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ARTICLE

A longitudinal study on the consequences of the take-up of informal care on work hours, labour market exit and workplace absenteeism due to illness

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Abstract

Little is known about the effects of informal care-giving on employees' absenteeism due to illness. This paper therefore provides a longitudinal analysis of the consequences of taking on informal care-giving for men's and women's working hours and workplace absenteeism due to illness. Data were taken from the Dutch Labour Supply Panel (waves 2004–2018); 495 of the 6,452 male observations in this panel and 696 of the 5,961 female observations had taken on informal care-giving. It was tested whether respondents who became (intensive) informal carers were more likely than respondents who remained non-care-givers to reduce their work hours or stop working between waves t and t1, or to be absent from work due to illness in wave t1. (Multinomial) logistic regression analyses showed that taking on informal care reduced women's working hours when the care they provided was intensive, but not men's. The predicted probability of women reducing their work hours was 12 per cent if they had remained non-care-givers between waves t and t1, 15 per cent if they had started giving non-intensive care and 19 per cent if they had begun providing intensive help. In addition, starting to provide (non-intensive) informal care increased the risk of workplace absenteeism among both women and men. The study highlights the need for workplace policies that prevent female carers from reducing their work hours, and enable male and female carers to continue working in a healthy way.

Keywords: informal care-giving; working hours; employment; workplace absenteeism; illness; longitudinal analysis

Introduction

Many countries face the challenge of an ageing population. An ageing population implies that a shrinking number of people of working age will have to care for a

rising number of elderly people with health problems (Herrmann *et al.*, 2010). At the same time, higher labour market participation is needed to pay for welfare state expenditures. Current policies therefore have seemingly contradictory goals (Moussa, 2019). On the one hand, policy makers promote informal care – care or help provided by family members, friends or neighbours – to alleviate public health-care spending. On the other hand, policy makers want to increase labour market participation by raising the retirement age and by stimulating the employment of underrepresented groups such as women. Hence, health-care and labour market policies likely compete for people's time. An imperative question, therefore, is whether the provision of informal care hampers people's performance in the labour market, either because informal care-givers may reduce their working hours, may leave the labour market altogether, or be absent from work due to mental or physical illness caused by stress and burden resulting from the care-giving role. We will address this question in this study by examining whether transitions into (intensive) informal care-giving reduce labour supply (both in terms of shorter work hours and withdrawal from the labour market) and increase workplace absenteeism due to illness.

Previous studies have taught us that the relationship between informal care and paid work is sensitive to causality and selection issues (Bauer and Sousa-Poza, 2015; Martsolf *et al.*, 2020). A negative correlation between the provision of informal care and hours of paid work may imply that informal care reduces employees' labour market supply. However, it can also result from non-employed or part-time employed persons being more likely than full-time workers to pick up a caring role because they have more time available (causality). Furthermore, certain (personality) traits may foster the likelihood of being both a care-giver and having a weak attachment to the labour market (selection). Longitudinal studies are therefore necessary. Overview studies conclude that most longitudinal studies find evidence of some negative labour market consequences of providing informal care (Ciccarelli and Van Soest, 2018; Moussa, 2019). For instance, Ciani (2012) found a negative, but small effect of informal care-giving on labour market participation, based on the European Community Household Panel, waves 1994–2001, with data for men and women pooled. Leigh (2010) also found a small negative effect of informal care-giving on labour market participation based on Australian panel data for the period 2001–2007, again with data for men and women pooled. Kelle (2020), using the German SocioEconomic Panel (2001–2014), documented that, compared to German middle-aged working women without care-giving tasks, those with high-intensive care-giving tasks were more likely to stop working, and those with less-intensive care-giving tasks were more likely to make the transition from full-time to part-time work.

The contribution of this study is threefold. First, we extend the existing literature on work consequences of informal care by testing the impact of informal care on workplace absenteeism due to illness. This is a potential, and often overlooked, negative side-effect of care-giving. Apart from the impact on the care-giver, absenteeism due to illness negatively affects care-givers' employers as well. Absenteeism is costly (Edwards and Greasley, 2010) and may reduce firms' productivity, for instance because the employee cannot be substituted or a temporary replacement is less productive (*e.g.* Herrmann and Rockoff, 2012; Grinza and Rycx, 2018).

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This outcome measure is largely absent from the literature (exceptions are a Dutch report by Josten and De Boer (2015) and Mortensen *et al.* (2017)).

Second, this study will present a longitudinal analysis for the Netherlands. The Netherlands provides an interesting context for research into work-hour reductions. The Netherlands has the highest rate of part-time employment in Europe (Eurofound, 2007). Moreover, every employee has the legal right to ask for a reduction of his or her working hours and employers can only refuse when business stakes would be disproportionately high (Flexible Working Arrangements Act). Part-time workers are entitled to the same hourly wage as comparable full-time colleagues in the same job (Equal Treatment Act). In the Netherlands, reducing one's working hours may therefore be a relatively attractive solution for employees who experience difficulties in combining work and care. As argued earlier, longitudinal designs are essential to study properly the impact of informal care-giving on employment-related outcomes. However, these are largely lacking for the Netherlands. We fill this gap by using eight waves of data from the Dutch Labour Supply Panel, covering a 14-year period between 2004 and 2018, to test whether becoming an informal care-giver reduces work hours and increases the likelihood of labour market exit and workplace absenteeism.

Third, we will study the consequences of informal care-giving for both men and women. Many studies that consider the tension between labour market participation and informal care policies focus on middle-aged women as they are assumed to be most affected by both policies (Moussa, 2019). However, if informal care-giving is to be a common (often temporary) role in people's life, it will affect both men and women in all age groups. Moreover, although care-giving is indeed most common among women, in the Netherlands 13 per cent of working men provide informal care (compared to 23% of working women) (Josten and De Boer, 2015). There have been a few previous longitudinal studies on gender differences in the labour market effects of informal care, but the results of these have been mixed. Ciccarelli and Van Soest (2018), for instance, concluded on basis of the Survey of Health, Ageing and Retirement in Europe that daily care-giving lowered women's labour market participation, but not men's, while non-daily care-giving did not affect either group. Leigh (2010), on the other hand, found no evidence for a weaker effect on men than women in an Australian sample. We therefore argue that more insight is also needed into the consequences of providing informal care for men. We will study women and men separately, and argue how their outcomes may differ.

