


New Evidence on Employment Effects of Informal Care Provision in Europe

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Objective. To estimate how labor force participation is affected when adult children provide informal care to their parents.

Data Source. Survey of Health, Ageing and Retirement in Europe from 2004 to 2013.

Study Design. To offset the problem of endogeneity, we exploit the availability of other potential caregivers within the family as predictors of the probability to provide care for a dependent parent. Contrary to most previous studies, the dataset covers the whole working-age population in the majority of European countries. Individuals explicitly had to opt for or against the provision of care to their care-dependent parents, which allows us to more precisely estimate the effect of caregiving on labor force participation.

Principal Findings. Results reveal a negative causal effect that indicates that informal care provision reduces labor force participation by 14.0 percentage points (95 percent CI: $-0.307, 0.026$). Point estimates suggest that the effect is larger for men; however, this gender difference is not significantly different from zero at conventional levels.

Conclusions. Results apply to individuals whose consideration in long-term care policy is highly relevant, that is, children whose willingness to provide informal care to their parents is altered by available alternatives of family caregivers.

Key Words. Health economics, labor economics, instrumental variables, long term care, home care

The demand for long-term care services is continuously increasing in the industrialized world. Both demographic change and technological progress in medicine make the oldest old, who are most likely in need of some form of care, the largest growing group in the population. In the United States, the number of individuals aged 80+ is projected to increase from about 13 Mio. in 2015 to 19.5 Mio. in 2030 and 31 Mio. in 2050.¹ In Germany, these numbers are 4.5, 6, and 10 Mio., and this tendency is representative for the OECD with only Japan reaching the peak in the amount of people 80+ in 2030 already.

Likewise throughout the industrialized world, informal care, that is, care provided by relatives, partners, or neighbors, is the predominant form of long-term care. For instance, 73 percent of all long-term care recipients receive some form of informal care (50 percent solely receive formal care) in Germany (Destatis 2017). Also in the United States, the majority of care recipients receive informal care (National Academies of Sciences, Engineering, and Medicine 2016). Given that informal care is typically preferred by the average care recipient (e.g., Hajek et al. 2017), this seems to be reasonable. However, informal care provision is burdensome for the caregiver, and the increasing demand for informal care provision in the future might have negative consequences that are not yet adequately taken into account by health policy. A recent study from the United States reports that informal care tasks are very heterogeneous, but many caregivers now take over services that were previously carried out by trained medical staff, such as overseeing medication, monitoring health, and injections (National Academies of Sciences, Engineering, and Medicine 2016). But also the traditionally carried out tasks such as toileting or getting in and out of bed are both mentally and physically challenging.

In addition to increased responsibility for the informal caregiver, two other societal changes increase pressure on children of the care-dependent elderly. First, in the United States (but likewise in other countries), the size of families is shrinking. Thus, children are less able to pass over care obligations for parents to their siblings or to the parent that is not care-dependent. Second, not only the amount of older individuals is increasing, but also the old-age dependency ratio (the number of individuals older than 65 as a percentage of those between 15 and 64). In order to maintain public retirement systems, both the female employment rate and also that of older individuals in general will need to increase.² Yet care obligations are time-consuming and informal caregivers are confronted with the decision to keep their job and take on the double burden of caring and working, or to put their career on hold. If caregivers give up their job during the caring episode, informal care provision might not be the cheapest form of care provision for the society as often assumed by health policy. Caregivers forgo income with implications for

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lifetime income (lower pensions but also potentially forgone promotions). Yet, whether individuals indeed show labor market responses is an empirical question that we seek to answer in this study. Adequate policy measures, for instance those that enable caregivers to both care and work, can only be drawn once labor force reactions are fully understood.

We examine the effect of informal care provided by adult children to their dependent elderly parents on labor market participation using data from the Survey of Health, Ageing and Retirement in Europe (SHARE). This representative dataset includes individuals aged 50 and older from twenty European countries and provides extensive information on health, care status, and interpersonal relations of the individual which we use to model care needs. Even though we study the European setting, the results might be helpful to inform the current debate in the United States on family caregiving. Studying effects in Europe offers the unique possibility to exploit variations in institutional settings. For instance, while in the Northern European countries, there is some (although not necessarily enough) support from public insurance system for caregivers—both monetary and in-kind benefits for informal caregiving but also the institutionalized possibility to get paid access to formal care—Southern and Eastern European countries offer much less support. Finding different labor market responses in these different countries might help to learn about the influence of institutions.

