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Working Paper

Informal care provision and work disability days

Ruhr Economic Papers, No. 616

Provided in Cooperation with:
RWI – Leibniz-Institut für Wirtschaftsforschung, Essen

Suggested Citation: Roller, Christiane; Stroka-Wetsch, Magdalena A.; Linder, Roland (2016) : Informal care provision and work disability days, Ruhr Economic Papers, No. 616, ISBN 978-3-86788-715-1, Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI), Essen, https://doi.org/10.4419/86788715

This Version is available at:
https://hdl.handle.net/10419/140874

RUHR
ECONOMIC PAPERS

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RUHR UNIVERSITÄT BOCHUM RUB RWI #616

Imprint

Ruhr Economic Papers

Published by

Ruhr-Universität Bochum (RUB), Department of Economics
Universitätsstr. 150, 44801 Bochum, Germany

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Ruhr Economic Papers #616

Responsible Editor: Thomas K. Bauer

ISSN 1864-4872 (online) – ISBN 978-3-86788-715-1

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RWI

Bibliografische Informationen der Deutschen Nationalbibliothek

Die Deutsche Bibliothek verzeichnet diese Publikation in der deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über: *http://dnb.d-nb.de* abrufbar.

http://dx.doi.org/10.4419/86788715
ISSN 1864-4872 (online)
ISBN 978-3-86788-715-1

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Informal Care Provision and Work Disability Days

Abstract

Due to the demographic change and the concomitant ageing of society, the labor force will reduce in Germany in the following decades. Simultaneously, the demand for informal care will increase as a result of the ageing society. Informal care is assumed being the least expensive form of care and is the most common form of care in Germany. However, the literature conveys the impression that informal care is not easily compatible with a range of situations in life. This is especially confirmed by findings of negative health effects of informal caregiving. Based on these findings, it could be suspected that there have to be large effects on employment, as individuals with health restrictions are supposed to work less. Indeed, findings on effects of informal care provision on employment indicate a rather small or even an insignificant effect. We think that health problems become manifest in some form or another. Thus, the effects of informal care provision on labor supply are possibly larger than it has been assumed so far. To verify our hypothesis, we examine the effects of informal caregiving on a health related labormarket outcome in the form of work disability days using administrative data of Germany's largest sickness fund, the Techniker Krankenkasse with more than 5 million observations. In order to identify the effects of informal care on work disability days, linear regression models are estimated in which is controlled for timeinvariant heterogeneity. The results illustrate a significant positive relationship between informal caregiving and the number of work disability days.

JEL Classification: I10, J10

Keywords: Informal care; work disability days; demographic change; ageing society; administrative data; fixed-effects

April 2016

1 Christiane Roller, RUB; Magdalena A. Stroka-Wetsch, Federal University of Applied Administrative Sciences, Brühl, RWI, WINEG, Hamburg; Roland Linder, RWI. *- The authors are grateful to the participants of the annual conference of the German Society of Medical Informatics (GMDS) and the German Society for Health Economics (DGGÖ) for helpful comments and suggestions. Conflict of interest: The mission of the Scientific Institute of the TK for Usefulness and Efficiency in Public Health (Wissenschaftliches Institut der TK für Nutzen und Effizienz im Gesundheitswesen, WINEG) is to investigate the value of innovations and new programmatic approaches within the statutory health insurance framework. Roland Linder declares that because he belongs to the Techniker Krankenkasse, a potential conflict of interest exists according to the guidelines of the International Committee of Medical Journal Editors .* *- All correspondence to: Magdalena Stroka-Wetsch, Hochschule des Bundes für öffentliche Verwaltung Zentralbereich, Willy-Brandt-Straße 1 , 50321 Brühl, Germay, e-mail: Magdalena.Stroka-Wetsch@hsbudn.de*

1 Introduction

As a consequence of the demographic change, above all the population of working age will shrink substantially in most industrialized countries. This is also the case for Germany, the country with the most inhabitants in Europe and a pronounced social security system. While in Germany there were 49 million people of working age in 2013, in 2060 there will be, according to estimations, only 34 to 38 million inhabitants belonging to the labor force. In contrast, the number of elderly people (65+) will increase, especially the age group of people 80+ will double until 2060 (9 million) compared to 2013 (4.4 million) (Statistisches Bundesamt, 2015a). In order to mitigate the consequences of the demographic change, the European Council aims inter alia at an increased labor force participation of women. However, there is not only the problem of a potential gap in the labor force. The demographic change goes also along with many challenges considering long-term care. In Germany in 2013, 1.25 million elderly people in need of care received care from relatives at home, this is almost the half of the total number of people in need of care (Statistisches Bundesamt, 2015b). Hence, it is the most widespread form of care in Germany.