In summary, this study will address the following research question:

- To what extent does taking on (intensive) informal care-giving increase the likelihood of work-hours reduction, labour market exit, and workplace absenteeism due to illness for men and women in the Netherlands?

Theoretical expectations

Impact on work hours or labour market exit

Role conflict theory (Goode, 1960; Biddle, 1986) argues that having multiple roles implies multiple and contrasting demands which may bring along high levels of

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burden. Employed men and women who start providing informal care face such a combination of roles. Greenhaus and Beutell (1985) argue that combining multiple roles produces time-based conflict (as time devoted to one role hampers performance in another role) and strain-based conflict (because worries from one role spill over into the other role). Stress is the result. Adjustment of one of the roles potentially resolves the problem. Reduction of work hours or – the most extreme option – leaving the labour market altogether are assumed to be solutions that facilitate the combination of work and care (Dautzenberg *et al.*, 2000; Van Houtven *et al.*, 2013; Lee and Tang, 2015). Note that another solution could be to reduce the number of care hours rather than the number of working hours. However, the care needs of the care recipient strongly determine the hours of care provided, and it seems not to be very flexible in the case of certain forms of support (*e.g.* help with showering, dressing, preparing meals) or acute hospitalisation. Hypothesis 1 therefore is:

- Starting to provide informal care will reduce work hours and increase the likelihood of withdrawing from the labour market.

Impact on workplace absenteeism due to illness

Health problems are the main reason for workplace absenteeism (European Foundation for the Improvement of Living and Working Conditions, 1997; Johannson and Lundberg, 2004). The existing literature consistently reports that informal care-giving is associated with lower levels of mental and physical health and wellbeing (Pinquart and Sörensen, 2003). Two types of explanations are offered for this (Verbakel, 2014). First, the negative relationship may lie in the care-giving experience itself. Care-giving sometimes implies carrying out difficult or physically demanding tasks. Some care-givers are confronted with problem behaviour by the care recipient, may suffer from a deteriorating relationship with the care recipient or may be emotionally affected by the deteriorating health of their loved one (Pearlin *et al.*, 1990; Broese van Groenou *et al.*, 2013). Such difficulties inherent in providing care generate worries, stress or sadness, which may manifest themselves in a deteriorating mental but also physical health. The second mechanism emphasises an indirect pathway in which care-giving limits one's personal, social and working life, which in turn negatively affects health and wellbeing. Explanations for this indirect pathway can again be found in role conflict theory (Greenhaus and Beutell, 1985). Time scarcity that results from combining multiple roles produces stress and hampers one's opportunities to participate in leisure activities that bring joy and relieve stress symptoms. It thus limits one's time for recovery from care and from work demands. The effort-recovery model (Meijman, 1989; Meijman and Mulder, 1998) states that if there is insufficient time for recovery between (work and non-work) tasks, people may expend compensatory effort to still maintain their performance, which, in turn, will further increase fatigue and stress levels. In addition, negative spill-over effects of strain and worries caused by one role may reduce one's performance in other roles, making people less satisfied with their personal, work and social life. Reduced wellbeing may be the result.

Ill health is not necessarily the only reason for calling in sick. People may also stay home from work because they suddenly have to take care of a sick family

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member. These unexpected demands are more common among care-givers than non-care-givers. However, as we will study long-term (*i.e.* 2 weeks or more) absenteeism, this explanation may be less relevant. In summary, we expect that:

- Starting to provide informal care will increase the risk of workplace absenteeism due to illness.

Gender differences in the impact on work hours or labour market exit and on absenteeism due to illness

As providing care is traditionally seen as a female role, while being the main breadwinner is often regarded as a male role (Davis and Greenstein, 2009), women will identify more strongly with the care-giving role and show greater commitment to care-giving compared to men (Swinkels *et al.*, 2019). This may first affect what their care-giving situation looks like. Women not only spend more time on care-giving, they also help with more care-giving tasks and assist with more demanding forms of care, such as personal care, than men (Pinquart and Sörensen, 2006; Verbakel *et al.*, 2017). In other words, the average female care-giver faces a more demanding care-giving situation than the average male. As a result, female care-givers may feel a greater need than males to reduce their work duties and may experience higher levels of stress, the latter potentially leading to higher absenteeism rates. Second, even when the care situations of women and men are alike, women may be more likely to prioritise care-giving over work because of their stronger commitment to and identification with the care-giving role. If the combination of work and care responsibilities becomes too challenging, women may therefore be more likely to reduce their work duties. In addition, women may also prioritise care-giving over other, non-work activities, such as leisure, leaving them less time to recover. This may make them more likely to become absent from work due to illness. In short, we expect that:

- Starting to provide care will reduce work hours, increase labour market exit and increase workplace absenteeism due to illness more strongly for women than for men.

Methods

Data

The data used in this study were taken from the Dutch Labour Supply Panel (Arbeidsaanbodpanel). This is a biannual panel survey among a representative sample of the Dutch working-age population (16–66 years old) in which information is collected on respondents' work and private lives. Data are obtained from self-completion questionnaires. The number of respondents is about 4,800 in each wave, of whom approximately 3,700 are in paid employment; 70–80 per cent of the individuals who participate in one wave also take part in the next round of data collection, two years later. The panel is refreshed each wave to counter attrition and to ensure that young people are also represented in the panel. For more information on the Dutch Labour Supply Panel, *see* Josten (2020).

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In this study, we used waves 2004–2018. We constructed a person-period file with each record containing information on an individuals' answers in two consecutive waves, and allowed individuals to be included multiple times in the data. For instance, respondents who had taken part in the 2010, 2012 and 2014 surveys each provided two records: one with their information from the 2010 (t) and 2012 (t1) survey waves, the other with their information from the 2012 (t) and 2014 (t1) survey waves. We selected the records in which the respondents were employed and not giving care at the first of the two consecutive waves (t). They also had to be aged 23–57 in wave t, to exclude students with part-time jobs and workers close to retirement. The total number of observations was 6,452 for males, clustered in 2,441 unique respondents, and 5,961 for females, clustered in 2,370 unique respondents.

