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Working Paper

Caring alone? Social capital and the mental health of caregivers

SOEPPapers on Multidisciplinary Panel Data Research, No. 860

Provided in Cooperation with:

German Institute for Economic Research (DIW Berlin)

Suggested Citation: Thiel, Lars (2016) : Caring alone? Social capital and the mental health of caregivers, SOEPPapers on Multidisciplinary Panel Data Research, No. 860, Deutsches Institut für Wirtschaftsforschung (DIW), Berlin

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860-2016

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of caregivers**

Lars Thiel

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ISSN: 1864-6689 (online)

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Caring alone? Social capital and the mental health of caregivers

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July 2016

Abstract

This study analyzes the role of social capital in buffering the negative relationship between informal-care provision and mental health. Using data from the German Socio-Economic Panel (SOEP) and fixed-effect regression models, we show that those individuals who socialize more frequently enjoy better mental health. We also find that stronger social ties moderate the negative association between caregiving and mental well-being. The protective role of social capital appears to be particularly strong for caregivers with high time commitments or those who regularly perform voluntary work. The moderating role of social activities can neither be explained by the caregiver's observed characteristics correlated with social capital, nor by features of the caregiving process. However, the results might be driven by insufficient overlap in covariates between carers and non-carers, and the simultaneity between caring decisions and social activities. We relate our results to recent policy initiatives that aim to improve the carer's well-being. Utilization of caregiver-support services is still rather low. Our findings suggest that caregivers may prefer informal support provided by family, friends, or neighbors to public caregiver benefits. To corroborate this hypothesis, further research regarding the (causal) buffering effects of social capital in the context of informal care is needed.

Keywords: Informal care, social capital, mental health

JEL Classification: I10, J14, Z13

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1 Introduction

For several years, great effort has been devoted to the study of the health effects of informal care – that is care provided to a loved one at home — and the implications for health care and labor markets (for a recent review, see [Bauer and Sousa-Poza, 2015](#)). With respect to psychological health outcomes, empirical research suggests that caregivers more frequently report greater degrees of depression, anxiety, or stress and exhibit lower levels of subjective well-being than non-caregivers (e.g. [Schulz and Sherwood, 2008](#)). Recent evidence from German individual-level data even indicates a causal impact of informal care duties on mental health ([Schmitz and Westphal, 2015](#)). The repercussions of poor caregiver health on health care costs and labor markets can thus be substantial. This is why many developed countries have introduced and expanded public support programs to address the well-being of informal carers (for an international overview of caregiver support policies, see [Colombo et al. \(2011, ch. 3\)](#)). For instance, German health insurance and long-term care (LTC) providers offer respite care, training and counseling, and coordinated information services for family carers. Although these services are widely known, and informal caregivers have a legal right to obtain them, recent surveys among the insured suggest that utilization rates are rather low ([Robert Koch Institute, 2015](#)).

This chapter looks at an alternative source of caregiver support, that is the individual’s social capital. Specifically, we ask whether caregivers with stronger social ties have better psychological health than carers with fewer social connections. The basic hypothesis states that social capital buffers the negative mental health effects of caregiving. This is because social bonds such as family, friends, or neighbors may offer resources for emotional, instrumental, and informational support (e.g. [Cohen and Wills, 1985](#); [Thoits, 2011](#)), which can reduce the psychological burden of caregiving.¹

This research is related to studies documenting how individuals from different subgroups of the population react to caregiving responsibilities. A great deal of this research has examined gender differences, even though female and male caregivers display similar mental health states when caregiving stressors (e.g. care receiver’s health, or hours of care) and social resources are accounted for ([Pinquart and Sörensen, 2006](#)). Some studies have investigated the interaction between informal caring and employment with respect to psychological health. The protective effects of working may result from the social resources involved in gainful employment, e.g. support received from colleagues or employers ([Hansen and Slagsvold, 2015](#)). However, informal caring along with full-time work may also imply a double burden

¹Note that we use the terms social capital, social ties, social bonds, social networks, social interaction, social participation etc. interchangeably, acknowledging the different theoretical connotations in the literature.

and exacerbate the negative health consequences of caregiving (Schmitz and Stroka, 2013). This study also adds to prior research that has addressed heterogeneous effects of informal care depending on marital status or whether the caregiver cohabits with the care recipient (e.g. Hansen et al., 2013; Van den Berg and Ferrer-i Carbonell, 2007).

Another strand of (economic) literature examines the insurance effect of social participation with respect to adverse life events such as divorce, unemployment and negative income shocks (Clark and Lelkes, 2006; Dehejia et al., 2007; Winkelmann, 2009). The general argument is that social capital may reduce the negative well-being consequences of these economic shocks. As a result, individuals with more social capital, who have higher utility in the case of adversity than those with less social capital, may rely less on governmental or social security benefits.

Generally, we contribute to the caregiving literature in the following ways: First, this is, to the best of our knowledge, the first study which uses rich survey data from the larger general population to analyze the moderating role of social capital with respect to caregiver mental well-being. A key limitation of previous research is that it is based on small samples, with a focus on caregivers and health care professionals (see, for example, the reviews and analyses by Cannuscio et al., 2004; Rodakowski et al., 2012; Barrow and Harrison, 2005). Second, we provide a more in-depth analysis of the interaction between caregiving and social capital. We examine whether and to what extent care intensity (i.e. hours of care) and different types of social interactions influence the buffering process. Third, this study contains a variety of sensitivity checks to assess how observed characteristics, correlated with social capital, and the caregiving context explain the moderating role of strong social ties. Furthermore, we also estimate buffering effects using a matched sample of carers and non-carers where each person theoretically has the same probability of caregiving. Fourth, the empirical models include an extensive list of personal and household characteristics that might simultaneously influence the decision to provide informal care, social activities, and mental health. In addition, we take unobserved individual effects into account that do not change over time, but which can influence the estimated relationships.

We use individual-level data from the German Socio-Economic Panel (SOEP) study. Our baseline estimates suggest that social capital (measured basically as the equally weighted sum of formal and informal social activities) weakens the negative association between informal care and mental health. A one-unit increase in the social capital index, which is measured roughly on the same scale as caring status, reduces the negative correlation between caregiving and mental health by 54%. Looking at the mental health subscales, we find that social capital improves vitality, and alleviates depressive symptoms and perceived time pressure among caregivers. Furthermore, caregivers with high time commitments or who participate

regularly in voluntary organizations experience significant buffering effects.

