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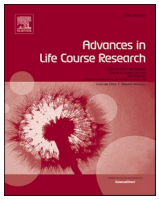

The wage penalty for informal caregivers from a life course perspective

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ABSTRACT

Caring for a friend or family member in need of care has been found to have negative consequences for wages. This study contributes to the literature by studying how three major life course factors, namely timing of first caregiving, duration of caregiving, and the number of caregiving episodes, help to explain the (hourly) wage penalty for informal caregivers (i.e., providers of health-related care to older or disabled people in the personal network). We used unique retrospective data of 1417 informal caregivers in the Netherlands that map start and end dates of up to seven caregiving episodes. Findings showed that a higher number of caregiving episodes was related to a stronger wage penalty, whereas timing of first caregiving was not associated with a wage penalty. Opposite to our expectation, we found that the wage penalty decreased the longer someone cared, potentially even resulting in a wage premium for long-time caregivers. We conclude that applying a life course perspective is relevant when examining employment consequences of informal caregiving and that caregiving possibly fosters skills that are beneficial for employment careers in the long run.

1. Introduction

In recent years the Dutch government has decided to decrease formal care (i.e., care by professionals who are trained and paid for it) and put more responsibility onto families (Broese van Groenou, Jacobs, Zwart-Olde, & Deeg, 2016), which together with a growing older population increases the need for informal care. However, informal care, meaning the provision of health-related care to older or disabled people in the personal network (excluding help provided in a professional context or regular childcare), often stands in conflict with employment. Informal caregivers are more likely to reduce labor supply by reducing working hours (Gomez-Leon, Evandrou, Falkingham, & Vlachatoni, 2019; Henz, 2004; Schmitz & Westphal, 2017; Van Houtven, Coe, & Skira, 2013) or by dropping out of employment completely (Gomez-Leon et al., 2019; Henz, 2004; Hohmeyer & Kopf, 2020; Lee & Tang, 2013; Pavalko & Henderson, 2006). Additionally, informal caregivers generally earn less compared to (currently) non-caregivers (Carmichael & Charles, 2003; Carmichael & Ercolani, 2016; Earle & Heymann, 2012; Heitmueller & Inglis, 2007; Schmitz & Westphal, 2017; Van Houtven et al., 2013). This study focuses on the wage penalty that comes with informal caregiving and looks at three major life course factors that may explain why the wage penalty varies among caregivers, namely: timing of first caregiving, duration of caregiving, and the number of caregiving episodes.

Experiencing informal caregiving is distinct for most caregivers as caregiving can start in any life stage of a person, the duration can differ from short-term helping to lifelong caregiving, and a person can care for one or for multiple persons. To understand these heterogeneous experiences, and therefore also the heterogeneous employment consequences potentially resulting in lower wages, the life course perspective can provide a useful theoretical lens. The life course perspective enables us to approach the consequences of informal care provision from a long-term perspective taking into account that wages of informal caregivers can be effect by caregiving situations earlier in life, even those that have already ended (Schmitz & Westphal, 2017). We consider the care provision to one particular care receiver (for instance, the partner or father) as a care episode in one's life, with all care episodes together defining caregiving trajectories that span over the life course (Keating, Eales, Funk, Fast, & Min, 2019). The life course perspective acknowledges that it matters for the wage penalty when and how caregiving enters one's life for the first time (i.e., timing) as disadvantages early in life can accumulate. Also, by characterizing care histories in terms of duration of caregiving and number of caregiving episodes as indicators of longer and more potential employment interruptions, we improve our understanding of what aspects of the caregiving career are related to wages later in life. Altogether, we answer the following research question: *How do the timing of the first caregiving episode, the duration of caregiving, and the number of caregiving episodes matter for the wage penalty for informal*

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caregivers?

So far, only few scholars empirically focused on caregiving from a life course perspective (see Keating et al., 2019) and little attention has been paid to how the consequences of informal care for employment differ over the life course (Carmichael & Ercolani, 2016; Fast, Dosman, Lero, & Lucas, 2013; Fast, Keating, Eales, Kim, & Lee, 2020; Hamilton & Cass, 2017; Henz, 2004). Henz (2004) found that informal caregivers who started caregiving later in life were more likely to reduce labor supply and to not increase paid work again after care ended. Additionally, the longer the duration of the first caregiving episode, the less likely informal caregivers experienced a change in employment at the end of that episode. We follow Henz (2004) life course focus and add to it by theorizing and empirically testing the consequences of informal care for wages and in doing so take a closer look at long-term rather than short-term consequences. The literature on wage penalties due to caregiving from a life course perspective mostly focuses on childcare (e.g., Muller, Hiekel, & Liefbroer, 2020). Informal care, however, is in general far less predictable than childcare and it can intersect with paid work at more various moments throughout the life course (Ehrlich, Möhring, & Drobnič, 2019; Henz, 2004). Our theoretical contribution is that we transfer the life course arguments often used in research on the impact of childcare on wages, namely role strain theory and human capital theory, to informal care and test whether these are plausible when applied to informal care.

We built our analysis on unique retrospective data on informal caregiving that includes 1417 current and past informal caregivers in the Netherlands. Informal caregivers were selected from the participants of the Longitudinal Internet studies for the Social Sciences (LISS) if they indicated that they are or were caring for someone. Informal caregivers (thus referring to both current and past caregivers) were asked retrospective questions on their caregiving episodes so that full caregiving histories of the informal caregivers could be reconstructed. The informal care wage penalty was assessed by matching the caregivers in our sample to non-caregivers (outside our empirical sample) who were similar in terms of educational level, partner, children, age, and sex. Next, we assessed in our sample of caregivers to what extent the informal care wage penalty in hourly wages in 2020, or wages right before retirement, depended on the life course factors timing of first caregiving, duration, and the number of episodes, which we derived from the detailed caregiving histories.

2. Theory and hypotheses

2.1. Informal care wage penalty

Although caregiving could have positive effects on informal caregivers' lives, many scholars found a negative relation between care and paid work (Fast et al., 2013; Gomez-Leon et al., 2019; Henz, 2004; Hohmeyer & Kopf, 2020; Kelle, 2020; Korfhage, 2019; Lee & Tang, 2013; Pavalko & Henderson, 2006; Schmitz & Westphal, 2017; Van Houtven et al., 2013). Informal caregiving often stands in conflict with paid work because the caregiving role competes with the employment role. According to role strain theory, this conflict arises because it can be difficult to combine and meet all the expectations in both roles due to time restrictions and spillover of strain from one role to the other (Greenhaus & Beutell, 1985; Lee & Tang, 2013).