Measurements

The first dependent variable, 'changes in labour market supply', was measured using information on contracted work hours.[1] We used contracted hours and not actual hours because a reduction in contracted hours directly affects people's income. It is thus a strong signal that the care-giver experiences a role conflict. A reduction in actual working hours does not necessarily affect income since actual work hours also include unpaid overtime. For the self-employed, we had to rely on actual work hours, but for them, shortening actual work hours does have direct financial consequences. Respondents were classified as having reduced their work hours if they worked at least 4 hours less per week than in the previous wave. They were categorised as having stopped working if they did not do paid work but had done so in the wave before. In summary, we distinguished the options (a) had reduced work hours (by at least 4 hours per week) or (b) had stopped working, and (c) kept the same number of work hours or had increased work hours.[2] In 7 per cent of the male observations and 12.4 per cent of the female observations in our sample, a reduction in work hours was recorded. Labour market exit was less common; it was reported in 2.5 per cent of the male observations and 4.5 per cent of the female observations.

Our second dependent variable, 'workplace absenteeism due to illness', was defined as an absence from work of at least two consecutive weeks (yes/no). This was measured with the question: 'Were you on sick leave for at least two consecutive weeks during the previous calendar year? (excluding maternity leave).' This information was measured in wave t1. Workplace absenteeism due to illness was reported in 9.6 and 13.3 per cent of the observations among men and women, respectively.

Our independent variable, 'transitions into (intensive) informal care-giving', indicated whether respondents had taken on (intensive) informal care between waves t and t1. Informal care was measured with the following question: 'Do you spend time on unpaid care for an elderly or dependent person in your environment? (by this we mean help with personal care or household duties for an elderly or (chronically) ill family member, friend, acquaintance or neighbour).' Note that we include a wide range of social relationships: not only care for relatives, but also for non-relatives (Perry-Jenkins and Gerstel, 2020). The average care-giver in our sample spent 4 hours per week on such care (working respondents only).

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Respondents were classified as having taken on intense levels of care if they devoted more than 4 hours per week, *i.e.* more than the average, to care. In total, we looked at three types of transitions: (a) from non-care-giving to non-care-giving (stability), (b) from non-care-giving to non-intensive care-giving (0.5–4 hours per week), and (c) from non-care-giving to intensive care-giving (more than 4 hours per week). In total, take-up of informal care-giving was recorded in 495 of the 6,452 male observations (7.7%) and in 696 of the 5,961 female observations (11.7%) between waves t and t1 (*see also* Table 1). Non-intensive care-giving was more common than intensive help: among males, starting to provide the first form of care was observed 404 times (6.3%), while starting to help intensively was observed 91 times (1.4%). Among women, these figures were 576 (9.7%) and 120 (2.0%), respectively.

Analytical strategy

We tested whether respondents who became (intensive) informal carers were more likely than respondents who remained non-care-givers to reduce their work hours or to stop working between waves t and t1, or to be absent from work due to illness in wave t1. We estimated (multinomial) logistic regression analyses. We ran separate models for females and males, as their labour market behaviour differs. Predicted marginal probabilities were estimated to provide insights into the strength of the effects. In addition, we ran a pooled model with an interaction between transitions into (intensive) informal care-giving and gender to test statistically for gender differences.

Some of the respondents in our dataset provided multiple records, which may underestimate standard errors (SE), and as a consequence, overestimate significance levels. It may also affect the regression coefficients. We therefore estimated multilevel models. These corrected for the fact that some observations were not independent of each other, but were clustered at the level of the individual respondent.

We included the standard demographics as control variables in the analyses, *i.e.* age in wave t (in categories) and educational level: low (lower vocational education or less), medium (intermediate vocational education) and high (higher vocational education or a university degree). We also added the following control variables: the number of work hours in wave t (categorised as $\leq$19, 20–27, 28–34 and $\geq$35 hours per week); presence of a child under the age of 13 in the household in wave t (yes/no); birth of a first child between waves t and t1 (yes/no); being employed in health care or social work in wave t (yes/no); year of data collection (in wave t); and, for the analyses on absenteeism only, absenteeism in wave t. Working hours, presence of small children and birth of first child were included because these are known to influence people's subsequent work-hours decisions. Being employed in health care or social work was added because both the rate of informal carers and the absenteeism rate in this sector are well above average.

We deleted missing values in a listwise manner. Respondents who were no longer employed in wave t1 had missing values by default on workplace absenteeism due to illness. Therefore, the number of observations was lower in the sample used to test the effect of informal care take-up on workplace absenteeism. The number of respondents with one or more missing values on the control variables was N = 138 or 1.1 per cent (analyses on labour market supply), and N = 103 or

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Table 1. Characteristics of the sample: distribution of the respondents by dependent, independent and control variables

	Labour market supply sample		Absenteeism due to illness sample	
	Men	Women	Men	Women
N	6,452	5,961	6,308	5,706
	Percentages			
Dependent variables:				
Transitions in labour market participation:				
No change in or increased work hours between t and t1	90.6	83.1		
Reduced work hours with 4 or more between t and t1	7.0	12.4		
Stopped working between t and t1	2.5	4.5		
Absenteeism due to illness (t1)			9.6	13.3
Independent variable:				
Transitions in informal care-giving:				
Remained non-care-giver between t and t1	92.3	88.3	92.4	88.5
Started non-intensive care-giving between t and t1	6.3	9.7	6.2	9.6
Started intensive care-giving between t and t1	1.4	2.0	1.4	1.9
Control variables:				
Age (t):				
23–34	19.6	25.9	19.8	26.1
35–44	30.6	32.3	30.8	32.2
45–57	49.8	41.8	49.4	41.7
Educational level (t):				
Low	19.8	17.0	19.7	16.5
Medium	37.5	39.2	37.3	39.2
High	42.7	43.8	43.1	44.3
Child aged <13 in household (t)	40.0	38.6	40.2	38.6
Birth of first child between t and t1	2.6	3.0	2.6	3.0
Weekly work hours (t):				
≤19	1.8	25.2	1.7	24.4
20–27	3.1	28.7	3.1	28.9
28–34	9.5	23.3	9.3	23.6
≥35	85.6	22.8	85.9	23.1

(*Continued*)

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Table 1. (*Continued.*)

	Labour market supply sample		Absenteeism due to illness sample	
	Men	Women	Men	Women
N	6,452	5,961	6,308	5,706
Employed in health care or social work (t)	7.0	36.0	7.0	36.4
Year (t):				
2004	14.5	12.6	14.6	12.9
2006	16.0	16.0	16.1	16.2
2008	15.3	14.7	15.2	14.5
2010	13.2	13.6	13.2	13.6
2012	13.8	14.3	13.6	14.1
2014	13.7	14.4	13.7	14.4
2016	13.5	14.4	13.6	14.4
Absenteeism due to illness (t)			9.3	12.0

0.9 per cent (analyses on absenteeism), respectively. Table 1 shows descriptive information on all variables in our models for both samples and for men and women separately.