There have been several studies on the relationship between informal care provision and labor force participation before (e.g., Ettner 1995; Heitmueller 2007; Bolin, Lindgren, and Lundborg 2008; Carmichael, Charles, and Hulme 2010; Leigh 2010; Lilly, Laporte, and Coyte 2010; Michaud, Heitmueller, and Nazarov 2010; Viitanen 2010; Fevang, Kverndokk, and Røed 2012; Kotsadam 2012; Van Houtven, Coe, and Skira 2013; Crespo and Mira 2014; Heger 2014; Schmitz and Westphal 2016), with findings reaching from very small to very large labor force reactions to care provision. Besides the ability to draw lessons from different institutional settings, our paper can contribute to the existing literature in three ways. First, we are able to identify *potential* care responsibilities of all individuals. While initially, only individuals above the age of 50 are interviewed, we pursue a change of perspective in our dataset. The interviewed are seen as potential care recipients while their children (possibly younger than 50) are their potential caregivers and the individuals of interest in this study. We observe for each child the exact health status of their parents and know whose parents are actually in need of care.³ In general, previous studies cannot discriminate between noncaregivers who do not provide care because there is simply no one in need of care in their family and

those who actively decide against care provision even though there are potential care recipients. We restrict the analysis to those children whose parents' current condition confronts the children with the choice of whether to provide personal care or not. This considerably strengthens the relevance of the employed instruments and therefore allows us to estimate the effect of interest more precisely than previous studies that sometimes had problems with weak instruments (e.g., Bolin, Lindgren, and Lundborg 2008).

Second, our data allow us to simultaneously look at the whole age distribution of potential caregivers, including the younger working-age population across a considerable part of European countries. The Social Situation Monitor of the European Commission reports a substantial part—between one-third and almost half—of informal caregivers of working age in Europe to be between 18 and 44 years (Rodrigues et al. 2013), and the National Alliance for Caregiving and American Association of Retired Persons report 48 percent of caregivers to be between 18 and 49 years old in the United States (NAC and AARP 2015). This is especially relevant as they are likely in the prime ages of their working lives. These high percentages are also reflected in our sample that is limited to the working-age population: While 10 percent are aged 20–29, 23 percent are between ages 30 to 39 and one-third is aged between 40 and 49 (Table 1). Given these numbers, a large potential impact on a country's welfare might have been hidden in previous studies, which often focus on the population 50+.

Third, previous studies often focused on female caregivers (e.g., Ettner 1995; Michaud, Heitmueller, and Nazarov 2010; Viitanen 2010; Skira 2015; also the closest one compared to ours, Crespo and Mira 2014). However, excluding men would be a great loss in our case, given that in our sample, half of the individuals who are confronted with the choice of providing care are male. Although females are often mentioned as the main providers of informal care, the gender mix could be changing in the future and already the current share of men is non-negligible: For Europe, Riedel and Kraus (2011) report 41 percent of all caregivers who provide personal care on an almost daily basis to be male with only little variation in the gender mix between the countries. In the United States, almost the same amount (40 percent) is reported to be male caregivers (NAC and AARP 2015).

In this study, we will use instrumental variables estimations to address the endogeneity of care provision in identifying its effect on labor market participation. After starting with a pooled model—stratified by gender—we move on to separate estimations for country clusters in order to learn how the potential effect of caregiving might change by institutional setting.

