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WORKING PAPER NO. 704

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March 2024

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ISSN: 2240-9696

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Ester Lazzari* **and Valeria Zurla†**

Abstract

Previous research has highlighted the positive impact of parents on their adult children's fertility plans through childcare, but the association between parental health and fertility expectations remains unclear. Thus, this paper offers a novel perspective on the issue of family support by investigating how caregiving responsibilities towards elderly parents affect adult children's decision to have a child. Using a long panel dataset for Australia, we examine whether adult children changed their fertility expectations after becoming care providers to their parents. To address issues of unobserved heterogeneity and selection into parenthood and caregiving, we employ generalized difference-in-differences models. Results show a 6% decrease in fertility expectations within two years of becoming a parental caregiver, with a stronger effect over time, consistent across genders and more pronounced for respondents with one child. These findings suggest that interventions aimed at reducing the caregiver burden could provide an opportunity to positively influence fertility levels.

JEL Classification: J13, J14, J16, J18.

Keywords: fertility expectations, parental caregiving, intergenerational relations.

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Introduction

The physical and emotional demands of caregiving can be substantial. This impact extends not only to the elderly person in need of care but also to their adult children, who often step in to provide care and support. Parental caregiving can be emotionally overwhelming and stressful, particularly if it requires a significant time commitment or if the parent has a serious health condition (Fortinsky et al. 2007; Schulz et al. 2020). Although parental caregiving can be fulfilling for many, it also entails significant financial, social, and psychological costs and it can be detrimental for individuals' overall wellbeing (Al-Janabi et al. 2019; Van Houtven et al. 2019; Labbas and Stanfors 2023). Therefore, parental caregiving may have far-reaching consequences on a number of life choices and expectations about the future, including the fertility plans of adult children, who may face difficult choices and trade-offs between caring for their aging parents and starting a family of their own. Against this background, this study aims to investigate whether and how parental caregiving responsibilities affect the fertility preferences of adult children.

The prevalence of chronic health conditions increases with age. Hence, caregiving responsibilities towards aging parents can become an increasingly relevant barrier to forming a family as adult children move through the life course and may especially hinder the fulfillment of fertility plans for those who have postponed having children. Additionally, the added stress of being a caregiver may arise unexpectedly, such as in the case of a sudden deterioration in parental health. Fertility plans may be difficult to readjust in response to such unexpected shifts, potentially resulting in a long-lasting impact on an individual's ability to form a family. This effect may be especially pronounced for those who have delayed parenthood and have less time left to make this life transition. This issue is further compounded by the significant ongoing delay in fertility observed since the 1970s (Beaujouan 2020; Prioux 2005). As a result, caregiving responsibilities may eventually have a real impact on childbearing recuperation and fertility levels in countries where fertility has been postponed.

Theoretically, a deterioration in parental health may negatively impact the childbearing plans of adult children in two ways. First, through the time and energy devoted to caregiving, leaving fewer resources for other activities such as starting a family; and second, by disrupting the provision of informal childcare. In Western high-income countries, there is a substantial involvement of grandparents in childcare, with most countries seeing more than half of grandparents actively contributing to the care of their grandchildren (Baxter 2022; Glaser, Di Gessa, and Tinker 2014). Providing this type of assistance could prove challenging as they experience declining health, resulting in their adult children having to depend more on paid childcare services instead of the support provided by grandparents.

The literature so far has focused on the positive impact that grandparents have on the realised and intended fertility of their adult children through the provision of different forms of support, particularly childcare (i.e., Aassve et al. 2012a; Rutigliano 2020; Yoon 2017; Rutigliano 2020; Tanskanen and Danielsbacka 2021). Recently, Okun and Stecklov (2021) drew attention to the perspective of the adult child and demonstrated how parental loss, another key feature of the intergenerational relationship between parents and children, negatively impact the fertility of adult children in Israel. However, little attention has been given to the effects of parental care needs on reproductive outcomes and it remains unclear whether the declining health of elderly parents is related to the revision of the fertility expectations of their adult children later in life. This is despite the fact that it is a prominent feature of intergenerational linkages, and with a potentially increasing impact on fertility due to the changing demographics mentioned above. Hence, this paper offers a novel perspective on the issue of family support, with the adult children being the providers, rather than the recipients, of support.

We use a long panel of survey data representative of the entire adult Australian population from 2001-2021 and examine whether prospective parents changed their fertility expectations after becoming care providers to their parents. To address issues of unobserved heterogeneity and selection into parenthood and caregiving, we employ a generalized difference-in-differences (DID) model. This approach allows us to compare the changes in fertility expectations before and after the event of becoming a caregiver, and then compare these changes to those of control individuals that did not become caregivers. The results provide important information about the relationship between parental health and childbearing intentions and contribute to a deeper understanding of the complex multigenerational processes influencing individuals' fertility expectations.

Parental influence on adult children's fertility choices

Demographic changes are altering the life course context in which individuals become parents. Because of childbearing postponement, the transition into the grandparent role has been delayed across cohorts (Leopold and Skopek 2015; Margolis 2016). Since health deteriorates with age, an increasing share of prospective grandparents may thus be in need of care rather than able to provide care by the time their children start planning to have a child of their own. Despite the increase in the number of potential helpers (Perry and Daly 2017), grandparents remain the most common providers of childcare (Baxter 2022; Sear and Coall 2011), which suggests that an alteration in the flow of support from grandparents can have important implications for fertility expectations. In this section we detail the pathways through which caregiving responsibilities towards parents may affect the fertility expectations of their adult children.