Sensitivity analyses suggest that the buffering role of social capital cannot be explained by the moderating influence of observable factors correlated with social capital. The findings are also robust to the inclusion of caregiving context variables (care-receiver health, other sources of support, and the relationship between the caregiver and the dependent person) as potential buffering mechanisms. However, the results might be driven by a comparison of individuals that differ widely in terms of observable characteristics and the propensity to become a caregiver, respectively. This is a problem in linear regression models which account for observable characteristics but include control observations with equal weight. Thus, non-caregivers with a close to zero probability of caring may contribute considerably to the estimates. Indeed, in a fixed effects regression using a matched sample of caregivers and non-caregivers, who have roughly the same probability of caring, the coefficient for the moderator effect decreases substantially.

The moderating role of social capital could explain the low utilization rates regarding caregiver support services. Persons with higher social capital tap into their social network to obtain assistance rather than relying on public support programs. Many individuals may simply have a preference for informal help because the care receiver rejects care provided by strangers, the perceived cost of support services are too high, or they do not know how and where to obtain these services (Jacobs et al., 2016). Policies to promote caregiver well-being should therefore also involve measures to strengthen social interaction and participation in the neighborhood or the community. As argued by Putnam (2001), engagement in social activities is one of the main drivers of social capital and trust and contributes to the formation of social networks that provide and foster norms of mutual assistance and reciprocity. Thus, social participation provides the fundamental resources to which individuals can turn to under demanding situations, such as providing informal care to a family member.

The remainder of this chapter is organized as follows: Section (2) reviews the theoretical and empirical literature regarding the buffering role of social capital in the context of informal care. Section (3) describes the data and outlines the econometric method used for our analysis. In Section (4), we present and discuss the main estimation results. Section (5) provides several sensitivity checks. Section (6) summarizes the main findings and concludes.

2 Related Literature

This study largely builds on sociological and psychological research regarding the stress-buffering role of social capital, which have also found their way into the economic literature. Caregiving is generally understood as a stress process, which involves a variety of character-

istics of the caregiver, the care recipient and family background that shape the experience of informal care provision. An important contextual factor is a person's social network or support received from others, because it may alter the way how the caregiving burden translates into mental and physical health problems (Pearlin et al., 1990). In their seminal paper, Cohen and Wills (1985) make this assumption more explicit and advance the *stress-buffering hypothesis*. After reviewing evidence on the relationship between stress, social support and well-being, they argue that integration in social networks can reduce the negative health consequences of taxing circumstances. Specifically, support received from others (family, friends, neighbors etc.) can improve health by altering the assessment of the stressful event or situation at several occasions.

The extant research proposes a variety of mechanisms that explain why and how social ties can reduce stress and mental health problems. The comprehensive reviews by Kawachi and Berkman (2001) and Thoits (2011) suggest that the buffering effect mainly operates through support received from social contacts. They basically distinguish between three types of social support: emotional, instrumental, and informational support. Emotional support involves social-psychological mechanisms that can improve psychological well-being in demanding circumstances. By expressing understanding, concern and care for the caregiver's problems, social ties can reduce the burden and stress associated with providing informal care. Spending time with others in social or leisure activities may also serve as an opportunity for the caregiver to distract oneself from the potentially difficult caregiving duty. Instrumental support comprises practical assistance or financial aid. Thus, caregivers may receive financial payments or benefits in-kind from their relatives, friends, or neighbors; or social contacts may simply assume caregiving tasks and responsibilities, for example when the primary caregiver is working. These factors may improve psychological well-being by easing the caregiver's tasks and facilitating the compatibility of informal care with other activities such as work or leisure.

Social ties may also act a valuable resource for information and advice. According to Durlauf and Fafchamps (2005), the individual's social capital is an important resource for information. The health economic literature frequently highlights the role of social capital with respect to information problems on health care markets. Social interactions may improve the knowledge about the health system's institutional details and the availability and suitability of medical and psychological treatments (e.g. Deri, 2005; Folland, 2008).

Generally, previous studies find a positive association of social capital with caregivers' mental well-being (for reviews, see for example Cannuscio et al., 2004; Rodakowski et al., 2012). A major shortcoming of these studies is that the majority is based on small-scale samples paying attention to specific subgroups of the population (e.g. caregivers only or

nurses), and that they also omit many characteristics that might confound the relationship between social contacts and health among caregivers. Only a handful of studies exist that use population-level data and investigate the buffering effect employing a regression framework. Using a cross-section of the Nurses' Health Study (NHS) from the U.S., [Cannuscio et al. \(2004\)](#) have reported that a higher caring workload is associated with an increased risk of depressive symptoms. This relationship was more pronounced among women with fewer social ties. [Barrow and Harrison \(2005\)](#) have analyzed the potential role of neighborhood attachment as a modifier of the caregiving-health nexus. They have found that caregivers with a higher sense of belonging to the community experience less physical and mental health problems than caregivers who felt more alienated. Similarly, [Carpiano \(2008\)](#) has examined how actual neighborhood attachment influences the buffering effects of social capital. They have found that stronger ties to the neighborhood promote the buffering of the caregiver burden. This provides evidence that strong social connections facilitate access to the tangible and intangible resources available in the community, which could improve caregiver health and well-being.

Empirical economic research regarding the buffering hypothesis is rather scarce and, to the best of our knowledge, absent in the context of caregiving. Nevertheless, the stress-buffering property of social capital might also be economically relevant. From an economic perspective, individuals invest in their social capital to acquire market and non-market based resources ([Glaeser et al., 2002](#)). By building up social capital through social participation, for instance through civic or voluntary engagement, individuals obtain valuable resources which they can harness when they need them (see also [Coleman, 1988](#)). Probably the first econometric test of stress buffering was conducted by [Clark and Lelkes \(2006\)](#), who have analyzed whether religious involvement mitigates the negative effect of adverse life events on subjective well-being. They have found significant moderating effects of religiosity for unemployment and marital dissolution. [Dehejia et al. \(2007\)](#) extend the analysis to income and consumption shocks, respectively. They have shown that regular religious participation mitigates the negative happiness effect of adverse income shocks. [Winkelmann \(2009\)](#) has also tested the buffering hypothesis among German individuals who became unemployed. However, he finds no significant buffering effect of social capital (measured by a variety of formal and informal social activities) on the unemployed's subjective well-being. Generally, individuals with more social capital and with greater happiness or utility levels in the event of economic shocks may have lower demand for governmental or social security benefits, since they can rely on the resources embedded in their social network.

We argue that social capital can (partially) insure the individual against the negative psychological consequences of informal care provision. It does so by providing resources for

emotional and practical support. It may also involve valuable information about resources that directly or indirectly address both the care receiver’s and the caregiver’s health and well-being.

3 Data and Empirical Approach

To examine whether and how the negative association between caregiving and mental health is modified by social capital, we use data on individuals and families from the German Socio-Economic Panel (SOEP) study (Wagner et al., 2007).² The SOEP is a longitudinal survey of German households running since 1984 providing information on employment, income, subjective well-being and other characteristics. Recent survey years have included more detailed measures of self-rated health and time use, which also involve informal care provision and social activities.