Table 1: Summary Statistics

	<i>Potential Caregivers (Full Sample)</i>				
	<i>Actual Caregivers</i>		<i>No Caregiver</i>		
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>t-Statistics</i>
Dependent variable					
Working (any)	0.74	0.44	0.87	0.34	11.9259
Full time	0.59	0.49	0.72	0.45	8.6790
Part time	0.09	0.28	0.08	0.27	−0.6116
Self-employed	0.06	0.24	0.07	0.26	1.3213
Independent variables					
Age	44.14	10.44	38.97	9.58	−17.1110
Male	0.35	0.48	0.53	0.50	11.2393
Married	0.44	0.50	0.50	0.50	3.7181
Lower education	0.11	0.31	0.06	0.24	−6.0190
Medium education	0.62	0.49	0.62	0.49	0.0103
Higher education	0.27	0.45	0.32	0.47	3.1497
Number of children	1.14	1.15	1.28	1.24	3.6285
Young child	0.20	0.40	0.33	0.47	9.0850
Other caregiver	0.08	0.27	0.15	0.36	6.57433
Married parents	0.35	0.48	0.49	0.50	8.8794
City	0.07	0.25	0.10	0.30	3.3776
Town	0.12	0.32	0.19	0.39	6.1382
Rural area	0.13	0.33	0.17	0.38	3.7909
Instruments					
Father is widowed	0.05	0.21	0.01	0.11	−9.0375
Mother is widowed	0.25	0.44	0.06	0.24	−24.3269
Number of siblings	1.31	0.90	1.57	0.89	9.3698
Age groups					
Age 20–29	0.10	0.30	0.17	0.38	6.1131
Age 30–39	0.23	0.42	0.38	0.49	10.2274
Age 40–49	0.33	0.47	0.28	0.45	−3.7398
Age 50–64	0.34	0.47	0.17	0.37	−14.5549
Observations	1,096		14,566		

Notes. Country dummies are not shown. Working is a dummy variable defined as 1 if working full time, part time, or being self-employed and 0 if being unemployed or a homemaker. Other caregiver indicates that there is at least one other person inside the parent household who is in excellent, very good, or good health. City, town, and rural area denote the living area of the parents. We report *t*-statistics for the equality of means of both groups. Missing information is imputed from other waves when available and if indicated that there was no change in these variables.

DATA AND EMPIRICAL STRATEGY

The information that we use in our analysis is provided by respondents of SHARE who are aged 50 and older. We have data for the years between 2004

and 2013, thus more waves than Crespo and Mira (2014), who follow a similar approach to ours. These data provide extensive information on health, socioeconomic status, and many additional variables, which makes them very well suited for our analysis. In particular, detailed information on care needs is provided. However, our main interest is not in the SHARE respondents (we call them “parents” from now on) but in their adult children who are their potential informal caregivers.

We reshape the dataset of the responding individuals into a “child dataset.” We limit the dataset to those children whose parents’ health status indicates that they are in need of care. More specifically, at least one parent indicates that he or she receives personal care inside or outside the household, irrespective from whom, on a daily or almost daily basis or is permanently sick or disabled.⁴ We argue that it is plausible to assume that once individuals decided on the type of care, it is unlikely that they will switch from formal to informal care. Of course, children whose parents are solely receiving formal care also have the choice of whether they should provide informal care or not. However, we refrain from including individuals with parents who exclusively receive formal care: The institutionalized population is undersampled in SHARE (Schulz and Doblhammer 2011; Avendano et al. 2015), and the focus of the paper is on those individuals who are potential informal family caregivers; that is, those who have a parent in need of care that is still bearable for an informal caregiver. Moreover, including another variable to control for formal care would result in another endogenous variable, which is difficult to account for.⁵ We observe whether the individual actually has a potential care recipient in the personal milieu and hence is a potential caregiver, instead of relying on the statement whether they provide care or not. All individuals in our final dataset used for estimation have at least one dependent parent, so they actively had to decide whether to provide care to their parents or not.

While information is available from 178,060 individual parent observations, 12 percent of these parents receive care or are permanently sick or disabled. Our final dataset consists of 15,662 individual observations for which we unambiguously identify and assign the required information on caregiving. Every individual is included once per wave, irrespective of whether they provide care to one or both parents. Although SHARE is a panel study, we use a repeated cross section which better accommodates our instruments, and because tracking information for the children over time and correctly assigning the information to the respective child over different waves are possible only in a very limited manner. Of these children who have at least one dependent parent and hence are potential caregivers, 7 percent actually provide care

to a parent. Information from official sources on the share of younger caregivers is very limited. However, the share of caregivers in our sample is comparable to numbers from the European Commission when restricting to caregivers that are 50 or older (European Commission 2014).

In contrast to most of the previous literature, including the closest compared to our study (Crespo and Mira 2014), we do not only include elderly individuals, but we cover the whole range of the working-age population. We restrict our sample to children who are available on the job market; that is, those that are between 20 and 64 years old, are not permanently sick or disabled, and do not receive personal care from their parents.

We do not split our sample by gender but interact each explanatory variable with a male dummy and estimate a completely interacted model.⁶ We only use observations if we can unambiguously identify the actual caregiver on child level.⁷ Countries that are included in our analysis are Austria, Germany, Sweden, the Netherlands, Spain, Italy, France, Denmark, Greece, Switzerland, Belgium, Israel, Czech Republic, Poland, Ireland, Luxembourg, Hungary, Portugal, Slovenia, and Estonia.