If the role conflict between care and paid work becomes too pressing, informal caregivers have to find a way to better combine both roles. One option to lower strain is handing over caregiving tasks to other formal or informal caregivers. However, a frequent option and for some caregivers perhaps the easier way to cope with the conflict is to adjust employment. Caregivers may reduce labor supply by reducing their working hours or by quitting their job altogether. Other ways to better combine paid work and care are to become self-employed or to change to a job that accommodates care and paid work (Fast et al., 2013). A strategy could be to choose less demanding jobs, which are often jobs with lower status and fewer career prospects (Abendroth, Huffman, & Treas, 2014).

Our starting point is that scholars (not explicitly testing the life course perspective) found that decisions on the side of work employment because of care provisions can have long-lasting consequences (e.g., Schmitz & Westphal, 2017; Skira, 2015) also after caregiving has ended as employment decisions (e.g., labor supply reduction) are often not reversed (Ehrlich et al., 2019). Even if there is no intended employment adjustment, paid work can still be influenced by caregiving. For instance, informal caregivers might miss out on a promotion because they miss work more frequently or have (or are stigmatized to have) lower work performance (Abendroth et al., 2014; Ehrlich et al., 2019; for a literature review on lower performance of informal caregivers see Martsolf et al., 2019). Reducing labor supply, changing jobs, becoming self-employed to be more flexible, missing a promotion, negative work performance (or the stigmatization as such), and employment interruptions are all mechanisms that explain why we expect that those who ever provided care in their lives on average earn less compared to those who have never provided care with similar characteristics.

There are thus several mechanisms that explain why informal caregiving would harm wages. The life course perspective adds to these mechanisms by taking into account that paid work-related changes can accumulate over the life of the caregiver. In this study, the separate mechanisms are not directly tested because the focus is on the total effect of the life course factors on the wage penalty for informal caregivers as an indicator of short- but also long-term consequences. In the following section, we will elaborate how the life course factors potentially impact the informal care wage penalty by arguing how the mechanisms of time or role conflict work out differently, depending on when (timing), for how long (duration), and how often (number of episodes) care was provided over the life course. All life course factors are interrelated with each other, meaning that the earlier in life informal caregivers start to care, the more likely they are to care longer and to have more caregiving episodes in their life. Nevertheless, we can distinguish them theoretically (as well as empirically).

2.2. Timing of caregiving

Starting to care is a turning point in a person's life and can have long-term consequences by shaping identity, behavior, and events and transitions in other life domains, such as the employment domain (Elder, Johnson, & Crosnoe, 2003). How impactful an event or new episode is, depends on the timing in a person's life (Elder & Giele, 2009). Thus, informal caregiving can be experienced and approached differently depending on when in someone's life it occurs (Abendroth et al., 2014; Elder et al., 2003). This also means that paid work is disrupted differently in different life stages, and consequently, that timing of caregiving affects the informal care wage penalty. In the following, we borrow arguments from literature on the motherhood penalty literature, in which becoming a mother has weaker employment consequences the later in life the first child was born (Abendroth et al., 2014), and adapt them to informal caregiving.

Handling the work-care conflict that potentially arises with informal care is arguably the most difficult in early adulthood since scaling back paid work could reduce career prospects. When caregiving, especially those who are younger will be restricted in their opportunities in the domain of paid work. For instance, they might not be able to move far for a job if they care for someone, restricting their employment career opportunities. After early adulthood, in which we argue it is mainly the transition into the first job that is influenced by caregiving, traditionally comes the family formation stage. In this stage, employment and informal care might strongly clash if the informal caregiver additionally cares for young children. When still in the career-building phase in life, this 'triple burden' can result in missing promotions and/or might motivate people to choose a lower-status career that is easier to combine with informal caregiving and childcare (Abendroth et al., 2014).

Furthermore, disadvantages in the domain of paid work accumulate over the life span: inequalities earlier in the employment career intensify and the loss in wages will add up over the life course (Crystal, Shea, & Reyes, 2016; Möhring, 2018). A loss or stagnation in human capital will have long-lasting consequences if it occurs early in working life when it is important to gain experience, educate yourself, develop skills, show productivity, and establish a career (Abendroth et al., 2014; Florian, 2018; Muller et al., 2020). It is more influential for the employment development when the conflict occurs earlier in life as young caregivers might be perceived as less committed to work, less productive, and less suited for promotion (Abendroth et al., 2014; Ehrlich et al., 2019). Older informal caregivers, in contrast, have already established their careers, accumulated human capital, and built a professional social network to rely on (Florian, 2018). Altogether, the impact of caregiving on the wage penalty for informal caregivers should be higher for informal caregivers who started earlier with caregiving than caregivers who started later in life. This leads to the following hypothesis: *The earlier the life stage in which caregiving started, the larger the wage penalty for informal caregivers (H1)*.

2.3. Duration of caregiving

Using a similar argumentation, integrating the life course perspective and human capital theory, we expect the wage penalty to be conditional on the duration of caregiving. The duration is the time between starting and ending a caregiving episode (Elder et al., 2003), with the total duration being the number of months people provided care in one's life, either to one or multiple people simultaneously. Starting to care can involve a change in status, identity, and often behavior (Elder et al., 2003). The conflict between care and paid work is a process and has to first develop and amplify before the impact on paid work becomes apparent. In the case that caregiving and paid work have to be combined for a longer time, adaptations on the side of employment become more likely and the caregiver is (perceived as) less productive for a longer time. This implies that with longer duration more human capital is potentially lost. It is easier to catch up in terms of human capital and rebuild professional relationships after a short time of caregiving, resulting in a lower wage penalty (Keating et al., 2019). We hypothesize that *the longer the duration of caregiving, the larger the wage penalty for informal caregivers (H2)*.

