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# Informal care and labor market participation ☆

Andrew Leigh *

*Economics Program, Research School of Social Sciences, HC Coombs Building, Australian National University, Canberra ACT 0200, Australia*

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ABSTRACT

Understanding the effect of informal care for an elderly or disabled person on labor market outcomes is important for developing policies targeted towards caregivers. However, because of omitted variables bias, simple cross-sectional relationships may provide a misleading picture of the causal impact of informal care provision on labor force status. To address this, I use panel data for the period 2001–2007, which make it possible to track the same individuals over time, and observe how their outcomes alter as their care arrangements change. While caregiving does appear to have a modest negative impact on labor force participation, this impact is only one-quarter to one-sixth as large in the panel as in the cross-section. Taking account of individual heterogeneity, the impact of caregiving on other labor force outcomes (and on life satisfaction) seems to be small or non-existent. Large estimated effects from cross-sectional regressions are most likely driven by individual heterogeneity. One possible interpretation of this result is that the impact of caregiving on labor market outcomes and life satisfaction takes several years to manifest itself. Another is that the causal effect of caregiving on labor force outcomes and life satisfaction is quite small.



## 1. Introduction

The majority of care for a person with a disability, severe medical condition, or who are frail aged is provided by friends and family. In the case of the elderly, the OECD estimates that around 80% of the hours of care are provided informally (OECD, 2005). With most developed countries experiencing population ageing, the demand for informal care is likely to grow. At the same time, many nations are attempting to raise the participation rate in the formal labor market. Since a significant portion of informal care is provided by people of working age, an important policy question is to understand how caring affects labor market participation. Although many respondents say that their caring duties were the main reason they left the labor market, how sure can we be that caregiving has a large negative impact on labor supply?[1]

The channels through which caring duties may affect labor force participation have been extensively explored in the literature. With just 24 h in the day, caring time can simply crowd out paid employment. The emotional stress of caring work can make it difficult for carers to effectively hold down a paid job. The unpredictability of caring duties may cause workers to be absent from their paid jobs, which can eventually lead to them being dismissed or resigning. And caring responsibilities may affect paid employment if they shape the individual's self-perception (what psychologists have termed "role theory" – see e.g. Romeis, 1986).

A substantial body of empirical literature has explored the relationship between caregiving and labor force participation. In each case, the studies have sought to compare the observed labor force participation of carers with some counterfactual. Since the counterfactual is (by definition) not observed, it must be assumed in some manner. One common approach has been to look at the cross-sectional relationship between caregiving and labor force participation – a strategy that implicitly assumes that if it were not for their caring responsibilities, the labor market participation of carers would be the same as that of non-carers. Among the studies of this type are Glezer and Wolcott (2000), Tolhurst (2001), and Gray and Hughes (2005) for Australia; Dautzenberg et al. (2000) for the US; and Jones and Latreille

☆ This paper uses confidentialized unit record file data from the Household, Income and Labour Dynamics in Australia (HILDA) survey. The HILDA Project was initiated and is funded by the Commonwealth Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (MIAESR). The findings and views reported in this paper, however, are those of the author and should not be attributed to either FaHCSIA or the MIAESR. Since the data used in this paper are confidential, they cannot be shared with other researchers. Instructions on how to order the data are available at http://melbourneinstitute.com/hilda/data.html. The Stata do-file used to create the regression results is available from the author upon request. Susanne Schmidt and Elena Varganova provided outstanding research assistance. I am grateful to editor Katharine Abraham, two anonymous referees, Susan Lindsay, FaHCSIA staff and participants at an in-house FaHCSIA seminar for comments on an earlier draft.

* Tel.: +61 2 6125 1374; fax: +61 2 6125 0182.
*E-mail address:* andrew.leigh@anu.edu.au.
*URL:* http://andrewleigh.org.

[1] Throughout this paper, "caregiving" refers only to informal care for elderly and disabled people, not to care for children or paid work in the nursing home or hospital sector.

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(2007) for Wales. For the most part, these studies find a negative relationship between caregiving and labor force participation. An exception is Wolf and Soldo (1994), who estimate a structural model on US data, and find that among married women, caring for an elderly parent is not associated with any reduction in employment or in hours of work given employment.

If all carers were suddenly relieved of their caring duties, would they have the same employment rate as non-carers? If the answer is yes, then cross-sectional studies would provide an unbiased estimate of the causal impact of caring on paid employment. But in some cases, people may choose to take on caring responsibilities precisely because they are not in paid work. In this case, estimates derived from cross-sectional studies may exaggerate the impact of caring on labor force participation.

Another approach is to use survey questions that ask carers whether they would be working if they did not have caring duties.[2] Such a strategy effectively assumes that the respondent knows the counterfactual, and will answer truthfully. For example, Gray and Hughes (2005) found that among non-workers who cared for adults, 45% of men and 30% of women said that their caring responsibilities were the main reason that they were not seeking work. Of carers who were in the labor force, Gray and Hughes also found that one in seven would have liked to make greater use of particular work arrangements (such as flex time, shift work, or working from home) but were unable to do so. However, such survey evidence may also suffer from biases. For example, if respondents felt some social pressure to say that they wanted to enter paid employment, then they might overstate their willingness to work. In that event, if all carers were relieved of their caregiving duties, not all respondents who said that their caring duties impeded work would necessarily enter the labor market. (Social pressures might also affect stated preference responses on caregiving. For example, if respondents felt some social pressure to say that they would adopt caring duties if they could, then those who state that they would like to make use of different work arrangements would not all necessarily change their behavior if such options were available).

The last relevant literature is a series of studies (mostly in the field of psychology) that have analyzed the relationship between life satisfaction and caregiving. While these studies are mostly cross-sectional, it is notable that they tend not to find the same negative relationship between caregiving and life satisfaction that other cross-sectional studies find between caregiving and employment. In a small sample of US women, Moen et al. (1995) found no significant relationship between caregiving and life satisfaction. Similarly, in a study of women in London, Livingston et al. (1996) did not observe any relationship between caregiving and depression. Comparing employed and non-employed caregivers in the US, Edwards et al. (2002) found no differences in their levels of worry, strain, and depression. Similarly, Amirkhanyan and Wolf (2003, 2006) found small or zero associations between caregiving and depression (though they did observe that respondents whose parents *needed* care were more likely to exhibit depressive symptoms).[3] Similarly, a study of US carers found no relationship between hours of caregiving and life satisfaction (Haley et al., 2003). An exception to this pattern is a cross-sectional study of Australian carers (Cummins et al., 2006), which found that they had lower levels of self-reported life satisfaction (and higher levels of depression) than a comparable group of non-carers.

Thus, while the previous literature provides some suggestions of the possible relationship between caregiving and labor force outcomes/life satisfaction, most of the studies are hampered by the lack of a credible counterfactual. To address this problem, this paper uses panel data on caring and employment.[4] By following the same individuals over time, it is possible to observe how employment patterns change when an individual takes on caring responsibilities. While the cross-sectional approach asks the question "Are people who care for others less likely to have a job?", the panel approach asks the question "In the year when a person takes on caring responsibilities, does s/he tend to change his/her work patterns?". While the counterfactual in the cross-sectional approach is the behavior of non-carers, the counterfactual in the panel approach is the behavior of the same individual at a time when s/he was not carrying out caring responsibilities.

To preview the results of the paper, I find that the strong negative relationship between caring and labor force or life satisfaction measures in the cross-section is substantially smaller in the panel. One possible interpretation of this result is that the impact of caregiving on labor market outcomes and life satisfaction takes several years to manifest itself. Another is that the causal effect of caregiving on labor force outcomes and life satisfaction is quite small.

The remainder of this paper is structured as follows. Section 2 outlines the data and descriptive statistics. Section 3 presents the empirical strategy and results, and the final section concludes.