Parents provide comprehensive information with respect to their children in the questionnaire. Available information on child level is gender; year of birth; geographic proximity to the parent household; being a step, adoptive, or foster child; marital status; has a partner; contact with parent; year moved out from the parents' household; working status (occupation); education; further education or training in a country-specific category; number of children; and year of birth of the youngest child.

The dependent variable is a binary indicator on whether an individual is working—full time, part time, self-employed—versus not working, that is stating to be unemployed or a homemaker. The numbers on employment status resemble those from official statistics for the European Union as well as the United States. While 62 percent (65 percent) of the European (US) population aged 15 to 64 were employed in 2013, 13 percent (11 percent) were working part time and 52 percent (56 percent) were working full time (OECD 2017b,c).

Our main explanatory variable is a dummy variable that indicates whether the individual has helped a parent with personal care—such as washing, getting out of bed, or dressing—daily or almost daily on a regular basis, excluding help during short-term sickness. These intensities of caregiving are close to those that are necessary to receive benefits from the state for informal care support in several countries, and therefore they are a good approximation for what is of political interest (Colombo et al. 2011), and also represent a level of care that may make working more challenging and/or less possible. In

this respect, we deviate slightly from the literature. The definition of Bolin, Lindgren, and Lundborg (2008), for instance, includes personal care, practical household help, and help with paperwork. Van Houtven, Coe, and Skira (2013) use two definitions. One for any caregiving; that is, someone provided 100 hours or more in the previous 2 years. The definition for intensive caregiving includes 1,000 hours or more of personal care and help with chores in the previous 2 years. The latter is closer to our definition.

We include information as described in Table 1. A significantly higher percentage of noncaregivers than caregivers is working, in particular, full time. A lower percentage of caregivers has a child that is younger than 15, which might be due to the fact that individuals who provide care are on average 5 years older than those who are potential caregivers but do not provide care to a parent. More than one-third of the caregivers is male, which compares to numbers from Europe and the United States (Riedel and Kraus 2011; NAC and AARP 2015). Educational levels are very close to official statistics on educational attainment for individuals ages 25–64 (OECD 2017a): Between 6 and 11 percent have lower education, while 62 percent have medium education and almost one-third have higher education. Other controls we use in our analysis include marital status; the number of children; whether there is at least one other person in the parent household who is in excellent, very good, or good health; whether the parents are married; the living area of the parents; the country of residence; and the wave in which the interview was conducted. Adult children can live with their parents; however, this decision is endogenous and hence not considered further.

Obviously, it is necessary to settle the potential endogeneity of caregiving: People might select into the role of a caregiver because they are less attached to the labor force or have limited opportunities in the labor market, and the decision to provide informal care to parents and the decision to work are simultaneously determined. To alleviate the potential bias from endogeneity, we implement an instrumental variable approach. We employ a set of variables that indicate whether the father is widowed, whether the mother is widowed, and the number of siblings. These characteristics describe the presence of other potential caregivers in the family and cannot be altered by the child. Similarly, sibling and family characteristics have been used as instrumental variables in the past, for example Van Houtven and Norton (2004) and Bolin, Lindgren, and Lundborg (2008).

It is plausible to assume that the availability of other family caregivers does not have a direct impact on the employment status of the child except through the status of actually providing care to the parent and that the

instrument set is not correlated with unobserved determinants of the labor market status. A concern might be that a parent's health could directly affect work status of the child by being correlated with the child's ability to work later or that watching a parent's health decline may influence the mental health of the child (Amirkhanyan and Wolf 2006). We follow recent literature (Coe and Van Houtven 2009; Van Houtven, Coe, and Skira 2013) and assume that these pathways are relatively weak and that the death of a parent does not directly influence mental health and hence possibly work behavior.

The instruments strongly influence the probability of care provision when at least one parent is in need of care. Under the assumption of effect heterogeneity, coefficients are interpreted as local average treatment effects in the sense that they apply to those whose care provision is the result of the presence or absence of another source of provision of care within the family.

