uncertain treatment where patients often require help with medical coordination, emotional support, and daily activities such as bathing and feeding. We use the first cancer hospitalization as a health event severe enough to induce variation in adult care provision.

We use detailed administrative records for the universe of individuals in the Chilean Social Registry of Households. This registry is the information system used by the Chilean State to allocate a wide range of social subsidies and programs among potential beneficiaries. It is built from administrative databases from several institutions. It covers approximately 5 million households and 13 million people, equivalent to 75% of the Chilean population. This

[5]Other Latin American countries spend similar amounts. (Uruguay: 0.04%, Argentina: 0.05%). Public long-term care services are practically nonexistent in the region (IDB 2020).

[6]The Disability-Adjusted Life Year (DALY) is a metric that captures the total burden of disease –both from years of life lost due to premature death and from years lived with the disease.

sample excludes the highest-income households in Chile, where the burden of caregiving might be mitigated due to greater capacity to afford formal care.[7] We create a novel data linkage that allows us to (i) identify individuals who experience a cancer shock from hospitalization records, (ii) identify their working-age children from birth records, and (iii) observe children's labor market trajectories from unemployment insurance records. Our final sample comprises 14,000 working-age children with a parental cancer shock and 226,000 control children, whom we observe through an 11-year period, from 5 years before to 5 years after the parental cancer shock.

We use a difference-in-differences stacked event study to estimate the labor market effects of a parental health shock on children. We estimate effects on employment and earnings, separately for sons and daughters. We find that a parental health shock creates a divergence in the labor market outcomes of daughters and sons. Daughters' employment and earnings fall after the shock. On average, daughters experience a 3% and 4% decline in employment and earnings respectively in the five years after the shock. These declines are persistent and do not show any sign of recovery within the 5-year post-shock period. We find strong evidence that sons do not experience similar costs. Instead, after a parental health shock, sons' earnings increase, although this effect is less precisely estimated. For treated families, a parental cancer shock increases the gender gap in earnings by 4 percentage points, equivalent to a 9% increase.

We provide additional evidence that the caregiving shock is uncorrelated with other shocks that might affect female employment. Families that face health shocks that lead to higher and more persistent care needs see a larger reduction in daughters' employment and earnings. In contrast, parental health shocks that do not increase care needs do not affect daughters' labor market outcomes. Additionally, the increase in sons' earnings is driven by low-income families, where the need to generate additional income to compensate for earning losses or health expenditures is more pressing. In low-income families, a parental cancer shock increases the gender gap by over 10 percentage points.

Following the literature on child penalties, we define the "caregiving penalty" as the

[7] 5% of adults over 50 years who require care have a paid caregiver (ENDIDE 2022).

percentage by which daughters fall behind sons due to a parental health shock[8]. We estimate penalties of 5% in employment and 12% in earnings five years after the parental health shock. These penalties are sizeable. They amount to 40% and 63% of the child penalties based on childbirth as estimated by Kleven et al. (2019).

Our results show that a parental health shock leads to a gender specialization within families that is consistent with daughters providing unpaid care and sons providing financial resources. The opposing effects that a parental health shock has on sons and daughters can result from two reasons. Due to pre-existing gender disparities in earnings, women face lower opportunity costs of providing adult care than men. Additionally, gender norms about care establish that care is primarily a responsibility of women.[9] We find reductions in daughters' outcomes even in cases where they earned more than their siblings and their partners, suggesting that opportunity costs alone cannot explain the different effects by gender and that gender norms matter in the allocation of caregiving. Finally, we find that the costs of parent care are concentrated among women who are mothers, suggesting a correlation between the distribution of child care and parent care.

This study contributes to a growing body of work studying the role of caregiving in explaining gender disparities in the labor market. Research on the persistence of gender gaps in employment and earnings, despite the disappearance of gaps in education, has considered the unequal distribution of unpaid care as an explanation for gender inequality. However, so far, this work has focused almost exclusively on child care. There is compelling evidence that women pay large and persistent costs for motherhood (Cristia 2008; Bertrand et al. 2010; Angelov et al. 2016; Lundborg et al. 2017; Kleven et al. 2019; Kleven 2022; Goldin et al. 2022; Cortés and Pan 2023; Kleven et al. 2023), and that motherhood accounts for a significant share of current gender disparities in the labor market (Kleven et al. 2019, 2023). In contrast, men seem to benefit from parenthood (Goldin et al. 2022).

[8]Kleven et al. (2019) use this definition for child penalties. The penalty is defined as the effect on women relative to the effect on men, scaled by the women's expected outcomes.

[9]We refer to gender norms broadly as the societal expectations, beliefs, and rules regarding how men and women should behave. Regarding care, the concept encompasses situations ranging from explicit obligations or responsibilities to circumstances where women prefer to provide care over men, or where they engage more in care work because they believe or are believed to be better caregivers than men.

We contribute to this literature by focusing on the role of another type of caregiving in explaining gender disparities. Similar to child care, adult care can be a lengthy and intense activity that interferes with paid work.[10] However, adult care differs in ways that can influence how its burden is allocated (Mommaerts and Truskinovsky 2023). Adult care begins later in life, it offers less capacity for anticipation, it involves more uncertainty about its tasks and duration, different family and non-family members can provide it, and it can take place at home or at formal care institutions. To our knowledge, this study is the first to demonstrate that adult caregiving widens gender disparities in the labor market and to quantify its contribution to the gender gap. Furthermore, we document that the contribution of adult caregiving to gender gaps works through two channels: daughters reduce their employment and earnings due to unpaid care, while sons increase their employment and earnings to generate additional financial resources. In this sense, adult care operates similarly to child care in widening gender inequalities.

There is an emerging literature studying the effects of parental health shocks on adult children, to which we also contribute. Two recent studies assess the labor market consequences for children of different parental health events, finding from null (Rellstab et al. (2020) for the Netherlands) to negative effects (Halla et al. (2023) for Austria). Related, recent work shows that children's labor market outcomes are responsive to long-term care policies (Massner and Wikström 2023; Halla et al. 2023; Shen 2021; Løken et al. 2017). Interestingly, in these studies for European countries, parental health shocks impact men and women similarly, with moderate effects. Long-term care policies differentiate our setting –and generally that of low and middle-income countries– from high-income European countries. In Chile, adult caregiving is provided almost exclusively by families, whereas the Netherlands and Austria along with many high-income countries provide public long-term care services and have developed markets for formal care.[11] Our results suggest that care policies are relevant in determining how the burden of caregiving is allocated and show that gender norms matter for this allocation. The contrast between our

[10] Half of caregivers have provided care for at least 2 years and 30% provide care for at least 20 hours per week (Pickens et al. 2018).

[11] The Netherlands and Austria both spend over 1.5% of their GDP on long-term care services.

findings and those for European countries is in line with recent work showing wide variation in child penalties by region (Kleven et al. 2023) and by GDP per capita (Aaronson et al. 2020).

We provide the first evidence that, in the absence of formal care, a parental health shock leads to a gender specialization within the family, increasing the earnings of men and reducing the earnings of women, thereby widening the existing gender pay gap. The vast majority of developing countries are facing an aging population with no substantive long-term care policies. Our work suggests that adult caregiving will play and important and growing role in maintaining and potentially expanding gender disparities in the labor market in the coming years.

The rest of the paper is organized as follows.

1. Institutional Background

The rise in adult care needs is a global phenomenon (UN 2017). However, there are wide disparities in the conditions and capabilities of different countries and regions to address it. In this section, we provide a description of the Chilean context in global perspective, regarding gender inequalities in the labor market, adult care needs and policies, and the distribution of adult care work. We further posit that the Chilean context is similar to that of other countries in the region and to overall lower and middle-income countries.

1.1. Labor Market

Gender Disparities in the Labor Market. —In Chile, as in other Latin American and lower and middle-income countries (LMICs), the labor market displays wide gender disparities (Kleven et al. 2023). In 2019, the female labor force participation rate was roughly 55%. Latin American countries and LMICs show similar or lower rates, while high-income countries, the European Union, and the United States have rates at least 10 percentage points higher. The gender gap in labor force participation is around 30%, a larger gap than that observed for high-income countries. (Figure A1). For employees, the gender gap in earnings is around 20% (IMF 2018).

Informal Employment. —While informal employment accounts for half of employment in Latin America, the informal labor market share in Chile is around 27%, the lowest in the region (ILO 2023). Men and women exhibit similar rates of informal employment.

1.2. Adult Care

Care Needs. —Worldwide, the share of the population aged 65 years or older has nearly doubled in recent decades (Figure A2). With an aging population, the prevalence of chronic diseases also rises. Chronic diseases tend to be of long duration and result in long-term health consequences and often create a need for long-term treatment and care. Currently, chronic diseases are the leading cause of death and disability in the world, disproportionally affecting low and middle-income countries (PAHO 2023). Chile is in an advanced stage of population aging. In Chile, chronic diseases account for over 85% of deaths and for 68% of disability cases (PUC 2021).

Long-term Care Policies. —In most countries, especially low and middle-income countries, population aging is outpacing the development of long-term care policies and services. In most LMICs, public support plays little role in adult caregiving (Feng 2019). In Chile, public expenditure on long-term care amounts to 0.02% of GDP.[12] Public plus private provision of long-term care facilities covers less than 5% of the adult population with some degree of dependency, and there are no policies subsidizing formal home care[13]. This landscape contrasts with high-income countries. On average, OECD countries spend 1.7% of their GDP on long-term care. Countries such as the Netherlands, Sweden, and Norway allocate over 3% of their GDP to long-term care (OECD 2019). Policies in place include domestic help, social assistance, personal care, and nursing care (Rellstab et al. (2020) and Massner and Wikström (2023)).

[12]Other Latin American countries have broadly similar expenditures. For example, Uruguay and Argentina spend 0.04% and 0.05% on long-term care respectively.

[13]Caregivers of individuals with severe dependency are entitled to a monthly payment of US$40 only if they are not employed.

Informal and Family-based Care. —The lack of long-term care policies or markets makes families the main source of adult care (Feng 2019). In Chile, over 95% of adult caregivers are unpaid caregivers, and over 80% are household members. Children comprise half of caregivers caring for an adult in the same household, followed by spouses (30%) (Table 1). Within families, the majority of caregivers are women. Across the world, women carry out three-quarters of unpaid care work. However, the gender distribution of unpaid care varies by region. In Latin America and other LMICs, women comprise over 75% of caregivers (ILO 2019). In OECD countries, caregiving is distributed more equally. On average, 62% of caregivers are women, and the share women caregivers does not exceed 55% in countries like Austria, The Netherlands, and Sweden (OECD 2021).

In Chile, as caregiving largely falls on children and predominantly on women, daughters are the most frequent caregivers for adults with dependency[14] (ENDIDE 2022). The main role of children as adult caregivers aligns with the social beliefs about care. 68% of adults consider it the children's obligation to take care of a parent when they are unable to take care of themselves, and 60% believe parents should live with children in these cases (*Bicentenario* Survey 2021). This responsibility is not perceived equally for sons and daughters: 40% of adults believe that daughters have a higher responsibility in parent care than sons, while 30% believe sons have a higher financial responsibility towards parents. This gender division between care support and financial support is more pronounced in lower-income households (Herrera and Fernández 2013). In contrast, around 30% of people in European countries believe children should live with their parents when an elderly parent can no longer live without regular help. This figure is below 10% in Nordic countries (Ruppanner and Bostean 2014).

1.3. Cancer

Incidence. —Cancer diagnoses and deaths have increased due to demographic changes and progress in other health conditions (Honoré and Lleras-Muney 2006). Currently, cancer is the leading cause of death worldwide, accounting for nearly one in six deaths (WHO

[14] Among children, 70% of caregivers are daughters.

2022). In Chile, it is the leading cause of death since 2019 (INE 2019). Cancer incidence will keep increasing. Cancer incidence rates are projected to increase by 55% worldwide and by 75% in Chile between 2040 and 2020 (UK 2023; Atun 2023).

Care Needs. —The economic and social costs of cancer arise not only from the expenditures on treatment and the negative impact on the patients' employment and earnings (Gupta et al. 2015), but also from its impact on their family and caregivers. Cancer patients often need assistance with daily task activities, medical care, and social and emotional support. Cancer increases dependency, disability, and difficulty with daily activities (Table 2). If the illness worsens, care also intensifies. Time devoted to caregiving is particularly high during the last year of life (Berry et al. 2017). In Chile, cancer patients account for almost half of all patients requiring palliative care (Pérez-Cruz et al. 2023). The characteristics of cancer caregivers are very similar to the characteristics of adult caregivers in general, as previously described.

2. Data

We use comprehensive administrative data for the universe of individuals in the Social Household Registry (*Registro Social de Hogares*) of the Ministry of Social Development and Family in Chile. The Social Household Registry is the information system used by the Ministry to gather information about the country's residents with the aim of allocating social services, welfare programs, and other forms of public assistance. The registry is composed of several administrative databases from different sources plus self-reported information from households. It contains information for approximately 5 million households and 13 million people, representing 74% of the national population. Households excluded from the registry correspond to higher-income households. We rely primarily on three sources of information:

Hospital discharge records. Hospital discharge records 2007-2019, contain date of hospitalization, primary diagnosis, and length of stay for all hospitalizations in the country.

Vital statistics. Birth and death records up to 2022 include date of birth, and date and cause of death. Additionally, they contain parents' identification, allowing the linkage between parents and children.

Unemployment insurance records. Unemployment insurance records 2006-2019 contain information on monthly employment and earnings for workers employed in the formal private sector.