2.4. Number of caregiving episodes

The last factor potentially influencing the wage penalty for informal caregivers is the number of caregiving episodes. In our definition, a caregiving episode refers to a period of care to one particular person (e.g., mother). People may have experienced multiple caregiving episodes in life (e.g., care to one's mother and partner), potentially at the same time (i.e., overlap). Even when overlapping for some time, the episodes count separately. From the literature on childcare, we know that the wage penalty increases with each additional caregiving episode (Abendroth et al., 2014). Compared to one-time informal caregivers, informal caregivers who take up multiple caregiving episodes during their lives more often come in the situation where the caregiving and paid work role are in conflict. For each additional caregiving episode, they again have to find a way to combine paid work and care. Each episode is unique and potentially involves additional and distinct work-care conflicts as the relationships in each episode are different resulting in more but also different conflict situations. This means that each potential conflict has to be addressed and an own handling has to be found. Hence, informal caregivers with a higher number of caregiving episodes might have a higher likelihood to have reduced employment (as found in the Canadian context, see Fast et al., 2013) or to have changed to a job in which they are better able to combine paid work and care, just as mothers with multiple children (Abendroth et al., 2014). Consequently, the loss in human capital leading to a reduction in wage is higher the more caregiving episodes a person experiences. From this we derive the hypothesis that *the more caregiving episodes a person experiences, the larger the wage penalty for informal caregivers (H3)*. This relationship might not be linear as the wage loss per caregiving episode might not be equal. Some of the adjustments, like reducing working hours, might not have to be arranged again in the following episodes. Moreover, the (negative) employer's perception of the caregiver likely becomes more stable the more often the caregiver cares for someone, as it is for having children (Abendroth et al., 2014).

2.5. Caregiving situation

How large the wage penalty for informal caregivers is and how that can be explained by the life course factors can be partly attributed to differing care situations. Care situations vary over the life course and are related to employment outcomes. We want to filter out the independent effects of the life course factors, which is why we control for factors related to the care situation. First, the extent to which caregiving influences wages depends on the relationship between the informal caregiver and the care recipient. Caring for a child or partner where the informal caregiver is the main informal caregiver compared to caring for a friend or neighbor, influences the work-care conflict and how it is addressed (Henz, 2004). For instance, informal caregivers might be willing to reduce employment to care for a close family member, but not for a neighbor. In a similar line of argumentation, the work-care conflict might differ depending on whether informal caregivers see the caregiving task as their duty or not. In the ethics of care, it is argued that it is not the same to care for a person out of obligation as to care out of sympathy (Rachels & Rachels, 2012). A person who cares out of sympathy rather than obligation will be more willing to give up other tasks or roles. Third, the relationship between caregiving and wages depends on how intensive the caregiving is. Scholars found that the negative impact of care on employment is stronger as the number of hours spent on caregiving is higher (e.g., Hohmeyer & Kopf, 2020; Kelle, 2020). Fourth and last, doing several tasks for one person in need arguably requires more effort than doing only one or a few different tasks, which could also affect paid work-related decisions.

3. Methods

3.1. Data

Our analysis on the influence of the three life course factors on the wage penalty for informal caregivers will be based on a sample of informal caregivers only. However, to create our outcome variable, i.e., the informal care wage penalty, we used information on non-caregivers too. We used the 'Retrospective informal care career' data collected among the Longitudinal Internet studies for the Social Sciences (LISS) panel administered by CentERdata (Tilburg University, the Netherlands). The panel is based on a representative sample of the Dutch population (see www.lissdata.nl and Scherpenzeel & Das, 2010 for more information). While the data on current wages was collected yearly in the core studies, the caregiving study consisted of a two-step data collection. The first time, in January 2020, the complete panel was asked:

> "The following questions are about providing informal care to people you know with health problems. These people could be your partner, a family member, a friend, neighbor, acquaintance or colleague who needs or needed help because of physical, psychological or mental limitations or because of old age. Examples of informal care are doing household chores, helping with washing and dressing, keeping company, providing transport or performing odd jobs. You may have done so for a short period or for a long period. It could involve people known to you to whom you provided care in the past, but could also involve people known to you to whom you are providing care at

present. Care provided as part of your occupation or as a volunteer does not count. Have you ever provided this type of care in your life?".

82.9% of the panel answered this question (N = 5315) (Verbakel & CentErdata, 2021). Those who care or cared at least once in their life were regarded as informal caregivers, whereas those who never did were considered non-caregivers.

The second time, in March 2020,[1] the subsample of informal caregivers aged 16–78 was asked retrospective questions on up to seven past or current caregiving episodes (87.5% response rate among those who indicated they cared in January, N = 3061) (Verbakel & CentErdata, 2021). This unique data collection allowed us to reconstruct full caregiving histories, including information on each caregiving episode, and to combine these histories with background and wage information of the respondents from the core modules of the LISS panel, which are repeated yearly.

We considered two kinds of respondents in our sample[2]: (a) the ones who were employed or self-employed in March 2020 and (b) the ones who were employed or self-employed but retired in or after 2009, which is the year from which on we have data on wages before retirement.[3] We decided to include the self-employed because self-employment can be a coping strategy for informal caregivers when experiencing a care-work conflict (see also Robustness Checks). For respondents who were still working, the available information on wages in the LISS panel was from the previous year, that is, 2019. We therefore trimmed caregiving histories at the end of 2019. As a result, 42 informal caregivers who only had caregiving episodes in 2020 were considered non-caregivers. For retirees, we used their last fully (self-)employed year as the foundation for their wage. Caregiving episodes after retirement were not included in the analysis because they cannot affect wages anymore (54 retired respondents with caregiving episodes only after retirement were considered non-caregivers) and caregiving episodes that span from pre-retirement into retirement were cut at the end of the last (self-) employed year. The final sample to start constructing our measures consisted of 1417 current and past informal caregivers (N = 16 deleted before the main analysis due to missing values on control variables) and 1013 non-caregivers.

3.2. Measures

3.2.1. Dependent variable

Our dependent variable, the informal care wage penalty, reflected the calculated difference in hourly wages between informal caregivers (i.e., those who ever in their life provided informal care) and similar non-caregivers (i.e., those who never provided care), measured at the respondent level. As a first step, we constructed hourly wages for both caregivers and non-caregivers. We choose hourly wages rather than monthly or yearly wages to avoid having an indirect measure of the number of weekly working hours. The hourly wages were constructed based on the total annual wages of all jobs the respondent had in 2019, or the year before retirement, divided by 52 (to make it weekly wages) and divided by the self-reported weekly (contractual) working hours in 2019, or the year before retirement, in their main job and side job (if any), top-coded at 60 h.[4,5] For self-employed and on-call employees, we used actual working hours as these groups do not have fixed working hours (for an analysis without self-employed see Robustness Checks).