## 2. Data description

Data for this analysis are drawn from the Household, Income and Labour Dynamics in Australia survey (HILDA), a panel dataset spanning the years 2001–2007. HILDA contains a rich array of labor market variables, as well as information on informal care provision. Importantly, it also allows researchers to follow the same individuals over time, even as they change households. This makes it possible to see how changes in caregiving are related to changes in labor force participation, wages, and life satisfaction. The sample is restricted to respondents aged between 25 and 64, excluding those who are most likely to be completing education or entering retirement.[5]

An important issue in analyzing caregiving is how to define someone who provides informal care. Informal care spans a wide spectrum, from individuals who provide a small amount of care each week, to those who devote most of their waking hours to caregiving. I therefore define carers in two ways. The first measure is based on time use. HILDA respondents are asked "How much time would you spend on each of the following activities in a typical week?". One of the activities is "caring for a disabled spouse or disabled adult relative, or caring for elderly parents or parents-in-law". I define respondents as carers if they spend 10 or more hours of a typical week engaged in caregiving activity (below, I show that the results are robust to using a higher or lower threshold).

The second measure of caregiving is based on benefit receipt: respondents are classified as carers if they report receiving Carer

[2] See for example AIHW (2004), who base their long-run projections on this kind of analysis.

[3] Amirkhanyan and Wolf (2003) point out that the main impact on depression may come not through caregiving, but as a result of having an ill or disabled family member who requires care (and in some cases, whose impending death has a direct impact on their loved ones' mental wellbeing).

[4] I have been able to locate only three studies that take a similar approach. Pavalko and Artis (1997) estimate a lagged model using data from the US National Longitudinal Survey of Mature Women. However, their focus is on the impact of employment on eldercare, while mine is the reverse. In a fixed-effects specification using Norwegian data, Fevang et al. (2008) estimate that having a lone parent in the terminal phase of life lowers the labor supply of their offspring by 1–2 percentage points. Using panel data from the US Health and Retirement Study, Amirkhanyan and Wolf (2006) analyze the relationship between caregiving and depression, but estimate random effects rather than fixed effects models (effectively assuming that the individual specific effects are uncorrelated with the independent variables). In my data, a Hausman test strongly rejects the random effects assumption.

[5] Australia does not have a mandatory retirement age. However, rules about access to public and private pensions may affect behavior. In 2001–07, the eligibility age for the public pension was 65 for men, and rose from 62 to 63 for women. Access to superannuation (the main form of private pensions) is permitted after age 55. Employer-run pension schemes have a variety of differing age limits. Empirically, the employment rate in the 2001–07 HILDA data is 8% among those aged 65 or over, and 52% among those aged 55–64. However, to account for the possibility that some respondents might retire before age 65 (or might be affected by spousal retirement), I present a robustness check in which I re-estimate the main specification with the sample restricted to those aged 25–54.

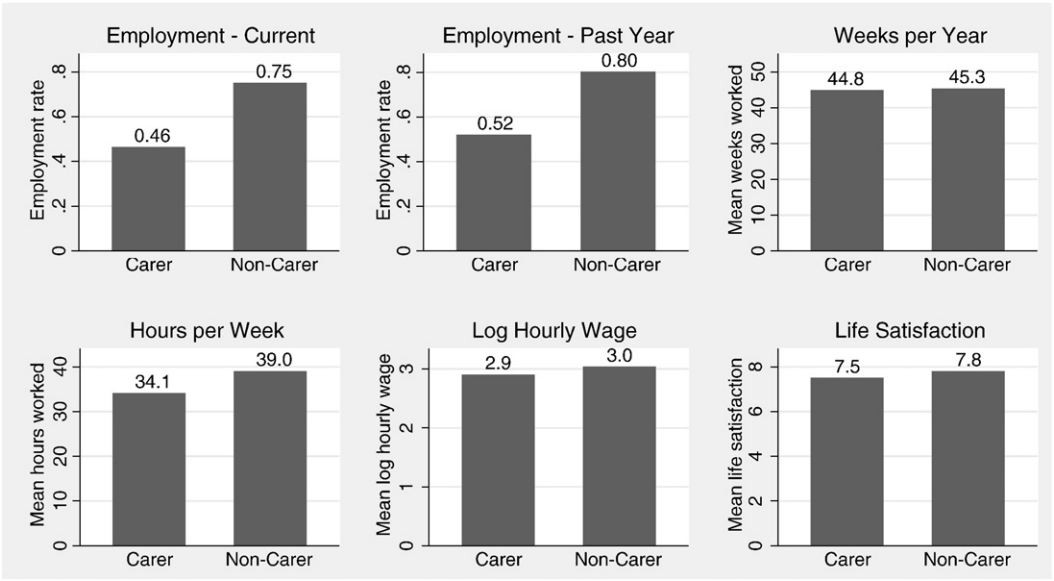


**Fig. 1.** Cross-sectional relationship. Caring defined by time use. The sample for weeks per year includes only those who worked a positive number of weeks in the previous year; the sample for hours per week and hourly wage includes only those who reported current employment at the time of the interview.

Allowance or Carer Payment. According to the official guidelines, "Carer Allowance helps carers who are looking after a child or an adult with a severe disability or medical condition who needs a lot of additional attention", while "Carer Payment is an income support payment for carers who, because of the demands of their caring role, are unable to support themselves through full participation in the work force". More details on these programs are available at www.centrelink.gov.au. In the HILDA survey, 3.1% of respondents are defined as carers on a time use definition, and 2.5% of respondents are defined as carers on a benefit receipt definition.[6] Note that the sample size is somewhat larger when defining carers by benefit receipt, since questions about carer benefit were asked in the main interview (most of which were conducted face-to-face), while questions about time spent caring were asked in a mail-back self-completion questionnaire. On average, about 10% of respondents who completed the main interview did not return their self-completion questionnaire (Watson, 2009, p. 103), and not all questionnaire respondents answered the time use questions.

Five labor market variables are used in the analysis: whether the respondent was employed at the time of the interview; whether the respondent was employed in the previous financial year; weeks worked per year; hours worked per week; and the respondent's hourly wage.[7] These variables cover work in all jobs, not just the main job. Weeks worked are calculated from a derived variable giving the share of time that the respondent worked in the previous financial year. This is then multiplied by 48 to give a total weeks worked figure (the basic annual leave entitlement in Australia is 4 weeks). The hourly wage is calculated as pre-tax weekly earnings in all jobs, divided by the number of hours worked in all jobs. Hourly wages of less than $1 per hour are assumed to be misreported, and are dropped. The weeks worked figure is based on the past year, while the hours per week and hourly wage measures are based on the week prior to the interview. The weeks worked, hours worked, and hourly wage variables are only defined for employed individuals.

In addition to the four labor market variables, I also analyze a measure of life satisfaction (sometimes also referred to as "happiness"), which is based on a question that asks "All things considered, how satisfied are you with your life?". Respondents are asked to report their life satisfaction on a scale from 0 to 10.

To glean some sense as to the basic patterns in the data, I begin by plotting the relationship between caregiving and the five outcome measures, first in levels, and then in differences. Fig. 1 shows the overall relationship across the seven waves between caregiving and labor market measures. Note that because this approach merely pools the data, it may potentially be confounded by omitted person-specific factors that affect both caregiving and labor market participation. The graph suggests that carers (defined by time use) are nearly 30 percentage points less likely to be employed. Of those who were employed in the previous year, carers tend to work about half a week less than non-carers. Among those currently employed, carers tend to work about 5 fewer hours per week, and earn hourly wages that are around 10% below those of non-carers. Carers also report lower levels of life satisfaction than non-carers.

Fig. 2 presents a similar plot, but with caring defined by benefit receipt. Using this approach, the differences between carers and non-carers are even larger: carers are nearly 40 percentage points less likely to be employed, while employed carers work 4 fewer weeks per year, 13 fewer hours per week, earn lower wages, and are less satisfied with their lives.