Estimation sample. We build our treatment sample by identifying individuals hospitalized due to cancer from hospital discharge records. We identify a cancer shock as the first cancer hospitalization a person experiences. We restrict our sample to individuals who have at least one child between 30 and 60 years old at the time of the first cancer hospitalization. Additionally, we restrict our sample to families where we can identify both parents and where all siblings share the same parents.[15] These restrictions allow us to identify treatment at the family level. We build a pure control sample by matching "treated" families –those with a parental health shock– to similar families in composition, educational level, and age where neither parent has a cancer hospitalization. We use a coarsened exact matching, matching on family composition (number of children and number of daughters), parents' and children's educational level, and on 5-year groups for parents' age and age at first child. Finally, using unemployment insurance records, we build an individual panel of annual frequency containing the employment and earnings of adult children in both treated and control families.

Our final sample comprises 8,162 treated families and 146,131 control families, with 14,045 and 226,566 adult children aged 30-60 years at the time of the parental health shock. Tables 3 and 4 show the main characteristics for parents and children respectively, separately by treatment status. The average family has 2.6 children, and fathers and mothers are on average 64 and 61 years old at the time of their first cancer hospitalization (Table 3). Adult children are on average 35 years old at the time of the parental health

[15]The share of births with data on both parents significantly drops for cohorts born before 1970. As a result, our sample primarily consists of children aged 30-45 at the time of the first parental cancer hospitalization (Figure 1).

shock.[16] Our sample has relatively low education, less than 30% of children have a college degree. The employment rate was 58% for sons and 37% for daughters. Men and women had annual earnings of around US$7,200 and US$3,500 respectively. Control and treated children displayed similar employment rates and earnings before the parental cancer shock (Table 4).

3. Research Design

Treatment. —We define a health shock as the first cancer hospitalization a person experiences.[17] A cancer shock is different from a cancer diagnosis, and cancer diagnoses that do not lead to hospitalization are not considered treatments in our setting. If cancer diagnoses with no hospitalizations increase care needs, then our control sample can be partially treated, potentially biasing our results down. We address this issue by removing all cancer deaths from our control sample. Parents with a cancer diagnosis who are never hospitalized and who survive the disease for at least 8 years are potentially included in our control sample. However, these cases probably represent the mildest cases of the disease, a very small share of our control sample, and any increase in care needs associated with them would bias our results towards a null effect.

Specification. —We use a difference-in-differences event study approach to estimate the effect of a cancer shock on adult children's labor market outcomes. As cancer shocks are staggered over time, we follow a stacked event study similar to that discussed by Gardner (2022) and applied by Cengiz et al. (2019) and Fadlon and Nielsen (2021). To avoid "forbidden" comparisons[18] between early and late-treated units, we organize our

[16] Figure 1 shows the distribution of age at the cancer shock for both children and parents.

[17] A similar approach with varying health shocks has been used in recent studies to assess the effect of own health on labor market outcomes (Datta Gupta et al. 2015; Dobkin et al. 2018) and the effect of health shocks on relatives' outcomes. For example, to assess the impact of children's health shocks on parents' labor market outcomes (Breivik and Costa-Ramón 2022; Eriksen et al. 2021; Adhvaryu et al. 2023; Vaalavuo et al. 2023) and the impact of spouses' health shocks on the other spouse's labor market outcomes (Fadlon and Nielsen 2021; Jeon and Pohl 2017).

[18] With staggered treatment, estimation leverages comparisons between groups that got treated over a period of time and reference groups that were treated earlier. These comparisons are only valid under strong assumptions and were labeled "forbidden" comparisons by Borusyak et al. (2023).

data in groups or stacks, with each stack including pure controls and treated units that received treatment in the same year. Additionally, as we build our control sample by a coarsened matching procedure, all units in a given stack also share similar characteristics.

We set the year of the first cancer hospitalization as $t = 0$. Our baseline specification considers a balanced panel of adult children whom we observe every year for 5 years before the shock through 5 years after the shock. We study the evolution of employment and earnings as a function of event time. We exclude $t = -1$ from the regression, so all effects in $t \neq -1$ are measured relative to the year before the parental cancer shock. Specifically, we denote as Y_{icst} the outcome of interest for individual i in stack c at calendar year s and event time t. We estimate the following equation separately for men and women.

$$Y_{icst} = \sum_{t}^{T} \beta_t \times D_{ics}^{t} + \mathbf{X}\alpha + \mu_i \times \eta_c + \delta_s \times \eta_c + \epsilon_{ics} \tag{1}$$

D_{ics}^{t} is equal to 1 if s is t years since i's cancer shock, $\mu_i \times \eta_c$, and $\delta_t \times \eta_c$ represent respectively unit-by-stack, and year-by-stack fixed effects. We cluster standard errors at the family level, as this is the level treatment is assigned. In our preferred specification, $\mathbf{X}$ includes a full set of age of child dummies to control non-parametrically for life-cycle trends. We show in section 6 that the results are robust to different specifications.

We estimate equation 1 separately for men and women, obtaining $\hat{\beta}^g$ with $g = \{\mathrm{m}, \mathrm{w}\}$. m and w stand for men and women respectively. A relevant share of our sample –especially women– has zeros in the main outcomes due to non-participation in formal employment. To include this information, we estimate equation 1 in levels and rescale $\hat{\beta}^g$ to present results in percentages. Following Kleven et al. (2019), we compute:

$$P_t^g \equiv \frac{\hat{\beta}_t^g}{E[\tilde{Y}_{icst}^g | t]}$$

where $\tilde{Y}_{icst}^g \equiv \hat{Y}_{icst}^g - \hat{\beta}_t^g$. P_t^g thus represents the change in the outcome relative to the counterfactual –the estimated outcome in the absence of a cancer shock. Additionally, we

compute adult care penalties as:

$$P_t \equiv \frac{\hat{\beta}_t^m - \hat{\beta}_t^w}{E[\tilde{Y}_{icst}^w | t]}$$

P_t represents how much daughters are impacted by a cancer shock relative to sons. In addition to 1, we also present results for a standard difference-in-difference specification (equation 2) estimating average effects for our full period of analysis. In this equation, D_{ics} is equal to 0 for pre-treatment periods (–5 to –1) and equal to 1 for post-treatment (0 to +5). We use this specification to summarize our main results or to show results for specific samples.

$$Y_{ics} = \beta \times D_{ics} + \mu_i \times \eta_c + \delta_s \times \eta_c + \epsilon_{ics} \tag{2}$$

The validity of our specification relies on the standard parallel trends assumption. In this setting, this means that children exposed to a parental health shock would have followed the same labor market trajectories as control children, in the absence of the parental health shock. Additionally, in section **??** we show that control and treated individuals display very similar labor market trajectories, not only in trends but also in levels, before the shock.

4. Impacts on Parental Health

We estimate the impact of a health shock on two measures of parental health: hospitalizations and mortality, separately for men and women.

Hospitalizations. —Days hospitalized spike the year of the first cancer hospitalization (Figure 2, panel (a)). Fathers and mothers spend, on average, 14 and 10 more days in the hospital than control parents during this year respectively. Hospitalizations decrease after $t = 0$ and return to pre-treatment levels two years later. Treated and control parents exhibit similar trends in hospitalization before the health shock, with a slight increase

from $t = -2$ to $t = -1$ for treated parents, suggesting that some health issues related to cancer might appear a few months before the first cancer hospitalization. However, this difference represents only 2.7-6.3% of the change between $t = -1$ and $t = 0$. Control and treated parents display similar trends from $t = -5$ to -2.

Mortality. —Upon a parental health shock, mortality rates jump by 18 percentage points for fathers and by 12 percentage points for mothers (Figure 2, panel (b)). Parental mortality keeps increasing in the following years at a decreasing rate. Five years after the health shock, mortality rates are higher for treated parents by 35 and 25 percentage points for fathers and mothers respectively.

A "cancer shock" is a severe health event that significantly deteriorates an individual's health and substantially increases the likelihood of death. In the case of cancer, death is usually preceded by a period of deterioration where care needs intensify.

5. Impacts on Children's Labor Market Outcomes

Figure 3 plots the average employment rate and earnings of treated and control children, separately for men and women, during an 11-year period centered on the year of the parental health shock. Treated and control children have similar labor market outcomes –both in levels and trends– before the shock. The parental cancer shock doesn't seem to modify labor trajectories for sons. However, the case is different for daughters. Upon a parental health shock, daughters' employment and earnings fall immediately. A gap between treated and control daughters emerges and remains quite stable during the following five years. Building on this comparison, we estimate equation 1, which allows us to obtain estimates from within-stack variation and include a full set of controls. Treated and control children display similar trends in employment and earnings before the parental health shock. Daughters' employment and earnings fall immediately upon the shock by 2.5% with no sign of recovery. Five years after the shock, daughters' employment and earnings are 2.5% and 5% lower. Sons do not face any reduction in employment or earnings after a cancer shock. Conversely, income increases post-shock, though this increase is not

statistically significant for most years (4).[19]

Five years post-cancer shock, P_5 –the percentage by which daughters fall behind sons after a parental cancer shock– is 5.2% for employment and 12.3% for earnings. These penalties are sizeable. They amount to 40% and 63% respectively of the child penalties estimated for Denmark (Kleven et al. 2019). In our sample, a parental cancer shock increases the gender gap in earnings by 4 percentage points, equivalent to a 9% increase.

5.1. Daughters as Providers of Care

Our results are consistent with daughters undertaking most of the care caused by a parental health shock and facing a penalty in the labor market as a result of adult caregiving. In this section, we provide evidence consistent with unpaid caregiving as the main driver of our results. In particular, we show that the labor market impact on daughters is larger when the care burden is higher.

By Care Burden. —Cancer patients can vary widely in regard to the amount of care they need. Cancer –even within the same diagnosis– can have a different impact on a patient's level of dependency due to differences in treatment, symptoms, and the evolution of the illness. We present results separately by a measure of shock intensity or persistence: cancer re-hospitalization. 40% of parents with a cancer hospitalization in our sample face multiple hospitalizations due to the disease. Treated families with sick a parent with one or multiple cancer hospitalizations have overall similar characteristics (Table 5). The cancer shock affects both groups at a similar age, and children in each group had broadly similar employment and earnings before the shock. However, parents with one and multiple cancer hospitalizations face a very different evolution of their health status. Parents who are re-hospitalized spend more time in the hospital, but the main differences emerge in mortality. Parents with multiple cancer hospitalizations have lower mortality rates at time t_0 but mortality increases continuously from t_1 onward (Figure 5). Five years post-health shock, mortality rates are over 10 percentage points larger for parents with multiple cancer

[19]Figure A3 shows results in levels instead of percentages.

hospitalizations relative to parents with a single cancer hospitalization.

These differences imply different care burdens. For the group with a single cancer hospitalization, whether because the disease worsens rapidly leading to death, or because the patient recovers or stabilizes, the higher demand for care is shorter in duration. For the group with multiple hospitalizations, there seems to be a more gradual decline, representing a situation where the demand for care is present and increasing for a longer time.

The average results for children's labor market outcomes mask substantial heterogeneity by the number of parental cancer hospitalizations (N_h). For cases with $N_h = 1$, although daughters' employment falls, the reduction is smaller and there are no statistically significant differences between sons and daughters (Figure 6, panels (a) and (c)). On the other hand, for cases with $N_h > 1$, daughters exhibit larger and long-lasting impacts both on employment and earnings (Figure 6, panels (b) panel (d)). For those with multiple cancer hospitalizations, employment is persistently 5% lower after a cancer shock and earnings decrease between 5% and 15%. The penalty P_5 for this group reaches 11% for employment and 17% for earnings.

As effects are larger for cases with a higher care burden, we expect results to be smaller or non-existent for cases with a lower or no care burden. When the parent dies within a month from the first cancer hospitalization there's no decline in daughters' labor market outcomes (Figure 10, panels (a) and (c)).[20] Similarly, the sudden death of a parent by either a stroke or a heart attack does not decrease daughters' employment or earnings (Figure 9).[21]

Lastly, we compare cancer to other health shocks that create a lower demand for adult caregiving. We estimate the effect of parental strokes and heart attacks on children's labor market outcomes, excluding sudden deaths from these events.[22] We find no evidence of reductions in children's employment or earnings arising from these health shocks (Figure

[20] As cases where the parent dies within a month from the first hospitalization are infrequent the effects are not precisely estimated.

[21] We define a sudden death as one caused by a heart attack or a stroke for people with no hospitalizations in the previous year.

[22] We drop from the sample used for these estimations the cases where a parent dies within a month from the first hospitalization due to either a stroke or a heart attack.

8). The absence of costs for children –especially for daughters– in these cases is consistent with the smaller impact these shocks have on parental health relative to cancer, and thus the smaller impact on care needs. Non-fatal strokes and heart attacks have smaller effects on subsequent mortality than cancer cases with a single cancer hospitalization (Figure 7).[23]

Taken together, these results show that daughters pay a cost in employment and earnings after a parental health shock that increases the demand for adult caregiving. The results are consistent with unpaid caregiving as the mechanism driving our results as only health shocks that increase the demand for adult caregiving negatively impact daughters' labor market outcomes. Health shocks that create an ongoing need for care, particularly end-of-life care, seem to be particularly costly for daughters.

5.2. Sons as Providers of Financial Resources

Our results rule out that sons, on average, bear any labor market costs associated with a parental cancer shock, as is the case for daughters. However, the results extend further, indicating that sons experience an increase in their earnings after a parental cancer shock. Sons' earnings increase on average by 1.5% between 0-5 years post-cancer shock[24]. This effect is driven mostly by men with low employment and earnings. We divide our sample in terciles defined by pre-shock employment rate. Men with high employment before the parental cancer shock (Figure 11, panels (b) and (d) on the right) do not experience any effects on employment or earnings. On the other hand, men with low employment (Figure 11, panels (a) and (c) on the left) experience a sizeable increase in employment and particularly in earnings. Earnings are between 20 to 40% higher 3 to 5 years after the shock.[25] Among low-employment men and women, a parental cancer shock increases the gender gap in earnings by over 10 percentage points.