Both the wage and working hours variable had missing values in our sample of employed caregivers and non-caregivers (wage 30% missing values; working hours 19 % missing values). Those missing values were potentially not random (Riphahn & Serfling, 2005). We imputed 25 datasets with multivariate imputation using chained equations (MICE) (see Royston & White, 2011) in STATA 16 separately for women and men to impute wages and hours worked. We used multiple, relevant variables for the imputation (educational level, children, partner, age, caregiving yes/no, income including wages and other sources besides paid work, working hours the year before, age squared, and wage information from the year before), which is why we are confident that we came as close as possible to the real value.[6] After the imputation and subsequent calculation of hourly wages, we coded all hourly wages below 1 Euro (bottom 0.05 %) to 1 Euro per hour (similar to Langner, 2018) and coded all wages above 580 Euro (top 0.05 %) to 580 Euros to make them more realistic (see also Robustness Checks).

The second step consisted of creating the informal care wage penalty by assessing the difference in hourly wages between similar informal caregivers and non-caregivers. This step is both necessary and innovative. It is necessary because this study is about testing whether the penalties for caregiving varies across caregivers with different life courses. Non-caregivers logically have no valid information on our life course factors (timing of first caregiving, duration of caregiving, and number of caregiving spells). Hence, our main analysis must be based on a sample of caregivers only. We used the nearest neighbor approach (nnmatch algorithm in STATA, see Abadie, Drukker, Herr, & Imbens, 2004). This implies that we compared the wage of a caregiver with that of non-caregivers who were very similar in several respects based on the matching variables. We matched, split by sex, the informal caregivers to non-caregivers with the most similar values on the variables educational level, partner, children, year of retirement, and age. The informal caregivers were matched to a minimum of four (or, in case multiple non-caregivers were equally close, more than four non-caregivers) (Abadie et al., 2004). Of the 1013 non-caregivers in our sample 97 % (N = 980) were used in the matching process. The average estimated distance between the matches was 0.19 for men and 0.31 for women. For both sexes, the median was very close to the optimal match, with a distance of 0.02 for men and 0.05 for women. For women, 12 % of the matches were prefect matches (distance zero) and for men, it applied to 14 % of the matches.

For each caregiver, the average wages of the non-caregivers matched to them was subtracted from the wages of the caregiver to calculate the wage difference. This informal caregiving wage penalty, now assigned as an individual characteristic to each caregiver in our sample, was our dependent variable. On the final scale (see also Fig. 1), positive values mean that informal caregivers earned more than non-caregivers (i.e., a wage premium) and negative values mean that informal caregivers earned less than non-caregivers (i.e., a wage penalty).

The wage difference between informal caregivers and non-caregivers

[1] The data collection took place during the start of the COVID-19 pandemic. However, the data appeared not to be biased as the responses on potentially biased variables of people answering the questionnaire before and after March 15 did not differ statistically (Raiber, Verbakel, & Visser, 2021).

[2] Before defining the sample several caregivers where excluded from the caregiver sample. 38 caregivers were excluded due to missing on the start date of the caregiving, the baseline for the life course variables. 35 caregivers were excluded because they were not clearly definable as informal care or non-caregiving. 7 caregivers were excluded because they indicated a starting date for caregiving before the age of five.

[3] Due to this sample definition we excluded 2710 non-caregivers and informal caregivers who did not work or retired before 2009.

[4] In case there were missing values on the exact annual wage, we used the mid-value of the categorical question, e.g., 12,000 Euros for the category 8000 to 16,000 Euros per year.

[5] The data on wages were from wave 13 of the 'Economic Situation: Income' questionnaire of the LISS panel, collected in June and July 2020 because the question in 2020 asked for the annual wages in 2019. Hours worked are collected in April and May 2019 in wave 12 of the 'Work and Schooling' questionnaire because they asked for current hours worked.

[6] The imputation was used to construct our outcome variable, which is why we took the average for weekly wage and hours worked from the imputed datasets to construct hourly wages.

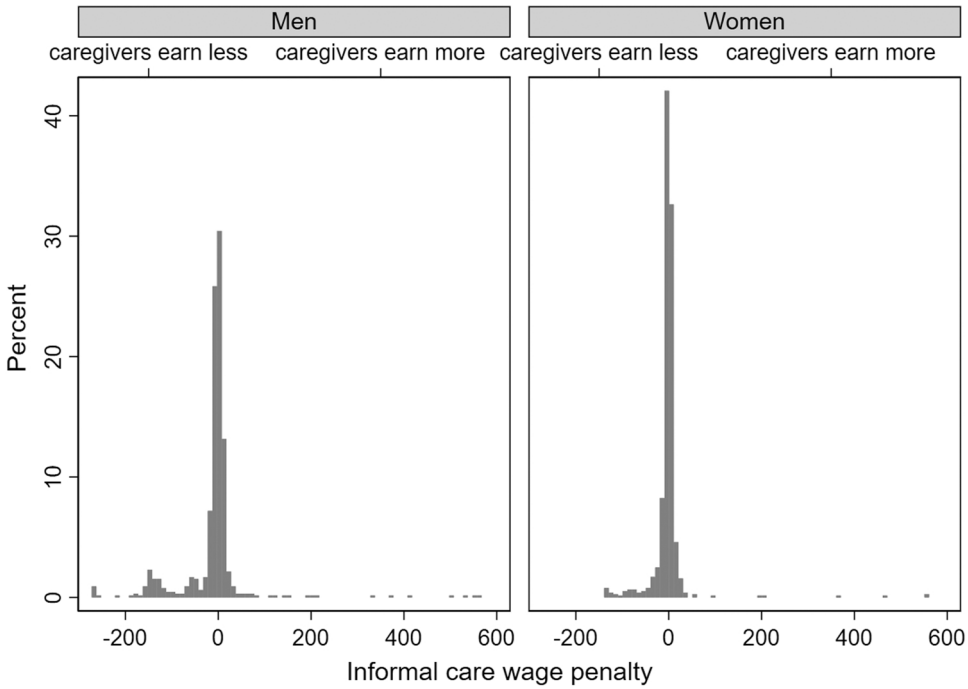

Fig. 1. Distribution of the informal care wage penalty (wage difference between caregivers and non-caregivers). Men N = 654 and women N = 763.

after matching was on average negative for both women (−1.81 Euro) and men (−11.08 Euro), meaning that there was indeed a wage penalty for informal caregivers, which was larger for men than for women (see Table 1 for all descriptive results). To test if the difference between caregivers and non-caregivers was significant on a 5 %-level, we ran a OLS regression on the wages comparing both caregivers and non-caregivers with the matching variables as control variables. For men, the wage penalty, was significant, but for women, it was not. However, in this study, we want to explain *variation in* the wage penalty by the life course factors. For women, the hourly wage difference had a standard deviation of 44; for men, it was 74. Hence, for both women and men, there was sufficient variation in our outcome to be possibly explained by the life course variables.