To account for the possibility of omitted variables bias, Fig. 3 shows the relationship between changes in caring (defined by time use), and changes in labor market outcomes or life satisfaction. Where there were two groups in the previous panels (carers and non-carers), this analysis now has three groups: those who became carers, those who ceased being carers, and those whose caring status did not change

[6] In a given year, 33% of those who are carers on a time use definition are also carers on a benefit receipt definition, while 42% of those who are carers on a benefit receipt definition are also carers on a time use definition. The overall caregiving rates shown here are slightly lower than those from the Australian Bureau of Statistics (2004, 2005), most likely because I set a higher threshold for caregiving, and exclude those aged over 64.

[7] There are a couple of reasons for using two different measures of employment. First, the current employment measure covers the same period as hours worked, while the previous year employment measure covers the same period as weeks worked. Second, using both measures helps account for the fact that changes in caregiving status may occur at any point in the 12 months or so that elapses between HILDA interviews.

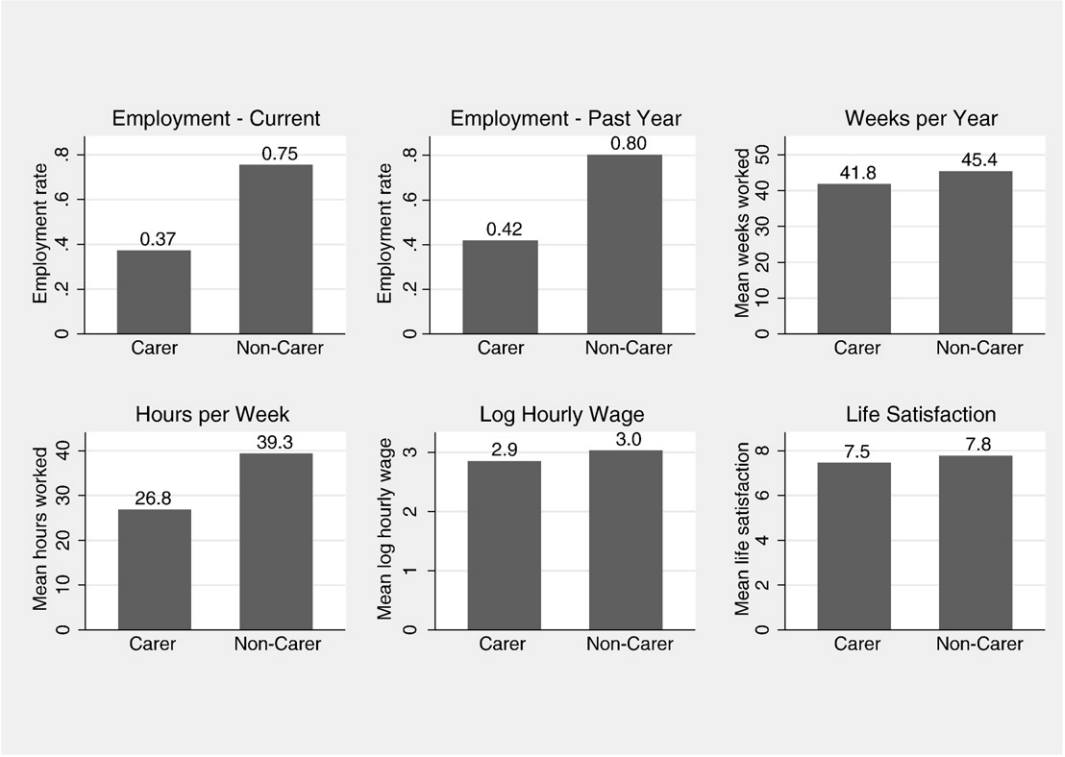


**Fig. 2.** Cross-sectional relationship. Caring defined by benefit receipt. The sample for weeks per year includes only those who worked a positive number of weeks in the previous year; the sample for hours per week and hourly wage includes only those who reported current employment at the time of the interview.

(either because they stayed carers, or stayed non-carers). The graph uses changes across all seven waves of HILDA (i.e. 2001 to 2002, 2002 to 2003, and so on).

Using the time use definition, 1.5% of person-year observations ceased to be carers at some point, while 1.6% started caregiving (a respondent "ceased" if they were observed as a carer in one year, but not in the subsequent year; a respondent "started" if they were not a caregiver in one year, but were a carer the next year). Using the benefit definition, 0.6% of person-year observations in the sample ceased to be carers at some point, while 0.8% started caregiving. Focusing on individuals rather than observations, 11,200 people in the sample were never carers (on the time use definition), 132 were

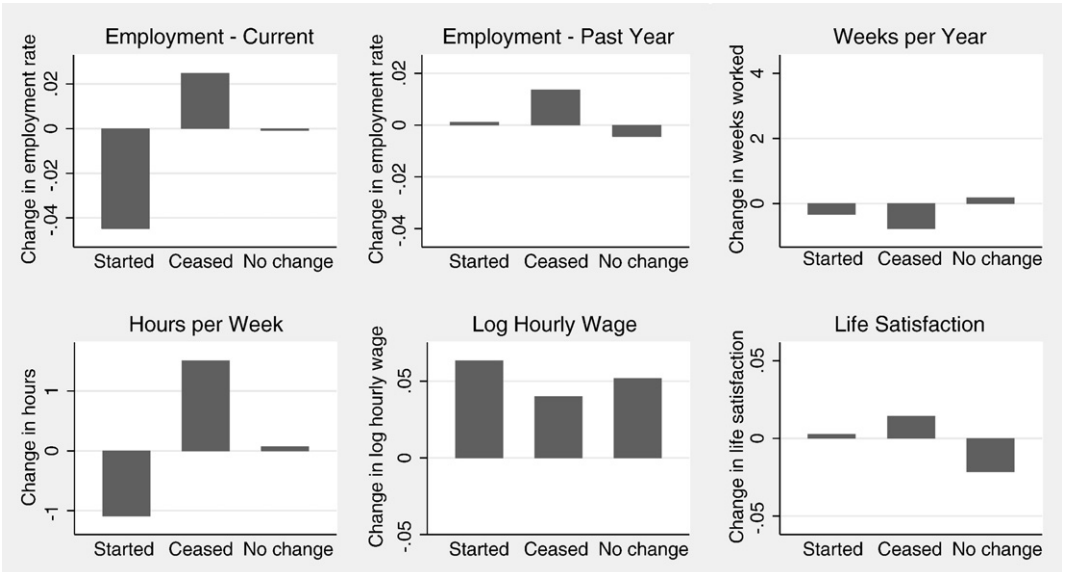


**Fig. 3.** Panel relationship. Caring defined by time use. STARTED, CEASED, and NO CHANGE refer to the respondent's caring from one year to the next. The sample for weeks per year includes only those who worked a positive number of weeks in the previous year; the sample for hours per week and hourly wage includes only those who reported current employment at the time of the interview.

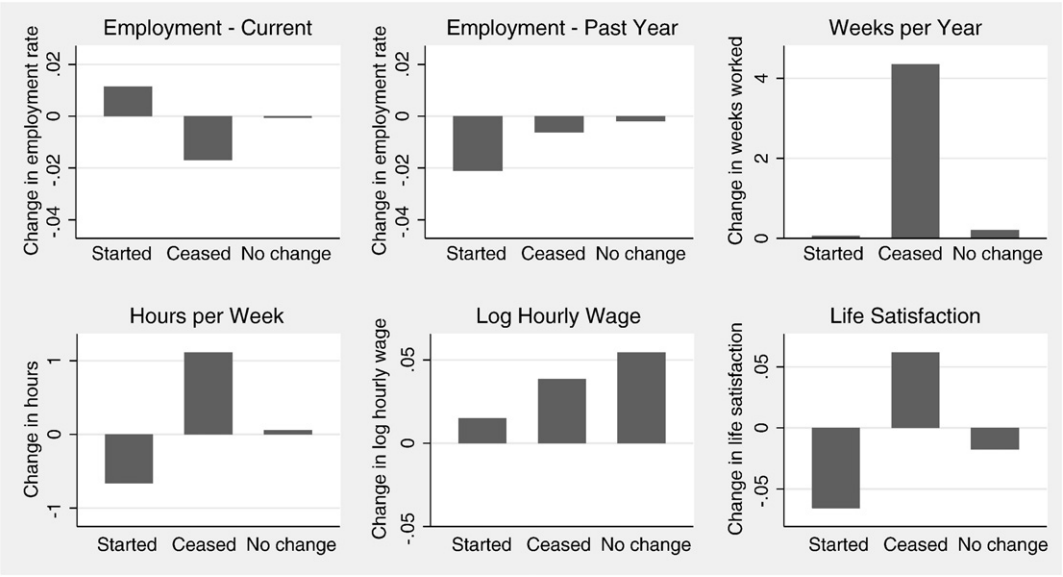


**Fig. 4.** Panel relationship. Caring defined by benefit receipt. STARTED, CEASED, and NO CHANGE refer to the respondent's caring from one year to the next. The sample for weeks per year includes only those who worked a positive number of weeks in the previous year; the sample for hours per week and hourly wage includes only those who reported current employment at the time of the interview.