[23] Additionally, even in a context of family-based adult care, adults with nervous or circulatory system conditions are more likely to be institutionalized than cancer patients (Table A2).

[24] This coefficient is statistically significant at the 10% level.

[25] Women face negative effects in both groups (high and low previous employment). However, the relative impact is larger for lower-employment women although less precisely estimated due to higher rates of non-participation. The effects for men are also less precisely estimated in the low-employment group due to the same reason.

The behavior of sons is consistent with the need to cover health expenditures related to cancer treatment and to compensate for the loss of family income (by either affected parents, caregivers, or both) that is more pressing in families facing tighter financial constraints.[26]

A parental health shock contributes to gender inequality through two different channels, especially among lower-income population. First, the rise in care needs reduces daughters' employment and earnings due to adult caregiving. Second, the need for extra financial resources increases sons' employment and earnings. A health shock forces a gender specialization where women are the main care providers and men are the main financial providers.

5.3. What Explains the Disproportionate Impact on Women?

There are two possible explanations for the disproportionate burden of adult caregiving born by women. The first relates to different opportunity costs. Women have a lower opportunity cost of informal care due to their lower earnings. The second relates to gender norms dictating who should provide care and who should provide financially, even conditional on earnings.[27] To evaluate the importance of these factors, we assess whether women experience penalties after a parental health shock even in cases where they do not have lower opportunity costs, suggesting the presence of gender norms.

We show results from equation 2 separately for four groups: individuals who earned more than their partners, individuals who earned less than their partners, individuals who earned more than their siblings, and individuals who earned less than their siblings (Figure 12).[28] Women in all groups are negatively affected by a parental health shock,

[26]Schaller and Eck (2023) find an increase in children-to-parent financial transfers when parental health worsens for the United States.

[27]We refer to gender norms broadly as the societal expectations, beliefs, and rules regarding how men and women should behave. Regarding caregiving, gender norms dictate that such work is primarily a responsibility of women. When we say "gender norms dictate who should provide care", we are referring to a broad phenomenon that mixes expectations, preferences, responsibilities, and perceptions. The concept encompasses situations ranging from explicit obligations or responsibilities to circumstances where women prefer to provide care over men, or where they engage more in care work because they are believed to be better caregivers than men.

[28]We observe an individual's partner for X% of our sample. We identify partners by (i) marriage data,

even in cases where there is a lower-earning partner or sibling. On the other hand, men do not face reductions in employment or earnings in any of these groups. When men are the lower-earner within a family –either relative to a partner or to siblings– they respond to a parental health shock by increasing their employment and earnings.[29]

Additionally, we... [PENDING]

Figure X shows that the main results remain unchanged when controlling for earnings differences among siblings.

Taken together, Figures 12 and X rule out a model where the allocation of adult care work to women is entirely defined by differences in opportunity costs. They provide evidence for the role that gender norms play in determining who provides adult care within families. These results are in line with what has been found for the child penalties (Andresen and Nix 2022) and for overall domestic work division among couples Bertrand et al. (2015).

The overall pattern of gender specialization coming from parent care resembles the impact of children on new parents. As a last step, we investigate whether the costs of parent care are distributed differently between children who are and are not parents themselves. The negative (positive) effects of a parental cancer shock for women (men) are concentrated in the subsample of children who are parents (Figure 13). For the subsample of children who do not have kids, the effects are smaller, not statistically significant, and similar between men and women. The concentration of the effects of parent caregiving on children with kids suggests a correlation between caregiving across the life course. When families are faced with adult care needs, it is more likely that adult care will fall on women who have already cared for children.

6. Robustness and Validity Checks

Alternative Mechanisms. —Especially in developing countries, grandparents –primarily grandmothers– are a relevant source of informal childcare. Therefore, a parental cancer

and (ii) cohabitation data, when available. All of these comparisons are made at $t = -1$

[29] As cases with men as the lower-earner are infrequent, most of these results are not precisely estimated and should be considered suggestive evidence.

shock could affect daughters' labor market outcomes by reducing informal childcare provision.[30] We present two pieces of evidence that rule this out. First, we show that the effects do not differ based on the presence of a child aged 0-6 years, the group most in need of child care (Figure A5). Second, the sudden death of a parent –an event that reduces childcare provision but does not increase parental care needs– does not affect sons' or daughters' labor market outcomes (Figure 9).

Alternative Control Sample. —Our main results are obtained by comparing treated children –those who have a parent who has been hospitalized for cancer– to pure controls –those whose parents do not experience a cancer hospitalization. While treated and control children have similar characteristics (Table 4) and similar employment and earnings –both in levels and trends– before the parental health shock (Figures 3 and 4), one might worry that families that experience cancer might differ from families that do not, making the latter not well suited as counterfactual for the former. This would be the case, for example, if the occurrence of a parental cancer hospitalization is correlated with other health issues, especially with children's health. To assess whether our results are driven by differences in post-shock trends between treated and pure control families in the absence of treatment, we estimate equation 1 with an alternative control sample. Instead of pure controls, we use not-yet-treated individuals as controls. For individuals treated in year t, individuals treated in $t + 6$ act as controls. In this case, we define stacks only by the year of the first parental cancer hospitalization.[31] Estimates are obtained from within cancer families exploiting variation in the timing of the cancer shock. Using not-yet-treated children as controls delivers the same pattern of results (Figure A4).

Additional Robustness Checks. The main results are similar when we estimate equation 1 without weighting the control sample (Figure A6) and without including controls (Figure A7).

[30] Talamas (2023) shows that after the death of a cohabiting mother, women with children aged 0-6 years old reduce their employment by 12 p.p. in Mexico.

[31] The year of the first parental cancer hospitalization is defined as $t - 6$ for controls.

7. Conclusion

The prevalence of adult care is increasing rapidly as a result of population aging. In most of the world, adult care is provided almost exclusively by families, and within families women comprise the majority of adult caregivers. However, the role of adult care in shaping gender disparities in the labor market has remained largely unexplored.

In this study, we show that adult care is a relevant factor behind gender disparities in the labor market. We center the analysis on care provided by working-age children to a sick parent. Using data for 75% of the Chilean population and a difference-in-differences event study design, we show that a parental cancer shock –the first parental cancer hospitalization– leads to a gender specialization. Daughters face reductions in their employment and earnings, while earnings increase for sons. The penalties that arise from parent care are sizeable and comparable to the child penalties estimated in the literature. A parental cancer shock increases the gap in earnings by 9%.

Additionally, we show that gender norms influence the allocation of care work and that care work is mostly concentrated on daughters who are mothers. These results suggest that care work is correlated across the life cycle, especially between child care and parent care. These findings are particularly pertinent in a context where demographic changes are making it more common to care for both a child and an aging or sick parent at the same time.

We believe our findings speak to a broad context of rising care needs associated with population aging and higher prevalence of chronic diseases. The burden of adult care will only increase in the coming decades and most countries, especially low and middle-income countries, do not have robust policies regarding long-term care services. Our results suggest that if rising adult care needs are addressed with family-based care, adult care will become an increasing source of gender inequality. This should be an important piece in the policy discussion regarding the current demographic changes.

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8. Tables and Figures

TABLE 1. Distribution of Caregivers by Relationship with Care Recipient. Adults over 50 Years with Moderate to Severe Dependency

Relationship with Care Recipient	Percentage
Children	49.18%
Spouse or partner	25.13%
Siblings or siblings-in-law	5.51%
Grandchildren	5.00%
Other relatives	8.79%
Other non-relatives	4.37%
Personal health service	1.11%
Domestic Service	0.92%

Notes: Numbers in each row represent percentages over the total population of adults over 50 years old with moderate to severe dependency who receive help from at least one person due to their health status. Own calculations based on data from the Disability and Dependency Survey (ENDIDE) 2022, Ministry of Social Development and Family.

TABLE 2. Measures of Care Needs by Cancer Diagnosis, Adults over 50 Years

	Adults with a Cancer Diagnosis	Adults without a Cancer Diagnosis
A. Dependency		
No dependency	83.87%	66.22%
Mild to moderate dependency	10.95%	20.48%
Severe dependency	5.19%	13.30%
B. Disability		
No disability	74.03%	50.58%
Mild to moderate disability	6.98%	7.66%
Severe disability	18.99%	41.77%
C. Level of difficulty in daily activities		
No difficulty	14.03%	3.98%
Mild to moderate difficulty	62.27%	47.06%
Severe difficulty	23.70%	48.96%

Notes: Numbers in each panel represent percentages over total population (adults over 50 years with a cancer diagnosis and adults without a cancer diagnosis over 50 years). Own calculations based on data from the Disability and Dependency Survey (ENDIDE) 2022, Ministry of Social Development and Family.

TABLE 3. Descriptive Statistics for Parents Sample

	Treated	Control
A. Fathers		
Age at first cancer hospitalization	64.1	63.8
Age at first child	27.4	27.3
Number of children	2.6	2.6
Number of sons	1.3	1.3
Number of daughters	1.3	1.3
Level of education		
Less than high school	71.8%	71.8%
High school or some college	20.9%	20.9%
College	7.3%	7.3%
Observations	8,162	146,131
B. Mothers		
Age at first cancer hospitalization	61.3	61.0
Age at first child	24.6	24.5
Number of children	2.6	2.6
Number of sons	1.3	1.3
Number of daughters	1.3	1.3
Level of education		
Less than high school	74.8%	74.8%
High school or some college	18.9%	18.9%
College	6.3%	6.3%
Observations	8,162	146,131

Notes: Main summary statistics for treated and control parents.

TABLE 4. Descriptive Statistics for Children Sample

	Treated	Control
A. Sons		
Age at parental first cancer hospitalization	35.3	35.2
Has children	70.4	69.8
Age at first child (conditional on having children)	26.9	27.0
Level of education		
Less than high school	24.3%	24.2%
High school or some college	46.2%	46.3%
College	29.5%	29.5%
Employment and earnings		
Employment rate	57.8%	57.8%
Earnings	$US 7,278	$US 7,153
Earnings (conditional on employment)	$US 3,566	$US 3,454
Observations	6,863	108,977
B. Daughters		
Age at parental first cancer hospitalization	35.4	35.4
Has children	80.6%	80.5%
Age at first child (conditional on having children)	24.7	24.4
Level of education		
Less than high school	20.9%	20.8%
High school or some college	50.6%	50.7%
College	28.5%	28.5%
Employment and earnings		
Employment rate	37.0%	37.1%
Earnings	$US 3,566	$US 3,454
Earnings (conditional on employment)	$US 3,566	$US 3,454
Observations	7,182	117,589

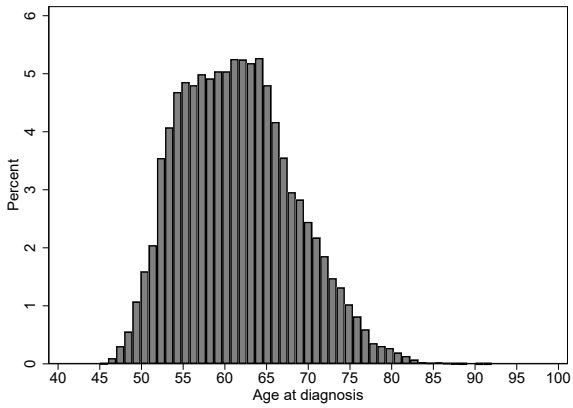
Notes: Main summary statistics for treated and control children. Employment and earnings are measured the year before the parental cancer shock.

TABLE 5. Characteristics of Parents and Children with a Cancer Shock by Parental Cancer Re-hospitalization

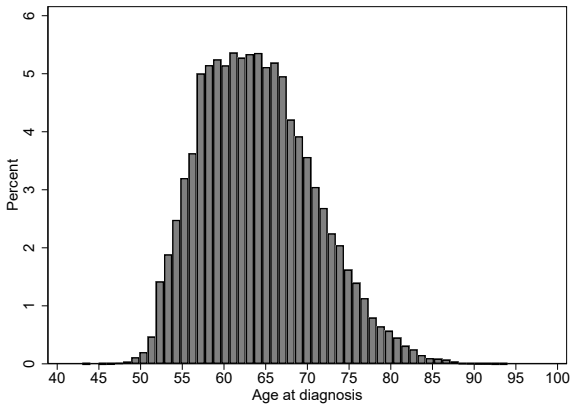
	One Cancer Hospitalization	Multiple Cancer Hospitalizations
Panel A. Sons		
Age at cancer shock	36.3	36.1
Employment	7.09	6.71
Annual earnings	5,047,940	4,780,567
Observations	4,452	2,411
Panel B. Daughters		
Age at cancer shock	36.5	36.2
Employment	4.4	4.5
Annual earnings	2,342,484	2,510,740
Observations	4,684	2,498

Notes: Age and labor market outcomes for treated children by whether parent is re-hospitalized due to cancer.