3.2.2. Main predictors

Our first predictor variable was the timing of first caregiving. For informal caregivers with multiple episodes, the age at the start of the first episode was chosen. We defined six life stages: (1) young caregivers with a starting age before 17, (2) young adult caregivers between age 18 and 27 (reference category),[7] (3) caregivers in the early family formation stage between age 28 and 37, (4) caregivers in the late family formation state from age 38–47, (5) older caregivers between age 48 and 57, and (6) caregivers near retirement with an age at first episode above 57.[8] Second, the duration of caregiving was measured as the total number of months over one's life spent on caregiving. Months with simultaneous caregiving episodes only counted once. Last, the number of episodes reflected the total number of episodes which equals the number of different people the caregiver cared for.[9]

3.2.3. Control variables

The control variables combined information from all caregiving episodes to make the most use of the available data. This means that all control variables were aggregated to the level of the caregiver. First, we included three separate dummy variables (0/1 coded) on the closeness of relationships: (1) ever cared for close family, meaning partner, parents, or child, (2) ever cared for other family members, and (3) ever cared for non-family. Caregivers might thus score one in multiple categories, for instance, when they cared for their partner and their sister. The next control variable was a dummy on felt obligation as a reason for caregiving. If informal caregivers in one of their episodes indicated that they experienced caregiving as an obligation, they scored 1 on the obligation dummy. If a caregiver never felt obligated the value is 0. The intensity of caregiving was reported for the start and end (or current situation) of each caregiving episode. We took the average of all episodes' maximum hours of caregiving, meaning the sum of the maximum intensity per episode divided by the number of episodes for which we knew the intensity. Finally, we calculated the number of different tasks (differentiating companionship or emotional support, transportation, assistance when visiting a doctor, administrative help, housekeeping, personal care, nursing care, arranging or coordinating care, and other care) per episode averaged over all episodes for which the tasks were known.

3.3. Analytical strategy

We ran linear regression models on the wage penalty on our sample of informal caregivers. The three predictor variables – timing, duration, and the number of caregiving episodes – were first added one by one (on top of the control variables) so that we could observe what they separately added to explaining the wage penalty. The final model included

[7] Both young caregiver and young adult caregiver are life stages based on Hamilton and Adamson (2013). 27 years was used as the end of the young adult life stage because 28 seems a realistic cut point as the start of the family formation stage for both women and men as well as for different generations (Statistics Netherlands (CBS), 2018).

[8] Using a continuous variable for age at first caregiving did not change any of our conclusions.

[9] It was possible to enter details on up to seven episodes. We excluded all respondents with more than seven episodes (N = 75) because we could not accurately assess their age at first caregiving or the total duration.

Table 1
Descriptive statistics.

	Women (N = 763)			Men (N = 654)		
	Range	Mean / %	S.D.	Range	Mean / %	S.D.
Outcome variable						
Informal care wage penalty	-139.06–559.22	-1.78	43.38	-272.23–559.28	-11.06	73.48
Predictor variables						
Age at first caregiving						
–17	5–17	7.47		5–17	8.26	
18–27	18–27	21.89		18–27	14.37	
28–37	28–37	25.29		28–37	21.56	
38–47	38–47	21.10		38–47	23.70	
48–57	48–57	19.13		48–57	23.09	
58 +	58–71	5.11		58–78	9.02	
Duration in months	1–711	112.31	129.71	1–733	106.58	123.22
Number of episodes	1–7	2.25	1.44	1–7	2.05	1.31
Control variables						
Relationship: Close family	0/1	74.97		0/1	73.65	
Relationship: Family	0/1	47.58		0/1	44.83	
Relationship: Non-family	0/1	31.98		0/1	28.97	
Obligation	0/1	26.34		0/1	28.38	
Tasks	1–9	3.24	1.56	1–9	3.2	1.58
Intensity	1–168	7.46	13.67	1–168	6.97	12.94

all life course factors simultaneously in one linear regression model, so controlled for each other. This is summarized in the following equation for caregiver i, where the dependent variable is a results of the average wages of the matched non-caregivers (here matches i) subtracted from the wages of the caregivers (here wages i):

$$\left(wages_i - \left(\frac{\sum wages\ \ matches_i}{n(matches_i)}\right)\right) = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \ldots + \beta_n x_{in} + \varepsilon_i$$

The model was estimated for women and men separately, because of their different norms and behavior towards paid work and care (Smith, Cawley, Williams, & Mustard, 2020). We compared the results of the sex-specific analysis to the overall results.

4. Results

4.1. Descriptive results

When looking at the main predictors in Table 1, we see that informal caregivers in our sample on average started to care below the age of 40, with women on average at age 36 (median is also age 36) compared to men who started to care a few years later, on average at age 39 (median is age 40). For both women and men, the average duration of caregiving episodes was around 9 years (112 months for women and 107 months for men), both with high standard deviations (130 months for women and 123 months for men). The median duration was 57 months for men and 61 months for women (approximately 5 years). Regarding the number of caregiving episodes, both women and men mostly had two caregiving episodes (median), with women having a slightly higher average (2.25 versus 2.05).

Fig. 2 shows the descriptive patterns in the wage penalty in combination with the life course variables. We do not observe the expected tendency that caregivers who started caregiving in an earlier life stage experienced a larger wage penalty than caregivers who started later. Caregivers who started at age 58 or older even had the highest wage penalty with 11.74 Euros. For caregiving duration, we see that until 350 months (about 29 years) there was a wage penalty, meaning that informal caregivers earned less compared to similar non-caregivers. After 400 months (about 33 years) there seem to be a wage premium for caregivers. These values are, however, driven by very few caregivers (<1 %) and should therefore be interpreted with caution. Regarding the number of caregiving episodes, a tendency is visible that informal caregivers earned less for each additional episode until five episodes. From six episodes on (N = 30), the wage penalty decreased and even became a wage premium at seven episodes, indicating a non-linear relationship. However, it should be noted that only 11 caregivers in our sample experienced seven episodes.