First, recent research has examined how in low-fertility settings grandparents have the potential to influence decisions regarding the family size of their adult children through intergenerational transfers. This is based on the idea that grandparents provide different types of support, including emotional, financial, and time-based resources, which can mitigate the perceived costs of parenthood (Aassve et al. 2012a; Harknett et al. 2014; Rutigliano 2020). Consequently, these forms of assistance can positively affect an individual's decisions regarding having children and ultimately lead to higher fertility rates.

Several studies have presented empirical evidence that grandparental support leads to higher childbearing intentions among adult children (Rutigliano and Lozano 2022; Tanskanen and Danielsbacka 2021; Tanskanen and Rotkirch 2014) and facilitates the transition into parenthood (Rutigliano 2020). Additionally, research has shown that parental support increases the likelihood of having a second or higher order birth (Aassve et al. 2012b; Rutigliano 2020; Yoon 2017). Our study relates to this body of literature because it recognizes the value of intergenerational linkages that tie grandparents to the fertility choices of their adult children. In particular, we posit that grandparents who are unwell or have health issues will be less able to provide childcare, and hence may cause a decline in the fertility expectations of their adult children through the loss of this important potential source of support. In their estimation of the impact of parental death on the fertility of adult children, Okun and Stecklov (2021) bolster the idea that a loss of grandparental childcare services due to grandparental death may indeed influence a downward revision of fertility expectations. Clearly, market-based or government-funded childcare options can also allow families to delegate some of their childcare responsibilities to others (Di Gessa et al. 2016). However, grandparental childcare is often viewed as the 'best' form of childcare there is (Wheelock and Jones 2002), as it is a more reliable and cost-effective alternative, and it plays a more important role in mitigating parenting stress for both mothers and fathers than any other form of childcare (Craig and Churchill 2018).

Second, adult children who are responsible for caring for their elderly parents or parents-in-law may face challenges in balancing their caregiving responsibilities with having children of their own due to a lack of time, energy, or other resources. For instance, they may experience a reduction in their labour force participation and earnings, especially in countries which do not provide sufficient opportunities to deal with adverse health events of family members (Frimmel et al. 2020; Hammer and Neal 2008; Løken et al. 2017; Reelstab et al. 2020; Vangen 2021). Caring for older parents can also be emotionally demanding and have implications on mental health and wellbeing (Fortinsky et al. 2007; Hammer and Neal 2008; Schulz et al. 2020), which may also impact on fertility expectations (Lawley et al. 2022). As parental health declines, adult children may anticipate the risk of being

'sandwiched' between the needs of their future children and their parents (Hammer and Neal 2008; Perrig-Chiello and Hopflinger 2005). This new source of uncertainty can lead to a decrease in perceived behavioural control, which may negatively affect their attitudes and intentions towards having children (Ajzen 1991).

The empirical literature reviewed above indicates that an increase in caregiving responsibilities towards elderly parents may be associated with a decreased expectation for having children due to both a lack of childcare and resources available to raise children. Aside from these material resources, psychological sentiments may also play a role. Specifically, providing care for ageing parents may increase the value that adult children place on family and intergenerational relationships. As a result, they may feel a stronger desire to have children of their own or may perceive a need to accelerate fertility, both as a way of continuing the family lineage and ensuring that their parents can witness the birth of their grandchild. This theoretical argument is consistent with empirical research suggesting that caregiving can lead to positive outcomes for the caregiver, including increased feelings of purpose and meaning in life (Cohen et al. 2002; Mendez-Luck et al. 2008). It is also consistent with the finding that familial death can prompt changes in psychological understandings in a way that positively influences fertility plans (Rackin and Gibson-Davis 2022). Hence, the effect of a decline in parental health on the fertility expectations of their children is theoretically unclear and requires empirical investigation.

Research context

In Australia, the childcare system is mainly market-driven and receives government fundings through the Child Care Subsidy (Gray et al., 2022). Despite this support, the costs of childcare remain relatively high compared to other wealthy societies. For example, a family with two children, where both parents work full-time, spends around 26% of their average earnings on childcare, whereas the OECD average is 17% (OECD 2019). At the same time, a strong social expectation to re-enter the workforce after childbirth has been documented. For instance, findings from a national survey of Australian women indicate that when asked about future aspirations in their early 20s, only 5% of women aspired to work unpaid at home (Johnstone & Lee, 2009). Despite this situation, the employment rate for Australian women aged 15-64 with at least one child under the age of 15 is 69%, which is below the OECD average and lower than comparable countries like the United Kingdom and New Zealand (OECD, 2019).

Considering the challenging landscape of childcare costs and the societal emphasis on women re-joining the workforce, it becomes evident that informal care plays a key role in facilitating the balance between work and family life for Australian women. Historically and to this day, informal care has been primarily provided by

grandparents and it plays a key role in Australia's childcare landscape (Baxter, 2013), with almost two-thirds of Australian grandparents providing some form of childcare (Baxter 2022).

Australia exhibits one of the highest life expectancies in the world (GBD 2017 Mortality Collaborators 2018). A remarkable and sustained decline in mortality rates among individuals aged 50 to 90 has been observed since the mid-1990s, while the disparity in life expectancy between genders has narrowed (Booth et al. 2016). These trends align with the fourth stage of the epidemiologic transition, characterized by delayed onset of degenerative diseases (Booth et al. 2016). Australia's aging population is hence expected to grow substantially in the coming decades, with projections indicating that the proportion of individuals aged 65 or older will reach 21-23% of the total population by 2066 (Australian Institute of Health and Welfare (AIHW) 2021a). As life expectancy continues to increase, the demand for unpaid family caregivers for the elderly is also on the rise. According to the Australian Bureau of Statistics (ABS) (2016), these caregivers are typically family members and are more likely to be women. Adult children often take on the role of caregiving for their parents due to a sense of emotional obligation and the belief that they can provide better care than anyone else (ABS 2016).