Correspondingly, it is foreseeable that the number of people in need of care and thereby the demand for informal care will also increase. Since informal home care is preferred over formal care by both care recipients and politicians, and typically women engage in informal caregiving (Bobinac et al., 2010; Miller and Cafasso, 1992; Schmitz and Westphal, 2015; Stone et al., 1987), a conflict between increased labor force participation and informal caregiving emerges. These two issues seem to be not fully compatible. To meet the challenges imposed by the demographic change, it is indispensable to draw attention to the consequences of informal care provision (e.g. the physical and mental burden) and based on this, the compatibility of work and informal care should be improved.

Informal care has long been ignored by economists and politicians due to the assumption that benefits of informal caregiving compensate the cost (Van den Berg et al., 2014) and that informal care is the least expensive form of care. However, in the last years some literature considering both labor force and health effects has emerged. The effects of informal caregiving on hours of work are examined by e.g. Ettner (1996) who finds that informal caring reduces hours of work; but this effect is only significant for females who

provide care to their parents outside the household. Bolin et al. (2007) detect that an increase of 10% in time spent on informal care leads to a 2.6% reduction in weekly work hours. Spiess and Schneider (2001) inspect the relationship between changes in caregiving and changes in hours of work for women aged 45 to 59 in Europe; they find mixed results. They observe a significant negative effect of starting informal caregiving on changes in weekly hours of work for women in Northern Europe only and in turn, they identify a significant negative effect of increasing hours of informal care provision on the amount of working hours for women in Southern Europe only. However, Crespo and Mira (2014) arrive at the result that the effect of informal care provision on employment is negligibly small for women aged 50 to 60 in northern and central European countries. Meng (2013) finds a significant but also small negative effect of informal care provision on hours of work; e.g. if women provide additional 10 hours of caring per week, they work 35 minutes per week less. This amount is from an economic point of view negligible.

However, many authors have considered further outcomes, e.g. employment probability, by examining effects of informal care provision on employment. Wolf and Soldo (1994) discover that informal caregiving does neither reduce the probability for being employed nor the weekly working hours. Carmichael and Charles (1998) state based on their findings that labor market participation is only negatively affected if informal care provision requires more than 20 hours per week, even so the effect turns out to be small. Likewise, working hours are hardly reduced due to informal caregiving. Ciani (2012) finds also small negative effects.

All in all, the findings in economic literature on the effects of informal care provision on labor supply are not consistent, though it seems that the effects largely tend to be rather small. However, the effect of informal care on the labor market might be much larger when considering health related labor market outcomes like work disability days which have been disregarded so far. In general, research in the economic literature on health effects of informal care provision is scarcer than on employment effects. Schmitz and Stroka (2013) find some evidence, measuring health by prescribed doses of drugs, that the double burden of full time work and informal caring seems to be detrimental to the mental health status. Similarly, Van Houtven et al. (2005) and Stroka (2014) detect that higher care intensity is linked to a higher amount of consumed drugs. Moreover, Coe and Van

Houtven (2009) examine if caregiving affects the mental and physical health status of adult children providing care to an elderly parent. They observe that informal caregiving has a negative effect on health; it increases depressive symptoms and decreases self-rated health over time. Schmitz and Westphal (2015) assert that informal care provision is mentally as well as physically demanding. However, in their paper they merely can identify a significant negative short-term effect of informal care provision on mental health which weakens over time. An effect on physical health is neither observed in the short-term nor in the medium-term.

Similar to the results of the studies mentioned above, Van den Berg et al. (2014) find a negative impact of informal caregiving on a broader measure of health, well-being, which is consistent with the results of Bobinac et al. (2010) who state based on their findings that the well-being of informal caregivers is positively related with the health of the care recipient[1]. Bauer and Sousa-Poza (2015) examine the effects of informal care provision on three different fields: employment, health and family. Their results are in accordance with the above mentioned literature; the effect on labor supply is small and informal care provision affects mental health negatively.