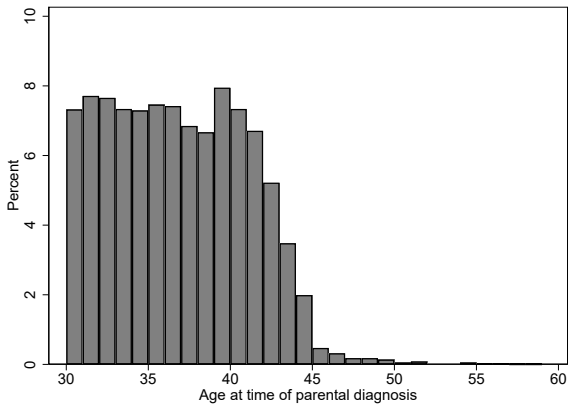
FIGURE 1. Distribution of Age at Cancer Shock for Treated Families



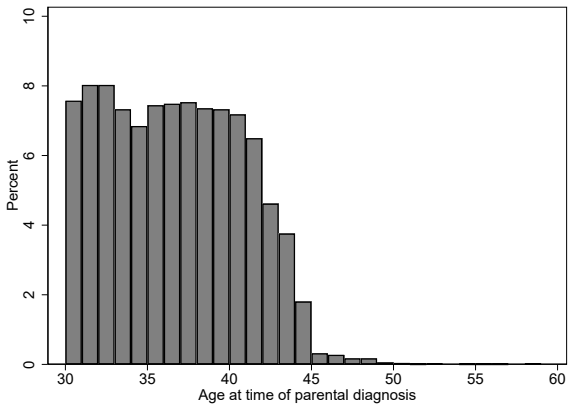
(a) Mothers



(b) Fathers



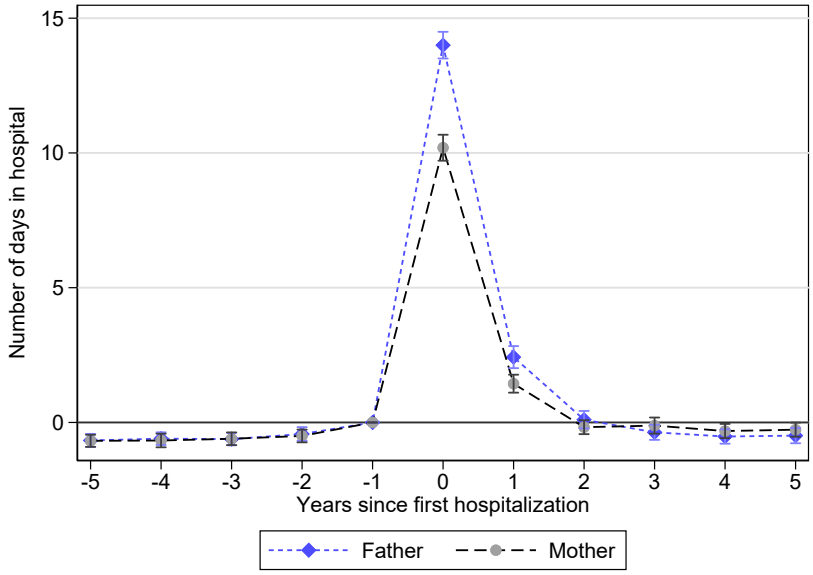
(c) Daughters



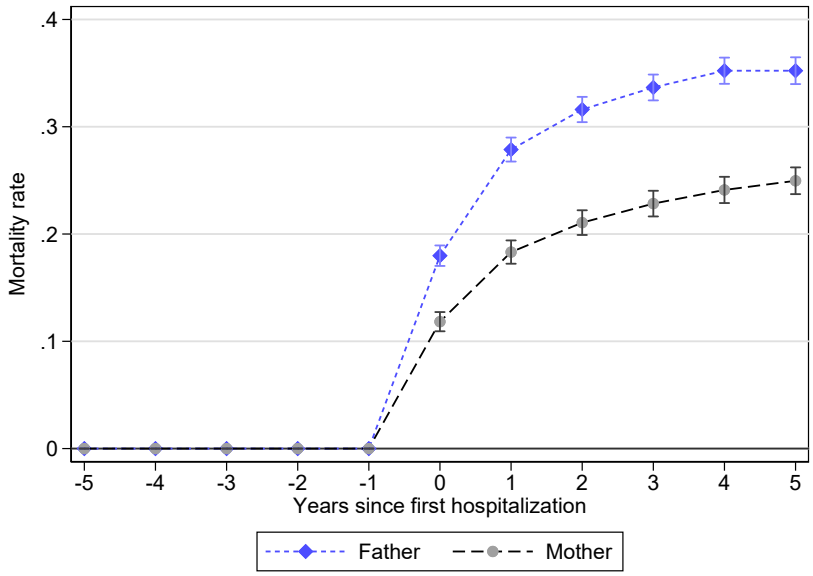
(d) Sons

Note: Distribution of age at year of cancer shock for treated parents by gender (panel (a) for mothers and panel (b) for fathers) and for treated children by gender (panels (c) for daughters and panel (d) for sons). Each bin corresponds to one year. The low share of children aged over 45 years is related to data limitations for birth records for cohorts born before 1970.

FIGURE 2. Effect of a Parental Cancer Shock on Parental Health



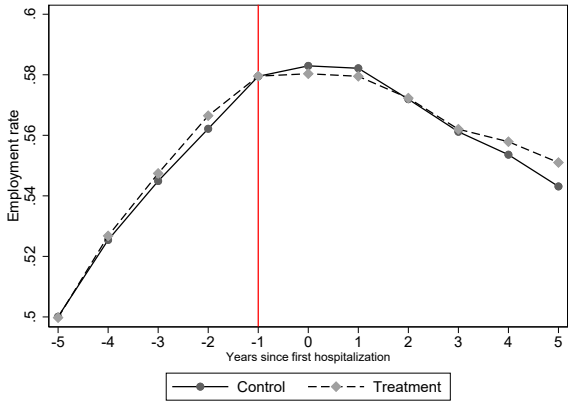
(a) Days in Hospital



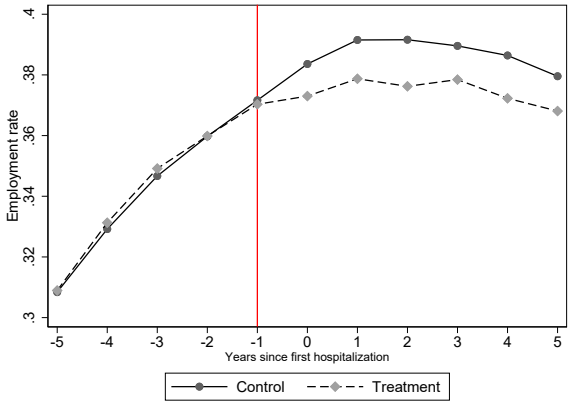
(b) Mortality

Note: Estimates from equation 1. Outcomes are measures of parental health. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

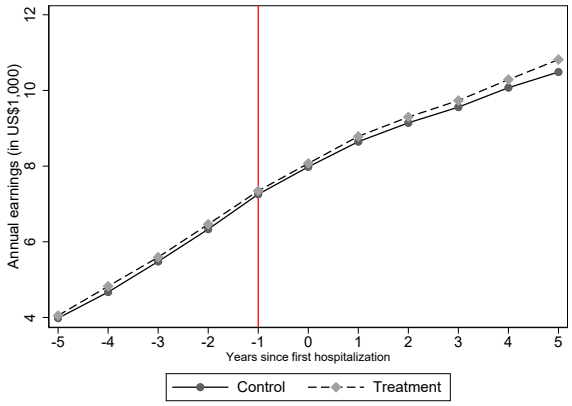
FIGURE 3. Average Employment and Earnings of Adult Children by Gender and Treatment Status over Time



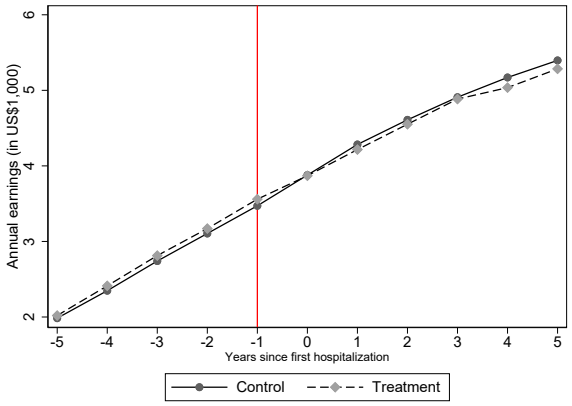
(a) Employment rate, Men



(b) Employment rate, Women



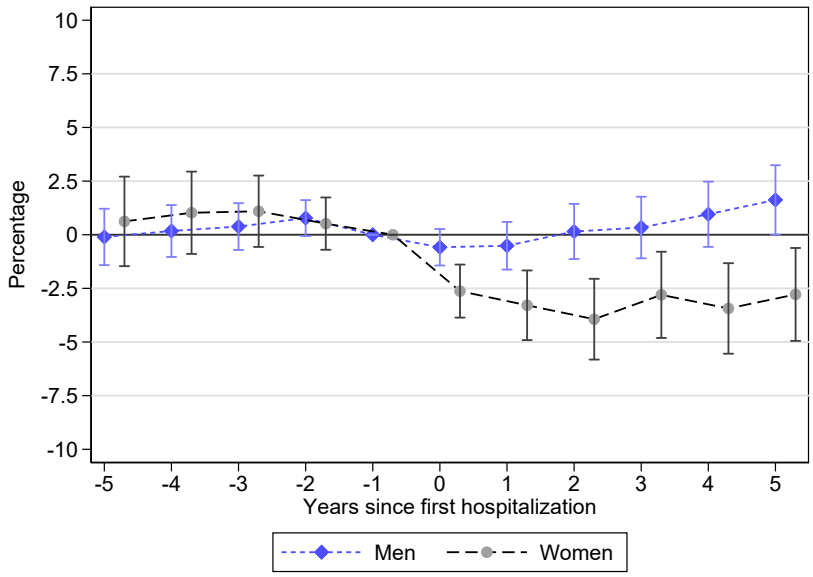
(c) Annual earnings, Men



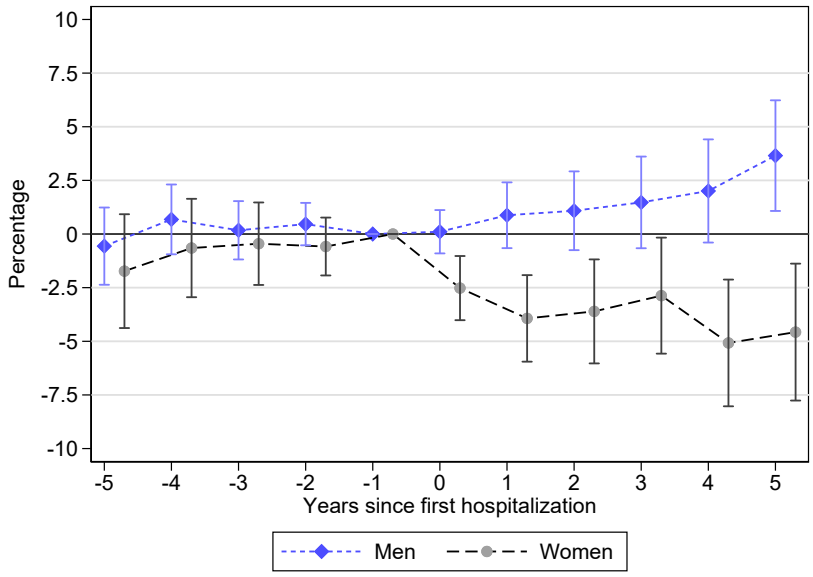
(d) Annual earnings, Women

Note: Estimates from equation 1. Outcomes are labor market outcomes for children. Panel (a) and (c) are estimates for cases with one cancer hospitalization ($N_h = 1$). Panel (b) and (d) are estimates for cases with multiple cancer hospitalizations ($N_h > 1$). All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

FIGURE 4. Effect of a Parental Cancer Shock on Adult Children's Labor Market Outcomes



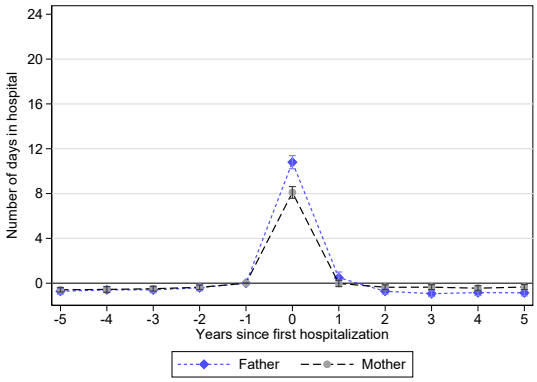
(a) Employment rate



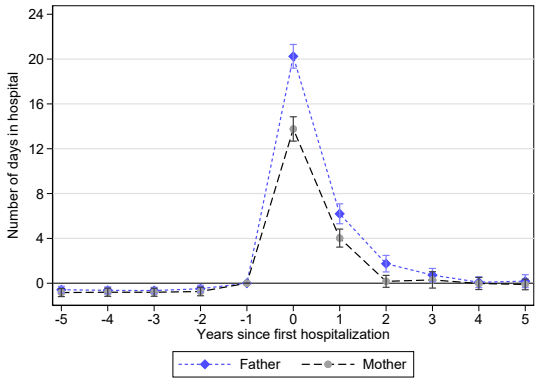
(b) Annual earnings

Note: Estimates from equation 1. Outcomes are labor market outcomes for children. Estimates correspond to P_t^m for men and P_t^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

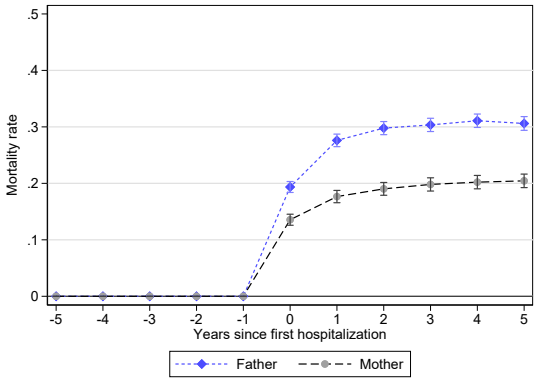
FIGURE 5. Effect of a Parental Cancer Shock on Parental Health by Re-hospitalization