3.1 Measurement of Variables

Mental Health

As the main outcome, we use the mental component summary scale (*MCS*) extracted from the SOEP version of the 12-item short-form health survey (SF-12), which has been included biennially since 2002 (see also Andersen et al., 2007). The SF-12 questionnaire contains a variety of questions that cover the respondents health-related quality of life. Twelve items are aggregated into eight subscales and the two major dimensions “mental health” and “physical health” by means of factor analysis. The mental-health scale of the SF-12 survey in the SOEP sums the subcomponents *vitality* (*VT*), *social functioning* (*SF*), *role emotional* (*RE*), and *mental health or depressive symptoms* (*MH*).³ The corresponding items refer to the individual’s self-reported health status in the last four weeks, and are assessed on a five-point scale (from 1=always to 5=never). *Vitality* measures how often the respondent had felt energetic. *Social functioning* reflects to what extent mental health problems limited social contacts, whereas *role emotional* provides information on whether and how strongly mental health problems interfered with work and daily activities. Finally, *mental health* reflects the frequency of depressive symptoms, notably sadness or agitation.

What is more, we also consider perceived time pressure or stress (*TS*) as a dependent variable, which has rarely been done in previous studies. We argue that it is an important outcome in the context of caregiving, since providing informal care interferes with other

²Socio-Economic Panel (SOEP), data for years 1984-2013, version 30, SOEP, 2015, doi:10.5684/soep.v30.

³See Table (A.1) in the appendix for further details on the mental component summary scale.

activities such as leisure and work. The question on perceived time pressure uses the same categories as the other scales, and respondents are asked to assess how often they had felt pressed for time in the last four weeks. We expect that caregivers report being more frequently pressed for time than non-caregivers, but that caregivers with more social capital feel less time-pressed than their counterparts with fewer social bonds.

We will use the *MCS*, its four subscales and the time stress variable as outcomes in the regression analyses. The dependent variables are standardized so that they have a mean of zero and a standard deviation equal to one. Higher scores reflect improved health status.

Caregiving Status

Caregiving status is computed based on information regarding caregiving relationship, hours and cohabitation status. We create a dummy variable *Caregiver* which is equal to one when the respondent reports at least one hour of care per week and is the main caregiver to a care-dependent person who lives in the same household. Confining the sample to cohabiting caregivers allows us to include the caregiving context characteristics into the analysis. This becomes particularly important when we examine alternative explanations for the moderating role of social capital. For example, care-recipient health — which may also be correlated with the caregiver’s social capital — may also influence the perceived burden of informal care.

With the data at hand, we can also explore the importance of different caregiving intensities. We create a categorical variables which reflects increasing hours of care per week and which is loosely based on the eligibility criteria of the German LTC insurance (for a general overview of the German LTC system, see [Zuchandke et al., 2011](#)). Basically, persons who claim benefits from the LTC insurance fund need to undergo a medical examination which assesses the care needs of the recipient. After evaluation is completed the care recipient is usually assigned to one of three care levels that reflect increasing need and help in terms of (instrumental) activities of daily living. It also involves an assessment of time necessary for nursing care which serves as a basis for our caregiving intensity or hours variable. The categories are defined as follows: 0 (non-caregivers), 1-9, 10-20, 21-34, and 35 and more hours per week. We expect that there is a negative correlation between weekly informal care workload and mental health. Social contacts might be particularly useful for caregivers with a high time commitment ([Cannuscio et al., 2004](#)).

Social Capital

To define individual-level social capital, we follow Putnam’s (2001) approach. As a proxy for the stock of social capital, we use the individual’s formal and informal social activities. On the one hand, individuals build up and maintain social capital by meeting with friends, going to the movies, or having a night out. On the other hand, civic engagement or participation in social organizations — such as political engagement, religious involvement, or volunteer work — may also constitute an important part of the individual’s social capital (see also Glaeser et al., 2002). Similar concepts have recently been adopted by Bauernschuster et al. (2014) and Winkelmann (2009) who also use the SOEP data.

The SOEP study includes several formal and informal social activities, and the following variables are used⁴: the frequency of meeting with friends, relatives, or neighbors (*Social gatherings*); helping out friends, relatives or neighbors (*Helping*); involvement in a citizens’ group, political party, or local government (*Political participation*); attending church or religious events (*Religious participation*); volunteer work in clubs or social services (*Volunteer work*); doing sports (*Sports participation*); going to cultural events (*Cultural attendance*); going to the movies, pop music concerts, dancing, disco, or sports events (*Entertainment attendance*); and artistic or musical activities (*Artistic activities*). Each item is assessed by means of four categories which reflect the frequency of the activity: never, less often, monthly, and weekly.

We follow the method proposed by Kling et al. (2007) to create a comprehensive social capital measure by adding up the z scores of the individual social capital components. We thus obtain a social-capital-index (*SOCI*) variable that assigns equal weight to each of its components and which reflects increasing levels of social capital.⁵ In further analyses, however, we include the individual social capital components separately. They enter the regression models as dichotomous variables which reflect at least monthly participation in each activity.

Control Variables

We incorporate a variety of personal and household characteristics that might confound the relationship between mental health, caregiving, and social capital. The regression models include control variables for gender, age (and age squared), marital status (married, separated, single, divorced, widowed), and migration background (yes/no). Socioeconomic factors involve schooling (log. of years of education) and income (log. of net equivalized household

⁴See Table (A.2) in the appendix for further details on question wording and response scales.

⁵Cronbach’s alpha is equal to 0.67.

income). We also take the respondent’s labor market involvement and job characteristics into account. Employment is assessed using the individual’s labor force status (employed, unemployed, not working). Furthermore, we include working hours and net hourly wages to control for time restrictions and opportunity costs related to the decision to become a caregiver and to socialize. We include a dummy variable for missing values when information on working hours and wages are not available or inapplicable. In these cases, the working hours and wages are zero.

To control for health-related selection, we include the widely used measure of self-assessed health (SAH). It consists of five categories reflecting different states of general health: bad, poor, satisfactory, good and very good. Although the direction is not always clear, empirical evidence generally demonstrates a strong correlation between self-reported health status on the one hand and the decision to provide informal care and social participation on the other hand (e.g. [Bauer and Sousa-Poza, 2015](#); [Rocco and Fumagalli, 2014](#)). Omitting the respondent’s health would therefore bias the associations between mental health, caregiving and social capital.