In this study, we combine both literature strands (on the effect of caring on labor and health) by investigating the effect of informal caregiving on a health related labor-market outcome in form of the number of work disability days. From our point of view, this issue has to be paid more attention and researched thoroughly due to the fact that informal care seems to have a negative effect on health but only small employment effects. As a consequence of the negative health effects described in the economic and medical literature, it could be assumed that there have to be larger effects on employment when taking also work disability days into account, since individuals with health problems are supposed to work less. Possibly and as the literature shows, informal caregivers do not often consider a reduction or termination of employment. Thus, there remains the question whether the

[1] *In the medical literature, there are some studies on the relationship of health and care provision, principally from the US, see, e.g. Schulz et al. (1995), Stephen et al. (2001), Gallicchio et al. (2002), Tennstedt et al. (1992), Beach et al. (2000), Ho et al. (2009), Shaw et al. (1999), Lee et al. (2003), or Dunkin and Anderson-Hanley (1998). Though, a potential point of criticism relating to these studies could be the sample size which is typically very small and the focus which is essentially directed on caregivers providing care for elderly people with a particular illness (e.g. Alzheimer's disease). Beyond that, the empirical strategies of these studies consist mainly of descriptive comparisons and cross-sectional regressions.*

negative health effects become manifest in a health related labor-market outcome as in the considered work disability days. If this is the case that would imply that the effects of informal care provision on labor supply is larger than it has been assumed so far. Combining health and employment effects of informal care provision in the consideration of work disability days, we are the first to examine this issue.

Below, we describe the utilized data. Afterwards, our empirical model and the estimated results are presented. Based on these findings, we conclude this paper with thought-provoking impulses for possible reforms.

2 Data, Sample Selection and Descriptive Statistics

In Germany, there are 124 sickness funds (Statista, 2015). With more than 10 million insurants the Techniker Krankenkasse (TK) is the largest one among these. The data used in this study are provided by the TK. The administrative nature of the data is advantageous due to their completeness and reliability compared to survey data. Furthermore, Schmitz and Stroka (2013) substantiated the representativeness of the TK data by comparing them with e.g. data from the German Socio-Economic Panel (SOEP). The estimation sample utilized for this study contains general socio-economic information as well as detailed information on diagnosed work disability days. As the TK is provider of both health and long-term care insurance and informal caregivers have to be reported in order to assert their claim for attendance allowance, the data set also comprises information on informal care provision. Identifying informal caregivers and link them to the care recipient is only possible if the care recipient is also an insurant of the TK. Therefore, it might be that there are individuals that in fact provide informal care but are assigned into the control group of *non-carers*. Nevertheless, this share is relatively small compared to the amount of individuals who actually do not provide care. Thus, the overall mean effect in this group should not be affected.

Our extensive data set contains more than 5 million observations in person-year form resulting from more than 2 million individuals of the years 2007 to 2009. On the basis of the panel character, we are able to apply panel data models and to control for time-invariant heterogeneity. The data set is based on observations of employed individuals which are

35 to 65 years old. According to Meng (2013), Stroka (2014) as well as Schmitz and Stroka (2013), we do not include individuals who are younger than 35 because informal care is mainly provided by the group of age named above. Individuals aged 65 and older are not contained in the utilized data due to the fact that they usually are not part of the labor force anymore. As some insurants choose another sickness fund or decease, our panel data set is unbalanced. However, for the largest part of individuals there are observations for each year.

Besides a long list of socio-economic variables including information on the work position and education, the data contain very detailed health outcomes. Thereby, the number of diagnosed work disability days, diagnoses as well as all other variables are recorded for a period of one year and the variables include information from the outpatient and the in-patient sector. Detailed definitions of all utilized variables can be found in the appendix (table A1). Table 1 contains means of work disability days for female and male *carers* as well as *non-carers*. Descriptive statistics give a first overview of potential relationships between caregiving and work disability days. Apparently, women are more absent from work than men, irrespective of caregiving. Relating to the unequally distributed number of work disability days, the data at hand correspond to the existing findings in the economic literature; see e.g. Bridges and Mumford (2001) who investigated gender differences in absenteeism in the UK or Ichino et al. (2009) who examined absenteeism and the effect on earning differences between women and men by means of Italian data. Moreover, it can be seen that both women and men have a higher amount of work disability days if they provide care compared to providing no care. This can be interpreted as a first indication of a positive relationship between informal care provision and work disability days. On average women who provide care are 17 days absent from work compared to non-caring women who have an amount of work disability days of about 12. The descriptive statistics for men reveal a smaller difference in work disability days between carers (13 days) and non-carers (9 days). Descriptive statistics of all variables of the sample at hand can be found in table 2.