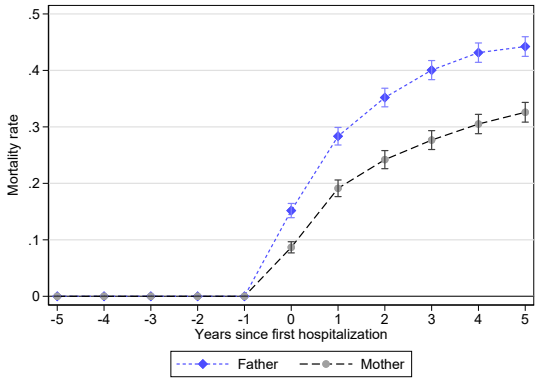
(a) Days in Hospital, $N_h = 1$



(b) Days in Hospital, $N_h > 1$



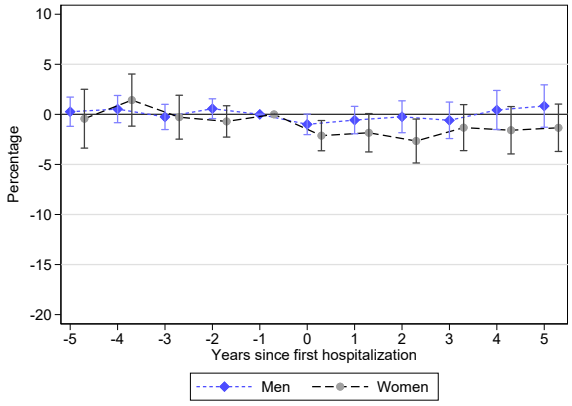
(c) Mortality, $N_h = 1$



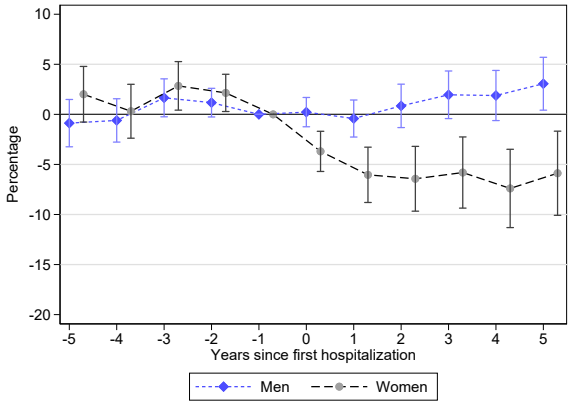
(d) Mortality, $N_h > 1$

Note: Estimates from equation 1. Outcomes are measures of parental health. Panel (a) and (c) are estimates for cases with one cancer hospitalization ($N_h = 1$). Panel (b) and (d) are estimates for cases with multiple cancer hospitalizations ($N_h > 1$). All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

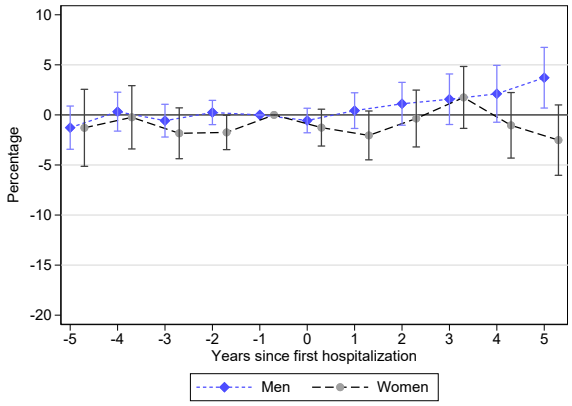
FIGURE 6. Effect of a Parental Cancer Shock on Adult Children's Labor Market Outcomes by Number of Cancer Hospitalizations



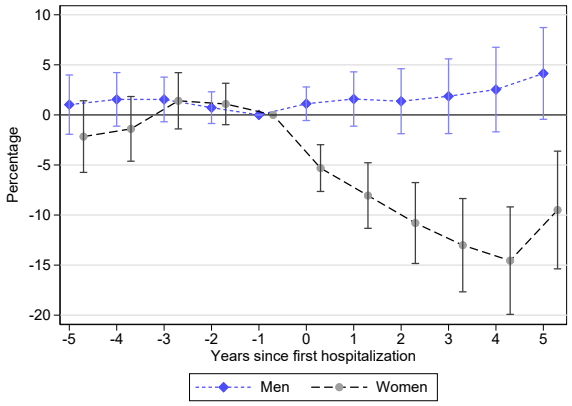
(a) Employment rate, $N_h = 1$



(b) Employment rate, $N_h > 1$



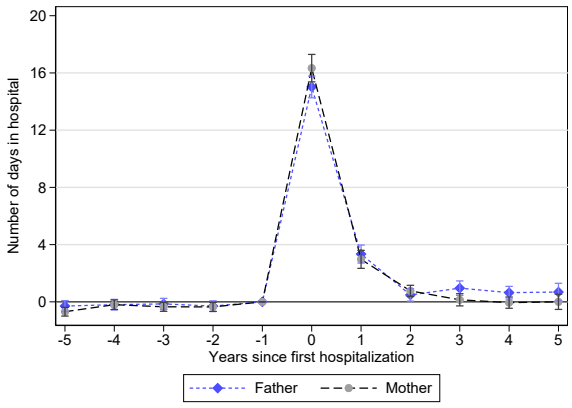
(c) Annual earnings, $N_h = 1$



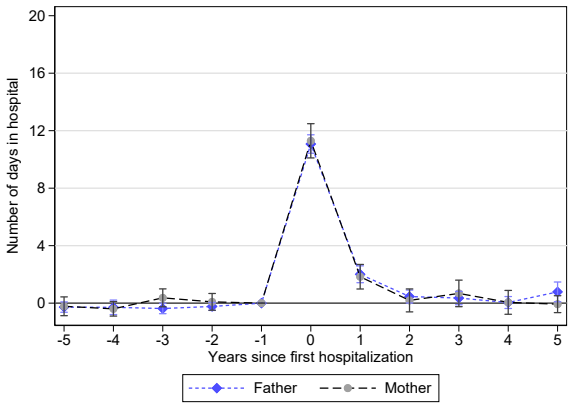
(d) Annual earnings, $N_h > 1$

Note: Estimates from equation 1. Outcomes are labor market outcomes for children. Panel (a) and (c) are estimates for cases with one cancer hospitalization ($N_h = 1$). Panel (b) and (d) are estimates for cases with multiple cancer hospitalizations ($N_h > 1$). Estimates correspond to P_t^m for men and P_t^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

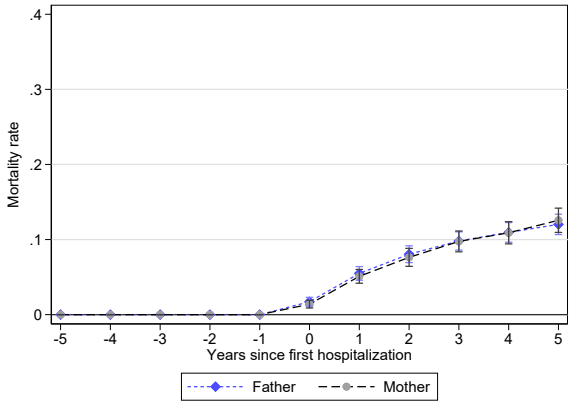
FIGURE 7. Effect of Other Parental Health Shocks on Parental Health



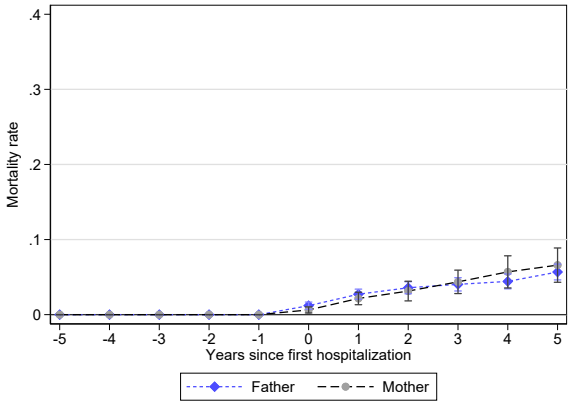
(a) Days in hospital, Stroke



(b) Days in hospital, Hear Attack



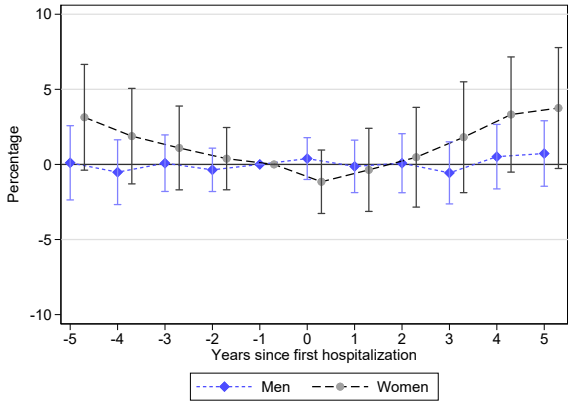
(c) Mortality rate, Stroke



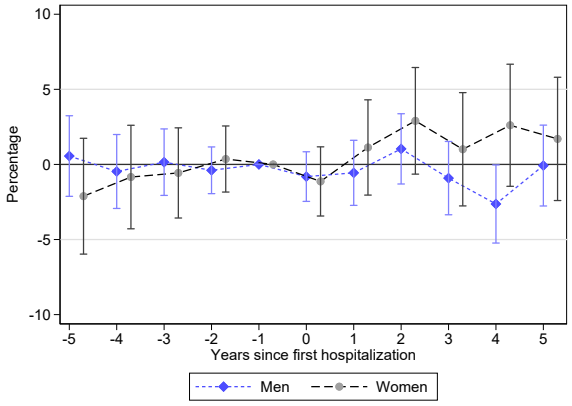
(d) Mortality rate, Heart Attack

Note: Estimates from equation 1. Outcomes are measures of parental health. Panels (a) and (c) show estimates for strokes as a parental health shock. Panels (b) and (d) show estimates for heart attacks as a parental health shock. In both cases, treatment is defined as a parental heart attack or stroke when the parent survives past the first month. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

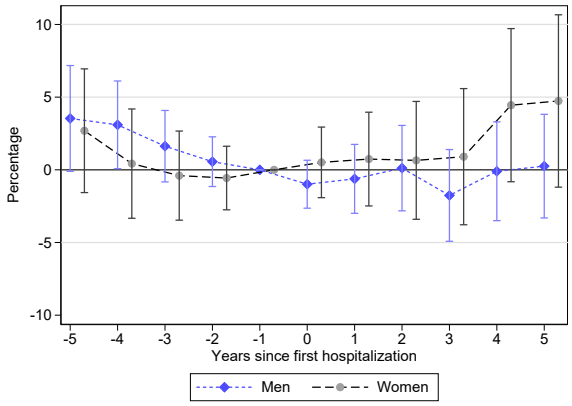
FIGURE 8. Effect of a Other Parental Health Shock on Adult Children's Labor Market Outcomes



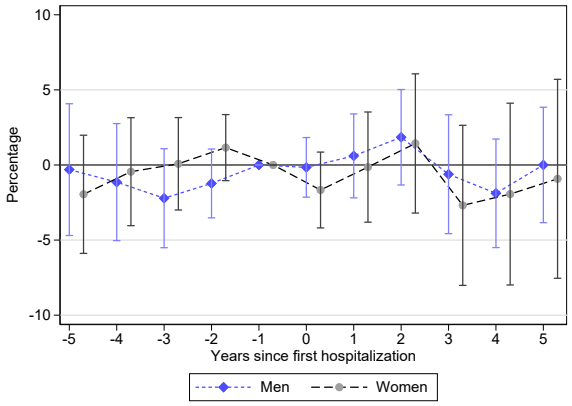
(a) Employment, Stroke



(b) Employment, Heart Attack



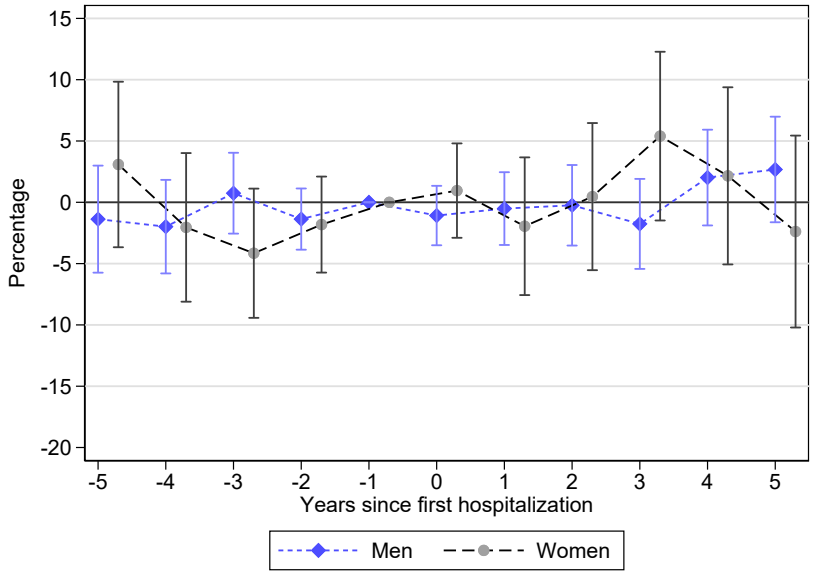
(c) Annual Earnings, Stroke



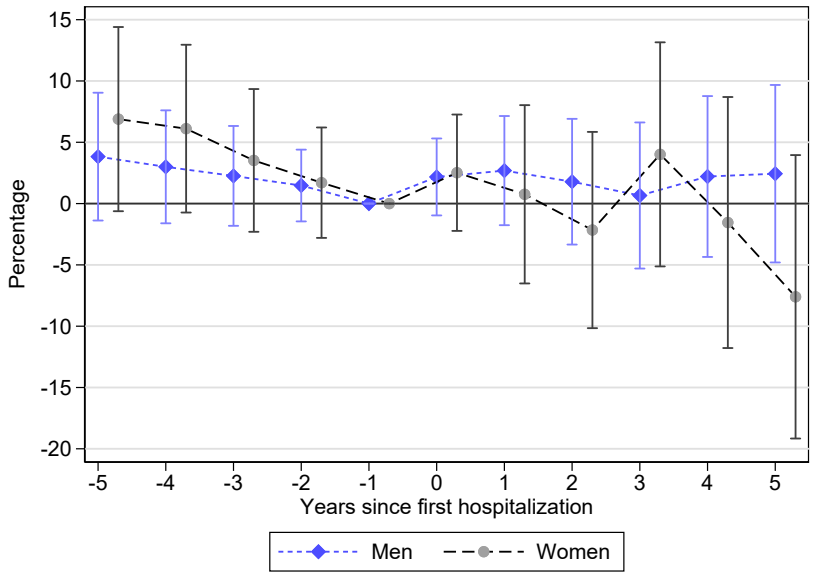
(d) Annual Earnings, Heart Attack

Note: Estimates from equation 1. Outcomes are labor market outcomes for children. Panels (a) and (c) show estimates for strokes as a parental health shock. Panels (b) and (d) show estimates for heart attacks as a parental health shock. In both cases, treatment is defined as a parental heart attack or stroke when the parent survives past the first month. Estimates correspond to P_t^m for men and P_t^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