carers in all valid waves, and 712 were carers in some but not all waves. On the benefit receipt definition, 13,206 were never carers, 89 were always carers, and 440 were carers in some waves only. The HILDA survey does not contain more precise information on the timing of when a respondent started or ceased caring, but since the question is asked annually, it is reasonable to assume that the average respondent who ceased or started caring will have changed status approximately six months prior to the interview date.

For employment, the sign of the effect in the panel is the same as in the cross-section, but much smaller in magnitude: becoming a carer is associated with a 4 percentage point fall in the probability of being employed, and ceasing caregiving activities is associated with a 2 percentage point rise in the probability of being employed.[8] However, the patterns for the other labor force measures are less systematic in the panel (Fig. 3) than in the corresponding cross-sectional graph (Fig. 1). Oddly, those who ceased being a caregiver reduced their weeks worked by more than those who started being a caregiver. For hours worked, those who started caring activities reduced their hours, and those who ceased caring activities increased their hours worked – but the changes are smaller in magnitude than in the cross-section. For hourly wages, those who started caregiving enjoyed higher hourly wage increases than those who or stopped (and larger increases than the "No change" control group). Similarly, life satisfaction rose for both those who started and stopped caring, and fell for the "No change" group.

Fig. 4 shows the relationship between changes in caregiving and the five outcome measures, now with caregiving defined by benefit receipt. In this case, the direction of the effect is mostly consistent with the cross-sectional results, but the magnitudes of the panel differences in Fig. 4 are much smaller than in the corresponding cross-sectional chart (Fig. 2).

This simple graphical analysis suggests that the cross-sectional relationship between caring and labor market outcomes is not always consistent with the panel relationship. However, such an analysis is limited by the fact that it does not account for time-varying individual characteristics. I therefore turn in the next section to a more formal analysis of the data.

## 3. Regression analysis

### 3.1. Main results

In order to test whether the cross-sectional relationship between caregiving and labor supply is due to individual heterogeneity, I compare the results from the following two regressions:

$$\text{Without individual fixed effects: } Y_{it} = \alpha_1 + \beta_1 C_{it} + \gamma_1' Z_{it} + \rho_1' \delta_t + \varepsilon_{it} \quad (1)$$

$$\text{With individual fixed effects: } Y_{it} = \alpha_2 + \beta_2 C_{it} + \gamma_2' Z_{it} + \rho_2' \delta_t + \eta_2' \psi_i + \nu_{it} \quad (2)$$

In these equations, $Y$ is an outcome measure (employment, participation, wages, or life satisfaction) for individual $i$ in year $t$; $C$ is an indicator variable denoting whether the respondent is a caregiver; $Z$ is a vector of individual characteristics (gender, age, education, marital status, number and age of children, and education), $\delta$ are time fixed effects, and $\psi$ are individual fixed effects.[9] Both $\varepsilon$ and $\nu$ are normally-distributed, mean-zero error terms. All regressions are weighted, using longitudinal weights for waves 2–7, and the cross-sectional weight for wave 1 (the weights are then adjusted so that each wave has an equal weight). Standard errors are clustered at the person level to account for within-person serial correlation. All regressions are estimated using ordinary least squares.[10] The key question of interest is whether the relationship between caregiving and the outcome measure differs when fixed effects are added to the regression; in other words, whether $\beta_1 = \beta_2$.

[8] In principle, one might expect that caregivers who were receiving carer benefit would be more inclined to find work when it ceased than would unpaid caregivers in the same situation, since the income effect would be larger for the former group than for the latter group. However, this is difficult to test using the available data, since those receiving carer payment are likely to differ from non-recipients on other observable and unobservable dimensions.

[9] Naturally, the gender control drops out once individual fixed effects are included, but the other variables in the $Z$ vector do not, since they can vary within the same individual over time.

[10] In principle, one would ideally want to use a fixed effects logit model for the employment regressions. However, such a model does not converge, due to the large number of fixed effects. Estimating a logit model on de-meaned data produces similar results to those reported here.

**Table 1**
Summary statistics.

| | Mean | SD | Observations |
|---|---|---|---|
| Caregiver variables | | | |
| Carer (time use) | 0.031 | 0.175 | 47,097 |
| Carer (benefit receipt) | 0.025 | 0.156 | 53,620 |
| Dependent variables | | | |
| Employed (current) | 0.744 | 0.436 | 53,620 |
| Employed (past year) | 0.793 | 0.405 | 53,620 |
| Weeks per year | 45.335 | 8.331 | 42,611 |
| Hours per week | 39.167 | 15.048 | 39,914 |
| Hourly wage ($) | 23.856 | 21.433 | 35,391 |
| Life satisfaction | 7.763 | 1.538 | 53,601 |
| Additional controls | | | |
| Age | 43.637 | 10.911 | 53,620 |
| Married | 0.720 | 0.449 | 53,620 |
| Children 0–4 | 0.204 | 0.521 | 53,620 |
| Children 5–14 | 0.443 | 0.831 | 53,620 |
| Children 15–24 | 0.274 | 0.628 | 53,620 |
| Years of education | 12.380 | 2.104 | 53,620 |
| Gender | | | |
| Female | 0.519 | 0.500 | 53,620 |

Note: Sample is respondents aged 25–64, with non-missing covariates, from the regression specification in Table 3, Panel C, Column 1.

**Table 2**
Demographic characteristics of carers and non-carers.

| | Non-carers | | Carers | | Started | | Ceased | |
|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| *Panel A: Time use measure of caregiving* | | | | | | | | |
| Age | 43.683 | 10.903 | 49.872 | 9.061 | 49.182 | 9.452 | 49.165 | 9.594 |
| Married | 0.729 | 0.444 | 0.679 | 0.467 | 0.653 | 0.477 | 0.655 | 0.476 |
| Children 0–4 | 0.206 | 0.522 | 0.083 | 0.338 | 0.103 | 0.351 | 0.091 | 0.301 |
| Children 5–14 | 0.446 | 0.832 | 0.302 | 0.748 | 0.370 | 0.770 | 0.411 | 0.828 |
| Children 15–24 | 0.273 | 0.624 | 0.281 | 0.642 | 0.303 | 0.667 | 0.279 | 0.605 |
| Years of education | 12.426 | 2.110 | 11.826 | 1.992 | 12.068 | 2.040 | 11.787 | 1.949 |
| Female | 0.519 | 0.500 | 0.674 | 0.469 | 0.711 | 0.454 | 0.699 | 0.459 |
| *Panel B: Benefit measure of caregiving* | | | | | | | | |
| Age | 43.567 | 10.919 | 46.396 | 10.191 | 45.561 | 9.893 | 46.034 | 9.777 |
| Married | 0.721 | 0.449 | 0.690 | 0.463 | 0.658 | 0.475 | 0.605 | 0.490 |
| Children 0–4 | 0.204 | 0.521 | 0.191 | 0.501 | 0.215 | 0.507 | 0.157 | 0.459 |
| Children 5–14 | 0.434 | 0.821 | 0.792 | 1.123 | 0.869 | 1.118 | 0.861 | 1.049 |
| Children 15–24 | 0.273 | 0.627 | 0.325 | 0.660 | 0.347 | 0.689 | 0.417 | 0.756 |
| Years of education | 12.405 | 2.106 | 11.412 | 1.770 | 11.561 | 1.724 | 11.331 | 1.603 |
| Female | 0.512 | 0.500 | 0.778 | 0.416 | 0.773 | 0.419 | 0.810 | 0.393 |

Note: Demographics for "Started" and "Ceased" are measured in the year that the change in status took place.