Table 1

Means of Work Disability Days for Carers and Non-Carers

	Work Disability Days			
	Females		Males	
Non-carer	11.593	(29.428)	9.341	(26.150)
Carer	17.053	(40.431)	12.783	(32.475)

Standard deviations are in parentheses.

Table 2

Descriptive Statistics of All Variables

Variable	Females Mean (Std. D.)		Males Mean (Std. D.)	
Dependent Variable				
Work disability days	11.611	(29.472)	9.348	(26.164)
Independent Variables				
Information on Care Provision				
Carer (all care levels)	0.004	(0.059)	0.002	(0.043)
Carer of person in care level 1	0.001	(0.030)	0.000	(0.020)
Carer of person in care level 2	0.001	(0.028)	0.000	(0.018)
Carer of person in care level 3	0.000	(0.019)	0.000	(0.013)
Carer of person in unknown care level	0.002	(0.039)	0.001	(0.031)
Socio-Economic Characteristics				
Age	46.360	(6.959)	47.775	(7.439)
Foreign nationality	0.026	(0.160)	0.028	(0.164)
Short-term unemployed	0.028	(0.165)	0.028	(0.164)
Education				
No educational achievement	0.059	(0.236)	0.043	(0.202)
University degree	0.232	(0.422)	0.372	(0.483)
Work Position				
Learner	0.002	(0.040)	0.001	(0.026)
Blue-collar worker	0.028	(0.166)	0.059	(0.235)
Craftsman	0.022	(0.148)	0.113	(0.317)
Master craftsman	0.002	(0.049)	0.043	(0.203)
Self-employed	0.003	(0.053)	0.004	(0.064)
Health Status				
Number of hospitalization	0.116	(0.440)	0.104	(0.471)
Diabetes	0.002	(0.042)	0.005	(0.068)
Myocardial infarction	0.000	(0.016)	0.001	(0.038)
Other cardiovascular diseases	0.018	(0.133)	0.028	(0.165)
Diseases of the liver	0.043	(0.202)	0.077	(0.267)
Disorders of the thyroid gland	0.259	(0.438)	0.084	(0.278)
Stroke	0.004	(0.060)	0.006	(0.078)
Invasive neoplasm	0.056	(0.230)	0.042	(0.200)
Diseases of the digestive system	0.046	(0.210)	0.076	(0.265)
Parkinson's disease	0.000	(0.210)	0.001	(0.029)
Spinal diseases	0.006	(0.076)	0.006	(0.077)
Death	0.016	(0.124)	0.013	(0.112)

3 Empirical Strategy

On the basis of the descriptive results in table 1, it can be assumed that informal care provision and the amount of work disability days are positively correlated. Though, it is possible that there are other factors which affect the decision to provide informal care as well as the number of work disability days. These factors include both unobserved and observed ones, e.g. motivation (unobserved) or health (to a large amount observed). By applying regression analysis, we control for potential confounding factors. We examine the aggregate effect of caregiving (model 1) as well as the effects of the single care levels (model 2) on the dependent variable by means of estimating the two following linear regression models.

Model 1:

$$\mathbf{Y}_{it} = \beta_0 + \beta_1 \mathbf{Care}_{it} + \beta_2 \mathbf{Z}_{it} + \lambda_i + \varepsilon_{it} \quad (1)$$

Model 2:

$$\mathbf{Y}_{it} = \beta_0 + \beta_1 \mathbf{Care\text{-}level}_{it} + \beta_2 \mathbf{Z}_{it} + \lambda_i + \varepsilon_{it} \quad (2)$$