Additionally, we add indicators for household size (log. of number of persons) and children (log. of number of children). We differentiate between children at ages 0-6 on the one hand and at ages 7-16 on the other hand. While household size in general might indicate the availability of other sources of support, the existence of (younger) children rather reflects an additional burden for informal carers (e.g. [Rubin and White-Means, 2009](#)). Furthermore, we include measures for home ownership (tenant vs. home owner) and urbanization level (urban vs. rural area), both of which have been shown to correlate with individual-level social capital ([Glaeser et al., 2002](#)). Finally, we include the monthly amount of care allowance received by the household. To account for macroeconomic conditions and time trends, we incorporate both survey year and state dummy variables.

Summary and Descriptive Statistics

The final analysis sample consists of 70,680 person-year observations resulting from 28,939 individuals observed over a maximum period of five years. Social capital and mental health are measured in different survey years. Information on mental well-being is gathered in even survey years, whereas social activities are assessed in odd years. What is more, most of the social capital variables are not available in 2003. The data on caregiving, social capital and covariates therefore refer to the years 2001, 2005, 2007, 2009 and 2011, and we use the mental health outcomes one year later.

Table (1) displays the mean values and standard deviations of the variables used in the empirical analysis. Apparently, there are marked differences between non-caregivers and

Table 1: Descriptive statistics of estimation sample

	Noncaregivers		Caregivers		Diff.
	Mean	S.D.	Mean	S.D.	
<i>MCS</i>	0.01	0.10	-0.41	1.09	-0.41
<i>SOCI</i>	-2.93	4.84	0.05	4.70	2.98
Female	0.52	0.50	0.68	0.47	0.16
Age	49.38	16.95	60.73	13.89	11.34
Married	0.62	0.48	0.84	0.37	0.22
Separated	0.02	0.13	0.01	0.10	-0.01
Single	0.21	0.41	0.06	0.24	-0.15
Divorced	0.08	0.26	0.05	0.21	-0.03
Widowed	0.07	0.25	0.04	0.20	-0.03
Household size	2.62	1.25	2.72	1.03	0.09
No. of children age 0-6 in hh	0.16	0.47	0.07	0.31	-0.10
No. of children age 7-16 in hh	0.32	0.67	0.22	0.60	-0.10
Migration background	0.18	0.38	0.19	0.39	0.01
Degree of urbanization	0.66	0.48	0.60	0.49	-0.06
Years of education	12.15	2.67	11.49	2.44	-0.66
Household income	21,572.17	16,310.38	18,685.68	8,567.59	-2,886.49
Employed	0.58	0.50	0.28	0.45	-0.30
Unemployed	0.05	0.22	0.07	0.25	0.02
Not working	0.37	0.48	0.66	0.48	0.28
Working hours	22.21	21.52	8.31	15.65	-13.91
Net hourly wage	5.59	7.22	2.32	5.22	-3.26
Homeowner	0.51	0.50	0.60	0.49	0.07
SAH bad	0.04	0.18	0.06	0.25	0.03
SAH poor	0.14	0.34	0.21	0.41	0.07
SAH satisfactory	0.33	0.47	0.44	0.50	0.11
SAH good	0.41	0.49	0.25	0.43	-0.16
SAH very good	0.09	0.28	0.03	0.18	-0.05
Monthly care allowance	4.01	48.41	213.53	276.23	209.53
Observations	69,593		1,087		

Note: All differences between caregivers and non-caregivers are significant except for migration background.

Source: Own calculations based on SOEP v30.

caregivers in terms of observed characteristics. For example, a raw comparison reveals that caregivers have significantly poorer general and mental health, and lower social capital than non-caregivers. Caregivers are more likely to be female, older and married than those who do not provide informal care. Caregivers also report fewer children than non-caregivers. Furthermore, caregiving seems to be associated with worse socioeconomic status, that is less years of schooling, lower income and a higher probability of joblessness. Working time and wages are also lower among informal carers. Intuitively, households with a care-dependent family member receive a higher monthly care allowance from the LTC fund.

3.2 Empirical Strategy

To examine the buffering mechanism induced by social capital in the context of caregiving, we perform linear regression analyses using the following model (suppressing the constant):

$$MH_{it} = \alpha Caregiver_{it} + \beta SOCI_{it} + \gamma (Caregiver_{it} \times SOCI_{it}) + \delta X' + u_i + \varepsilon_{it},$$

where i denotes the individual and t indicates the survey year. The coefficient α reflects the association between *Caregiver* and the mental health outcome MH , which is assumed to be negative; β measures the relationship between the social capital index *SOCI* and mental health, which is expected to be positive; the parameter γ evaluates the interaction between *Caregiver* and *SOCI*. Theory and previous empirical evidence suggests that the sign of the coefficient γ is positive. This implies that the negative association between caregiving and mental health is attenuated by increasing levels of social capital. The control variables are captured by the vector X' . The parameter u_i captures time-invariant individual effects, whereas ε_{it} reflects unobserved shocks that vary over time and individuals.

The *Caregiver* and the *SOCI* variable are centered around the mean and rescaled by dividing by two standard deviations of the original variable. This procedure facilitates comparisons between the dummy and the continuous variable since they are roughly measured on the same scale (Gelman, 2008). Otherwise, we would compare a discrete change from non-caregiver to caregiver with a one-unit change in the social capital index, which could understate the importance of social capital relative to caring. Standardization of the dichotomous variable is necessary because the caregiver distribution is highly skewed, with only 1.5% of observations in the caregiver group and a standard deviation of about 0.12. Using the unstandardized binary variable in the regression would therefore overstate the importance of caregiving relative to the standardized social capital index, which has a standard deviation of 0.5.

This regression produces unbiased estimates as long as unobserved differences between caregivers and non-caregivers, and socially active and inactive persons, are negligible. Unobserved preferences for helping and socializing with others, or an innate ability to perform various productive activities simultaneously, may drive the buffering effect by social capital. A further thread to the validity of estimates arises from the endogeneity or simultaneity between social activities and caring decisions. For instance, due to time restrictions, caregivers may reduce their social activities. This implies that those who participate frequently in social activities are less likely to be caregivers. The average mental health decline due to caring would thus be less severe for individuals with stronger social ties. Nevertheless, the smaller decline in psychological well-being is not attributable to the protecting role of social capital, but rather due to non-caregivers predominantly selecting into social participation. Consequently, we would overestimate the buffering effect of social capital.

Ideally, to avoid confounding due to omitted variables and simultaneity, caregiving status and social activities should be as good as randomly assigned. With observational data, we need external variation at least for individual-level social capital. Using an instrumental variable for social capital in a caregiver-only sample, for instance, we could estimate a buffering effect that is independent of unobservable variables and caregiver status. However, convincing and valid instrumental variables for social capital are not available in our data. In this study, we estimate fixed effects models instead, to get rid of at least some portion of unobserved heterogeneity. That is, we subtract for each individual and each variable the corresponding time-averaged mean from the contemporary value. This means that any time-fixed variable, also the individual effects u_i , are eliminated because of this procedure. In fact, we are able to remove any unobserved differences across individuals that may influence our results as long as they are stable over time.