Table 1 presents summary statistics for the relevant variables. Since the sample size differs slightly across the specifications, summary statistics are shown for the largest sample used in the paper: the employment specification using the benefit receipt measure of caregiving. Although the regressions include an indicator for each individual's educational attainment level, I recode these to a standard "years of education" measure for the purposes of showing summary statistics.

In Table 2, I examine the characteristics of carers and non-carers, as well as those who start and cease caring. These demographic statistics indicate that caregivers tend to be older than non-carers, less educated, less likely to be married, and more likely to be female. This broad pattern holds whether one uses the time use measure of caregiving (Panel A) or the benefit use measure (Panel B). The only difference is for the variables on young children, where the time use measure indicates that caregivers are less likely to have children aged 14 or under, while the benefit receipt measure indicates that caregivers are more likely to have children in this age group. (This could potentially be due to some parents of children with mild disabilities receiving carer payments, but spending less than 10 h per week caring for the child.)

The last four columns of Table 2 estimate the same statistics for those who started and ceased providing care. The average person who starts or stops providing care has demographic characteristics that are quite similar to the stock of carers. Again, this is true for both the time use and benefit receipt definition of caregiving.

Table 3 presents results from the main specification. To conserve space, the results show only the variables of interest, omitting the year fixed effects and time-varying demographics.[11] Panels A and C present results without individual fixed effects (i.e. a pooled cross-sectional specification), while Panels B and D include individual fixed effects.[12]

In the cross-section, those with caregiving responsibilities have an employment rate that is significantly lower than that of non-caregivers (20 percentage points with the time use measure, 28 percentage points with the benefit receipt measure). This coefficient is very similar regardless of whether the measure is current employment (in the week of the interview) or employment in the previous year. Conditional on working, carers work fewer weeks per year (an insignificant 0.3 weeks with the time use measure, a significant 2.9 weeks with the benefit receipt measure), and fewer hours per week than non-caregivers (2.5 h with the time use measure, 7.2 h with the benefit receipt measure). In addition, carers who are working earn lower hourly wages (10% less with the time use measure, 12% less with the benefit receipt measure), and have lower levels of life satisfaction (0.4 points using either measure of caregiving). This represents approximately one-quarter of a standard deviation (the standard deviation of the life satisfaction measure is 1.5 points).

However, the panel analysis suggests that the impact of caring on labor supply and wages is substantially smaller. Where eleven out of twelve coefficients were negative and significant in the cross-sectional specification (Panels A and C), only six of the twelve coefficients are statistically significant once individual fixed effects are added (Panels B and D). Importantly, the specifications with individual fixed effects not only tend to be statistically insignificant; they are also economically small. For example, with person fixed effects, the negative impact of caregiving on employment falls from 20–28 percentage points to 4–6 percentage points. This suggests that caregiving does reduce labor force participation, but that the magnitude of the effect is only about one-quarter to one-sixth as large as the cross-sectional estimate implies.

Conditional on being employed, the individual fixed effects specification suggests that the impact on weeks per year and hours per week is small. Using the benefit measure of caregiving, employed carers work 2 fewer weeks per year (insignificant for the time use measure). Using the time use measure of caregiving, employed carers work 1 h less per week (insignificant for the benefit measure). For hourly wages and life satisfaction, the point estimates in the individual fixed effects specifications are close to zero, and are all statistically insignificant.

Comparing the corresponding specifications in Panels A and B, and in Panels C and D, the standard errors are sufficiently small that one can be confident the caregiver coefficients in the cross-sectional and panel specifications are significantly different from one another. In the majority of the specifications in Table 3, a $Chi^2$ test rejects the null hypothesis that the caregiver coefficient is the same with and without individual fixed

[11] In the individual fixed effects specifications, the time-varying control variables generally have the expected sign. For example, as is standard in the literature, the relationship between wages and age traces out an inverted U-shape, while the relationship between life satisfaction and age follows a U-shaped pattern. Marriage is associated with increased labor force participation for men, and increased life satisfaction for both sexes.

[12] For simplicity, I refer to the results from specifications without individual fixed effects as "cross-sectional" estimates, although it would perhaps be more precise to call them "pooled OLS" estimates.

**Table 3**
Cross-sectional and panel relationships between informal care and labor market outcomes.

| | [1] | [2] | [3] | [4] | [5] | [6] |
|---|---|---|---|---|---|---|
| Dependent variable: | Employed (current) | Employed (past year) | Weeks per year | Hours per week | Log hourly wage | Life satisfaction |
| *Panel A: Without individual fixed effects, time use measure of caregiving* | | | | | | |
| Caregiver | −0.201*** | −0.198*** | −0.343 | −2.525*** | −0.101*** | −0.357*** |
| | [0.024] | [0.023] | [0.454] | [0.924] | [0.032] | [0.081] |
| $R^2$ | 0.18 | 0.18 | 0.03 | 0.18 | 0.16 | 0.05 |
| Observations | 47,097 | 47,097 | 37,372 | 34,908 | 30,998 | 47,085 |
| Individuals | 10,192 | 10,192 | 8672 | 8322 | 7875 | 10,190 |
| *Panel B: With individual fixed effects, time use measure of caregiving* | | | | | | |
| Caregiver | −0.054*** | −0.038*** | 0.149 | −1.236** | −0.015 | −0.052 |
| | [0.015] | [0.014] | [0.550] | [0.623] | [0.028] | [0.062] |
| $R^2$ | 0.76 | 0.79 | 0.52 | 0.79 | 0.75 | 0.65 |
| Observations | 47,097 | 47,097 | 37,372 | 34,908 | 30,998 | 47,085 |
| Individuals | 10,192 | 10,192 | 8672 | 8322 | 7875 | 10,190 |
| $Chi^2$ test for equality of Caregiver coefficients | 41.12 | 46.43 | 1.76 | 2.28 | 8.11 | 13.43 |
| | $P<0.01$ | $P<0.01$ | $P=0.19$ | $P=0.13$ | $P<0.01$ | $P<0.01$ |
| *Panel C: Without individual fixed effects, benefit measure of caregiving* | | | | | | |
| Caregiver | −0.276*** | −0.281*** | −2.890*** | −7.212*** | −0.126*** | −0.353*** |
| | [0.025] | [0.026] | [0.691] | [1.213] | [0.035] | [0.104] |
| $R^2$ | 0.18 | 0.19 | 0.03 | 0.18 | 0.16 | 0.04 |
| Observations | 53,620 | 53,620 | 42,611 | 39,914 | 35,391 | 53,601 |
| Individuals | 10,646 | 10,646 | 9050 | 8705 | 8279 | 10,643 |
| *Panel D: With individual fixed effects, benefit measure of caregiving* | | | | | | |
| Caregiver | −0.043** | −0.064*** | −1.916* | −1.244 | −0.014 | −0.065 |
| | [0.018] | [0.021] | [1.083] | [0.963] | [0.031] | [0.086] |
| $R^2$ | 0.75 | 0.79 | 0.5 | 0.78 | 0.74 | 0.64 |
| Observations | 53,620 | 53,620 | 42,611 | 39,914 | 35,391 | 53,601 |
| Individuals | 10,646 | 10,646 | 9050 | 8705 | 8279 | 10,643 |
| $Chi^2$ test for equality of Caregiver coefficients | 81.91 | 66.09 | 3.29 | 25.78 | 11.22 | 6.74 |
| | $P<0.01$ | $P<0.01$ | $P=0.07$ | $P<0.01$ | $P<0.01$ | $P<0.01$ |