$\mathbf{Y}_{it}$ is the dependent variable to analyze and measures the number of diagnosed work disability days in one year. The index *i* stands for the particular individual (i = 1, …, N) and *t* is an index for the certain year (2007-2009). $\mathbf{Care}_{it}$, in equation (1), is a dummy variable which is 0 if the individual is a *non-carer* and is 1 if the individual is a *carer*. In equation (2), $\mathbf{Care\text{-}level}_{it}$ is a vector of four mutually exclusive dummy variables which enables a more differentiated view so that it is possible to identify different effects of care levels 1-3 and the unknown care level[2]. The single care levels differ in their average time that is required for caring. In care level 1 caregiving is assessed to be about 90 minutes per day, in care level 2 the required time doubles and in care level 3 demanded time for informal caregiving is assumed to be at least 300 minutes per day. $\mathbf{Z}_{it}$ comprises a long list of control variables (e.g. health status, age, information on the education level, job characteristics). Due to the fact that diseases have a positive effect on work disability days, it is essential to notice that we control for a long list of diseases which is also comprised in $\mathbf{Z}_{it}$. ε_{it} is the random error term. β_1 and β_2 are the coefficients to estimate.

[2] *The unknown care level results from the fact that in the data set there are not for every individual information on the care level of the dependent care recipient.*

The chosen variables enable us to control for various confounding factors, however it is possible that there are other unobservable factors which influence the number of work disability days as well as the willingness to care for relatives. To avoid biased estimation results and to obtain consistent parameter estimations, we make use of panel data models and assume that these factors are time-invariant which is comprised in the term λ_i. We employed the Hausman specification test which leads to the result that the assumption of the random-effects model (no correlation between λ_i and the independent variables) does not hold and that the fixed-effects model is preferable.

4 Results

Table 3 presents the results of the fixed- and random-effects analysis for females and males. The results of equation (1) are shown first. The last passage displays the results for equation (2) which allows to differentiate the effect of the single care levels on work disability days. As mentioned in the previous section, fixed-effects model is preferable and therefore we concentrate on the results of the fixed-effects model in the following. The regression results including all control variables are presented in the appendix (tables A2-A3). Since we have no valid and strong instruments, there exists the potential problem of endogeneity (i.e. individuals with a higher level of work disability days might rather provide informal care). Hence, the presented results have to be regarded as correlations and not as causalities.

Table 3

The Effects of Informal Care on Work Disability Days for Model 1 and Model 2

	Females		Males	
	Random-Effects	**Fixed-Effects**	**Random-Effects**	**Fixed-Effects**
Model 1:				
Carer	4.676***	6.091***	3.594***	4.283***
	(0.482)	(0.810)	(0.444)	(0.677)
Model 2:				
Carer of person in care level 1	2.924***	4.357***	2.408***	2.150
	(0.966)	(1.247)	(0.897)	(1.314)
Carer of person in care level 2	4.860***	5.126***	4.021***	3.895***
	(0.963)	(1.360)	(1.127)	(1.300)
Carer of person in care level 3	12.587***	14.713***	5.032***	6.545***
	(1.935)	(2.559)	(1.331)	(1.753)
Carer of person in unknown care level	3.670***	5.011***	3.614***	5.081***
	(0.661)	(1.372)	(0.612)	(1.061)

*Significant on ***: 1% level; **: 5% level; *: 10% level. Robust standard errors in parentheses.*

In general, all results are significant except the result for male carers of persons in care level 1. In addition, it is observable that the effects for females are larger than for males. As expected, all coefficients are positive and increase with the care level of the dependent individual. The fixed-effects results confirm that both women and men have a higher amount of work disability days if they provide care compared to providing no care. The results of model 1 illustrate that men are on average 4 days more absent from work if they provide care. The number of work disability days of female carers rises to 6 days more p.a. By contemplating the results for the single care levels (model 2), it can be seen that women who care for persons in care level 1 are on average 4 days more absent from work compared to non-carers; the number slightly increases to 5 if the care recipient is in care level 2. In care level 3, work disability days amount to a total of almost 15 days more compared to non-caregiving women.

Considering this outcome in relation to the mean of work disability days of female non-carers (see table 1), it can be seen that the number of work disability days has more than doubled. Men who provide informal care to persons in care level 2 are on average 4 days more absent from work than non-carers, the number of work disability days increases slightly to 7 if they care for a person in care level 3. These results provide a first hint that

the rather negligibly small employment effects of care provision documented in the existing literature are considerably larger when taking also the absenteeism from work into account.