FIGURE 9. Effect of a Parental Sudden Death on Adult Children's Labor Market Outcomes



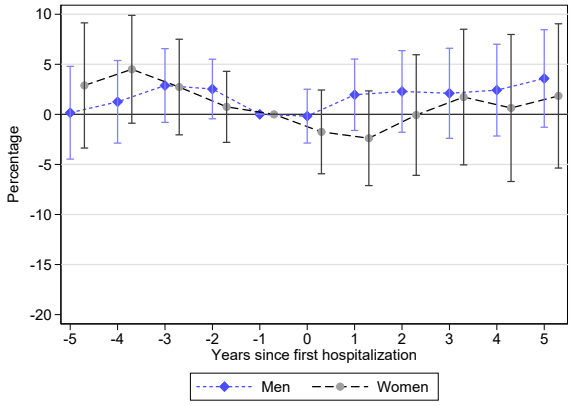
(a) Employment rate



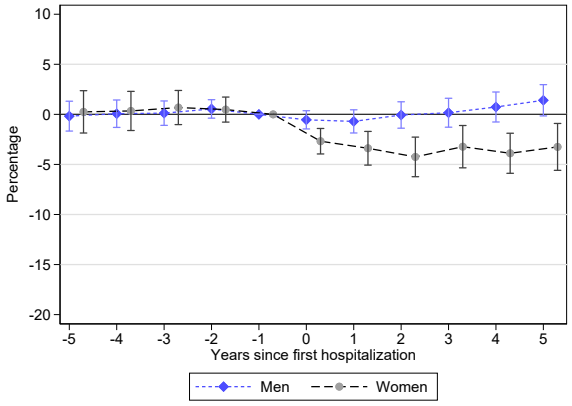
(b) Annual Earnings

Note: Estimates from equation 1 using a sudden parental death as treatment. A sudden parental death is defined as a death due to a stroke or a heart attack for parents with no previous hospitalizations. Outcomes are labor market outcomes for children. Estimates correspond to P_t^m for men and P_t^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

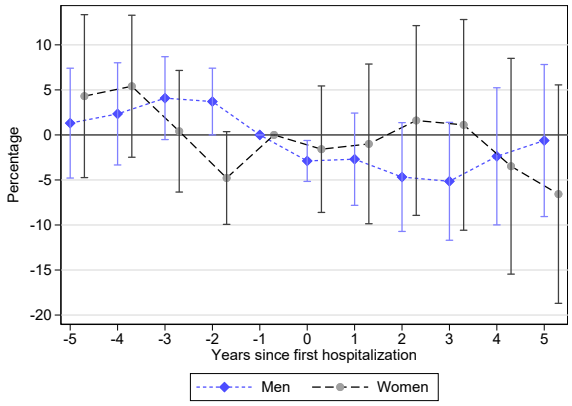
FIGURE 10. Effect of a Parental Cancer Shock on Adult Children's Labor Market Outcomes, by Timing on Death



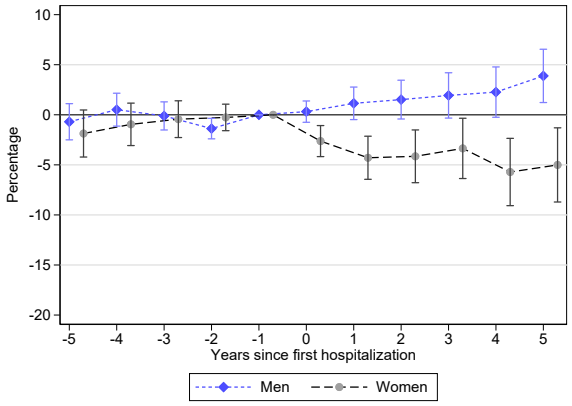
(a) Employment,
Parent dies during first month



(b) Employment,
Parent survives first month



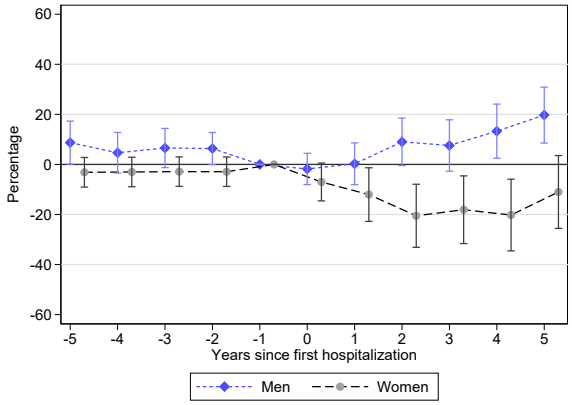
(c) Annual Earnings,
Parent dies during first month



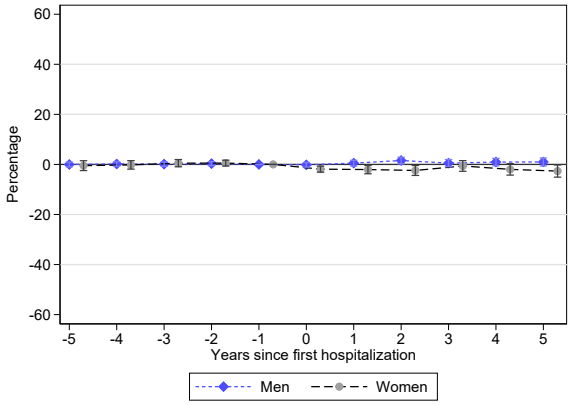
(d) Annual Earnings,
Parent survives first month

Note: Estimates from equation 1. Outcomes are labor market outcomes for children. Panels (a) and (c) show estimates for individuals whose parent dies within a month of the first cancer hospitalization. Panels (b) and (d) show estimates for individuals whose parent survives for at least a one since the first cancer hospitalization. The scale of the y axis is similar across panels to ease comparison. Estimates correspond to P_t^m for men and P_t^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

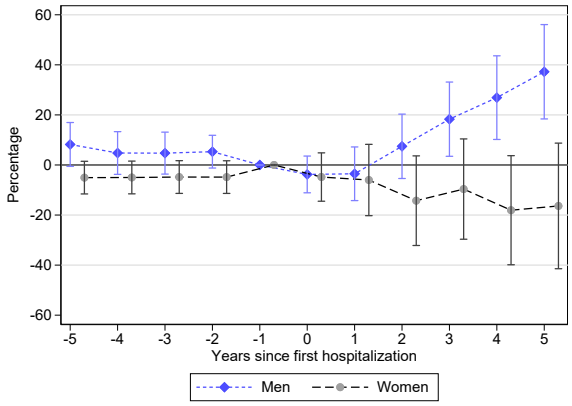
FIGURE 11. Effect of a Parental Cancer Shock on Adult Children's Labor Market Outcomes, by Employment Tercile



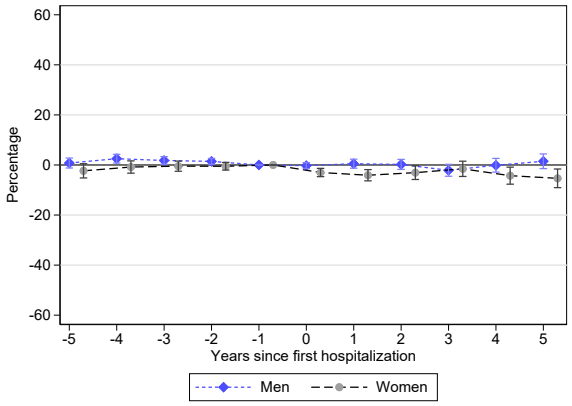
(a) Employment, First Tercile



(b) Employment, Third Tercile



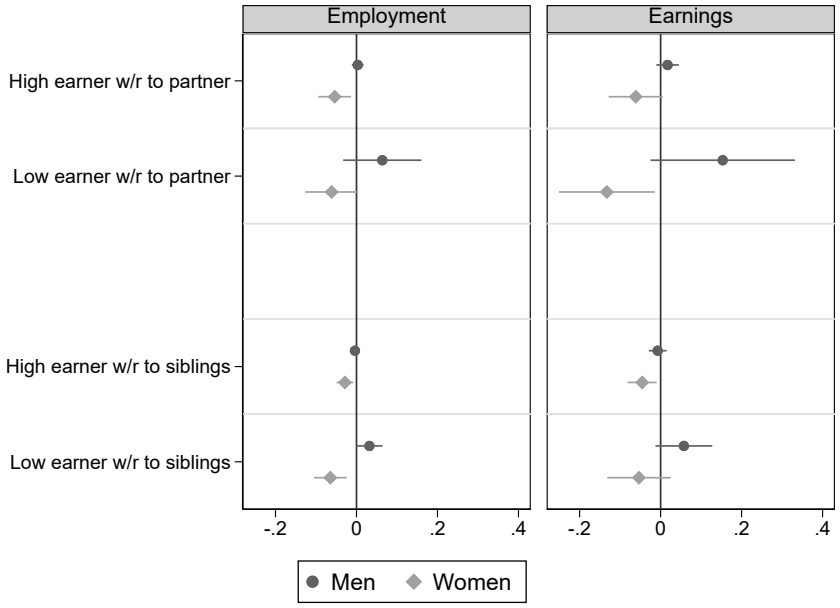
(c) Annual Earnings, First Tercile



(d) Annual Earnings, Third Tercile

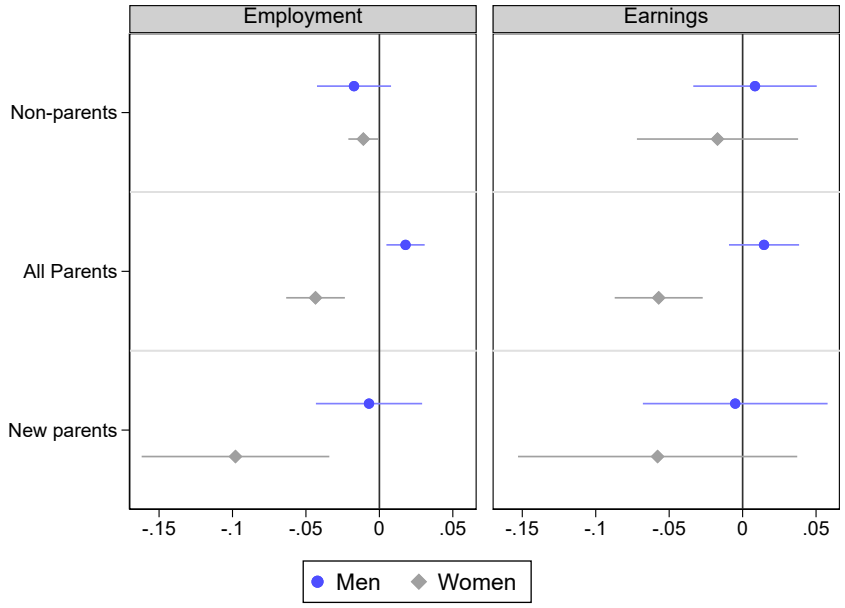
Note: Estimates from equation 1. Outcomes are labor market outcomes for children. Panels (a) and (c) show estimates for individuals in the first tercile of pre-shock employment, corresponding to the group of children with the lowest employment rates before the parental cancer shock. Panels (b) and (d) show estimates for individuals in the third tercile of pre-shock employment, corresponding to the group of children with the highest employment rates before the parental cancer shock. The scale of the y axis is similar across panels to ease comparison. Estimates correspond to P_t^m for men and P_t^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

FIGURE 12. Effects of a Parental Cancer Shock by Relative Earnings



Note: Estimates from equation 2. Outcomes are labor market outcomes for children. Estimates correspond to P^m for men and P^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

FIGURE 13. Effects of a Parental Cancer Shock by Parenthood



Note: Estimates from equation 2. Outcomes are labor market outcomes for children. Estimates correspond to P^m for men and P^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