RESULTS

Baseline Results

We first run OLS regressions without accounting for endogeneity. We employ a linear probability model as the use of nonlinear models with instrumental variables is more difficult in the case of a binary endogenous regressor (Newey 1990; Cutler 2007). In all estimations, we cluster on household level. Providing care to a parent is associated with a 5.8 percentage points lower probability to work while there do not seem to be any significant gender differences (Table 2). Columns (2) and (3) show robustness checks to our definition on work and nonwork. The association stays almost the same when only accounting for those that we regard as working a full-time job; that is, working either full time or being self-employed (2) or when we restrict the definition of working to those working full time and exclude the self-employed (3). The signs of the coefficients from our control variables are as we would expect and are reasonable in size.

Next, we employ an instrumental variable estimation. First-stage results show strong instruments, suggesting that the instruments are good predictors of informal caregiving status (Table 3, Panel A). Signs and magnitudes of the coefficients in the first stage are as we would expect. For women with a care-dependent parent, having a father (mother) that is widowed increases the probability to provide care by 15.1 (20.0) percentage points and having one more sibling decreases the probability to provide care by 2.8 percentage

Table 2: Effects on Employment Status—OLS Estimation

	(1) <i>Working (Any) vs. Unemployed or Homemaker</i>	(2) <i>Full Time Including Self-Employed vs. Unemployed or Homemaker</i>	(3) <i>Working Full Time vs. Unemployed or Homemaker</i>
Caregiver	−0.058*** [0.018]	−0.073*** [0.019]	−0.069*** [0.020]
Caregiver × Male	−0.005 [0.027]	0.005 [0.028]	−0.005 [0.030]
Age	0.025*** [0.003]	0.027*** [0.003]	0.028*** [0.003]
Age sq./100	−0.029*** [0.004]	−0.031*** [0.004]	−0.032*** [0.004]
Married	−0.002 [0.010]	−0.005 [0.012]	−0.009 [0.012]
Medium education	0.156*** [0.024]	0.163*** [0.026]	0.168*** [0.026]
Higher education	0.281*** [0.024]	0.314*** [0.026]	0.327*** [0.027]
Number of children	−0.039*** [0.005]	−0.050*** [0.006]	−0.054*** [0.006]
Young child	−0.041*** [0.012]	−0.059*** [0.014]	−0.060*** [0.014]
Other caregiver	0.025* [0.013]	0.023 [0.015]	0.023 [0.016]
Married parents	0.015 [0.010]	0.018* [0.011]	0.017 [0.011]
City	−0.027 [0.019]	−0.030 [0.022]	−0.028 [0.023]
Town	−0.024 [0.017]	−0.032* [0.019]	−0.031 [0.020]
Rural area	0.010 [0.016]	0.008 [0.019]	0.011 [0.019]
Age × Male	0.002 [0.002]	0.002 [0.002]	0.002 [0.002]
Age sq./100 × Male	−0.003 [0.003]	−0.003 [0.003]	−0.003 [0.003]
Married × Male	0.064*** [0.013]	0.071*** [0.014]	0.084*** [0.015]
Medium education × Male	−0.053* [0.029]	−0.060* [0.031]	−0.053* [0.032]
Higher education × Male	−0.136*** [0.030]	−0.167*** [0.031]	−0.165*** [0.033]
Number of children × Male	0.046*** [0.006]	0.057*** [0.007]	0.062*** [0.008]
Young child × Male	0.027* [0.014]	0.046*** [0.016]	0.042** [0.017]
Other carer × Male	−0.005 [0.015]	−0.002 [0.017]	−0.001 [0.018]
Married parents × Male	0.000 [0.011]	−0.002 [0.013]	−0.000 [0.013]
City × Male	0.006 [0.025]	0.007 [0.027]	0.007 [0.028]
Town × Male	−0.001 [0.021]	0.006 [0.023]	0.007 [0.025]
Rural × Male	−0.005 [0.021]	−0.003 [0.023]	−0.003 [0.024]
Constant	0.209*** [0.057]	0.162*** [0.061]	0.139** [0.064]
Observations	15,662	14,367	13,270

Notes. Exogenous variables further include dummies for country and wave. Clustered on household level. Standard errors in brackets.

* $p < .10$, ** $p < .05$, *** $p < .01$.

points. Interaction effects indicate that these effects are smaller in size for men but significantly different from zero and similarly good predictors for caregiving.