5 Conclusion

Informal care is of great importance in Germany as the majority of care dependent persons are attended to by their relatives and friends. Therefore, in face of the proceeding demographic change – imposing an increase of the care dependent population and a decrease of working age citizens – evidence on the relationship between informal caregiving and health related labor-market outcomes is important for both labor market policy and health policy. In the rather small economic literature on informal care provision, employment and health effects have been examined separately to a large extent. While the findings on health effects are consistent and indicate a negative effect of informal care on caregiver's health, there is no consent on effects on labor market outcomes, e.g. working hours, employment probability or labor force participation. But fundamentally, it seems that labor supply is hardly affected by informal care provision. Actually, it would appear that health impairments reduce labor supply in one way or another. This raises the question of how health impairments become manifest in the labor market. Therefore, we attend our study to the question if informal care provision affects the number of work disability days.

We make use of administrative data from the TK which contain detailed information on care dependency and care provision as well as the number of work disability days per year. The panel character of this data set enables us to apply models that control for time-invariant heterogeneity. Nevertheless, the problem of endogeneity remains as we have no valid and strong instruments. Thus, it has to be taken into account that the results at hand have to be considered as correlations and not as causalities. The results of the regression models indicate a negative relationship between informal care provision and work disability days which increases with the care severity of the dependent individuals. Our results are consistent with the results of e.g. Schmitz and Stroka (2013), Van Houtven et al. (2005) and Coe and Van Houtven (2009) in matters of negative health effects of informal care provision.

However, in the economic literature the effects of informal care provision on labor supply has been assumed to be negligibly small until now. Taking our results into account, these previous findings have to be reassessed. An amount of up to 15 work disability days per year are expensive for organizations, for health care as well as for individuals and cannot be neglected. As a consequence, the widespread assumption of informal care provision as the least expensive form of care has to be reevaluated. Admittedly, the work disability days could also result from the poor compatibility of informal care provision and work and not from bad health conditions of the caregivers. This issue has to be scrutinized in further research.

We contribute to the actual debate in Germany on the introduction of flexible work arrangements for informal caregivers. A transition to more flexible working hours could possibly relieve informal caregivers respective to health aspects which, in turn, should lead to a lower amount of work disability days. The Home Care Leave Act (*Gesetz über die Pflegezeit)* (2008) was a first step in the right direction, particularly with regard to the compatibility of work and informal care provision. It enables employees to release from work or to work part-time for a certain time period to care for relatives without being concerned to lose one's job owing to the protection against dismissal included in this law. The introduction of this law could serve as a basis of a difference in differences (DID) analysis of the aforementioned question, if the high amount of work disability days is related to health impairments or to the incompatibility of work and informal care provision.

Appendix

Table A1
Definition of Variables

Variable	Description
Dependent Variable	
Work disability days	Number of diagnosed work disability days in one year
Independent Variables	
Information on Care Provision	
Carer (all care levels)	= 1 if care provision to impaired person, 0 otherwise
Carer of person in care level 1	= 1 if care provision to impaired person in care level 1, 0 otherwise
Carer of person in care level 2	= 1 if care provision to impaired person in care level 2, 0 otherwise
Carer of person in care level 3	= 1 if care provision to impaired person in care level 3, 0 otherwise
Carer of person in unknown care level	= 1 if care provision to impaired person in unknown care level , 0 otherwise
Socio-Economic Characteristics	
Age	Age of Individual
Foreign nationality	= 1 if not German, 0 otherwise
Short-term unemployed	= 1 if had been unemployed up to 150 days in a year, 0 otherwise
Education	
No educational achievement	= 1 if no educational achievement, 0 otherwise (reference group: professional education)
University degree	= 1 if university degree, 0 otherwise (reference group: professional education)
Work Position	
Learner	= 1 if learner, 0 otherwise (reference group: white-collar worker)
Blue-collar worker	= 1 if blue-collar worker, 0 otherwise (reference group: white-collar worker)
Craftsman	= 1 if craftsman, 0 otherwise (reference group: white-collar worker)
Master craftsman	= 1 if master craftsman, 0 otherwise (reference group: white-collar worker)
Self-employed	= 1 if self-employed, 0 otherwise (reference group: white-collar worker)
Health Status	
Number of hospitalization	Number of hospitalizations in the considered year
Diabetes	= 1 if diabetes was diagnosed in the considered year, 0 otherwise
Myocardial infarction	= 1 if myocardial infarction was diagnosed in the considered year, 0 otherwise
Other cardiovascular diseases	= 1 if other cardiovascular diseases were diagnosed in the considered year, 0 otherwise
Diseases of the liver	= 1 if diseases of the liver were diagnosed in the considered year, 0 otherwise
Disorders of the thyroid gland	= 1 if disorders of the thyroid gland were diagnosed in the considered year, 0 otherwise
Stroke	= 1 if stroke was diagnosed in the considered year, 0 otherwise
Invasive neoplasm	= 1 if invasive neoplasms were diagnosed in the considerer year, 0 otherwise
Diseases of the digestive system	= 1 if diseases of the digestive system were diagnosed in the considered year, 0 otherwise
Parkinson's disease	= 1 if Parkinson's disease was diagnosed in the considered year, 0 otherwise
Spinal diseases	= 1 if spinal diseases were diagnosed in the considered year, 0 otherwise
Death	= 1 if death was diagnosed in the considered year, 0 otherwise