This approach does not completely solve the problems due to unobserved shocks and the potential endogeneity between social capital and caring. However, it still provides a major improvement compared to previous studies, such as [Cannuscio et al. \(2004\)](#) or [Carpiano \(2008\)](#), because we take a larger set of covariates and omitted variables bias into account. We therefore likely obtain less biased estimates than past research.

4 Results

4.1 Main Results

Table (2) reports the estimation results from the fixed effects (that is within-individual) regressions of mental well-being on caregiving status, the social capital index and the control

variables. Alongside the main terms we also include the product between the standardized caregiver and social capital variables to capture the alleviating role of social ties in the caregiving-health relationship. The inclusion of the interaction term changes the interpretations of the main terms slightly. The parameter belonging to the caregiving indicator reflects the comparison between caregivers and non-caregivers among individuals with an average level of social capital. The coefficient of the social capital index assesses approximately the relationship with mental health for non-carers.

Table 2: The moderating role of social capital

	(1) MCS	(2) VT	(3) SF	(4) RE	(5) MH	(6) TS
Caregiver	-0.066*** (0.013)	-0.016 (0.014)	-0.039*** (0.014)	-0.060*** (0.014)	-0.075*** (0.013)	-0.068*** (0.013)
<i>SOCI</i>	0.065*** (0.014)	0.109*** (0.014)	0.033** (0.014)	0.023 (0.014)	0.058*** (0.014)	-0.009 (0.014)
Caregiver \times <i>SOCI</i>	0.049** (0.020)	0.058*** (0.021)	0.019 (0.023)	0.011 (0.020)	0.044** (0.019)	0.063*** (0.019)
Observations	70,680	70,680	70,680	70,680	70,680	70,680

Note: Robust standard errors, clustered at the individual level, in parentheses. Dependent variables: *MCS* = mental component summary scale, *VT* = vitality, *SF* = social functioning, *RE* = role emotional, *MH* = depressive symptoms, *TS* = time stress. The caregiver dummy variable and the social-capital index are centered and standardized and have zero mean and a standard deviation of 0.5. All regression models include controls for age (and age squared), marital status (married, separated, single, divorced, widowed), household size, number of children at ages 0-6 and 7-16, degree of urbanization, migration background, schooling (years of education), income (net household income), employment status (employed, not working, unemployed), working hours, hourly net wage, ownership status (owner vs. tenant), states, and survey years. Individual fixed effects are also included. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Own calculations based on SOEP v30.

The estimates on both the main and the interaction variables generally go in the hypothesized direction. Column 1 shows the results for the mental health summary scale *MCS*, our primary health outcome. The parameter estimate for the caregiver dummy variable is -0.066 and significant, reflecting a negative relationship between informal care and mental health for individuals who display average levels of social capital.⁶ The parameter for the social capital index is 0.065 and also statistically significant. Thus, we find a positive link between social activities and mental health among non-caregivers. We see that, when we measure caregiving and social capital roughly on the same scale, social ties are just as im-

⁶We can calculate the association between the original caregiver indicator and mental health by dividing the parameter by two times the standard deviation of the original binary variable. Hence, caregiving reduces the mental health score by 0.268 ($0.066 / (2 \cdot 0.123)$) which is equal to roughly 27% of a standard deviation.

portant as informal caring. A one-unit, or two standard-deviation, change in both variables leads to a similar response of mental health, albeit in different directions.

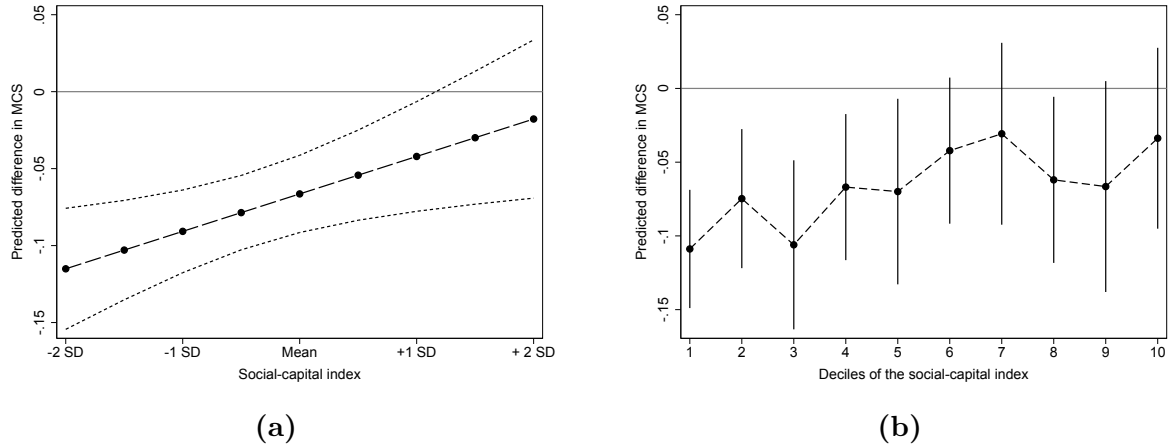
The parameter estimate for the interaction term equals 0.049 and is statistically significant, which provides evidence for the protecting role of social connections among caregivers. In other words, caregivers with a higher level of social capital have less mental health problems than their counterparts with less social capital.

To illustrate the interaction effect, it is useful to look at the predicted difference between non-caregivers and caregivers with respect to mental health for different values of the social capital index. This is shown in Figure (1) for an otherwise average person. Panel (a) shows the predicted mental health gap between non-caregivers and caregivers across increasing values of the continuous social capital index, based on the regression model using the standardized caregiver and social capital variables, respectively. One can clearly see that caregivers with more social capital suffer less, and that the mental health of caregivers and non-caregivers converges as the individual level of social capital increases. Consider, for example, an increase of the social capital index from one standard deviation below to one standard deviation above the mean, which compares low with high levels of social capital. The mental health difference between caregivers and non-caregivers decreases from -0.091 to -0.042. Thus, the fraction by which a one-unit increase in the social capital index reduces the negative association between caring and mental health amounts to 54%. In Panel (b), the mental health gap between non-carers and carers is estimated using a more parametric approach. That is, we run a regression of mental health on the caregiving indicator fully interacted with a categorical variable measuring the deciles of the social capital index. It can be seen that a social capital score above the fifth decile, or the sample median, basically renders the mental health difference insignificant.

The columns 2 to 6 of Table (2) show the regression results for the other mental health outcomes. We find a significant buffering role of social capital for the subscales depressive symptoms (*MH*) and perceived time pressure (*TS*). We also estimate a significant interaction between caregiving and social capital with respect to vitality (*VT*). Generally, the estimation results suggest that social capital may improve caregivers' mental health, even though it cannot fully compensate for the psychological cost of informal caring.