4.2. Correlations between life course factors

The life course factors were, not surprisingly, correlated. The more caregiving episodes a person had, the longer the duration was (*Pearson's* $r = 0.40$, $p = 0.00$). Age at first caregiving was negatively related to both the number of caregiving episodes (*Pearson's* $r = -0.23$, $p = 0.00$) and duration (*Pearson's* $r = -0.34$, $p = 0.00$). The earlier a person started with caregiving, the more caregiving episodes they had and the longer the duration of caregiving was. In the multivariate analysis, we included the life course factors one by one as well as simultaneously.

4.3. Multiple regression results

Table 2 presents the results of the multiple regression analysis. We found no effects of timing of first caregiving (i.e., the different life stages), not in Model 1 nor in Model 4. This means that we found no evidence for H1 that caregivers who started providing care at an earlier age would have experienced a greater wage penalty.

Regarding the duration of caregiving, we found a significant positive effect on the wage penalty for informal caregivers (Model 2), which contradicts H2 that the wage penalty would be larger with longer duration. This means that for each additional caregiving month, the wage penalty compared to similar non-caregivers was smaller. The effect size of 3 cents per additional caregiving month, or 40 cents per extra caregiving year, can be interpreted as a small effect.

Fig. 3 shows the calculated average marginal effects of the informal care wage penalty by duration of caregiving in months. An caregiver with only one month of caregiving earned 9.25 Euros less than a similar non-caregiver. The difference decreased for each additional month of caregiving significantly until 170 months, that is the first 14 years, to − 3.93 Euros. After 14 years of caregiving, the results are less certain, which is probably due to the smaller amount of observations (80 % of the observations involved less than 14 years of caregiving).

For the number of caregiving episodes, we found in the full model (including the other life course factors, see Model 4) that for each additional caregiving episode the wage penalty significantly increased. The effect size of 10.22 euros increase per episode can be considered a strong effect. Fig. 4 again shows the average marginal effects of the wage penalty. It can be seen that one-time caregivers did not differ in wages to non-caregivers, but that there was a wage penalty from two episodes on.

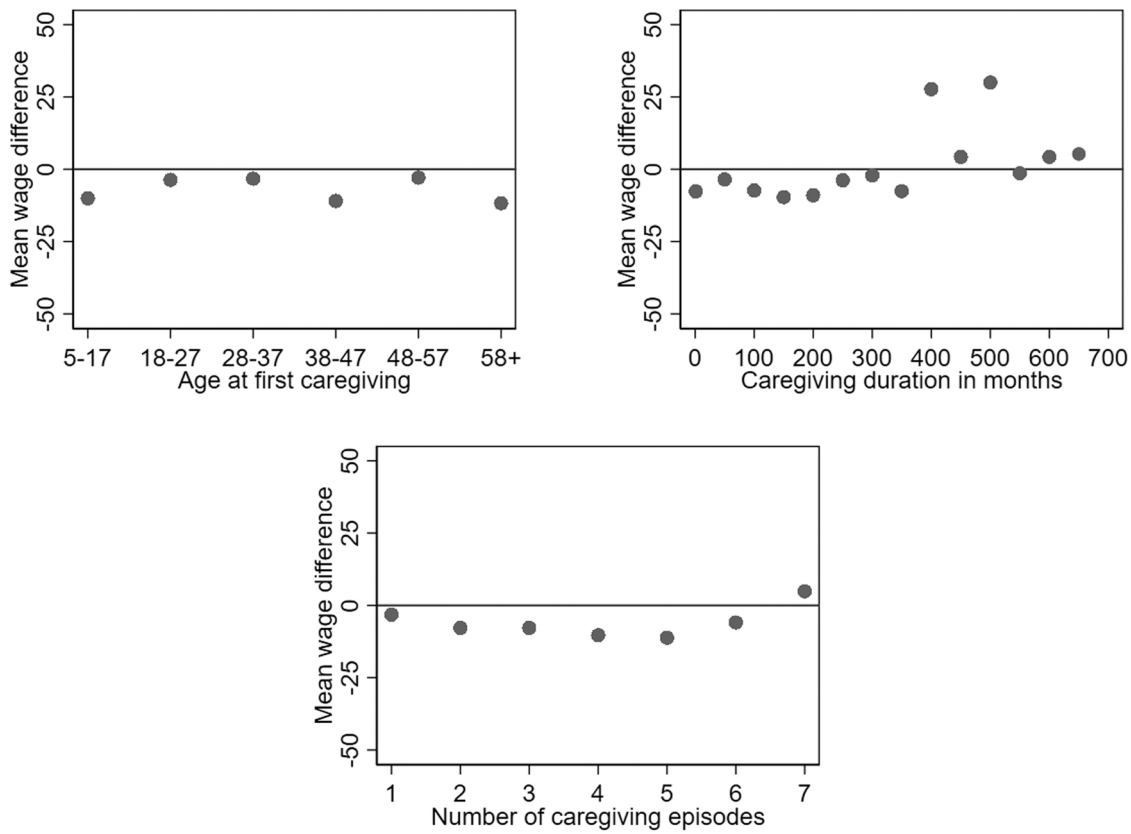

Fig. 2. Mean values of the informal care wage penalty displayed by the main predictors. Note: for visibility reasons, caregiving duration in months was categorized. N = 1417.

The wage penalty increased with a maximum difference of 55.55 euros at seven episodes.

When splitting the full model for women and men, results showed that for men the effect of duration was reproduced and the effect of number of episodes was somewhat less certain ($p = 0.07$). The model for women reproduced the results, but not significant on a 5% significance level, which means that the results seemed to be driven by men. We conclude that duration had an effect on the wage penalty, especially for men, but that the effect was in the opposite direction than expected. The number of caregiving episodes was negatively related to the informal care wage penalty, especially for men, which gave some support for H3 that more caregiving episodes would increase the wage penalty.