Recent estimates indicate that around 1 in 10 adults in Australia provide unpaid care to an aging or disabled family member (Australian Institute of Health and Welfare (AIHW) 2021b). The likelihood of needing to provide care for aging parents increases over the course of the reproductive life, as the prevalence of adverse parental health conditions tends to rise with age. In fact, the proportion of people aged 25 to 34 who receive public financial support for their caregiving tasks (i.e., Carer Allowance) is 9.9%, while this figure is almost double for those in the 35 to 44 age category (AIHW 2021c). Interestingly, 22% of reproductive-age men and women consider caring responsibilities (e.g., for those with a disability or elderly) to be a crucial factor in their decision about whether to have a child in the future (Gray et al., 2022).

Fertility postponement represents another major demographic shift in Australian demography (Lazzari 2021a). Recent statistics indicate that over the past few decades the mean age of mothers and fathers at childbirth has steadily increased to 31.7 and 33.7 years, respectively (ABS 2022). Typically, parenthood begins in the late 20s to early 30s and is followed by a period of intensive childbearing. This shift towards later childbearing has corresponded with a general decline in the completed family size of successive cohorts of women (Lazzari 2021b). Despite these trends, the social norm of having two children remains prevalent in Australia, with over 80% of women transitioning to a second child after the first (Gray and Lazzari 2023).

Data and Methods

Data

The analyses draw on data from the Household Income and Labour Dynamics in Australia (HILDA) Survey, a nationally representative panel study annually undertaken in Australia since 2001 through a combination of self-completion questionnaires and face-to-face interviews (Wooden and Watson 2002). The HILDA dataset contains detailed information on a wide range of aspects of life, including desires and expectations to have children, and caregiving responsibilities towards the elderly.

Because HILDA started to collect data on caregivers only from wave 5, the first four waves of data are excluded from our analysis. In addition, we do not use data collected in waves 5, 8,11,15, and 19 because in these waves different filters are applied to determine who can answer questions related to childbearing desires and expectations. Our final sample totalled 1,559 individuals of reproductive age (18-49).

Dependent and independent variables

Our analysis focuses on expected fertility, which refers to the number of children people anticipate having, as opposed to their intended or desired family size. While fertility desires represent an individual's ideal family size unconstrained by circumstances, intentions consider the practical constraints individual face in achieving their reproductive goals (Miller and Pasta 1993, 1995). Expectations, on the other hand, are a theoretically different concept, despite being empirically very similar to intentions (Morgan 2011), as they also take into account external constraints that are beyond an individual's control (Iacovou and Tavares 2023).

We measure fertility expectations, the dependent variable, using responses to the question: "How likely are you to have more children in the future?", which ranges from 0 (Very unlikely) to 10 (Very likely). For our regression analyses, we treat this variable as continuous.

The main exposure variable of interest is the respondent caregiver's status. Caregivers are identified within the HILDA survey by asking respondents if they provide ongoing care or help with activities of daily living to a family member who has a long-term health condition, is elderly, or has a disability. Our analysis focuses specifically on individuals who provide informal care to a parent or parent-in-law.

To examine the effect of caregiving on fertility expectations, we focus on cases where the need for parental care arises at a time when respondents have an expectation of having a child in the future. Specifically, we restrict the sample to individuals who, prior to becoming caregivers, expressed an interest in having children (i.e., provided a score of 4 or higher on the fertility expectations scale). By doing so, we ensure that the analysis includes only individuals with an actual interest in having children. These are childless individuals wishing to

become parents or parents with one or more children wishing to have another child. For this subset, caregiving responsibilities could disrupt their fertility expectations compared to those who do not anticipate having a child, and hence have repercussions on fertility outcomes.

A vast body of literature has used HILDA to investigate different features of childbearing goals among Australian men and women, highlighting influence of factors such as age, relationship status, employment conditions, parity, and health status (Beaujouan et al. 2019; Gray et al. 2013; Lazzari et al. 2023; Testa and Bolano 2021). Therefore, in our analyses, we include the following time-variant variables as controls: marital status (married, cohabiting, single), employment status (employed, unemployed, outside the labour force), age, and number of children ever born.

Table 1 presents summary statistics for all variables analysed in this study. The average age of the adult children included in the sample was 29.6 years, with a majority being childless (62%) and slightly over half married or cohabiting with a partner. Of the total sample, 68% were employed, 9% were unemployed, and the remaining 23% were outside the labour force. One year after becoming parental caregivers, respondents reported lower fertility expectations compared to one year prior to the becoming parental caregivers. Specifically, we observe an average decline of 0.8 in the fertility expectation score, which decreased from 7.8 to 7.0. In comparison to parents, childless adult children were, on average, 3.1 years younger, less likely to be in a union, and more likely to be employed. One year after becoming parental caregivers, childless respondents experienced a decline in the fertility expectation score of 0.7, whereas parents experienced a decline of 1.1. Figure 1 illustrates how the demands of caring for ageing parents increase with age, with the percentage of adult children providing parental care gradually rising over the course of the reproductive life, from 1.1% at age 18-24 to 5.8% at age 45-49.

Empirical strategy

This paper aims to identify the causal impact of parental caregiving on fertility expectations. A naïve correlational analysis of parental caregiving and fertility expectations will likely be plagued by endogeneity and selection concerns. For example, individuals who become parental caregivers may be inherently different from individuals who do not, and therefore, comparing individuals who are parental caregivers to individuals who are not would provide estimates that cannot credibly be given a causal interpretation. Along the same lines, comparing fertility expectations of individuals who become caregivers before and after they become caregivers would also not

provide credible causal estimates, as, for example, fertility expectations tend to decline with age (Gray et al. 2013), regardless of whether individuals become parental caregivers.