Appendix A. Tables and Figures

TABLE A1. Distribution of Parents with a Cancer Hospitalization by Cancer Type

Cancer Diagnosis	Fathers	Mothers	Total
Breast	0.2%	30.3%	15.2%
Prostate	29.4%	0.0%	14.7%
Colorectal	10.7%	8.4%	10.6%
Stomach	13.2%	5.1%	10.3%
Uterine cervical	0.0%	12.4%	6.2%
Gallbladder	2.2%	3.6%	3.1%
Bronchus and Lung	4.1%	2.3%	3.6%
Leukimia	3.3%	1.9%	2.6%
Pancreas	2.1%	1.7%	1.9%
Liver	1.8%	1.0%	1.6%
Esophagus	1.5%	0.8%	1.3%
Other	32.5%	33.0%	32.8%
Total	4,349	3,753	8,102

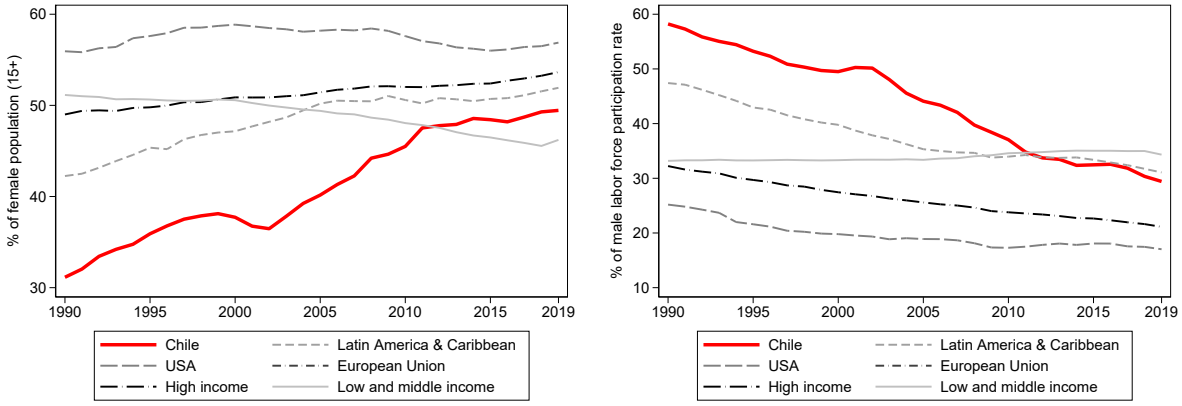
Notes: Distribution of treated fathers and mothers in our sample by type of cancer. Percentages over total treatment sample by gender of parent.

TABLE A2. Distribution of Residents in Public Long-Term Care Centers by Type of Disease

Disease	Percentage
Mental and Behavioral Disorders	69.7%
Circulatory System	65.2%
Musculoskeletal System	32.3%
Nervous System	29.5%
Endocrine, Nutritional, and Metabolic Disorders	25.2%
Eye	46.7%
Ear	43.7%
Congenital Malformations and Deformities	16.3%
Respiratory System	21.7%
Genitourinary System	11.4%
Injuries, Poisonings, Other External Causes	6.7%
Tumors	3.7%
Total	465

Notes: Percentage of residents in public long-term care centers by disease. Percentages add to over 100% as residents can have multiple diseases. The sample includes residents from 11 long-term centers. Source: "Living Conditions of Elderly Individuals within SENAMA's Long-Term Care Facilities" (2017), SENAMA (National Service for the Elderly).

FIGURE A1. Trends in Labor Force Participation (LFP) in Selected Countries and Regions (Population 15 Years and Over)

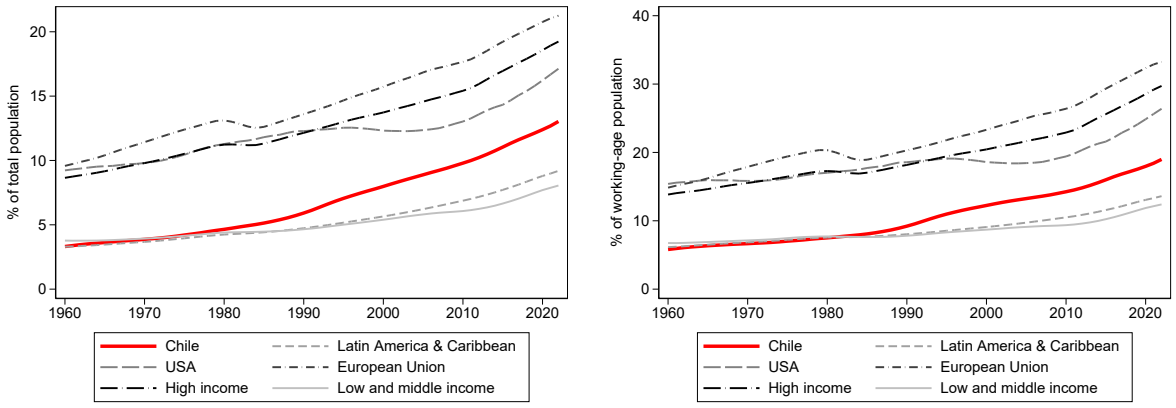


(a) Female LFP

(b) Gender Gap in LFP

Note: Panel (a) shows the female labor force participation (as percentage of total female population). Panel (b) shows the gender gap in labor force participation rate (as percentage of the male labor force participation rate). Population aged 15 years and older. Source: World Development Indicators, World Bank.

FIGURE A2. Trends in Population Aging in Selected Countries and Regions

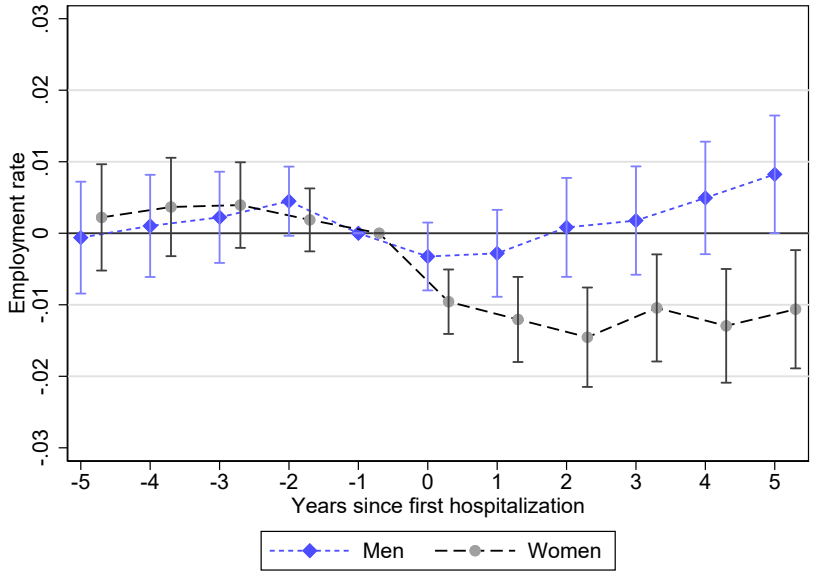


(a) Population Aged 65 and Older

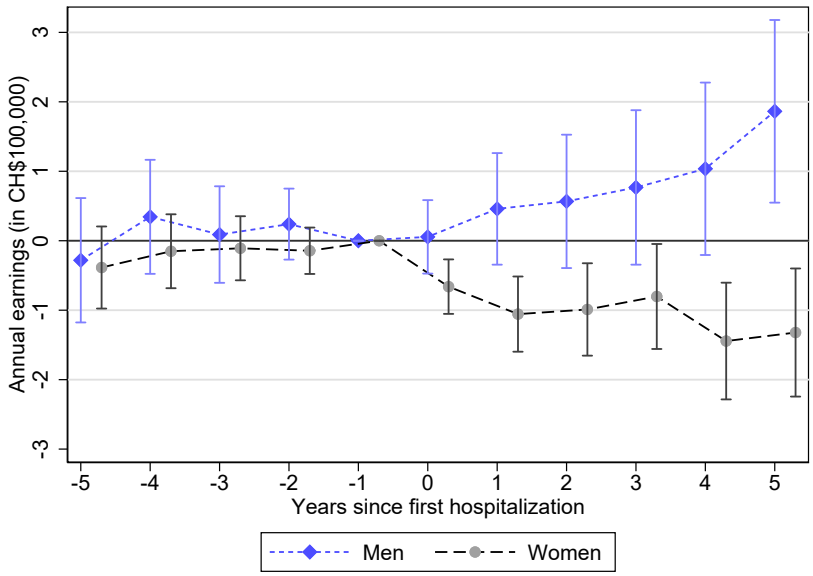
(b) Dependency Ratio

Note: Panel (a) shows the population aged 65 or older as percentage of total population. Panel (b) shows the dependency ratio, which is defined as the population aged 65 or older as percentage of working-age population (15-64 years old). Source: World Development Indicators, World Bank.

FIGURE A3. Effect of a Parental Cancer Diagnosis on Adult Children's Labor Market Outcomes (Estimates in Levels)



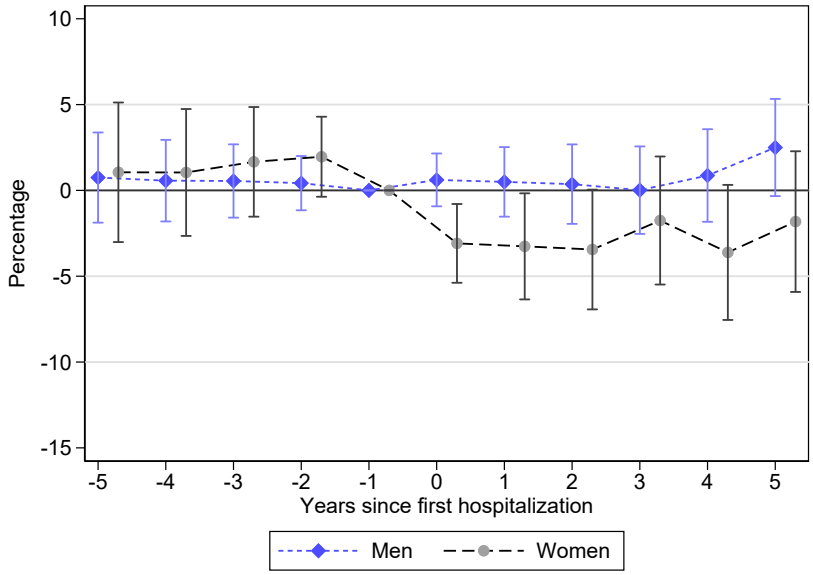
(a) Employment rate



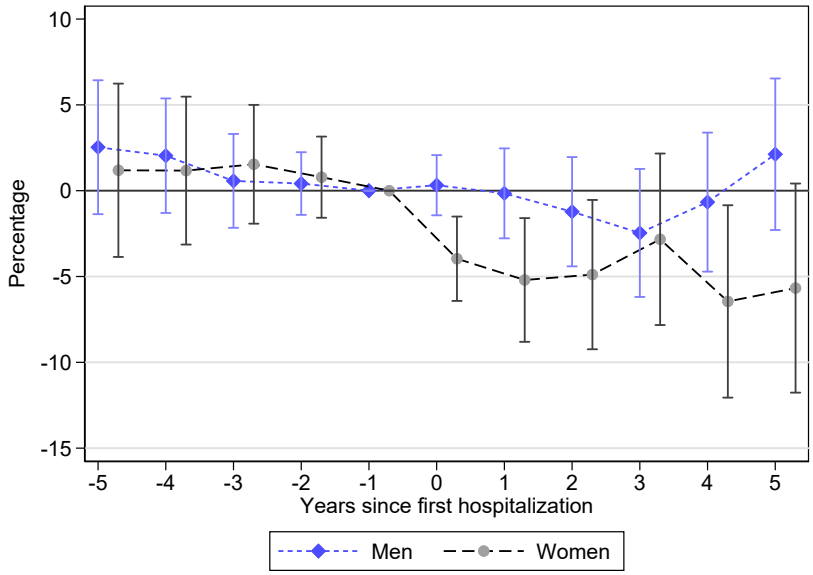
(b) Annual earnings

Note: Estimates from equation 1. Outcomes are labor market outcomes for children. Estimates are in levels. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. Chilean pesos exchange rate. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

FIGURE A4. Effect of a Parental Cancer Shock on Adult Children's Labor Market Outcomes (Alternative Control Sample)