4.2 The Role of Caring Intensity and Social Activities

This section offers a more detailed analysis of the moderating role of social capital in the context of informal care. The aim is to assess which caregivers derive the largest benefit from social capital on the one hand, and which kind of social activities are particularly helpful in



Source: Own calculations based on SOEP v30.

Figure 1: Difference in mental health between non-caregivers and caregivers, by different levels of social capital

ameliorating the adverse psychological implications of informal care on the other hand.

First, we assess whether the importance of social ties as an alleviating factor depends on the caregiving intensity. Social contacts might be particularly useful for caregivers with high time commitments. Panel A of Table (3) displays the estimation results from a regression model where we include the categorical caregiving intensity variable instead of the dichotomous indicator. It shows both the main terms and the interaction of the caregiving hours categories with the social capital index. The variables are again centered around the mean and standardized, so that the coefficients are comparable and correspond to a one-unit change in the explanatory variable. As expected, caregiving duration is negatively associated with the mental health score. The only significant (and positive) interaction with the social capital index is found for the highest category (35+ hours of care/week). This indicates that high-hour caregivers, who exhibit the highest psychological burden, might derive the greatest benefit from larger social networks. This result mirrors previous research by [Cannuscio et al. \(2004\)](#) who finds a similar pattern among female caregivers in a representative sample of registered nurses.

Second, specific social activities may matter more than others. To gain insights into the complex nature of social participation as a buffering factor, we substitute the individual social activity variables for the social capital summary index in the regression model. For each of the activities we create a dichotomous variable that indicates regular (at least monthly) participation. We obtain and include nine main terms reflecting frequent participation in social activities, and just as many interaction terms with the caregiver dummy variable. The results are shown in panel B of Table (3). The main term on the caregiver indicator

Table 3: The importance of caregiving hours and social activities

	Main terms		Interaction terms	
	Coef.	S.E.	Coef.	S.E.
<i>(A) Measuring caregiving by hours of care per week</i>				
1-9 hours	-0.023***	(0.008)	0.020	(0.016)
10-20 hours	-0.030***	(0.009)	0.008	(0.015)
21-34 hours	-0.044***	(0.011)	0.018	(0.019)
35+ hours	-0.041***	(0.012)	0.042**	(0.016)
<i>SOCI</i>	0.064***	(0.014)		
<i>(B) Including social-activity variables separately</i>				
Caregiver	-0.403***	(0.075)		
Social gatherings	0.048***	(0.012)	0.030	(0.083)
Helping	0.007	(0.009)	-0.015	(0.085)
Political participation	-0.004	(0.030)	-0.081	(0.284)
Religious participation	0.017	(0.017)	-0.084	(0.101)
Volunteer work	-0.004	(0.014)	0.300***	(0.091)
Sports participation	0.021*	(0.011)	0.092	(0.085)
Cultural attendance	0.010	(0.013)	0.088	(0.113)
Entertainment attendance	0.009	(0.012)	0.139	(0.123)
Artistic activities	-0.002	(0.014)	-0.037	(0.100)

$N = 70,680$. Robust standard errors, clustered at the individual level, in parentheses. Dependent variable: MCS = mental component summary scale. All regression models include controls for age (and age squared), marital status (married, separated, single, divorced, widowed), household size, number of children at ages 0-6 and 7-16, migration background, degree of urbanization, schooling (years of education), income (net household income), employment status (employed, not working, unemployed), working hours, hourly net wage, ownership status (owner vs. tenant), states, and survey years. Individual fixed effects are also included. In Panel A, the caregiving-hours indicators and the social capital are centered and standardized and have zero mean and a standard deviation of 0.5. The interaction terms contain the product between the rescaled hours-of-care and social-capital variables. In Panel B, the interaction terms consists of the caregiver dummy variable fully interacted with the social-participation indicators. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Own calculations based on SOEP v30.

now reflects the mental health difference between caregivers and non-caregivers among those individuals who rarely or never engage in social activities. Caregivers only seem to benefit from regular volunteer work, that is we exclusively find a positive interaction effect between caregiving status and unpaid public engagement. The implied buffering effect appears substantial. Regular voluntary work reduces the negative association between caring and mental health by 74%.

This result underlines the potential complementarity between caregiving and voluntary engagement. Caregivers may perform unpaid work in addition to providing informal care for a family member to distract themselves from the caregiving stress and burden. Further empirical support for this conjecture is provided by [Burr et al. \(2005\)](#) who have estimated a positive correlation between caregiving and voluntary work. This is consistent with the view that individuals contribute to charity to obtain psychological benefits. Unpaid work to help others provides a “warm glow” to the volunteer (see [Andreoni, 1990](#)), which may ease the caregiving tasks or make the caregiving experience more pleasurable.

Our findings regarding volunteer work may provide evidence for the existence of a certain personality trait or motivation, that is some type of altruism, prompting individuals to assuming several helping tasks simultaneously. These individuals are often referred to as “super helpers”, who have a high willingness to help others and who may also derive the highest benefits from combining formal and informal caring activities (e.g. [Hank and Stuck, 2008](#)). However, only 14% of those who provide informal care also engage in regular voluntary work in our estimation sample. Whether the “super helper” personality is a widespread phenomenon can thus be disputed, at least when caring for ill family members is involved.

5 Sensitivity Analysis

In this section, we examine the sensitivity of the buffering effects caused by social capital. The results of several robustness checks are presented in [Table \(4\)](#). For comparison purposes, panel A repeats the baseline estimate for the moderator effect. Panel B and C examine whether observed characteristics, correlated with social capital, explain why informal carers with stronger social ties are less responsive to the caregiving burden. For instance, individual health status is one of the major correlates of caregiving status and social participation. It reflects a person’s capacity to provide informal care, and it may also influence how caregivers manage co-occurring duties and activities. Caregivers with larger social networks could therefore simply be healthier and more resilient than those who assume no caregiving tasks and have less social ties, which would explain stress buffering by social capital. Another important example is educational attainment. Better educated individuals may have greater

economic, social, and psychological resources and knowledge that facilitate the caregiving duty (e.g. [Huang et al., 2009](#); [Ross and Wu, 1995](#); [Stronks et al., 1998](#)). Other factors such as age, marital status, the number of children, or the degree of urbanization are also potential moderators.