The ideal experiment for identifying the short- and medium-run effects of parental caregiving on fertility expectations would randomly assign parental caregiving duties to individuals and track the evolution of their fertility expectations over time. To perform this ideal experiment, we would need to compare ex-post fertility expectations responses of affected individuals to a counterfactual behaviour of similar unaffected individuals. The access to a long panel of Australian survey data allows us to use a quasi-experimental research design to mimic this ideal experiment by taking advantage of the potential randomness of the timing when individuals become caregivers for their parents.

More in detail, we rely on a generalized difference-in-differences design, which compares trends over time for individuals who become parental caregivers at a certain point in our sample period to trends among contemporaneous "control" individuals who are observably similar but become parental caregivers shortly after. By doing so, we can draw stronger causal inferences regarding the relationship between parental caregiving and fertility expectations.

It is important to note that the generalized difference-in-differences design, unlike a standard difference-in-differences design where all individuals in the treatment group are "treated" (i.e., become parental caregivers) at the same time (as in Lazzari et al. 2023), allows for the more general case where different individuals are treated at different times ("differential timing" or "staggered" design, see Roth et al. 2023 for details).

As a baseline specification, we therefore estimate the following staggered two-way fixed effect (TWFE) model, widely employed in the economics literature (Angrist and Krueger 1999; Blundell and MaCurdy 1999):

Equation 1

$$y_{iat} = \alpha_i + \delta_{at} + \sum_{l=b}^{c} \beta_l D_{it}^{l} + X_{it}'\gamma + \varepsilon_{iat}$$

where y_{iat} denote the childbearing intentions of individual i at time t, α_i are individual-level fixed effects and δ_{at} are age-by-calendar time fixed effects, which capture common shocks to childbearing intentions by age and calendar time. Time-varying characteristics such as employment status, relationship status, and parity are captured by X_{it}. Standard errors are clustered at the individual level. In all our event-study specifications, we normalize $\beta_{-1} = 0$ and set $b = -5$ and $c = 5$.

The event study indicators D_{it}^{l} are our treatment of interest, as they capture time from becoming a parental caregiver. Specifically, letting t_i^* denote the time at which individual i, becomes a caregiver, we have that $D_{it}^{l} = 1\{t = t_i^* + l\}$. The coefficients β_l for $l \geq 0$ capture the effect of becoming a caregiver on childbearing intentions. Identification of β_l hinges, first, on the assumption that individuals who have not become parental caregivers yet form a useful counterfactual for individuals who currently are parental caregivers. In other words, the assumption states that, absent the caregiving event, the outcomes of the treatment and control groups would have evolved parallelly.

This parallel-trend assumption can be assessed visually by evaluating the coefficients β_l for $l < 0$ in Figure 2. If these coefficients are significantly different from zero, it would indicate that we cannot distinguish between the true effect of becoming parental caregivers and prior unobserved dynamics. Reassuringly, we observe that the coefficients for $l < 0$ are not significant and close to zero, providing supporting evidence to the plausibility of the parallel trends assumption. Moreover, this result provides evidence of the suitability of our control group as counterfactual of the treatment group, suggesting that our method performs well even without using matching estimators, which might generate less precise estimates.

The second identification assumption of the model is that average treatment effects are homogeneous across treated individuals and over time. Assuming these assumptions hold, the coefficients of interest β_l for $l \geq 0$ identify the average treatment effect on the treated of parental caregiving on fertility expectations.

Under the assumptions above, the TWFE model allows us to rule out concerns that could otherwise limit our ability to interpret the estimates as causal. First, we can rule out that the results are driven by time-invariant differences in fertility expectations across individuals by including individual fixed effects. Second, we can rule out that our results are driven by fertility expectations evolving over time in a way that is common across all individuals. For example, the fact that, over time, the individuals in our panel are getting older might influence all individuals' fertility expectations similarly. Age-by-calendar time fixed effects allow us to rule out such concerns.

Although TWFE regressions like equation (1) are commonly used for differential timing research designs, it has been shown that they deliver consistent estimates only under relatively strong assumptions about homogeneity in treatment effects (De Chaisemartin and d'Haultfoeuille 2020; Borusyak, Jaravel, and Spiess 2021; Callaway and Sant'Anna 2021; Goodman-Bacon 2021; Sun and Abraham 2021). Specifically, if treatment effects are homogeneous across treated groups and across time, the TWFE estimator is consistent for the average treatment effect. Conversely, if treatment effects are heterogeneous across groups or time, the TWFE estimator does not deliver consistent estimates for the average treatment effect.

While our preferred specification does not include never-treated units (i.e., individuals who never become parental caregivers in our sample period), we address concerns about the reliability of TWFE estimator first by replicating our results including never-treated units in our estimation sample (Table S1 in Appendix). Second, we check the robustness of our estimates using the robust estimator introduced by Callaway and Sant'Anna (2021) (Figure S1 in Appendix). By shutting down the 2 × 2 difference-in-differences comparisons between newly treated and already treated units, the robust estimator delivers consistent estimates even in the presence of heterogeneous treatment effects across time and/or treated units.