Notes: Robust standard errors, clustered at the person level, in brackets. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Caregiver is an indicator variable denoting whether the respondent provided informal care (see text for details). Panels B and D include individual fixed effects; Panels A and C do not. All specifications control for year fixed effects, gender, a quadratic in age, an indicator for whether the respondent is married, number of children aged 0–4, 5–14, and 15–24, and the highest level of education attained by the respondent. The sample for weeks per year includes only those who worked a positive number of weeks in the previous year; the sample for hours per week and hourly wage includes only those who reported current employment at the time of the interview. Life satisfaction is the respondent's self-reported score on a 0–10 scale. Observations are person × year observations.

effects.[13] For example, when looking at life satisfaction, and defining caregiving by time use, the coefficient on caregivers is −0.357 without individual fixed effects (Panel A, Column 6), with a 95% confidence interval from −0.516 to −0.198. However, when individual fixed effects are included, the point estimate is −0.052 (Panel B, Column 6), with a 95% confidence interval from −0.173 to 0.070. Taken together, the results in Table 3 suggest that the large negative relationship between caring and labor market outcomes, and between caring and life satisfaction, is mostly due to unobserved individual heterogeneity, and not the causal impact of caring.

### 3.2. Testing for gender differences

Since past research has suggested that women have greater difficulty combining paid work and caring (Neal et al., 1990; Anastas et al., 1990, both cited in Turvey and Thomson, 1996), I split the sample into male and female respondents. Table 4 shows the results from this estimation strategy (here, all estimates include individual fixed effects). For the most part, the caregiving coefficients are statistically insignificant, with the exception being the employment regressions, where the switch to caregiving is associated with a significant reduction in labor supply. Using the benefit receipt measure, caregiving appears to have a greater negative impact on employment for men (−11 percentage points on both employment measures) than for women (−2 or −5 percentage points, depending on the employment measure). However, with the time use measure, the impact of caregiving on employment does not differ much by gender. When the dependent variable is labor supply on the intensive margin (weeks or hours), the caregiver coefficients are mostly negative, but all except one are statistically insignificant. There is little evidence that caregiving has an adverse short-run impact on men's or women's wages or life satisfaction.

### 3.3. Robustness checks

Since the time use measure of caregiving uses an arbitrary threshold (10 h per week), it is useful to see whether the main results are robust to varying this cutoff. In Table 5, I re-estimate the individual fixed effects regressions using a lower cutoff (1 h per week) and a higher cutoff (35 h per week). In addition, I estimate regressions for carers only, in which the key independent variable is the number of hours of care provided in a typical week. (Among carers in the sample, the median number of care hours per week is 5, the mean is 13, and the standard deviation is 23.)

Using a caregiving threshold of 1 h per week (Panel A), the panel estimates suggest that becoming a carer is associated with a 2 percentage point drop in the employment rate, but has no impact on the other dependent variables. With a threshold of 35 h per week (Panel B), the impact on employment is 5 percentage points (about

[13] Because Stata's *suest* command does not work with *xtreg*, and because the number of fixed effects is too large to estimate the model using a least-squares dummy variable approach, this test is estimated by demeaning the data instead of running an individual fixed effects model. However, the standard errors in the demeaned specifications are only slightly smaller than in the corresponding fixed effects specifications, so the $Chi^2$ values are only modestly inflated.

**Table 4**
Testing for gender differences in informal care and labor market outcomes.

| All regressions include individual fixed effects | | | | | | |
|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] |
| Dependent variable: | Employed (current) | Employed (past year) | Weeks per year | Hours per week | Log hourly wage | Life satisfaction |
| *Panel A: Women, time use measure of caregiving* | | | | | | |
| Caregiver | −0.051*** | −0.048*** | 0.345 | −1.325* | −0.031 | −0.087 |
| | [0.017] | [0.016] | [0.772] | [0.731] | [0.029] | [0.076] |
| $R^2$ | 0.74 | 0.77 | 0.51 | 0.77 | 0.7 | 0.64 |
| Observations | 25,051 | 25,051 | 18,114 | 16,590 | 15,121 | 25,044 |
| Individuals | 5327 | 5327 | 4281 | 4069 | 3895 | 5326 |
| *Panel B: Women, benefit measure of caregiving* | | | | | | |
| Caregiver | −0.023 | −0.048** | −1.793 | −0.685 | −0.025 | −0.066 |
| | [0.020] | [0.023] | [1.243] | [1.005] | [0.034] | [0.101] |
| $R^2$ | 0.74 | 0.77 | 0.49 | 0.76 | 0.69 | 0.63 |
| Observations | 28,278 | 28,278 | 20,488 | 18,837 | 17,154 | 28,268 |
| Individuals | 5536 | 5536 | 4447 | 4239 | 4072 | 5534 |
| *Panel C: Men, time use measure of caregiving* | | | | | | |
| Caregiver | −0.060** | −0.017 | −0.255 | −1.185 | 0.019 | 0.025 |
| | [0.028] | [0.026] | [0.645] | [1.164] | [0.059] | [0.108] |
| $R^2$ | 0.76 | 0.81 | 0.53 | 0.73 | 0.78 | 0.67 |
| Observations | 22,046 | 22,046 | 19,258 | 18,318 | 15,877 | 22,041 |
| Individuals | 4865 | 4865 | 4391 | 4253 | 3980 | 4864 |
| *Panel D: Men, benefit measure of caregiving* | | | | | | |
| Caregiver | −0.106*** | −0.113** | −2.104 | −2.451 | 0.019 | −0.054 |
| | [0.040] | [0.048] | [2.174] | [2.488] | [0.073] | [0.163] |
| $R^2$ | 0.76 | 0.81 | 0.52 | 0.72 | 0.77 | 0.65 |
| Observations | 25,342 | 25,342 | 22,123 | 21,077 | 18,237 | 25,333 |
| Individuals | 5110 | 5110 | 4603 | 4466 | 4207 | 5109 |

Notes: Robust standard errors, clustered at the person level, in brackets. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Caregiver is an indicator variable denoting whether the respondent provided informal care (see text for details). All specifications control for individual fixed effects, year fixed effects, a quadratic in age, an indicator for whether the respondent is married, number of children aged 0–4, 5–14, and 15–24, and the highest level of education attained by the respondent. The sample for weeks per year includes only those who worked a positive number of weeks in the previous year; the sample for hours per week and hourly wage includes only those who reported current employment at the time of the interview. Life satisfaction is the respondent's self-reported score on a 0–10 scale. Observations are person × year observations.

**Table 5**
Robustness checks.

| All regressions include individual fixed effects | | | | | | |
|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] |
| Dependent variable: | Employed (current) | Employed (past year) | Weeks per year | Hours per week | Log hourly wage | Life satisfaction |
| *Panel A: Time use measure of caregiving, 1 h per week threshold* | | | | | | |
| Caregiver | −0.022*** | −0.020*** | 0.215 | −0.297 | −0.013 | −0.037 |
| | [0.008] | [0.007] | [0.249] | [0.308] | [0.013] | [0.034] |
| $R^2$ | 0.76 | 0.79 | 0.52 | 0.79 | 0.75 | 0.65 |
| Observations | 47,097 | 47,097 | 37,372 | 34,908 | 30,998 | 47,085 |
| Individuals | 10,192 | 10,192 | 8672 | 8322 | 7875 | 10,190 |
| *Panel B: Time use measure of caregiving, 35 h per week threshold* | | | | | | |
| Caregiver | −0.049** | −0.053** | −0.218 | −2.385** | −0.05 | −0.117 |
| | [0.020] | [0.022] | [0.958] | [1.075] | [0.043] | [0.102] |
| $R^2$ | 0.76 | 0.79 | 0.52 | 0.79 | 0.75 | 0.65 |
| Observations | 47,097 | 47,097 | 37,372 | 34,908 | 30,998 | 47,085 |
| Individuals | 10,192 | 10,192 | 8672 | 8322 | 7875 | 10,190 |
| *Panel C: Continuous measure of caregiving (sample is carers only)* | | | | | | |
| Carer hours | −0.001* | −0.001 | −0.001 | −0.067* | 0 | 0.002 |
| | [0.000] | [0.001] | [0.016] | [0.036] | [0.001] | [0.003] |
| $R^2$ | 0.86 | 0.86 | 0.73 | 0.89 | 0.83 | 0.78 |
| Observations | 4619 | 4619 | 3213 | 2962 | 2605 | 4617 |
| Individuals | 2092 | 2092 | 1571 | 1456 | 1301 | 2091 |