In panel B, we follow [Dehejia et al. \(2007\)](#) and include an interaction term between the caregiver dummy variable and a predicted social capital index. The latter is from a simple linear regression of the actual social capital index on all control variables, and thus represents a linear combination of all observed covariates. We are thus able to assess whether and to what extent the estimated interaction between caregiving and social capital changes when we control for the buffering effects of the remaining observed attributes. Panel C shows the results from an alternative procedure, using a matched sample of individuals where each respondent has roughly the same probability of reporting a high level of social capital. This is achieved by performing a nearest-neighbor matching procedure based on propensity scores. In the first observation period, individuals who ever report a *SOCI* score above its median are matched with respondents who ever report a lower *SOCI* score and who are closest in terms of observed covariates and propensity scores, respectively. The aim is to minimize the observed bias between these two groups. We therefore match to each high-*SOCI* individual the five nearest neighbors within a caliper of 0.001. The caliper is a useful device to reduce the possibility of making poor matches (e.g. [Morgan and Harding, 2006](#)). This approach balances the distribution of observed covariates in these two groups. Hence, conducting a regression on this matched sample reduces concerns regarding the influence of observed characteristics, correlated with social capital, since they are basically the same for high-*SOCI* and low-*SOCI* individuals. In panel B and C, the coefficients for the interaction term between caregiving and social capital are practically equal to the baseline estimate. Thus, it is unlikely that the soothing influence of social capital is driven by observable factors correlated with social participation.

In panel D, we examine whether the buffering effect of social capital may also occur due to specific caregiving context characteristics. Individuals may benefit from a household member's social capital. Hence, persons with more social capital possibly provide informal care to individuals who are healthier per se. What is more, individuals who have stronger social ties are probably better able to acquire additional (private and public) support from sources outside the household. The relationship to the care recipient might also shape the experience of caregiving burden. It has been shown that individuals who provide care to spouses have an elevated risk of displaying mental health problems, because they more frequently lack social and other activities that could act as stress buffers ([Pinquart and Sørensen, 2003](#)).

Table 4: The sensitivity of the moderator effect

	Main terms			Observations
	Caregiver	SOCI	Interaction	
<i>(A) Baseline model</i>	-0.066*** (0.013)	0.065*** (0.014)	0.049** (0.020)	70,680
<i>(B) Controlling for the buffering effect of observed caregiver characteristics</i>	-0.067*** (0.014)	0.065*** (0.014)	0.050** (0.021)	70,680
<i>(C) Matched sample: High and low social capital</i>	-0.078*** (0.016)	0.070*** (0.016)	0.051** (0.020)	68,575
<i>(D) Controlling for the buffering effect of caregiving context</i>	-0.040 (0.028)	0.065*** (0.014)	0.045** (0.020)	70,680
<i>(E) Matched sample: Caregivers and non-caregivers</i>	-0.058*** (0.013)	0.172**** (0.065)	0.026 (0.022)	7,710

Robust standard errors, clustered at the individual level, in parentheses. Dependent variable: MCS = mental component summary scale. The caregiver dummy variable and the social-capital index are centered and standardized and have zero mean and a standard deviation of 0.5. All regression models include controls for age (and age squared), marital status (married, separated, single, divorced, widowed), household size, number of children at ages 0-6 and 7-16, migration background, degree of urbanization, schooling (years of education), income (net household income), employment status (employed, not working, unemployed), working hours, hourly net wage, ownership status (owner vs. tenant), states, and survey years. Individual fixed effects are also included. The number of observations in the matched samples is smaller than in the original sample because some control individuals are not used in the matching procedure due to the common-support requirement. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

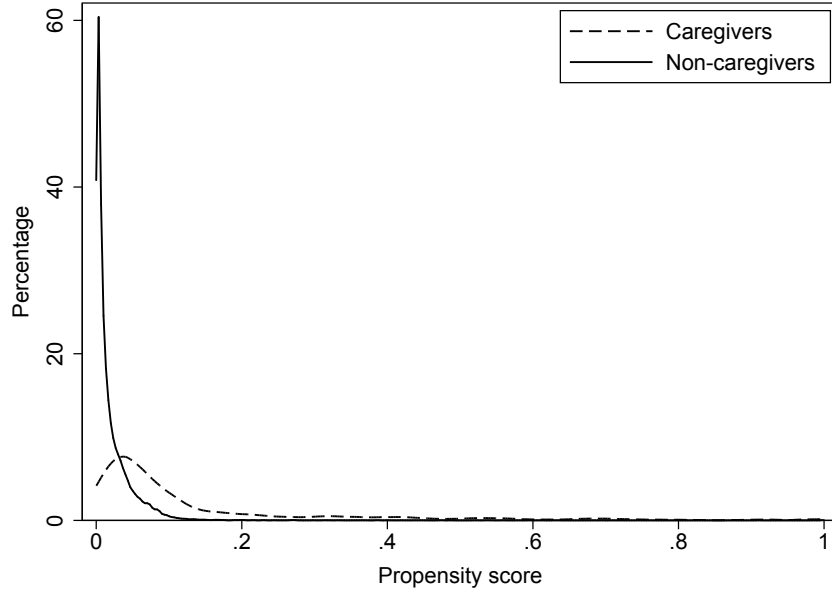
Source: Own calculations based on SOEP v30.

To capture the care receiver’s health status, we include a categorical variable that reflects the degree of limitations in daily self-care activities, as reported by the head of the household.⁷ An alternative measure indicates to which of the three LTC levels the care-recipient had been assigned. This presumably is a more objective measure of the dependent’s person health because the assessment is conducted by medical professionals. By entering the dependent’s person health, we are also able to control for the so-called *family effect* of informal care (Bobinac et al., 2010). Having a family member with health problems may also adversely influence the psychological well-being of household members who are not the primary caregiver. Failure to control for these potential spillovers may lead to overestimates of the caregiving effect and thus may, *ceterus paribus*, underestimate the moderating role of social capital. What is more, we add a dummy variable which indicates whether the dependent person additionally receives help from other sources than the main caregiver in the household. Finally, to capture the relationship of the caregiver to the care receiver we construct a binary variable that equals one for spousal caregivers, and zero for all the other relations. For all variables, the reference group consists of individuals with the lowest category. As shown by the estimates in panel D, the interaction effect between caring and social capital is comparable to the baseline finding. This implies that the buffering effect of social capital cannot fully be explained by caregiving context.

Panel E deals with the problem that caregivers and non-caregivers are very different and that a fair comparison between carers and non-carers is complicated. Generally, the probability of providing informal care is very low in our estimation sample (1.5 percent), and there could be insufficient or poor overlap in terms of observed characteristics between carers and non-carers.⁸ This means that for some values of the covariates there is no similar non-caregiver that can be compared with caregivers. This problem is illustrated in Figure (2). It depicts for both caregivers and non-caregivers the conditional probability of providing informal care and the propensity score, respectively. These quantities are equal to the predicted probabilities based on a probit model with caregiving as the binary outcome variable and observed characteristics as control variables. On the one hand, it shows that for most non-carers the theoretical probability of caring is very small or close to zero. On the other hand, the distribution of propensity scores is more widespread among caregivers. As a consequence, there is only a small range of propensity scores where there is sufficient overlap between carers and non-carers. Controlling for covariates in a linear regression may then produce biased estimates, because the linear model extrapolates the data obtained from

⁷The questions on which this and the following variables are based, are described in the appendix in Table (A.3).