Results

Figure 2 displays point estimates and their 95% confidence intervals obtained by fitting equation (1). The x-axis reports the "event time", as defined in the previous section, and captures the relative time from becoming a parental caregiver. The dashed grey line indicates where we would expect our coefficients to be if the effect of becoming a parental caregiver on fertility expectations was zero. The figure illustrates that in the immediate years after becoming a caregiver, individuals' expectations about having children significantly decrease. The reduction in the fertility expectations score ranges from 0.5 to 1.5 per year. This effect intensifies over time, with an increased likelihood of not expecting to have children three years after the caregiving event. It is also important to note that the event-study coefficients are relatively flat and close to zero in the years prior to becoming a caregiver, providing suggestive evidence in favor of the parallel-trend assumption and, hence, credibility to our identification strategy.

Table 2 presents the regression results using equation (1) stepwise. To investigate heterogeneity in the timing of the effect of parental caregiving on fertility expectations, we present both the short-run effect (year 1 and 2 after the caregiving event) and the medium-run effect (from year 3 onwards), following the characterization in Fadlon and Nielsen (2021). In the fully adjusted model (column 4), becoming a caregiver has an estimated negative impact on fertility expectations of 5.9 percentage points in the short-run, while a greater reduction of 16.3 percentage points is estimated in the medium-run. While a downward revision of fertility expectations with age is natural, the TWFE strategy implies that the drop in fertility expectations would have been less deep in the absence of the caregiving event. This estimated effect did not significantly vary by gender (Table S2 in Appendix).

In order to examine the potential variations in the impact of parental caregiving on fertility expectations, we conducted an analysis stratified by parity, as presented in Table 3. Our findings indicate that the negative effect

of caregiving on fertility expectations does not exhibit a significant difference between parents and childless respondents in the first two periods following the event. However, after three years from the caregiving event, we observe a significantly more pronounced decline in fertility expectations among parents who have one child.

Robustness checks

We perform three additional robustness checks. First, we include never-treated observations in the estimation of specification (1). Including never-treated units can be important as recent papers (Goodman-Bacon 2021) have warned against the identification of average treatment effects from two-way fixed effects models in the presence of heterogeneity of treatment effects. Including never treated units in the analysis permits us to identify the event-study coefficients in equation (1) by confronting treated individuals to not-yet-treated and never-treated individuals. Results are reported in Table S1 in Appendix. Including never-treated individuals does not substantially change our results. In particular, the effect on childbearing intentions in the medium run (from period three onward after the event) remains negative and statistically significant.

Secondly, as explained above, we also replicate our results using the estimator proposed by Callaway and Sant'Anna (2021) that is robust to treatment effect heterogeneity. The results are reported in Figure S1, which shows that, independently of the estimator used, the coefficients before the caregiving event are close to zero and exhibit no discernible pre-trends. Moreover, independent of the estimator used, parental caregiving negatively and significantly impact fertility expectations.

Third, we re-run specification (1) including a control for individual health status. Controlling for health status can be important since previous research has shown that individuals adjust their childbearing desires and expectations in response to changes in their health conditions (Gray et al. 2013). Table S3 in Appendix shows that our main results are robust to including health status as a control. Becoming a parental caregiver has a negative impact on fertility expectations both in the short and medium run. However, after controlling for health, the short-run coefficient is no longer statistically significant. In the medium run, we still find a negative and significant effect of parental caregiving on fertility intentions. Both coefficients are of similar magnitude to our preferred specification (column 4 of Table 1).

Discussion

The postponement of childbearing to later stages of life has brought about a shift in the life course context within which individuals plan parenthood. Consequently, it is essential to identify new factors within this context that

may influence decisions about having children, factors that were less relevant in the past when the parenthood project was achieved at younger ages. One such factor is the increasing demand for caring from ageing parents, which has prompted our study to examine whether and how parental caregiving responsibilities impact the fertility plans of adult children.

Our study demonstrates that becoming a caregiver to elderly parents or parents-in-law results in an immediate and substantial decline in the fertility expectations of adult children. Furthermore, this effect intensifies over time, with an average reduction of approximately 6% in fertility expectations observed within the first two years of becoming a caregiver, and a deeper reduction of over 16% observed three years after the caregiving responsibility began.

Although women typically bear most of the burden of caring for both children and the elderly (ABS 2016; Labbas and Stanfors 2023), our study did not find any significant gender differences in the impact of caregiving responsibilities on fertility expectations. One possible explanation for this pattern is that the deterioration in the health of an elderly parent can disrupt relationship dynamics within the family. For example, if one partner assumes the role of primary caregiver, their reduced availability in terms of time and energy may impact the spouse, resulting in a spillover effect that impacts both partners equally. The absence of gender effects also suggests the potential relevance of the loss of grandparental support as a relevant factor in the decline of fertility expectations upon assuming caregiving responsibilities. Indeed, while the loss of childcare responsibilities has a clear impact on both partners, the burden of caregiving tends to disproportionately fall upon women.

Additionally, we observed that the negative impact of caregiving on fertility expectations is more pronounced among parents who have only one child three years after the caregiving event. This could be attributed to the fact that parents with one child have a more concrete understanding of the demands and responsibilities associated with parenthood. Consequently, they may anticipate that the added caregiving responsibilities will significantly disrupt their existing plans, leading to a greater decline in their fertility expectations compared to childless individuals. Another explanation for this pattern is that parents with one child may have a clearer timeline in mind for when they intend to have their next child. Typically, the length of interval between first and second births is between two to four years (Köppen 2006). If caregiving responsibilities cause them to miss this opportune window, a close spacing of first and second birth is no longer possible and the likelihood of making the transition to parenthood again at a later age diminishes.