4.4. Robustness Checks

To check the robustness of our results, we ran six additional analyses. First, we bottom-coded the hourly wages to 4.50 euros instead of 1 euro because 4.50 is a more reasonable minimum amount someone earns per hour in the Netherlands.[10] This did not change our results. Second, we checked if there is, similar to the number of episodes, also a non-linear effect of duration. This was not the case. Third, in the matching procedure to create our outcome variable, we varied the number of non-caregivers to which the informal caregivers were matched (three or five rather than four). The results for the duration effect were unaffected, but the effect of the number of episodes became less certain. In the fourth robustness check, we checked whether outliers on our dependent variable, meaning very high values on the wage difference, were driving our results. Reducing the range of the wage difference to -200 to $+200$ (or alternatively to -50 to 50) did again not influence the results regarding duration but did make the effect of the number of episodes less certain. Next, we checked if high values on the life course variables could have influenced the results. Top-coding high values on duration at 524 months (highest 1 % top-coded), or the number of caregiving episodes at 6 episodes (highest 1 % top-coded), did not change the results. Excluding the high values of duration (more than 524 months) did not result in different results. Dropping caregivers with more than 7 episodes resulted in insignificant results for the number of episodes ($p = 0.11$). However, we have reasons to believe that it is not unrealistic to have cared for seven people and that those caregivers add to our understanding of the wage penalty. Last, when excluding the self-employed, the results for the duration were again reproduced, whereas the effect of the number of episodes was reproduced with less certainty. We conclude that our results were robust with regard to the effect of duration, but that effect on the number of episodes was less robust.

5. Conclusion

In this study, we examined how the life course factors timing of first caregiving, duration of caregiving, and the number of caregiving episodes mattered for the wage penalty for informal caregivers. Our research design allowed us to use information on wage differences and on the life course factors of up to seven caregiving episodes the informal caregivers had until the time of the survey, enabling an innovative analysis of the long-term consequences of caregiving on wages. Especially male caregivers earned less per hour than similar male non-caregivers, with a wage difference of 11 euros. Women earned on average 2 euros less than similar female non-caregivers. Findings showed that the timing of caregiving did not matter for the wage penalty, but that informal caregivers who cared for a longer time had a

[10] There is no general minimum hourly wage in the Netherlands. The value was chosen because it is a reasonable cut point for all sectors and because it is unlikely to have a lower hourly wage in the Netherlands.

Table 2
OLS regression analysis of the wage difference between informal caregivers and non-caregivers, unstandardized coefficients.

	Model 1	Model 2	Model 3	Model 4	Model 5a women	Model 5b men
Age at first caregiving						
5–17	-5.26			-5.23	-9.27	-1.20
	(6.77)			(6.80)	(6.89)	(12.63)
18–27	ref.			ref.	ref.	ref.
28–37	0.66			1.44	1.41	0.55
	(4.97)			(4.97)	(4.72)	(9.88)
38–47	-6.19			-5.27	-4.13	-7.57
	(5.06)			(5.09)	(5.01)	(9.78)
48–57	1.98			3.64	2.32	3.92
	(5.15)			(5.23)	(5.20)	(9.95)
58 +	-7.24			-5.31	9.27	-15.42
	(7.18)			(7.26)	(8.01)	(12.58)
Total duration in months		0.03*		0.03*	0.01	0.06*
		(0.01)		(0.01)	(0.01)	(0.03)
Number of episodes			-8.85	-10.22*	-4.02	-17.90
			(5.16)	(5.18)	(5.17)	(9.75)
Squared number of ep.			0.93	1.07	0.36	2.08
			(0.74)	(0.74)	(0.72)	(1.44)
Close family	-5.24	-6.62	1.23	0.20	1.64	-1.23
	(3.92)	(3.97)	(5.09)	(5.11)	(5.12)	(9.56)
Other family	-2.45	-3.83	3.29	2.92	1.61	3.78
	(3.45)	(3.41)	(4.54)	(4.57)	(4.57)	(8.50)
No family	2.80	1.46	7.70	7.49	4.63	10.75
	(3.62)	(3.64)	(4.65)	(4.66)	(4.64)	(8.72)
Obligation	0.97	0.68	1.18	0.45	3.36	-2.40
	(3.86)	(3.86)	(3.86)	(3.86)	(4.08)	(6.80)
Number of tasks	-0.44	-0.59	-0.41	-0.56	0.67	-1.63
	(1.09)	(1.09)	(1.08)	(1.10)	(1.12)	(1.98)
Intensity	0.05	0.06	0.05	0.04	0.02	0.07
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.23)
Sex	8.91**	9.41**	9.33**	9.05**		
	(3.21)	(3.18)	(3.19)	(3.21)		
Constant	-13.05	-15.63*	-11.41	-9.55	-2.66	11.91
	(8.11)	(6.99)	(8.05)	(9.00)	(7.32)	(14.45)
Number of caregivers	1417	1417	1417	1417	763	654

Note: Standard errors in parentheses. Significance levels: ** $p < 0.01$; * $p < 0.05$.

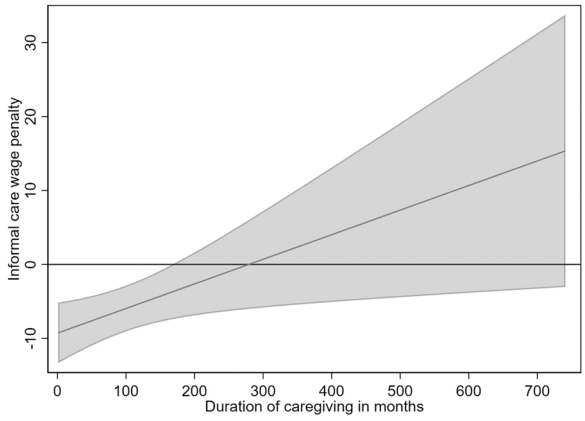

Fig. 3. Average marginal effects of the informal care wage penalty by duration of caregiving in months. The gray area indicates the 95 % confidence interval. N = 1417.