Turning to the results from the second stage, we find negative effects of providing informal care to a parent on the probability to work (Table 3, Panel B). The effects are larger than estimations that assume exogeneity would suggest and are statistically significant.⁸ For women, being a caregiver

Table 3: Effects on Employment Status—TSLS Estimation

	(1) Working (Any) vs. Unemployed or Homemaker	(2) Full Time Including Self-Employed vs. Unemployed or Homemaker	(3) Working Full time vs. Unemployed or Homemaker
<i>Panel A: First-stage results</i>			
(1) Caregiver			
Father is widowed	0.151*** [0.037]	0.132*** [0.040]	0.138*** [0.042]
Mother is widowed	0.200*** [0.019]	0.194*** [0.020]	0.190*** [0.020]
Number of siblings	−0.028*** [0.004]	−0.029*** [0.004]	−0.030*** [0.004]
Father is widowed × Male	−0.055 [0.049]	−0.029 [0.052]	−0.032 [0.056]
Mother is widowed × Male	−0.104*** [0.024]	−0.099*** [0.025]	−0.093*** [0.026]
Number of siblings × Male	0.010** [0.005]	0.011** [0.005]	0.010** [0.005]
<i>F</i> -stat. on excl. instruments	48.49	41.23	39.21
(2) Caregiver × Male			
Father is widowed	−0.002** [0.001]	−0.002** [0.001]	−0.002** [0.001]
Mother is widowed	−0.003*** [0.001]	−0.003*** [0.001]	−0.003*** [0.001]
Number of siblings	−0.001*** [0.000]	−0.001*** [0.000]	−0.001*** [0.000]
Father is widowed × Male	0.100*** [0.031]	0.106*** [0.032]	0.109*** [0.034]
Mother is widowed × Male	0.102*** [0.015]	0.100*** [0.015]	0.102*** [0.016]
Number of siblings × Male	−0.017*** [0.003]	−0.017*** [0.003]	−0.019*** [0.003]
<i>F</i> -stat. on excl. instruments	51.52	44.58	43.38
<i>Panel B: Second-stage results</i>			
Caregiver	−0.140* [0.085]	−0.172* [0.096]	−0.153 [0.098]
Caregiver × Male	−0.170 [0.144]	−0.161 [0.153]	−0.200 [0.159]
Socioeconomic controls	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes
Wave dummies	Yes	Yes	Yes
Observations	15,662	14,367	13,270

Notes. The full estimation results can be found in Table SA.II. Panel A shows the coefficients of the instruments from a regression with (1) caregiver and (2) the interaction effect of caregiver and male as the outcome in the first stage. *F*-stat. on excl. instruments describes the Sanderson–Windmeijer multivariate *F*-test of excluded instruments. Panel B provides the effects of informal care provision on labor force participation. Clustered on household level. Standard errors are in brackets.

* $p < .10$, ** $p < .05$, *** $p < .01$.

decreases the probability to work either full time, part time, or being self-employed by 14.0 percentage points (1). This effect does not differ significantly by the definition of labor force participation ((2) and (3)).

Point estimates for the interaction effect of caregiving status and being male are large and negative. These coefficients are not significant at conventional levels, which is why we do not interpret them quantitatively. The effects we find are larger than those reported in most of the previous literature; however, more recent studies similarly show large effects (Crespo and Mira 2014; Heger 2014).

Do Results Differ by Country Groups?

Next, we pool countries to analyze heterogeneity that potentially arises due to cross-country variation in institutional settings within Europe (Table 4). We allocate countries based on long-term care expenditures as a share of their gross domestic product (OECD 2016). This division results in the same country pools as in Bolin, Lindgren, and Lundborg (2008) and Crespo and Mira (2014) for the countries included in these previous analyses. We find that the effect on informal care provision is fully driven by informal care providers in Southern and Eastern European countries. Here, the baseline effect of caregiving is a 25 percentage point reduction in labor force participation. Again, effects for men seem to be larger but the gender difference is not statistically significant. There are not effects in the group of Northern and Central European countries. While Crespo and Mira (2014) only consider female caregivers, our findings are in line with their results.

Robustness Checks

In a sample modification, we run regressions on samples with an alternative definition of being a potential caregiver (Table 5). For this, we turn back to the pooled regressions. We include individuals with at least one parent who indicates having problems with activities of daily living. The coefficient of interest is large in absolute terms, but also has large standard errors. Having problems with activities of daily living thus seems to evoke differentiated care needs. Compared to the sample including parents with ADL limitations, we are using the more conservative variant in our main specification. If we remove any constraint of only including those children whose parents' health status indicates that they are in need of care, significance levels drop considerably. Without restriction to potential caregivers, there would be too much noise, which is reflected in very small coefficients in the first stage as for this augmented sample the instruments cannot work well for a large part of children who are not confronted with the choice of whether they should provide care.