In order to check for causality issues, we performed some additional analyses as robustness checks, which we will explain in the next section. All analyses were conducted in Stata version 16.

Furthermore, we should note that workers with care responsibilities who have difficulties with combining both tasks might be less likely to remain in a panel study due to lack of time. If this is the case, we would underestimate the relationship between informal care and our dependent variables. We therefore checked whether there were differences in drop-out rates between non-carers, non-intensive carers and intensive carers, or between carers who did and who did not report difficulties with combining both tasks, but this was not the case.[3]

Results

Before presenting the results of the multivariate analyses, we first discuss the bivariate associations. Table 2 presents the share of workers who had reduced their work hours or had experienced a long-term absence spell due to illness, broken down by whether or not they had become (intensive) informal carers. The numbers suggest that both men and women who took up intensive informal care were more likely than non-carers to have quit working.

The association between informal care and absenteeism due to illness also appears to be similar for men and women. Both groups got a higher risk of long-term illness absenteeism when they became carers, but this was only if they

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Table 2. Share of respondents who reduced their labour market supply and share of respondents with two or more consecutive weeks of workplace absenteeism due to illness, by transitions into care-giving

	Reduced work hours with 4 or more between t and t1	Stopped working between t and t1	Absenteeism due to illness in t1
	Percentages		
Men:			
Remained non-care-giver between t and t1	6.9	2.4	9.2
Started non-intensive care-giving between t and t1	6.7	3.0	13.5*
Started intensive care-giving between t and t1	11.0	5.5*	14.0
Women:			
Remained non-care-giver between t and t1	12.5	4.4	12.7
Started non-intensive care-giving between t and t1	11.8	4.9	17.7**
Started intensive care-giving between t and t1	15.0	8.3*	17.3

Note: We controlled for absenteeism in wave t in the analysis on absenteeism in wave t1.
Significance levels: Significantly different from those who remained non-care-giver (univariate tests): * $p < 0.05$, ** $p < 0.01$.

provided non-intensive forms of help. In the next step, we will test these associations while controlling for relevant confounders.

Table 3 presents the multivariate test of our hypothesis that starting with informal care reduces employment, both in terms of fewer weekly work hours and in terms of withdrawal from the labour market. The results show that men's labour market supply was not significantly affected by taking on either less-intensive or more-intensive forms of care. Women's labour market supply was affected, but the outcome differed from what the descriptive results suggested. Women who became informal carers did not leave the labour market significantly more often than non-carers, but those who had taken on an intensive form of care were more likely to have shortened their working week. There was no significant relationship between starting to give non-intensive informal care and reducing working hours (although it bordered on significance: $p = 0.052$). We calculated averaged predicted marginal probabilities to interpret the strength of effects. In other words, we estimated for each respondent what their probability on the dependent variable would be, assuming that they were in a certain care-giving transition category, while keeping their observed values on all control variables constant. For each category of transitions in care-giving, these predicted probabilities were then averaged across all respondents and are displayed in Table 5. Women's predicted probabilities of shortening their working week were 12 per cent if they had remained a non-care-giver between years t and t1, 15 per cent if they had started to provide

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Table 3. Multivariate test of the relationship between transitions into informal care-giving and changes in labour market supply

	Men				Women			
	Reduced work hours with 4 or more between t and t1		Stopped working between t and t1		Reduced work hours with 4 or more between t and t1		Stopped working between t and t1	
	b	SE	*b*	SE	*b*	SE	*b*	SE
Transitions in informal care-giving:								
Remained non-care-giver between t and t1	Ref.		Ref.		Ref.		Ref.	
Started non-intensive care-giving between t and t1	−0.05	0.21	−0.05	0.32	0.29	0.15	0.07	0.22
Started intensive care-giving between t and t1	0.57	0.36	0.77	0.49	0.60*	0.29	0.63	0.36
Age (t):								
23–34	Ref.		Ref.		Ref.		Ref.	
35–44	−0.14	0.16	0.08	0.30	−0.39**	0.12	0.04	0.19
45–57	0.09	0.14	0.56*	0.26	−0.11	0.12	0.01	0.20
Educational level (t):								
Low	Ref.		Ref.		Ref.		Ref.	
Medium	0.03	0.15	−0.19	0.20	−0.15	0.14	−0.42*	0.17
High	0.17	0.15	−0.85***	0.23	−0.26	0.15	−0.64***	0.19
Child aged <13 in household (t)	−0.19	0.12	−0.24	0.20	0.65***	0.12	−0.04	0.18
Birth of first child between t and t1	0.94***	0.25	−0.23	0.74	2.22***	0.20	1.02*	0.41
Weekly work hours (t):								

(*Continued*)

Table 3. (*Continued.*)

	Men				Women			
	Reduced work hours with 4 or more between t and t1		Stopped working between t and t1		Reduced work hours with 4 or more between t and t1		Stopped working between t and t1	
	b	SE	*b*	SE	*b*	SE	*b*	SE
≤19	−1.22	0.61	1.31***	0.36	−1.89***	0.18	0.56*	0.23
20–27	0.10	0.28	0.30	0.42	−1.24***	0.14	−0.13	0.23
28–34	0.08	0.17	0.55*	0.25	−0.56***	0.12	−0.13	0.23
≥35	Ref.		Ref.		Ref.		Ref.	
Employed in health care or social work (t)	0.30	0.19	−0.19	0.36	0.06	0.10	−0.65***	0.15
Year (t):								
2004	Ref.		Ref.		Ref.		Ref.	
2006	−0.36	0.19	−0.38	0.32	0.14	0.17	0.00	0.28
2008	0.04	0.18	0.11	0.29	0.27	0.17	0.62*	0.26
2010	0.07	0.19	−0.05	0.31	0.12	0.18	0.55*	0.27
2012	−0.01	0.19	0.35	0.29	0.18	0.17	0.65*	0.26
2014	−0.13	0.19	−0.17	0.32	0.18	0.17	0.50	0.27
2016	0.05	0.19	−0.22	0.33	0.18	0.17	0.43	0.28
Constant	−2.72***	0.22	−3.71***	0.35	−1.45***	0.20	−3.04***	0.31