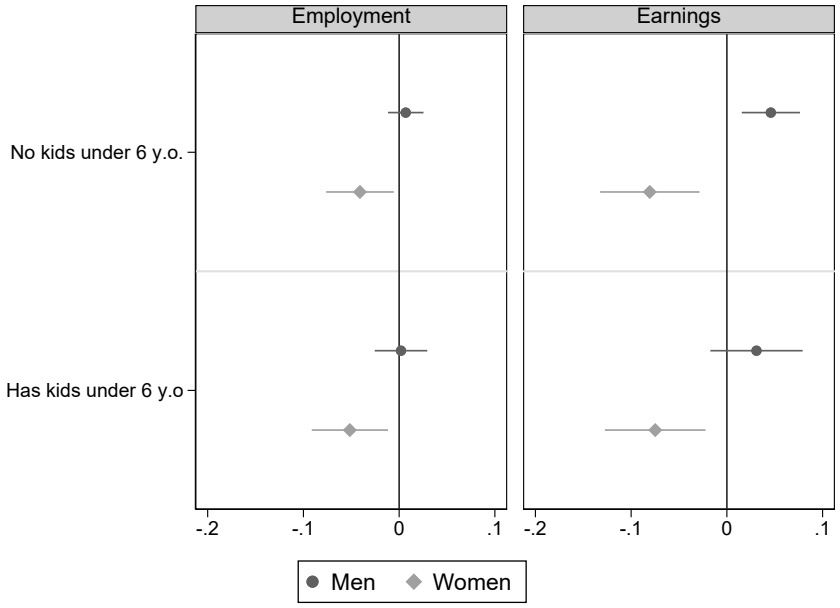
(a) Employment Rate



(b) Annual Earnings

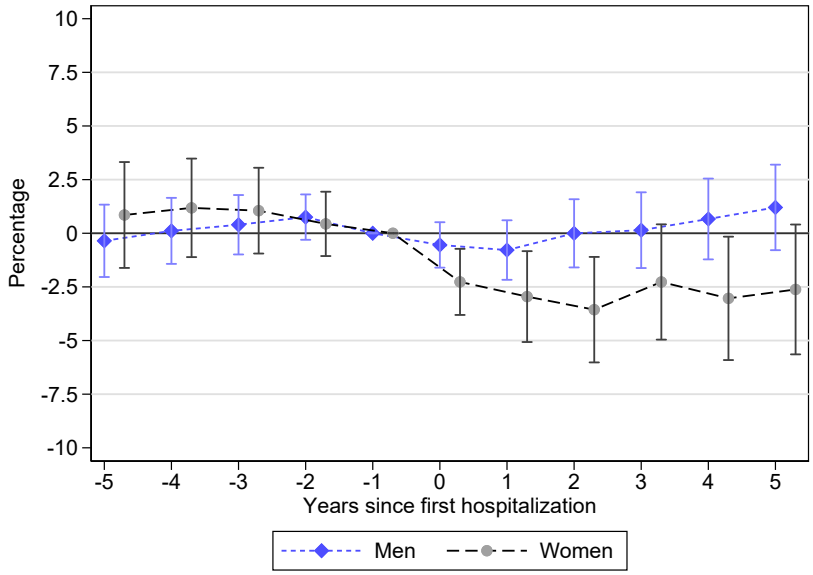
Note: Estimates from equation 1, with stacks defined only by year of cancer shock as explained in section 6, paragraph 6. Control sample are not-yet-treated units. Outcomes are labor market outcomes for children. Estimates correspond to P_t^m for men and P_t^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

FIGURE A5. Effect of a Parental Cancer Shock by the Number of Children Aged 0-6 Years

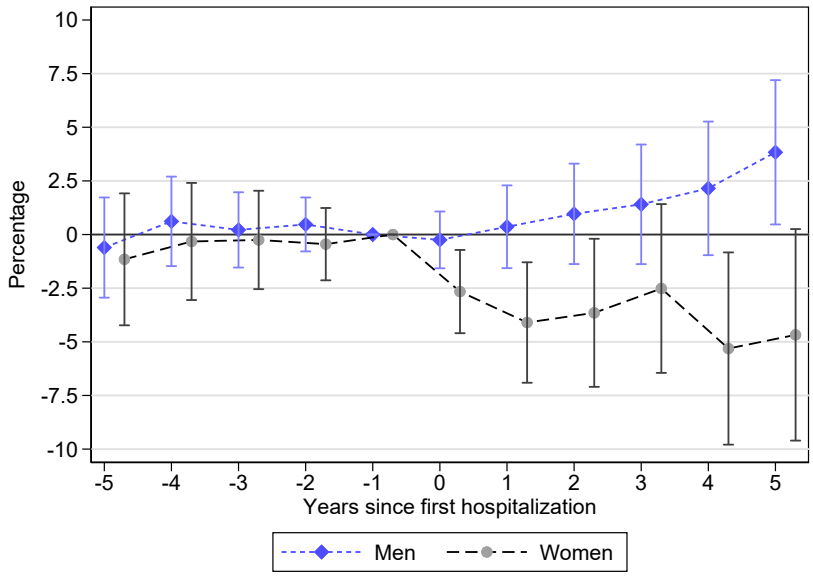


Note: Estimates from equation 2. Outcomes are labor market outcomes for children. Estimates correspond to P^m for men and P^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

FIGURE A6. Effect of Parental Cancer Shock on Children's Labor Market Outcomes (No Weights)



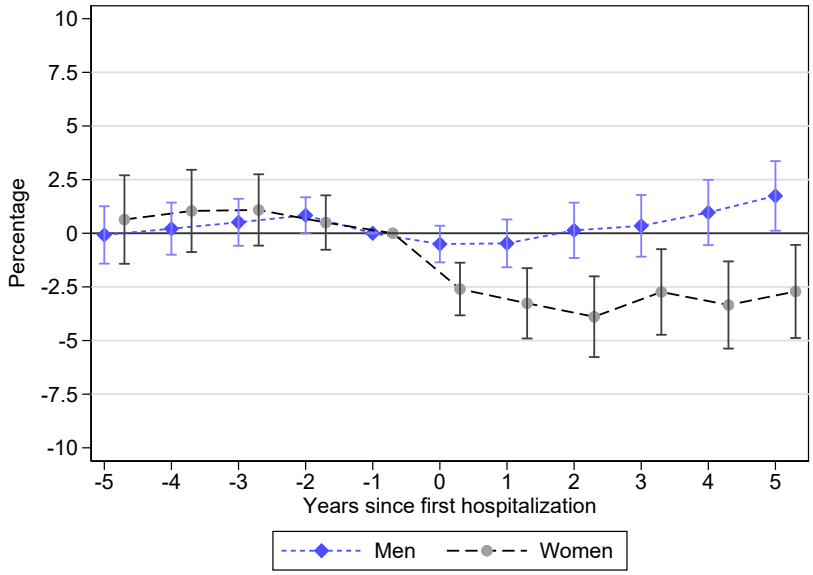
(a) Employment



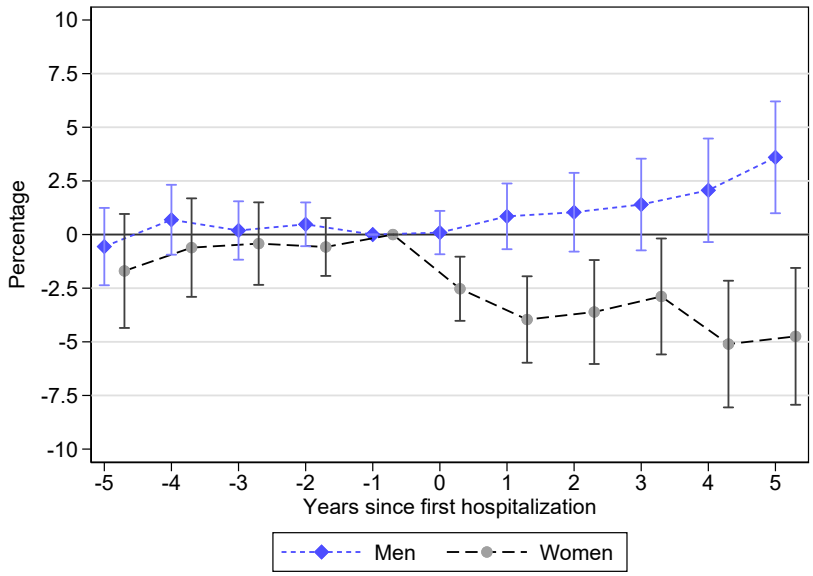
(b) Earnings

Note: Estimates from equation 1. Outcomes are labor market outcomes for children. Estimates correspond to P_t^m for men and P_t^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. All regressions control non-parametrically for age. Clustered standard errors at the family level. 95% confidence intervals.

FIGURE A7. Effect of Parental Cancer Shock on Children's Labor Market Outcomes (No Controls)



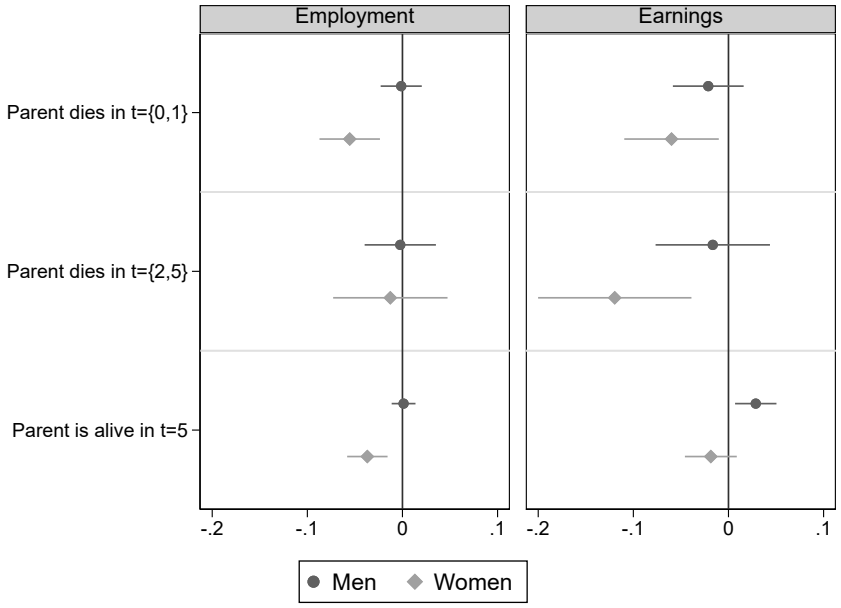
(a) Employment



(b) Earnings

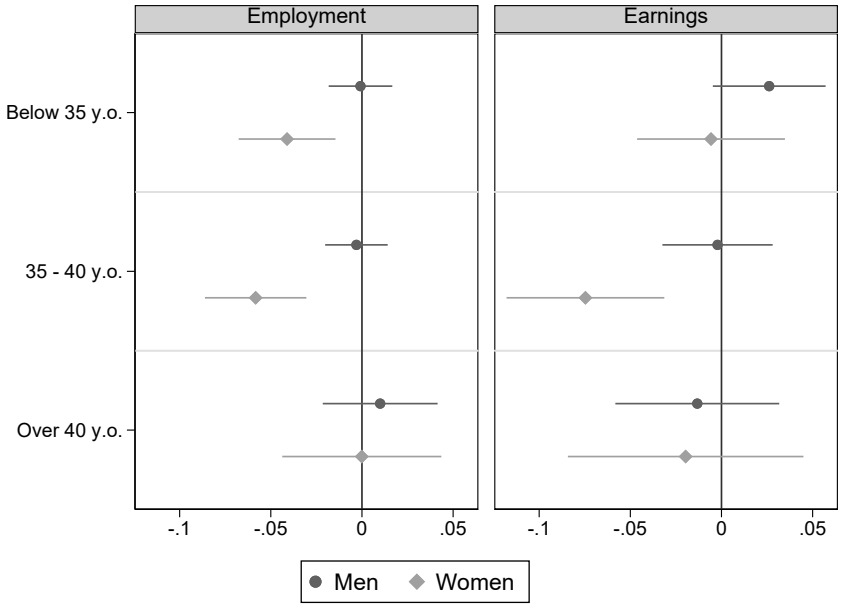
Note: Estimates from equation 1. Outcomes are labor market outcomes for children. Estimates correspond to P_t^m for men and P_t^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

FIGURE A8. Effects of a Parental Cancer Shock by Timing of Parental Death



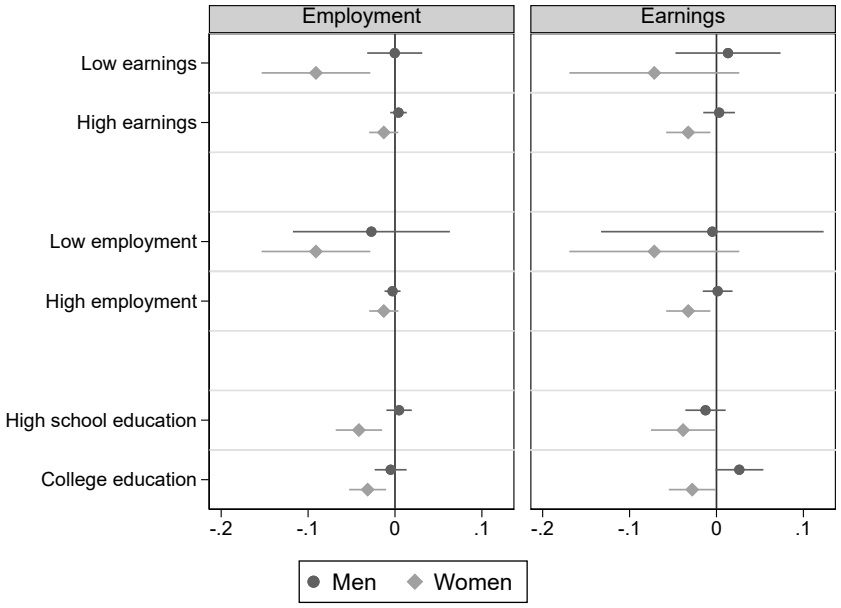
Note: Estimates from equation 2. Outcomes are labor market outcomes for children. Estimates correspond to P^m for men and P^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

FIGURE A9. Effects of a Parental Cancer Diagnosis by Age



Note: Estimates from equation 2. Outcomes are labor market outcomes for children. Estimates correspond to P^m for men and P^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.

FIGURE A10. Effects of a Parental Cancer Diagnosis by Socioeconomic Status



Note: Estimates from equation 2. Outcomes are labor market outcomes for children. Estimates correspond to P^m for men and P^w for women as defined in Section 3. Employment rate is defined as the average monthly employment rate for each year. Annual earnings are defined as total monthly earnings (including 0s) for each year. All regressions control non-parametrically for age. Control units are weighted by N_T/N_C, where N_T and N_C are the number of treated units and control units within stack. Clustered standard errors at the family level. 95% confidence intervals.