Table A2

Full Regression Results: The Effect of Informal Care Provision on Work Disability Days

	Females		Males	
	Random-Effects	**Fixed-Effects**	**Random-Effects**	**Fixed-Effects**
Carer	4.676***	6.091***	3.549***	4.283***
	(0.482)	(0.810)	(0.444)	(0.677)
Age	0.259***	1.202***	0.126***	0.716***
	(0.004)	(0.023)	(0.002)	(0.024)
Foreign nationality	-1.055***	-	-0.723***	-
	(0.126)	-	(0.091)	-
Short-term unemployed	4.920***	1.598***	3.168***	0.527**
	(0.177)	(0.269)	(0.159)	(0.239)
No educational achievement	2.466***	0.025	0.630***	0.633
	(0.114)	(0.610)	(0.102)	(0.553)
University degree	-2.267***	0.142	-2.772***	-0.101
	(0.046)	(0.366)	(0.031)	(0.231)
Learner	-0.873*	0.955	0.236	-0.284
	(0.456)	(1.013)	(0.530)	(1.352)
Blue-collar worker	4.638***	0.920	7.107***	0.750
	(0.169)	(0.645)	(0.097)	(0.521)
Craftsman	2.152***	-0.305	6.301***	1.515***
	(0.161)	(0.656)	(0.066)	(0.404)
Master craftsman	-0.204	-0.550	1.192***	1.673***
	(0.429)	(1.779)	(0.087)	(0.528)
Self-employed	-6.335***	-8.758***	-5.075***	-5.799***
	(0.238)	(0.535)	(0.133)	(0.311)
Number of hospitalization	21.065***	22.464***	16.889***	18.283***
	(0.528)	(0.359)	(1.720)	(1.478)
Diabetes	5.880***	2.537*	7.109***	4.993***
	(1.200)	(1.310)	(0.986)	(0.929)
Myocardial infarction	32.956***	34.046***	35.984***	38.400***
	(3.201)	(3.424)	(1.252)	(1.256)
Other cardiovascular diseases	8.116***	5.128***	9.986***	7.313***
	(0.646)	(0.508)	(1.932)	(1.602)
Diseases of the liver	2.517***	2.189***	2.357***	2.331***
	(0.309)	(0.327)	(0.590)	(0.472)
Disorders of the thyroid gland	1.937***	1.728***	1.663***	1.722***
	(0.053)	(0.113)	(0.086)	(0.147)
Stroke	9.460***	9.809***	11.333***	16.056***
	(0.676)	(1.196)	(0.471)	(0.913)
Invasive neoplasm	6.285***	7.176***	4.869***	5.167***
	(0.160)	(0.240)	(0.385)	(0.321)
Diseases of the digestive system	1.089***	-0.276	1.122	0.364
	(0.385)	(0.325)	(0.840)	(0.679)
Parkinson's disease	5.007***	-0.947	7.914***	5.961***
	(1.602)	(2.602)	(1.084)	(1.651)
Spinal diseases	32.532***	27.267***	32.378***	27.716***
	(0.864)	(0.847)	(1.630)	(1.402)
Death	-4.614***	-4.909***	-4.261***	-4.682***
	(0.112)	(0.205)	(0.118)	(0.194)
R^2		0.146		0.165
N	2,055,179	2,055,179	3,019,724	3,019,724