Notes: Multilevel multinomial logistic regression; reference group is no change in or increased work hours between t and t1. Ref.: reference category.
Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

non-intensive care and 19 per cent if they had begun to providing intensive help (*see* Table 5). Hence, women who started to give intensive care had a 50 per cent higher probability of reducing their work hours compared to women who remained non-carers. The significantly higher odds among females who gave intensive forms of care were not visible in the descriptive results (Table 2), due to differences in background characteristics between female carers and non-carers, which influenced their propensity to reduce their work hours. Female carers had fewer child care duties due to their above-average age. They also had a shorter than average prior working week. Both these characteristics reduced the likelihood of them shortening their working week, relative to other women. After controlling for the differences in these background characteristics between the two groups, the relationship between providing intensive forms of informal care and work-hours reduction became apparent. The association between the take-up of informal care-giving and labour market exit among both men and women, on the other hand, disappeared after controlling for, among other things, the higher age of respondents who had taken on informal care.

The patterns for men and women are shown graphically in Figures 1 and 2, which present the regression coefficients and confidence intervals of our independent variable 'transitions into informal care'. Figure 1 shows that the impact of taking on intensive informal care on reduction in working hours differed significantly from zero for women but not for men. The fact that the confidence intervals for men and women overlap implies that the estimates for men and women were not significantly different from each other, however. This result was confirmed by the pooled model with interaction term (took up non-intensive care: $b = 0.31$, SE = 0.26, $p = 0.23$ for work-hours reduction and $b = 0.02$, SE = 0.38, $p = 0.97$ for labour market exit; took up intensive care: $b = 0.03$, SE = 0.46, $p = 0.95$ for work-hours reduction and $b = -0.23$, SE = 0.61, $p = 0.70$ for labour market exit). Thus, we cannot be certain that the pattern of work-hours reductions is really gendered.

Table 4 shows the results of the multivariate tests on the impact of informal care on workplace absenteeism due to illness. The results for women correspond to the descriptive results in Table 2. Taking on informal care-giving increased the risk of absenteeism due to illness among women, but only if they provided non-intensive help. The magnitude of this effect can be more easily derived from the averaged predicted marginal probabilities (*see* Table 5). Women's predicted probability of an illness spell was 13 per cent if they remained non-carers and 16 per cent if they took up non-intensive care. Somewhat surprisingly, intensive help did not significantly increase women's workplace absenteeism, while non-intensive forms of care did.

There was no significant relationship between either non-intensive or intensive care and absenteeism among men. However, if we combine both care categories – and thus test the effect of taking on informal care as such – we do find that taking on informal care also increases men's odds of a long-term sickness absence spell. Lack of statistical power may explain why the coefficients for both categories of care separately were not significant, as there were fewer male than female workers who had taken on informal care (*see* Methods section).

As can be derived from Figure 3, the confidence intervals for men and women again overlap, implying that the impact of taking on (non-intensive or intensive)

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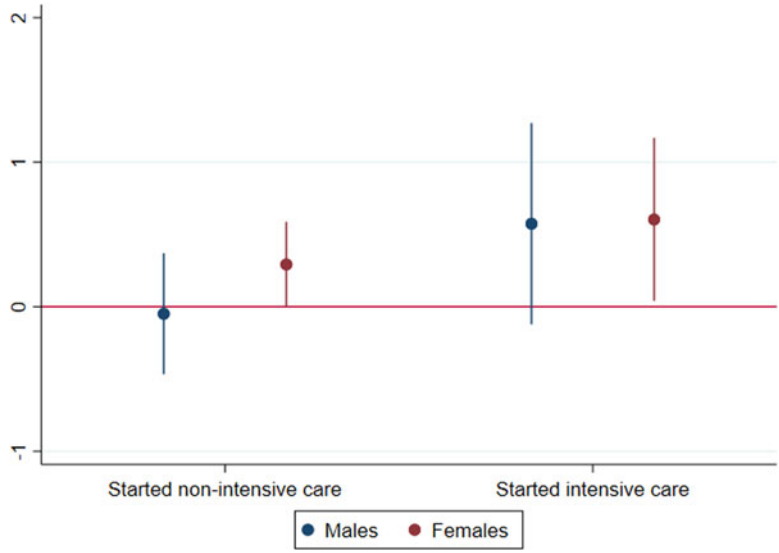

Figure 1. Coefficients and confidence intervals of transitions into informal care between t and t1 on work-hours reduction between t and t1.

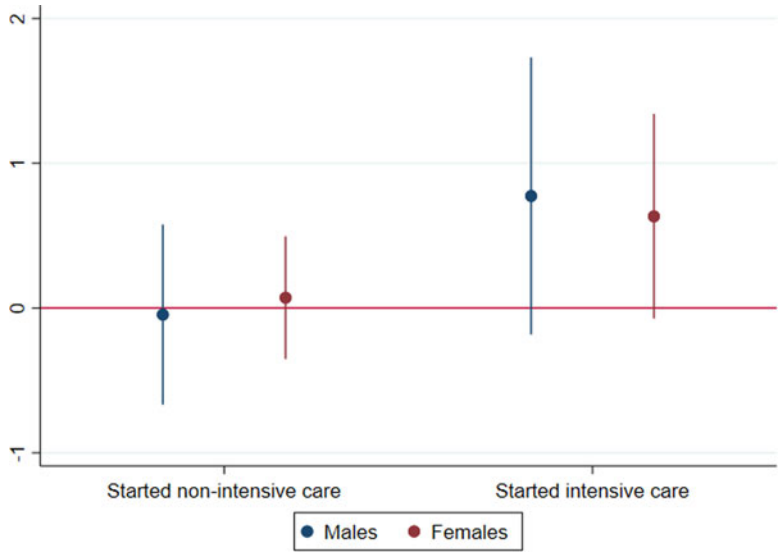

Figure 2. Coefficients and confidence intervals of transitions into informal care between t and t1 on quitting working between t and t1.

informal care did not differ significantly by gender. This was confirmed by the pooled model with interaction term (took on non-intensive care: $b = 0.01$, SE = 0.22, $p = 0.95$; took up intensive care: $b = -0.33$, SE = 0.46, $p = 0.48$).