Table 4: Effects of Caregiving on Employment Status—Country Groups (TSLS Estimation)

	(1) Working (Any) vs. Unemployed or Homemaker	(2) Full Time Including Self-Employed vs. Unemployed or Homemaker	(3) Working Full Time vs. Unemployed or Homemaker
<i>Northern and Central European countries</i>			
Caregiver	0.088 [0.182]	0.072 [0.225]	0.106 [0.243]
Caregiver × Male	−0.273 [0.277]	−0.321 [0.314]	−0.330 [0.326]
Observations	7,340	6,426	5,956
<i>Southern and Eastern European countries</i>			
Caregiver	−0.249** [0.104]	−0.277** [0.113]	−0.245** [0.114]
Caregiver × Male	−0.209 [0.180]	−0.191 [0.189]	−0.267 [0.198]
Observations	8,332	7,941	7,314

Notes. Control variables as in Table 3. Northern and Central European countries include Ireland, Denmark, Switzerland, Belgium, Luxembourg, Germany, Austria, the Netherlands, France, and Sweden. Southern and Eastern European countries include Greece, Portugal, Estonia, Czech Republic, Hungary, Poland, Israel, Spain, Italy, and Slovenia. Exogenous variables are not reported. Clustered on household level. Standard errors are in brackets.

* $p < .10$, ** $p < .05$, *** $p < .01$.

We vary our instrument set for robustness checks by excluding some instruments. When using only the number of siblings as an instrument, estimates point in the same direction as in the main specification, while they become larger, but insignificant. When we exclude the number of siblings from our initial instrument set, the overall results stay fairly stable, with in part slightly smaller, less significant point estimates. Effects from the specification of these instrument sets can only be ascribed to a fraction of the family caregivers. This might miss important aspects in the area of family care.

CONCLUSION

This study examines whether informal care provision to parents affects children’s probability to work. We use the SHARE to identify—and limit the analysis to those—children who are actually confronted with the decision to provide care and define caregivers as adult children who provide care at least daily or almost daily. To offset the problem of endogeneity, we exploit the availability of other potential caregivers within the family as predictors of the probability to provide care for a dependent parent.

Our results suggest that caregiving decreases the probability of working by about 14 percentage points. Effects for men are larger and negative, but not

Table 5: Effects of Caregiving on Employment Status—Alternative Definitions (TSLS Estimation)

	(1) <i>Working (any) vs. Unemployed or Homemaker</i>	(2) <i>Full Time Including Self-Employed vs. Unemployed or Homemaker</i>	(3) <i>Working Full Time vs. Unemployed or Homemaker</i>
Sample variation			
Parent has ADL limitations			
Caregiver	−0.112 [0.163]	−0.115 [0.181]	−0.030 [0.188]
Caregiver × Male	−0.728** [0.332]	−0.766** [0.352]	−0.811** [0.367]
Observations	22,631	20,800	18,916
No restriction to potential caregiver			
Caregiver	0.002 [0.272]	0.068 [0.310]	0.189 [0.320]
Caregiver × Male	−1.267** [0.505]	−1.354** [0.542]	−1.398** [0.562]
Observations	154,267	140,929	128,936
Instrument sets			
Number of siblings			
Caregiver	−0.144 [0.233]	−0.218 [0.253]	−0.194 [0.250]
Caregiver × Male	0.012 [0.341]	0.108 [0.358]	0.122 [0.351]
Observations	15,662	14,367	13,270
Father is widowed, mother is widowed			
Caregiver	−0.143 [0.094]	−0.167 [0.106]	−0.149 [0.110]
Caregiver × Male	−0.228 [0.172]	−0.241 [0.182]	−0.317 [0.196]
Observations	15,662	14,367	13,270

Notes. Control variables as in Table 3. Northern and Central European countries include Ireland, Denmark, Switzerland, Belgium, Luxembourg, Germany, Austria, the Netherlands, France, and Sweden. Southern and Eastern European countries include Greece, Portugal, Estonia, Czech Republic, Hungary, Poland, Israel, Spain, Italy, and Slovenia. Exogenous variables are not reported. Clustered on household level. Standard errors are in brackets.