In addition to our empirical findings, we also provide a theoretical contribution by emphasizing how the changing demographics of prospective grandparents may impact reproductive choices among individuals of

childbearing age. The findings of this study contribute to a deeper understanding of how changing external circumstances can shape fertility expectations and underscore the importance of examining the role of family networks in this process. Specifically, our results highlight that while grandparents can provide an important source of support to their adult children in their own childbearing decisions (Aassve et al. 2012a; Harknett et al. 2014; Rutigliano 2020), on the other hand their need of support may compete with their children's plan to form a family. This phenomenon goes beyond the concept of the 'sandwich generation', which refers to adults who are simultaneously caring for young children and elderly parents (Hammer and Neal 2008; Perrig-Chiello and Hopflinger 2005). Instead, it highlights the trend and implications of individuals *planning* their childbearing around the pressing needs of their aging parents.

While our analyses reveal a negative effect of parental caregiving on fertility expectations, the underlying mechanisms driving this phenomenon are not fully understood. These effects may be attributed to the loss of parental support in the form of childcare or to a reduction in the time available for planning parenthood due to increased caregiving responsibilities for elderly parents. Our analysis does not allow us to differentiate between these two mechanisms or determine if the observed effect is the result of a combination of both factors. Nonetheless, our results strongly suggest that the negative impact of caregiving responsibilities on fertility expectations is more significant than any potential positive effect. In other words, it appears unlikely that among the adult children taking on the new caregiver role would experience an increased sense of urgency to have children as it has been observed in response to parental death (Rackin and Gibson-Davis 2022).

Our study examines how parental caregiving impacts the fertility expectations of adult children within a specific country. Therefore, the direct generalization of our findings to other settings with differing formal care policies, support measures for at-home elderly caregiving, and distinct childcare systems may be limited. For example, the research conducted by Labbas and Stanfors (2023) illustrates that the psychological well-being of caregivers can vary based on the extent of public elder care available in the country. Hence, it is possible that in contexts where there is greater public support for elder care, the negative influence of caregiving on fertility expectations would be less severe.

Conclusion

In the context of delayed childbearing and population ageing, understanding the impact of caregiving responsibilities towards the elderly on fertility expectations is of paramount importance. While previous literature already documents that caregiving responsibilities towards elderly parents or parents-in-law entails significant

financial, social, and psychological costs for the caregiver, we provide new evidence that they may also lead to a negative revision of fertility expectations among adult children. In addition, by considering the intergenerational exchange of support and the potentially competing demands on caregiving resources, this study provides a more nuanced understanding of how parents may influence the fertility trajectories of their adult children. These findings have important implications for policies aimed at supporting intended parents in their plans to have children. They highlight the significant impact that caregiving responsibilities towards one's parent can have on individuals' decisions to revise their childbearing plans and suggest that interventions aimed at reducing the caregiver burden could provide an opportunity to positively influence fertility levels.

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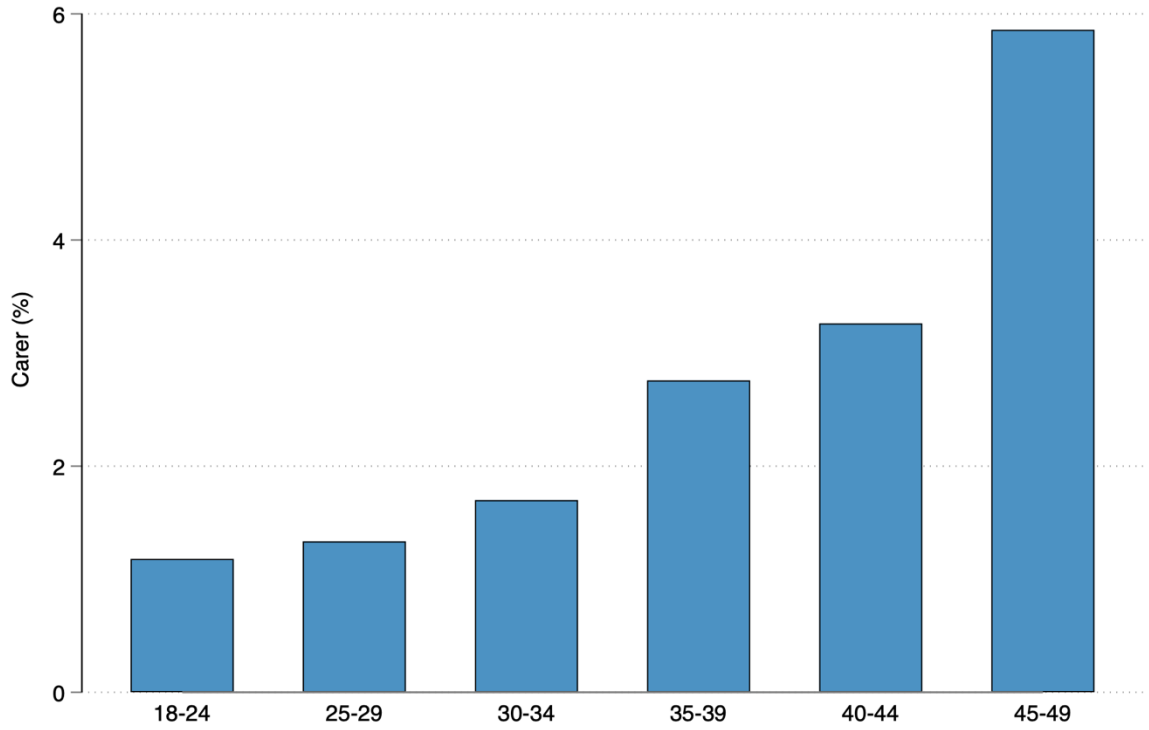
Tables and Figures