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Table 4. Multivariate test of the relationship between transitions into informal care-giving and workplace absenteeism due to illness

	Absenteeism due to illness (t1)			
	Men		Women	
	b	SE	*b*	SE
Transitions in informal care-giving:				
Remained non-care-giver between t and t1	Ref.		Ref.	
Started non-intensive care-giving between t and t1	0.30	0.18	0.30*	0.13
Started intensive care-giving between t and t1	0.49	0.37	0.17	0.28
Age (t):				
23–34	Ref.		Ref.	
35–44	0.03	0.17	0.13	0.13
45–57	0.34*	0.16	0.37**	0.13
Educational level (t):				
Low	Ref.		Ref.	
Medium	−0.34*	0.13	−0.33**	0.12
High	−0.83***	0.14	−0.41**	0.13
Child aged <13 in household (t)	−0.11	0.12	−0.01	0.11
Birth of first child between t and t1	−1.11*	0.54	−0.35	0.31
Weekly work hours (t):				
≥19	0.25	0.37	0.02	0.14
20–27	0.27	0.27	−0.07	0.13
28–34	0.26	0.17	−0.16	0.13
≤35	Ref.		Ref.	
Employed in health care or social work (t)	−0.13	0.22	0.06	0.09
Year (t):				
2004	Ref.		Ref.	
2006	−0.07	0.16	−0.07	0.15
2008	−0.06	0.17	−0.15	0.16
2010	−0.15	0.18	−0.15	0.16
2012	−0.27	0.18	−0.13	0.16
2014	−0.13	0.18	−0.25	0.16
2016	−0.64**	0.20	−0.17	0.16
Absenteeism due to illness (t)	1.10***	0.15	1.19***	0.12
Constant	−2.41***	0.21	−1.98***	0.19

Notes: Multilevel logistic regression; reference group is no illness absenteeism at t1. SE: standard error. Ref.: reference category.
Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

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Table 5. Predicted marginal probabilities of labour market supply reductions and workplace absenteeism due to illness, by transitions into informal care-giving

	Reduced work hours with 4 or more between t and t1	Stopped working between t and t1	Absenteeism due to illness in t1
	Percentages		
Men:			
If non-care-giver between t and t1	7.0	2.4	9.0
If started non-intensive care-giving between t and t1	6.7	2.3	11.4
If started intensive care-giving between t and t1	11.3	4.7	13.1
Women:			
If remained non-care-giver between t and t1	12.1	4.4	12.8
If started non-intensive care-giving between t and t1	15.2	4.5	16.2
If started intensive care-giving between t and t1	18.9	7.3	14.6

Notes: Estimation of the predicted marginal probabilities is based on the outcomes of the multilevel analyses in Tables 3 and 4. We estimated the respondents' probabilities for each care-giving transition category, while keeping constant their observed values on the control variables.

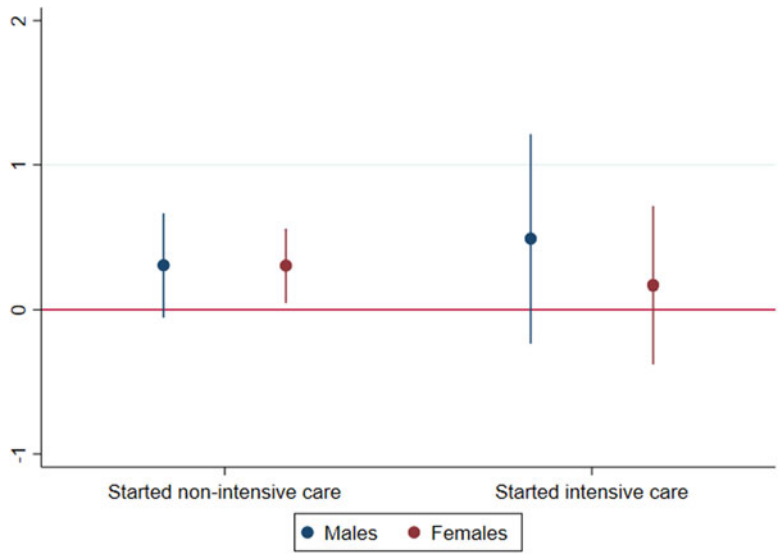

Figure 3. Coefficients and confidence intervals of transitions into informal care between t and t1 on long-term sickness absence in t1.

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In sum, our hypotheses were partially confirmed. Starting to provide informal care did indeed reduce work hours, but only among women who took up intensive forms of care, and not among men. We cannot be certain, however, that the effects of informal care on labour supply are really gendered, as the outcomes for men and women did not differ significantly from each other. Workplace absenteeism due to illness rose among both men and women when they took on (non-intense) informal care.

Robustness checks

Although we think the analytical design we used is to be preferred, we tested alternative model specifications in response to causality issues. The design of our data implied uncertainty about the temporal order of events. Both the take-up of informal care and the change in labour supply took place between waves t and t1, *i.e.* that is somewhere in a period of two years. As a result, we cannot say with certainty whether the reduction in work hours happened before or after the take-up of informal care-giving. As a first robustness check, we estimated the effect of a transition in informal care-giving between waves t and t1 on a change in labour market supply between waves t1 and t2. This approach ensured that the take-up of informal care happened before the respondent changed his or her labour market supply. The downsides of this alternative are that the change in labour market supply may have taken place long after the take-up of informal care (at maximum almost four years, if the informal care started shortly after t and the change in labour market supply was close to t2). Moreover, the respondent could already have stopped care-giving, in which case a reduction in working hours was not a response to the provision of informal care. In addition, this alternative design required that respondents had participated in three consecutive waves, which reduced the number of observations and thus reduced statistical power. For men, the results of the robustness check were similar to our baseline analysis. For women, they were not: females who had taken on informal care were not more likely to reduce their labour market supply between waves t1 and t2. However, as noted earlier, this may be due to the fact that female carers who wanted to shorten their work hours had already done so between waves t and t1.