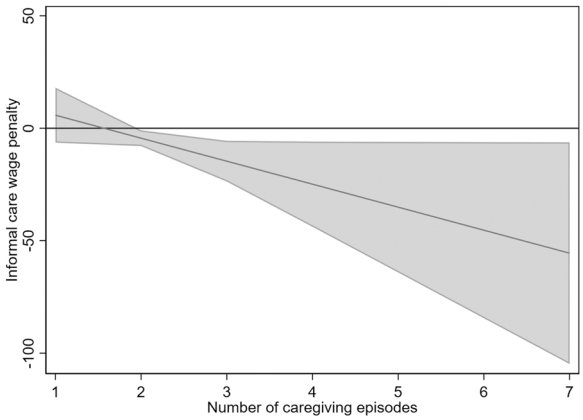

Fig. 4. Average marginal effects of the informal care wage penalty by number of caregiving episodes. The gray area indicates the 95% confidence intervals. N = 1417.

smaller wage penalty than informal caregivers who only cared for a few months. This is in the opposite direction than we expected as we argued that informal caregivers would have more difficulties combining care and paid work the longer the caregiving continues, resulting in higher wage penalties. Furthermore, we found that caregivers earned less compared to similar non-caregivers the more often they started care. This was in line with our expectations as we argued that caregivers who were confronted with more caregiving episodes during their lives experience more but also different situations with a work-care conflict. With each new caregiving episode, the (new) work-care conflict has to be managed, meaning that each episode can potentially result in an adaptation of paid work or perceived lower productivity in employment that consequently lowers the caregiver's wage.

A potential explanation for why we found an effect of duration in the opposite direction than expected and no effect of timing of first caregiving could be that the assumption of cumulative disadvantages did not hold or was weaker than expected. Possibly, counter forces are at work. One theoretical argument lies in enhancement theory (Bovenberg, 2008; Greenhaus & Powell, 2006). Caregivers potentially developed skills during their caregiving episodes that might be transferred to the employment domain and that positively affected their employment career, resulting in more equal or even higher wages compared to non-caregivers. One could think of skills like time management, setting priorities, empathy, reflective power, or self-confidence. This argument might be particularly valid for a longer duration because caregivers had more time to learn important skills. Following this line of reasoning, also young caregivers may particularly benefit from caregiving because they have the most time to use these skills in their employment career. This means that caregivers might experience a short-term negative effect on wages (as shown in e.g., Carmichael & Charles, 2003; Carmichael & Ercolani, 2016; Earle & Heymann, 2012; Heitmueller & Inglis, 2007; Schmitz & Westphal, 2017; Van Houtven et al., 2013), but that some caregivers might be able to compensate for these disadvantages or even turn their caregiving experiences to an advantage, resulting in no, weaker, or even positive long-term effects. The finding that long caregiving duration lowered the wage penalty may also result from selection processes. Caregivers who care or have to care for a longer time and still work, might be the caregivers that have a high hourly wage, which gives them an incentive to remain in employment. To detect the role of such selection process, full income histories would have been necessary. Furthermore, caregivers who care for a longer time and are apparently able to stay employed might be involved in caregiving situations that are relatively easy to be combined with paid work. We did control for variables related to the caregiving situation such as caregiving intensity, yet we cannot rule out its total impact without knowing the intensity over the complete duration (only intensity at the beginning and end was

observed). A last explanation is that caregivers who (have to) care for a longer time do have higher costs related to care (e.g., losing income of partner in case of spousal care) that has to be compensated for. Those caregivers are then more dependent on their income and will be less willing to adapt their paid work because of caregiving and have an incentive to try to even increase their wages.

Identifying the results as presented here would not have been possible with common research designs that use cross-sectional data or longitudinal data only covering point estimates instead of complete caregiving histories. However, there are drawbacks of this study that are important to note. First, matching informal caregivers to similar non-caregivers made it possible to control for some part of the selection into caregiving (namely selection driven by the matching variables), yet it does not solve selection issues completely. We did not match on employment-related variables. Some variables, which were not (fully) available, would have improved the matching, such as age at the start of first job or occupation at the start of the career or at least before the caregiving started. To some extent, educational level functions as a proxy of age at start of first job and first occupation. However, most employment-related variables, like part-time work or current occupation, are related to the mechanism explaining the wage penalty, thus mediating the relationship between the life course factors and the wage penalty. Matching on these factors would have masked the relationships we were interested in. Second, the data were collected retrospectively, which means that we have to rely on the memory of our respondents about their caregiving episodes. The memory of short or 'easy' care episodes might not be complete and some respondents might have experienced more care episodes than reported (Fast et al., 2020; Kjellsson, Clarke, & Gerdtham, 2014). It is unclear how this potential bias may have affected our results. It could mean that for caregivers there might be more caregiving episodes than we observe, but at the same time, the non-caregivers might have had caregiving episodes that remained unobserved. The wage penalty might have been overestimated because the supposed underreported episodes are likely the ones that were less influential to caregivers' employment careers, but it is less clear how the life course factors would have been impacted. Still, we believe that retrospective data provide valuable additions to our knowledge compared to cross-sectional or panel data, as they cover respondents' whole life span. Third, our assessment provided information on the long-term wage consequences of informal caregiving, but the process leading to those consequences remained a black box. A valuable addition to this study would be to focus on the mechanisms driving the wage difference, including different strategies to adapt paid work, like reducing working hours, stopping working for some time, and changing jobs. Fourth, by focusing on wages we excluded informal caregivers whose employment career was the most impacted by care: informal caregivers who never worked or who became non-employed and did not return to the labor market. This means that we only considered a specific group of caregivers who were able to stay or return to employment. Next, we had to deal with high numbers of missing values on wage. For the imputation, important predictors of wages were used. However, using data with fewer missing values and more objective data such as register data would overcome this issue. Last, including young informal caregivers means that part of our sample might not have experienced an effect of caregiving on their wages yet, but still could in the future. Together with the exclusion of the non-employed, this implies that our design might have led to an underestimation of the negative effect of the life course factors on employment.

We can conclude that using the life course perspective improved our understanding of the long-term employment consequences of informal caregiving. People take care of someone in their personal network at different ages, for longer and shorter periods, and most informal caregivers even care for multiple people. The life course perspective we applied in this study acknowledges these complexities and therefore provides context that was previously lacking. Variation in informal caregiving histories across the life span also means that the relationship to the domain of paid work is not straightforward and that some informal caregivers might be better able to compensate for losses in the paid work domain in the long run than others. Two patterns emerged. First, taking care for a longer time hurts the employment career less than we expected and caregivers even can make up for their loss in wages the longer they care. Second, taking care of multiple episodes leads to a bigger wage penalty. Knowing that especially caregivers who cared for multiple times suffer a bigger wage penalty may shift the focus of attention of policymakers to caregivers who again and again care throughout their life.

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