*Significant on ***: 1% level; **: 5% level; *: 10% level. Robust standard errors in parentheses.*

Table A3

Full Regression Results: The Effect of Providing Informal Care to Persons in Different Care Levels on Work Disability Days

	Females		Males	
	Random-Effects	**Fixed-Effects**	**Random-Effects**	**Fixed-Effects**
Carer of person in care level 1	2.924***	4.357***	2.408***	2.150
	(0.966)	(1.247)	(0.897)	(1.314)
Carer of person in care level 2	4.860***	5.126***	4.021***	3.895***
	(0.963)	(1.360)	(1.127)	(1.300)
Carer of person in care level 3	12.587***	14.713***	5.032***	6.545***
	(1.935)	(2.559)	(1.331)	(1.753)
Carer of person in unknown care level	3.670***	5.011***	3.614***	5.081***
	(0.661)	(1.372)	(0.612)	(1.061)
Age	0.259***	1.201***	0.126***	0.716***
	(0.004)	(0.023)	(0.002)	(0.024)
Foreign nationality	-1.055***	-	-0.723***	-
	(0.126)	-	(0.091)	-
Short-term unemployed	4.917***	1.594***	3.168***	0.528**
	(0.177)	(0.269)	(0.159)	(0.239)
No educational achievement	2.466***	0.026	0.630***	0.632
	(0.114)	(0.609)	(0.102)	(0.553)
University degree	-2.266***	0.144	-2.772***	-0.101
	(0.046)	(0.366)	(0.031)	(0.231)
Learner	-0.875*	0.936	0.235	-0.284
	(0.456)	(1.008)	(0.530)	(1.352)
Blue-collar worker	4.637***	0.920	7.107***	0.748
	(0.169)	(0.645)	(0.097)	(0.521)
Craftsman	2.152***	-0.304	6.302***	1.515***
	(0.161)	(0.656)	(0.066)	(0.404)
Master craftsman	-0.201	-0.543	1.192***	1.675***
	(0.429)	(1.778)	(0.087)	(0.528)
Self-employed	-6.335***	-8.759***	-5.074***	-5.800***
	(0.238)	(0.535)	(0.133)	(0.311)
Number of hospitalization	21.066***	22.465***	16.889***	18.283***
	(0.528)	(0.359)	(1.720)	(1.478)
Diabetes	5.878***	2.535*	7.109***	4.993***
	(1.200)	(1.310)	(0.986)	(0.929)
Myocardial infarction	32.960***	34.046***	35.984***	38.400***
	(3.201)	(3.424)	(1.252)	(1.256)
Other cardiovascular diseases	8.117***	5.129***	9.985***	7.313***
	(0.646)	(0.508)	(1.932)	(1.602)
Diseases of the liver	2.516***	2.189***	2.357***	2.330***
	(0.309)	(0.327)	(0.590)	(0.472)
Disorders of the thyroid gland	1.937***	1.728***	1.663***	1.722***
	(0.053)	(0.113)	(0.086)	(0.147)
Stroke	9.462***	9.809***	11.332***	16.056***
	(0.676)	(1.196)	(0.471)	(0.913)
Invasive neoplasm	6.286***	7.177***	4.869***	5.168***
	(0.160)	(0.240)	(0.385)	(0.321)
Diseases of the digestive system	1.090***	-0.276	1.122	0.364
	(0.385)	(0.325)	(0.840)	(0.679)
Parkinson's disease	5.005***	-0.965	7.914***	5.965***
	(1.602)	(2.602)	(1.084)	(1.651)
Spinal diseases	32.529***	27.262***	32.378***	27.716***
	(0.865)	(0.847)	(1.630)	(1.402)
Death	-4.613***	-4.908***	-4.261***	-4.682***
	(0.112)	(0.205)	(0.118)	(0.194)
R^2		0.146		0.165
N	2,055,179	2,055,179	3,019,724	3,019,724

*Significant on ***: 1% level; **: 5% level; *: 10% level. Robust standard errors in parentheses.*

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