Second, we conducted a similar robustness check on the causal order of informal care-giving transitions and workplace absenteeism due to illness. In our data, absenteeism due to illness referred to the calendar year before t1. It is therefore possible that the take-up of informal care-giving between t and t1 happened after the reported spell of illness absenteeism. We therefore conducted a robustness check in which we estimated the effect of a transition in informal care-giving between wave t and t1 on absenteeism due to illness recorded in wave t2. This has the same downsides as the robustness check for work hours: potential large time lag between the take-up of care-giving and workplace absenteeism; respondent may no longer be providing care at the time of the workplace absenteeism; and lower statistical power. The results for both sexes were quite similar to our baseline analyses. Among women, non-intensive care still seemed to be associated with higher levels of sickness absence, although the association weakened somewhat as the *p*-value decreased to 0.061 at t2. Among males, the analysis combining both

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categories of care into one gave the same results at t2 as at t1: a higher level of sickness absence. A small difference was that males who had taken on non-intensive care did have a significantly higher likelihood of absenteeism in t2 ($p = 0.04$) whereas they had not in t1 ($p = 0.10$).

Finally, one could argue that – despite the fact that we controlled for relevant confounders – our results may have suffered from unobserved heterogeneity. Some people may be more inclined to provide informal care-giving as well as to reduce their work hours or to take sick leave, and this may be due to characteristics we did not observe, such as personality traits. We conducted fixed-effects analyses to exclude confounding effects of such time-constant unobserved factors. We estimated the within-person association between changes in care-giving, on the one hand, and (a) changes in hours worked on the labour market (with respondents who had quit working having zero hours on the labour market) and (b) changes in workplace absenteeism due to illness, on the other hand. The fixed analyses were not conducted on the person–period file, but on a longitudinal file in which each record contained information on one wave per respondent. Note that fixed-effects analyses do not clarify the temporal order of events. In general, the results were quite similar to those of our baseline analysis, but there were a few differences. Both our multilevel transition model and the fixed-effects analysis showed that women who took on intensive informal care were more likely to reduce their labour market supply. Furthermore, according to the fixed-effects analysis, non-intensive care also reduced women's labour market supply. According to our multilevel transition model, this bordered on significance ($p = 0.052$). The results regarding male labour market supply were the same: informal care had no effect on male labour supply according to both types of analyses.

Furthermore, the fixed-effects analysis and our multilevel transition model largely agreed regarding the effects on absenteeism among males. According to the fixed-effects analysis, non-intensive informal care increased long-term sickness absence among males. According to our multilevel transition model, males who took on informal care (non-intensive and intensive forms combined) had an above-average risk of long-term sickness absence. The results regarding women's sickness absence differed, however: the fixed-effects analysis found no significant effect, contrary to our multilevel transition model. We are not certain of the cause of this difference. Perhaps the explanation is that the fixed-effects model estimates the impact of informal care regardless of when people had started providing such care, while our multilevel transition model only looks at the effects in the first two years (or less) after taking on informal care. As women tend to reduce their labour market supply, on average, when they give informal care, maybe they thus manage to reduce the effect of informal care on their absenteeism over time.

Conclusion and discussion

This study provided a longitudinal analysis of the effects of taking on informal care-giving on the likelihood of work-hours reduction, labour market exit and workplace absenteeism due to illness of men and women in the Netherlands. We found that women who started to give informal care were more likely to reduce their work hours. The results regarding non-intensive care were somewhat mixed, as our

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baseline model, a multilevel transition model, showed that women who took up this type of care were not significantly more likely to reduce their working hours ($p = 0.052$), whereas our robustness check, a fixed-effects model, showed that non-intensive care did affect women's labour market supply. Women's propensity to quit working altogether did not increase when they started to give informal care. Male employment, on the other hand, was not affected by the take-up of informal care-giving. In addition, our results demonstrated that starting to provide non-intensive informal care increased the risk of workplace absenteeism among women (but it is uncertain whether this effect continues to be present the longer the informal care lasts). There was no significant effect of taking on either non-intensive or intensive care on male sickness absence, but if both categories of informal care were combined, men's absenteeism turned out to be significantly affected by informal care as well.

We aimed to contribute to the literature by conducting a longitudinal study on the effects of informal care-giving on labour market supply in the Netherlands. We confirmed that Dutch working women who took up intensive informal care were more likely to reduce their working hours, which is in line with previous longitudinal research on other countries (Ciccarelli and Van Soest, 2018). This finding suggests that combining work and care is not easy and induces time conflict or strain, even in a country where a large share of women work part-time. Interestingly, starting with informal care did not stimulate Dutch working women to take the extreme option of withdrawing from the labour market completely, but only of reducing their working hours. From the perspective of government policy to increase labour market participation, this result is less detrimental than increased drop-out from the labour market. The Dutch context of this study, with ample and good opportunities for part-time work, may explain this result. When confronted with difficulties in reconciling work and informal care, an environment which is friendly to part-time work takes away the need for extreme labour market adjustments such as quitting working altogether. Instead, it stimulates work-hours reductions as a solution to better combine work and informal care. We could cautiously say that the specific Dutch employment context helps to keep care-givers attached to the labour market (in terms of preventing drop-out). The other side of the coin, however, is that easy reductions of work hours may harm labour market careers and economic independence in the long run. Women in our sample who reduced their work hours after taking up intensive informal care did so on average for more than 8 hours per week.[4] This is a substantial reduction that may limit their accumulation of human capital and harm their chances of promotion at work. Such negative long-term labour market effects among women, and hence a possible widening of the gender gap, might be avoided in contexts that are less friendly to part-time work.

Also in line with previous research is that we see more effect on women's than men's labour market supply (Moussa, 2019). However, as the confidence intervals for men and women overlap, we cannot be certain that the patterns we found really are different by gender. If they are, this may either suggest that the combination of work and care leads, on average, to less pressing situations for men and that they therefore feel less need to shorten their working week, or that men use strategies other than work reductions to combine work and informal care, such as sharing

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the care with others (Swinkels *et al.*, 2019). The suggestion that reducing work hours is a more likely response for women than for men is in line with gendered roles and expectations that are still prevalent in today's society. If caring is most strongly associated with the female sphere and earning money with the male sphere, men may be less inclined to compromise their work role, whereas women feel more room or more pressure to do so.