Figure 1. Informal carers of a parent or parent-in-law by age group (weighted)



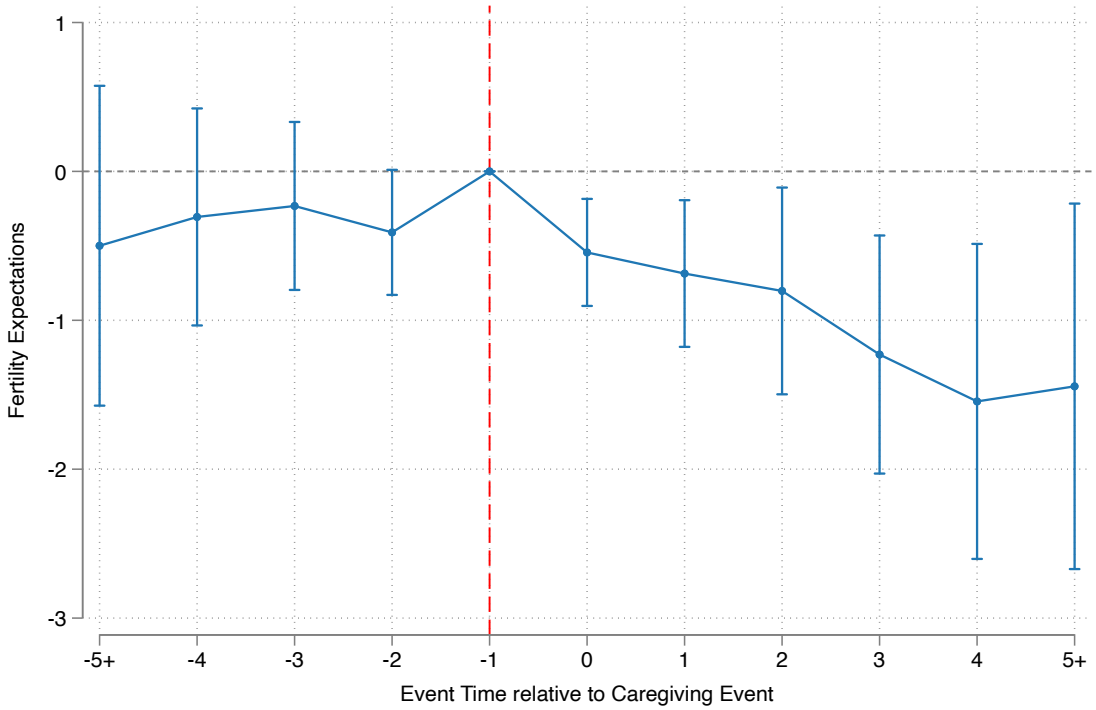
Note: Source: HILDA, waves 6-21, release 21

Table 1. Descriptive statistics of adult children's characteristics (pooled analytical sample)

	(1)		(2)		(3)	
	Whole Sample		**Childless**		**Parents**	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*
Age	29.58	7.33	28.56	7.17	31.68	7.24
Female	0.51	0.50	0.48	0.50	0.56	0.50
In a union	0.53	0.50	0.38	0.49	0.77	0.42
Employed	0.68	0.46	0.74	0.44	0.60	0.49
Unemployed	0.09	0.28	0.10	0.30	0.07	0.26
Out of LF	0.23	0.42	0.16	0.37	0.33	0.47
Fertility Expectations Before	7.79	1.97	7.85	1.92	7.67	2.07
Fertility Expectations After	6.96	2.81	7.17	2.63	6.57	3.07
N	2643		1645		995	

Note: Fertility Expectations Before refers to the average fertility expectations measured the year before the caregiving event. *Fertility Expectations After* refers to the average fertility expectations measured the year after the caregiving event. *Source*: HILDA, waves 6-21, release 21.

Figure 2. Effect of caregiving responsibilities on adult children's fertility expectations



Note: Coefficients and confidence intervals based on the linear fixed effects estimations of Model (1), with explanatory variables being: partnership status, employment, parity, survey year, and age. *Source*: HILDA, waves 6-21, release 21.

Table 2. Effect of caregiving responsibilities on adult children's fertility expectations

	(1) Childbearing Intentions	(2) Childbearing Intentions	(3) Childbearing Intentions	(4) Childbearing Intentions
treat*post SR	-0.366*	-0.379**	-0.484***	-0.460***
	(0.188)	(0.187)	(0.180)	(0.170)
treat*post MR	-1.354***	-1.479***	-1.351***	-1.267***
	(0.312)	(0.303)	(0.286)	(0.265)
Observations	2,643	2,643	2,640	2,640
R-squared	0.558	0.575	0.616	0.672
Ind. FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Age FE	NO	YES	YES	YES
Controls	NO	NO	YES	YES
Age-by-Year FE	NO	NO	NO	YES

Note: Standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. *treat*post SR* refers to the interaction between a dummy equal to one if the individual became a caregiver at any point in the sample period and a dummy equal to one for the two periods after the caregiving event. *treat*post MR* refers to the interaction between a dummy equal to one if the individual ever became a caregiver and a dummy equal to one after period three after the caregiving event. Controls include partnership status, employment, and parity. *Source*: HILDA, waves 6-21, release 21.