Notes: Robust standard errors, clustered at the person level, in brackets. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Caregiver is an indicator variable denoting whether the respondent provided informal care (see text for details). Carer hours is the number of hours of informal care, with the sample restricted to individuals who provided at least 1 h of care. All specifications control for individual fixed effects, year fixed effects, a quadratic in age, an indicator for whether the respondent is married, number of children aged 0−4, 5−14, and 15–24, and the highest level of education attained by the respondent. The sample for weeks per year includes only those who worked a positive number of weeks in the previous year; the sample for hours per week and hourly wage includes only those who reported current employment at the time of the interview. Life satisfaction is the respondent's self-reported score on a 0–10 scale. Observations are person × year observations.

the same impact as when a cutoff of 10 h per week is used), while the impact on hours worked is 2 h per week (about twice the impact as with the 10 h per week cutoff). Focusing on carers only (Panel C), each additional hour of care is associated with a 0.1 percentage point drop in the employment rate (statistically significant for current employment only), and a reduction in working time of 0.07 h per week. Put differently, for those who are already combining caregiving and paid work, one more hour of caregiving is associated with a 4 min reduction in paid work. This suggests that reductions in time spent caregiving are more likely to lead to increases in leisure or home production than to increases in formal employment.

Next, I check two other factors that may be affecting the main results that were presented in Table 3. First, it might be the case that caregiving is indeed reducing labor supply, but that there is also a grief effect. Suppose that a respondent has been caring for a loved one, and the caring duties ceased because that person died. In this case, the grieving process (or changes in wealth) might naturally affect the respondent's labor supply. While this might not have direct policy ramifications, it would affect the interpretation of the foregoing results. Although HILDA does not directly ask carers whether the person for whom they were caring died in the previous year, it does include questions about major life events, including whether the respondent experienced the death of a spouse or child, a close relative or family member, or a close friend. In each year, 16% of the full sample and 23% of carers (on either the time use or benefit receipt definition) had recently experienced such a death, and I exclude these respondents from the analysis.[14] The results of this specification are shown in Panels A and B of Table 6. In all cases, the point estimates and standard errors are very similar to the corresponding estimates in the full sample (Panels B and D of Table 3).

The second possibility is that the results are driven by carers opting for early retirement. I therefore carry out a straightforward robustness check in which I drop respondents aged between 55 and 64. Those aged 55–64 comprise 21% of the full sample, 36% of carers on the time use definition, and 28% of carers on the benefit definition. The results from this specification are shown in Panels C and D of Table 6. Using the time use measure of caregiving, restricting the sample to individuals aged 25–54 increases the impact on current employment from −5 percentage points to −8 percentage points. While this is a tangible impact, it is still considerably smaller than the −20 percentage point impact in the cross-sectional specification. The other results in Panels C and D of Table 6 are very similar to the corresponding specifications in Table 3. Together, the robustness checks in this table suggest that the results in Table 3 are not merely driven by the death of the person being cared for; nor are they specific to mature-aged carers.

### 3.4. Reconciling revealed and stated preference evidence

How can the foregoing results be reconciled with survey evidence indicating that a significant share of carers says that their caring responsibilities are the main barrier to them entering the labor market? One way of answering this question is to track those who say

[14] This question was not asked in the first wave, so I do not drop any first-wave respondents in this specification.

**Table 6**
Robustness checks.

| All regressions include individual fixed effects | | | | | | |
|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] |
| Dependent variable: | Employed (current) | Employed (past year) | Weeks per year | Hours per week | Log hourly wage | Life satisfaction |
| *Panel A: Grievers omitted, time use measure of caregiving* | | | | | | |
| Caregiver | −0.061*** | −0.036** | −0.049 | −1.255** | −0.025 | −0.075 |
| | [0.016] | [0.016] | [0.606] | [0.626] | [0.027] | [0.074] |
| $R^2$ | 0.76 | 0.79 | 0.55 | 0.79 | 0.76 | 0.68 |
| Observations | 39,782 | 39,782 | 31,906 | 29,869 | 26,585 | 39,770 |
| Individuals | 10,109 | 10,109 | 8555 | 8198 | 7710 | 10,107 |
| *Panel B: Grievers omitted, benefit measure of caregiving* | | | | | | |
| Caregiver | −0.036* | −0.067*** | −0.933 | −0.919 | −0.023 | −0.057 |
| | [0.020] | [0.024] | [0.974] | [1.038] | [0.036] | [0.102] |
| $R^2$ | 0.75 | 0.79 | 0.53 | 0.78 | 0.76 | 0.66 |
| Observations | 45,842 | 45,842 | 36,778 | 34,521 | 30,665 | 45,823 |
| Individuals | 10,612 | 10,612 | 8968 | 8617 | 8154 | 10,609 |
| *Panel C: 55–64 year-olds omitted, time use measure of caregiving* | | | | | | |
| Caregiver | −0.079*** | −0.046*** | −0.687 | −1.570** | −0.009 | −0.054 |
| | [0.018] | [0.018] | [0.546] | [0.762] | [0.030] | [0.076] |
| $R^2$ | 0.72 | 0.76 | 0.52 | 0.78 | 0.75 | 0.65 |
| Observations | 37,479 | 37,479 | 31,756 | 29,932 | 27,019 | 37,471 |
| Individuals | 8558 | 8558 | 7684 | 7432 | 7086 | 8556 |
| *Panel D: 55–64 year-olds omitted, benefit measure of caregiving* | | | | | | |
| Caregiver | −0.042* | −0.064** | −2.162* | −1.137 | −0.026 | −0.022 |
| | [0.022] | [0.026] | [1.160] | [1.114] | [0.036] | [0.096] |
| $R^2$ | 0.71 | 0.75 | 0.5 | 0.77 | 0.75 | 0.64 |
| Observations | 42,983 | 42,983 | 36,419 | 34,402 | 30,998 | 42,969 |
| Individuals | 8952 | 8952 | 8031 | 7775 | 7453 | 8949 |

Notes: Robust standard errors, clustered at the person level, in brackets. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Caregiver is an indicator variable denoting whether the respondent provided informal care (see text for details). All specifications control for individual fixed effects, year fixed effects, a quadratic in age, an indicator for whether the respondent is married, number of children aged 0–4, 5–14, and 15–24, and the highest level of education attained by the respondent. The sample for weeks per year includes only those who worked a positive number of weeks in the previous year; the sample for hours per week and hourly wage includes only those who reported current employment at the time of the interview. Life satisfaction is the respondent's self-reported score on a 0–10 scale. Observations are person × year observations.

that their caring responsibilities prevent them from finding a job, and see whether they begin looking for work when their caring responsibilities cease.[15] For this purpose, I use a question in the HILDA survey that asks respondents about various factors that might explain why they have not been seeking work. One of the options (which are not mutually exclusive) is "Ill health of someone other than self/other family reasons". Across the seven waves of the HILDA survey, a significant share of non-working carers (61% by the time use definition; 49% by the benefit receipt definition) nominate their caring duties as one of the reasons that they are not looking for work.

Among this group (non-working carers who said that their caring duties impeded work), a small number of respondents had ceased being a caregiver by the following year. Of these, at least four-fifths were neither working nor looking for work, despite having no caring duties.[16] While this is based on only a small sample (38 respondents by the time use definition; 15 respondents by the benefit receipt definition), it is extremely unlikely that the true proportion of former carers in work or looking for work was 100%. This suggests that the survey response evidence most likely presents a biased picture of the true counterfactual for non-working carers. A more accurate counterfactual can be discerned from revealed behavior than from stated preferences.