A second way of contributing to the literature was the inclusion of workplace absenteeism due to illness as a possible negative side-effect of providing informal care. We found evidence that workers who took up informal care were more likely to experience a spell of long-term sickness absence. This finding is in line with Mortensen *et al.* (2017), except that we found this result among both men and women, while they found increased sickness levels only among women. We interpret the positive association between informal care take-up and absenteeism due to illness as another indication that caring obligations may not be easily combined with paid work, presumably because burden and stress make informal carers more susceptible to falling ill. This finding complements literature that demonstrated negative effects of informal care-giving on health (Pinquart and Sörensen, 2003). Since previous studies suggest that mental health is more strongly affected than physical health (Ciccarelli and Van Soest, 2018), the higher levels of absenteeism after taking up care-giving are probably partly due to increased burden and stress. Increased levels of stress may follow from the care-giving role itself, from fulfilling this role in combination with paid work or from the lack of recovery time when combining both tasks. This result is also in line with research that finds that working carers are less inclined to invest in their own health because they prioritise the care recipient's health (Arksey, 2002; Chaix *et al.*, 2006).

A final contribution of this study was the inclusion of both men and women, rather than just women as is common in many studies of the employment consequences of informal care-giving. Given the increasing demand for informal care in today's ageing societies, we believe it is important to study the impact on both women and men. Indeed, our results showed that working men also experience negative consequences of taking up informal care-giving. We can conclude that combining informal care with paid work affects both men and women, but in different ways. For men, this manifested itself in a higher risk of long-term absenteeism from work due to illness; for women, the take-up of informal care was associated with both higher likelihoods of workplace absenteeism and work-hours reductions.

Our results offer relevant insights for the policy debate on the seemingly conflicting objectives of stimulating labour participation and, at the same time, asking people to spend more time on informal care to family or friends who are in need of care. Our longitudinal models showed that taking up informal care reduces female working hours and increases the likelihood of workplace absenteeism among both women and men. This study therefore provided some evidence that current labour market and health-care policies may be difficult to reconcile. We may even cautiously argue that seeking to increase both employment and informal care may be counterproductive in some respects. The negative health consequences, as evidenced by higher rates of absenteeism and the consistently documented reduced levels of mental wellbeing as a result of providing informal care (Pinquart and

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Sörensen, 2003; Verbakel, 2014), could eventually harm labour force participation and the provision of informal care. This outcome underlines the importance of policies that help to reconcile work and care in order to prevent such counterproductive consequences. This could include care-friendly workplace policies by employers, including the provision of flexible working arrangements (Ireson *et al.*, 2018). When designing care-friendly workplaces, special attention should be paid to the needs and preferences of women, as they may be more inclined to reduce work hours than men. Another option could be regular attention to employees' mental and physical health, for instance through voluntary medical examinations among employees, in order to prevent (long-term) illness.

It is important to note that several features of this study's design may have influenced our effect sizes. First, due to our interest in the onset of informal care-giving, we only looked at care-giving situations that had started maximally two years ago. As a result, we cannot see the consequences of long-term care-giving situations. It has been argued that mental wellbeing continuously deteriorates the longer people provide informal care, either because the care needs of the care recipient increase over time (Pearlin *et al.*, 1990) or because wellbeing gradually decreases due to wear and tear (Townsend *et al.*, 1989). If this is indeed the case, reductions in labour market supply and/or absenteeism may become more likely. Second, due to relatively small sample sizes with regard to intensive care-giving, we defined the take-up of intensive informal care as a change from no care-giving at all to more than 4 hours of care-giving per week. Previous literature has consistently shown that the effects of care-giving increase with the intensity of informal care (Ehrlich, 2018). Our relatively low threshold for intensive care-giving may therefore explain why this form of care had relatively small effects. Third, we restricted our sample to people aged 23–57 to avoid confounding the effects of informal care with (early) retirement decisions. We think this choice is preferable when the focus is on investigating the effects of informal care on people's labour market participation (*see e.g.* Meng, 2011; Fisher *et al.*, 2016). However, for workers close to their retirement age, providing informal care could be a relatively strong reason for leaving the labour market (*see e.g.* Ehrlich, 2018). For that specific age group, the effects of informal care on labour market exit may therefore be stronger.

Unfortunately, we were not able to differentiate further between care-giving situations. We had no information on the need for care, indicated by the health status of the care recipient. Information on the relationship to the care recipient was included in the data (the care-givers in our sample mainly cared for parents), but relatively small sample sizes prevented us from modelling these differences.

In summary, this longitudinal study provided evidence that women who started to provide intensive informal care were more likely to reduce their work hours. In addition, starting to give (non-intensive) informal care increased the risk of workplace absenteeism due to illness for both men and women in the Netherlands.

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Conflict of interest. The authors declare no conflicts of interest.

Ethical standards. Ethical approval was not required for this study. Participants received written information about the panel study prior to participation, and participation was voluntary. Data collection and analysis complied with national regulations.

Notes

1 There are two formal arrangements for compassionate leave in the Netherlands. One is short-term care leave, which can be taken for a maximum of 10 days per year and is partially paid. The other is long-term care leave, which can be taken for a maximum of 6 weeks per year and is unpaid. Use of these arrangements does not lower contractual working hours. Short-term leave is probably no alternative to a reduction in contractual working hours, given the limited duration of this type of leave. Long-term leave could, in principle, be an alternative but is hardly used: by fewer than 1 per cent of informal carers (Oldenkamp *et al.*, 2018).

2 The reference category included both respondents whose working hours remained constant and respondents who increased their working hours, as we were only interested in the effect on the share of respondents reducing their working hours. Of the observations among men in the reference category, 7.1 per cent involved an increase in working hours and 92.9 per cent involved stable working hours. For women, the corresponding proportions were 17.6 and 82.4 per cent, respectively. The results remained the same when the reference group was split into a group with increased working hours and a group with stable working hours.

3 Of course, there may still be a higher drop-out rate in extremely demanding care situations, such as when a partner or child is terminally ill. Our results, thus, should not be extrapolated to such extremely demanding care situations.

4 Note that we only included working time reductions of 4 hours per week or more, which obviously affected the average working-time reduction.

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