Table 3 Effect of caregiving responsibilities on adult children's fertility expectations: heterogeneity by parity

VARIABLES	(1) Childbearing Intentions
treat*post SR	-0.439**
	(0.186)
treat*post SR*Parity1	-0.0384
	(0.357)
treat*post SR*Parity2+	-0.135
	(0.467)
treat*post MR	-1.089***
	(0.302)
treat*post MR*Parity1	-0.759*
	(0.428)
treat*post MR*Parity2+	-0.0454
	(0.589)
Observations	2,640
R-squared	0.673
Ind. FE	YES
Year FE	YES
Age FE	YES
Controls	YES
Age-by-Year FE	YES

Note: Standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. *treat*post SR* refers to the interaction between a dummy equal to one if the individual became a caregiver at any point in the sample period and a dummy equal to one for the two periods after the caregiving event. *treat*post MR* refers to the interaction between a dummy equal one if the individual ever became a caregiver and a dummy equal to one after period three after the caregiving event. Controls include partnership status, employment, and parity. *Source*: HILDA, waves 6-21, release 21.

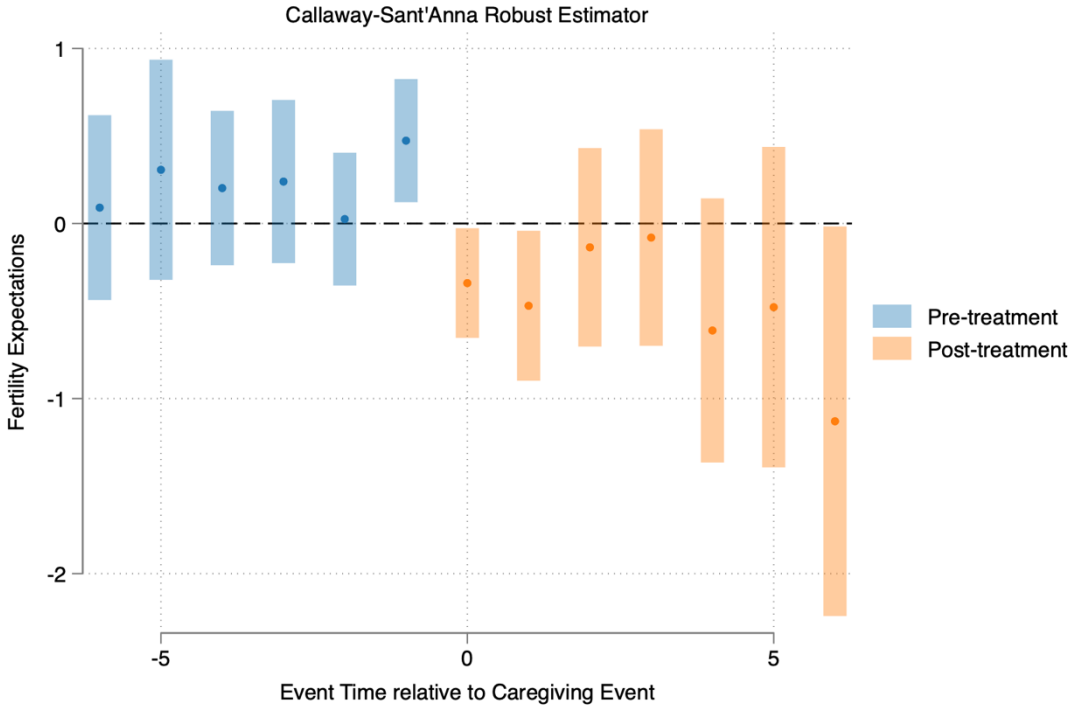
Supplementary material

Table S1. Effect of caregiving responsibilities on adult children's fertility expectations, supplementary analysis including never treated respondents

	(1) Childbearing Intentions
treat*post SR	-0.0468
	(0.138)
treat*post MR	-0.358*
	(0.190)
Observations	61,028
R-squared	0.664
Ind. FE	YES
Year FE	YES
Age FE	YES
Controls	YES
Age-by-Year FE	YES

Note: Standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. *treat*post SR* refers to the interaction between a dummy equal to one if the individual became a caregiver at any point in the sample period and a dummy equal to one for the two periods after the caregiving event. *treat*post MR* refers to the interaction between a dummy equal one if the individual ever became a caregiver and a dummy equal to one after period three after the caregiving event. Controls include partnership status, employment, and parity. *Source*: HILDA, waves 6-21, release 21.

Figure S1. Effect of caregiving responsibilities on adult children's fertility expectations, supplementary analysis using Callaway and Sant'Anna Robust Estimator



Note: Coefficients and confidence intervals based on TWFE estimation of Model (1) using the Callaway-Sant'Anna (2021) robust estimator, with explanatory variables being: partnership status, employment, parity, survey year, and age. *Source*: HILDA, waves 6-21, release 21.

Table S2. Effect of caregiving responsibilities on adult children's fertility expectations: heterogeneity by gender

VARIABLES	(1) Childbearing Intentions
treat*post SR	-0.458**
	(0.217)
treat*post SR*Female	-0.00369
	(0.294)
treat*post MR	-1.226***
	(0.324)
treat*post MR*Female	-0.0801
	(0.380)
Observations	2,640
R-squared	0.672
Ind. FE	YES
Year FE	YES
Age FE	YES
Controls	YES
Age-by-Year FE	YES

Note: Standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Controls include partnership status, employment, and parity. *Source*: HILDA, waves 6-21, release 21.

Table S3. Effect of caregiving responsibilities on adult children's fertility expectations, supplementary analysis controlling for the health status of respondents

	(1) Childbearing Intentions
treat*post SR	-0.303
	(0.188)
treat*post MR	-1.079***
	(0.295)
Observations	2,220
R-squared	0.699
Ind. FE	YES
Year FE	YES
Age FE	YES
Controls	YES
Age-by-Year FE	YES
Health	YES

Note: Standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Controls include partnership status, employment, and parity. *Source*: HILDA, waves 6-21, release 21.