⁸Problems of insufficient overlap, or common support, are for example discussed by Smith and Todd (2005).



Source: Own calculations based on SOEP v30.

Figure 2: Distribution of the conditional probability of informal caring

overlapping covariate regions to make a comparison between carers and non-carers in the region with insufficient or even no overlap (e.g. Angrist and Pischke, 2008, p. 77).

To reduce the problems arising from poor overlap and extrapolation, we create a matched sample of individuals who have roughly the same probability of being or becoming a caregiver within the observation period. For this purpose, the nearest-neighbor matching procedure as described above is applied. We obtain a balanced sample where the observed covariate distribution between carers and the control group are approximately the same. What is more, overlap, or common support, is ensured by restricting the estimation sample to individuals who have similar and positive propensity scores. The caliper of 0.001 also decreases the likelihood of using poor matches. The fixed effect regression is then performed using this homogeneous sample of individuals. As shown by panel E, using the matched sample and putting more weight on those who have roughly the same probability of becoming a caregiver, the point estimate of the interaction term almost halves compared to the baseline estimate. The fraction by which a one-unit increase in the social capital index reduces the negative association between caring and mental health decreases to roughly 37%. It should be noted, however, that enforcing the overlap requirement comes at the cost of losing a great deal of observations. This rises concerns that the obtained estimates may not be representative (e.g. Caliendo and Kopeinig, 2008).

6 Conclusion

This study examined the interrelationship between informal caring, social capital, and mental health. We tested the hypothesis that social capital weakens the negative association between informal care provision and mental health. To reduce concerns that unobserved heterogeneity might drive our results, we estimated fixed effects models which take unobservable, time-invariant differences between individuals into account. The results indicated that caregivers with more social capital, or more social ties, had better psychological well-being than caregivers with less social capital. Measuring caring and social capital essentially on the same scale, we found that a one-unit increase in the social capital variable reduces the negative association between caregiving and mental health by half. We also found significant moderating effects for vitality, depressive symptoms and perceived time stress. Further analyses revealed that particular groups of individuals might benefit more than others. Those with high caregiving workloads or caregivers who volunteer regularly appeared to experience the largest buffering effects.

We performed a variety of sensitivity checks to assess the robustness of our findings. Observed characteristics correlated with social capital could not explain the moderating role of social capital. Moreover, the buffering effect was unrelated to caregiving context, that is the care receiver's health status, support from individuals outside the household, and the relationship of the caregiver to the care-dependent person. Nevertheless, the buffering effect decreased substantially when the estimation sample was restricted to caregivers and non-caregivers with approximately the same probability of caring.

Our results may yield an explanation for the low utilization rates of formal caregiver support services. Some individuals (caregivers and care recipients) may prefer informal assistance obtained from family, friends, or neighbors to public or social programs. Clearly, policies to promote caregiver well-being should involve measures to facilitate information about the benefits of caregiver services and access to them. Yet, our findings also suggest that public programs should foster social and community involvement of caregivers (and care receivers).

To draw conclusive policy recommendations, however, further empirical evidence on the causal impact of social capital on the caregiver-health relationship is required. The results presented in this study rather represent associations, although we control for a variety of observed and unobserved background characteristics and alternative buffering mechanisms. It cannot be ruled out that unobserved shocks drive our findings. Another limitation results from the potential endogeneity between caregiving and social activities. Due to time restrictions, assuming caregiving tasks is usually associated with a decrease in other activities, such

as leisure or social participation. To avoid that the potential simultaneity between caring and social activities influences the buffering effect, one would need external variation in both the decision to provide informal care and social participation. Generally, future studies should focus on causal buffering effects and the mechanisms that explain the moderating role of social capital.

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Appendix

Table A.1: Mental health scale (*MCS*) of the SOEP SF-12 survey

Subscale (No. of items)	Question wording and scales
	<i>Scale: 1 (always) to 5 (never)</i>
Vitality (1)	During the last four weeks, how often did you feel energetic?
Social functioning (1)	During the last four weeks, how often did you feel that due to physical and mental health problems your were limited socially, that is, in contact with friends, acquaintances, or relatives?
Role emotional (2)	During the last for weeks, how often did you feel that due to mental health or emotional problems...
	<i>Achieved less due to mental-health problems</i> ...you achieved less than you wanted to at work or in everyday activities?
	<i>Less thorough due to mental-health problems</i> ...you carried out your work or everyday tasks less thoroughly than usual?
Mental health (2)	During the last four weeks, how often did you...
	<i>Run-down, melancholy</i> ...feel down and gloomy?
	<i>Well-balanced</i> ...feel calm and relaxed?
Time stress (1) (not part of <i>MCS</i>)	Please think about the last four weeks. How often did it occur within this period of time, that you felt rushed or pressed for time?

Source: SOEP v30.

Table A.2: Social activities in the SOEP study

Variable	Question wording and scales
	<i>Which of the following activities do you take part in during your free time? Please check off how often you do each activity: at least once a week, at least once a month, less often, never.</i>
Social gatherings	Meeting with friends, relatives or neighbors
Helping	Helping out friends, relatives or neighbors
Political participation	Involvement in citizen's group, political party, local government
Religious participation	Attending church, religious events
Volunteer work	Volunteer work in clubs or social services
Sports participation	Doing sports yourself
Cultural attendance	Going to cultural events (such as concerts, theatre, lectures, etc.)
Entertainment attendance	Going to the movies, pop music concerts, dancing, disco, sports events
Artistic activities	Artistic or musical activities (playing music/singing, dancing, acting, painting, photography)

Source: SOEP v30.

Table A.3: Selected long-term care variables in the SOEP study

Presence of care-dependent person in HH: Does someone in your household need care or assistance on a constant basis due to age, sickness or medical treatment?

- *Yes/no*

Limitations in (I)ADLs: Who is that and by which of the following activities does he or she need assistance?

- *Errands outside of the house*
- *Running the household, preparing meals and drinks*
- *Minor care, such as help with dressing himself, washing up, combing hair, shaving*
- *Major care, such as getting in and out of bed, bowel movements*

LTC level: Does the person in need of care receive nursing care assistance?

- *Yes: Care level 1/Care level 2/Care level 3*
- *No*

Sources of help: From whom does this person receive the necessary assistance?

- *Relatives in the household*
- *Public or church nurse, social worker*
- *Private care service*
- *Friends*
- *Neighbors*
- *Relatives not in the household*

Source: SOEP v30.