## 4. Conclusion

This paper has sought to estimate the relationship between informal caring and labor market outcomes, focusing particularly on the role of individual fixed effects. In a cross-sectional specification, carers are less likely to be employed, tend to work fewer weeks per year and fewer hours per week, earn lower hourly wages, and have lower levels of life satisfaction. But these results are generally not robust to the inclusion of individual fixed effects. Focusing only on changes in labor market outcomes (or changes in life satisfaction), the coefficients on caregiving become much smaller, and many become statistically insignificant. For example, while the cross-sectional specifications imply that caregiving reduces labor force participation by 20–28 percentage points and lowers wages by 10–12%, the individual fixed effects model suggests that the short-term causal effect of caregiving is to reduce participation by 4–6 percentage points, while having no impact on hourly wages. This is consistent with the structural model presented by Wolf and Soldo (1994), but not with much of the cross-sectional literature on the topic.

One possible interpretation of the individual fixed effects regression results is that the impact of caregiving on labor market outcomes and life satisfaction takes several years to manifest itself. For example, if it were the case that caregiving only reduced life satisfaction after a period of more than seven years, then the effects would not be picked up in a seven-year panel dataset such as the 2001–07 HILDA survey. Another interpretation, which seems more likely, is that the large estimated effects from cross-sectional regressions are driven by individual heterogeneity – meaning that the kinds of people who provide care tend to have low levels of labor force attachment even before or after they have provided that care. While caregiving does appear to have a modest negative causal impact on labor force participation, this impact is only one-quarter to one-sixth as large as in the cross-section. Taking account of individual heterogeneity, the impact of caregiving on other labor force outcomes (and on life satisfaction) seems to be small or non-existent.

To what extent can we generalize from Australia to other OECD countries? Classifying care regimes for the elderly, Lundsgaard (2005) identifies Australia as being in the middle of the pack on most dimensions, with above-average payments for informal carers compared to the median OECD country, and a higher-than-average degree of choice for persons consuming publicly-funded formal care. Although considerably more research remains to be done, it may be the case that the cross-sectional relationship between informal care and low labor force participation in other countries is largely explained by individual heterogeneity.

[15] Admittedly, this is still an imperfect way of determining the counterfactual, since it could be the case that when the caring duties cease, the respondent no longer needs the additional income that employment would bring. For example, an individual who was caring for an elderly parent might see their expenditure fall or their wealth rise following the death of that parent.

[16] By the time use definition, 84% of carers who said that their caring duties prevented them seeking work were not employed or searching for work in the year that their caring duties ceased. By the benefit receipt definition, 93% of carers who said that their caring duties prevented them seeking work were not employed or searching for work in the year that their caring duties ceased. While it is plausible that some had become discouraged, official estimates suggest that the number of discouraged jobseekers in Australia is very low: around 0.4% of the adult population (Australian Bureau of Statistics, 2009, p.10).

## References

Amirkhanyan, A.A., Wolf, D.A., 2003. Caregiver stress and noncaregiver stress: exploring the pathways of psychiatric morbidity. Gerontologist 43, 817–827.
Amirkhanyan, A.A., Wolf, D.A., 2006. Parent care and the stress process: findings from panel data. Journal of Gerontology 61B, S248–S255.
Anastas, J., Gibeau, J., Larson, P., 1990. Working families and eldercare: a national perspective in an aging America. Social Work 35, 405–411.
Australian Bureau of Statistics, 2004. Disability, ageing and carers, Australia: summary of findings, 2003. Cat No 4430.0 ABS, Canberra.
Australian Bureau of Statistics, 2005. Australian Social Trends. Cat No 4102.0 ABS, Canberra.
Australian Bureau of Statistics, 2009. Persons Not in the Labour Force. Cat No 6220.0 ABS, Canberra.

Australian Institute of Health and Welfare (AIHW), 2004. Carers in Australia: assisting frail older people and people with a disability. AIHW Cat No AGE 41 (Aged Care Series) AIHW, Canberra.
Cummins, R., Lau, A., Woerner, J., 2006. The wellbeing of caregivers. In: Blore, J., Gluskie, A., MacKay, Y. (Eds.), Proceedings of the 7th Australian Conference on Quality of Life. Deakin University, Melbourne.
Dautzenberg, M., Diederiks, J., Philipsen, H., Stevens, F., Tan, F., Vernooij-Dassen, M., 2000. The competing demands of paid work and parent care: middle aged daughters providing assistance to elderly parents. Research on Aging 22, 165–187.
Edwards, A.B., Zarit, S.H., Stephens, M.A.P., Townsend, A., 2002. Employed family caregivers of cognitively impaired elderly: an examination of role strain and depressive symptoms. Aging and Mental Health 6, 55–61.
Fevang, E., Kverndokk, S., Røed, K., 2008. Informal Care and Labor Supply. IZA Working Paper 3717. IZA, Bonn.
Glezer, H., Wolcott, I., 2000. Conflicting commitments: working mothers and fathers in Australia. In: Haas, L., Hwang, P., Russell, G. (Eds.), Organisational change and gender equity. Sage, London, pp. 43–56.
Gray, M., Hughes, J., 2005. Caring for children and adults: differential access to family-friendly work arrangements. Family Matters 70, 18–25.
Haley, W.E., Lamonde, L.A., Han, B., Burton, A.M., Schonwetter, R., 2003. Predictors of depression and life satisfaction among spousal caregivers in hospice: application of a stress process model. Journal of Palliative Medicine 6, 215–224.
Jones MK, Latreille PL. Disability, Health, Caring and the Labor Market: Evidence from the Welsh Health Survey. Mimeo, University of Wales: Swansea; 2007.
Livingston, G., Manela, M., Katona, C., 1996. Depression and other psychiatric morbidity in carers of elderly people living at home. British Medical Journal 312, 153–156.
Lundsgaard, J., 2005. Consumer Direction and Choice in Long-Term Care for Older Persons, Including Payments for Informal Care: How Can it Help Improve Care Outcomes, Employment and Fiscal Sustainability? OECD Health Working Paper No 20. OECD, Paris.
Moen, P., Robison, J., Dempster-McClain, D., 1995. Caregiving and women's well-being: a life course approach. Journal of Health and Social Behavior 36, 259–273.
Neal, M., Chapman, N., Ingersoll-Dayton, B., Emlen, A., Boise, L., 1990. Absenteeism and stress among employed caregivers of the elderly, disabled adults and children. In: Beigel, D., Blum, A. (Eds.), Aging and Caregiving: Theory, Research and Policy. Sage, Newbury Park, CA, pp. 160–183.
OECD, 2005. The OECD Health Project: Long-term Care for Older People. OECD, Paris.
Pavalko, E.K., Artis, J.E., 1997. Women's caregiving and paid work: causal relationships in late midlife. Journal of Gerontology: Social Sciences 52B, S170–S179.
Romeis, J.C., 1986. Caregiver strain: toward a role theoretic perspective with societal implications. Paper presented at the 39th Annual Scientific Meeting of the Gerontological Society of America, Chicago, IL.
Tolhurst, P., 2001. Supporting carers for older Australians. Work and Family 26, 3–4.
Turvey, K., Thomson, C., 1996. Caregiving and employment I: Who cares, what's involved? Different caregiving relationships and their impact on caregiver employment. Paper presented at the 5th Australian Family Research Conference Institute of Family Studies, Brisbane, 27–29 November. Social Policy Research Centre, University of New South Wales.
Watson, N. (Ed.), 2009. HILDA User Manual – Release 7. Melbourne Institute of Applied Economic and Social Research, University of Melbourne, Melbourne.
Wolf, D.A., Soldo, B.J., 1994. Married women's allocation of time to employment and care of elderly parents. Journal of Human Resources 29, 1259–1276.