* $p < .10$, ** $p < .05$, *** $p < .01$.

significantly different from the effects for women.⁹ Under the assumption of effect heterogeneity, our estimates are local average treatment effects; that is; they apply to those whose willingness of informal care provision is altered by available alternatives of family caregivers denoted by the number of siblings or the widowhood of the parent. These groups are typically affected by policy interventions of any kind, and their involvement is highly relevant when long-term care alternatives are considered.

A potentially policy-relevant finding is the strong difference in results by country groups. The effects in the pooled estimations are fully driven by the Southern and Eastern European countries—countries with much less support for informal caregivers than in Northern Europe. While this result should not be overrated (see the limitations of our study below), it might be interpreted as evidence that informal care support works. This should also matter for long-

term care systems outside Europe. A recent report from the United States calls for more attention and support for informal caregivers (National Academies of Sciences, Engineering, and Medicine 2016), and the results of this study imply that this could work to help combine care provision and labor force participation. Taking Germany as an example, a couple of measures might add to this. Caregivers who are working are allowed to be absent from work for 10 days per caregiving episode. Moreover, they can take a 6-month leave (unpaid) to provide care without endangering their job, that is, can return to their previous job afterward. More important, it is quite common that family members provide informal care while there is professional ambulatory care at the same time for the care recipient. These measures increase the flexibility for working individuals who have care obligations. Other measures could be thought of. Comparable to parental leave regulations that exist in many countries, one could consider “care provision leave” where individuals take longer leave, receive income replacements from the long-term care insurance, and have a legal claim to return to their previous job (also see Skira 2015).

Apart from keeping individuals with care obligations in the labor force, policy should not forget a problem, however, that could directly result from this: The double burden of working and caring may deteriorate caregivers’ health (see Schmitz and Westphal 2015; on health effects and Schmitz and Stroka 2013, explicitly on effects of the double burden.) Thus, health policy should not only follow the goal of keeping individuals in the labor force but also keep individuals healthy.

This study has several limitations. First, while the sample size is large, it is apparently not large enough to precisely estimate all effects of interest, once endogeneity of care provision is accounted for. The difference in point estimates between men and women is large but not statistically significant. Moreover, the interpretations regarding the effect of institutions need to be taken cautiously. First of all, the country differences might also reflect cultural differences and not necessarily those due to different support schemes for caregivers. Second, these support schemes differ so strongly across countries within the four groups (Eastern, Southern, Northern, and Central Europe) that a detailed analysis of what kind of support is most efficient cannot be delivered by this study. Moreover, we do not have enough power to carry out a more disaggregated analysis of country heterogeneity, say, an analysis by countries instead of country groups.

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NOTES

1. These and the following numbers taken from OECD (2017b).

2. These are central goals of the European Employment Strategy set up by the European Council in 2000.
3. This change of perspective has been pursued by Crespo and Mira (2014), before; however, they concentrate their analysis on women who are 50 and older.
4. Information on receiving care outside the household is only available in the first two waves. If we limit the analysis to either the first two or the fourth and fifth waves, results stay qualitatively the same.
5. The results are similar to the results of the main specification if we consider individuals with parents that exclusively receive formal care as potential caregivers, though are less precisely estimated.
6. The results hold if we estimate split samples. Results available from the authors upon request.
7. A detailed description of the selection of the children that ensures the correct assignment of caregiver and care recipient is provided in Figure S2.
8. The result that OLS estimates are downward biased toward zero is in line with the literature (Ettner 1996; Van Houtven, Coe, and Skira 2013). While Ettner (1996) acknowledges that a negative impact of caregiving on labor market hours might be amplified by the negative correlation between informal caregiving and the error term, he points out that second-order effects from correlations with other regressors can change the direction of the bias, and hence, the direction of the bias when not accounting for endogeneity cannot be predicted.
9. Some indication of larger effects for men than for women has been found in the literature (Leigh 2010).

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SUPPORTING INFORMATION

Additional supporting information may be found online in the supporting information tab for this article:

Appendix SA1: Author Matrix.

Table S1. Number of Observations per Wave.

Table S2. Effects on Employment Status — TSLS Estimation.

Table S3. First Stage — Effects on the Probability to Provide Care — Alternative Definitions.

Table S4. Effects on Employment Status — TSLS Estimation, Including Individuals with Parents Who Exclusively Receive Formal Care.

Figure S1. Age Distribution.

Figure S2. Selection of Children.