The Burden of Informal Care: Does Looking After Aging Parents Weaken Social Ties?

Zhenghao Chen* Yarine Fawaz[1] Pedro Mira[2]

March 26, 2026

PRELIMINARY VERSION[1]

Abstract

Informal care is a cornerstone of long-term care systems, yet its hidden social costs remain underexplored. This study provides causal evidence on the impact of intensive caregiving on the social connectedness of women aged 50 to 70 in Europe. Using panel data from the Survey of Health, Ageing, and Retirement in Europe (SHARE), we employ a two-stage least squares design that instruments for caregiving with the quasi-exogenous deterioration of a parent's health. We find that intensive caregiving does not significantly reduce the number of social ties but substantially erodes their quality. Specifically, caregiving leads to lower satisfaction with one's social network, reduced emotional closeness with confidants, and diminished participation in civic and social activities. These negative effects are concentrated in Southern and Eastern European countries, where weaker formal long-term care systems place a heavier burden on families. To establish the health economic relevance of this "social erosion," we then show that the very associational activities causally crowded out by caregiving are strong predictors of long-term survival. Cox proportional hazard models reveal that baseline participation in these activities is associated with a significantly lower ten-year mortality risk, even after conditioning on a comprehensive set of health and socioeconomic factors. Our findings identify a crucial social mechanism through which the burden of informal care operates, highlighting the need for policies that support not only the financial and mental health of caregivers but also their continued social integration.

JEL Classification: I12, I14, J14.

Keywords: Informal care; Social connectedness; Mortality; Aging; Long-Term Care.

Acknowledgements

*UCL

[1]CEMFI and UAM, e-mail: fawaz@cemfi.es

[2]CEMFI

[1]The authors declare that they have no financial conflicts of interest or other competing interests related to this research.

1 Introduction

Population ageing is reshaping care systems across Europe. As life expectancy rises and fertility declines, the share of older adults increases sharply, putting mounting pressure on long-term care (LTC) systems. While formal LTC services exist, coverage remains limited and highly unequal across countries, particularly in Southern and Eastern Europe (Colombo et al., 2016; European Commission, 2022). In this context, families remain the backbone of elderly care provision. Informal caregiving—unpaid support provided by relatives, most often women—continues to absorb the bulk of LTC demand. Our own calculations from the Survey of Health, Ageing and Retirement in Europe (SHARE) show that 71% of informal caregivers are female. Middle-aged women aged 50–60 are especially likely to provide intensive care, often while juggling paid employment and childrearing responsibilities.

A large body of research has documented the consequences of caregiving for caregivers' health and economic outcomes. Meta-analyses and systematic reviews have consistently linked informal caregiving with elevated risks of stress, depression, and declines in self-rated health (Bauer and Sousa-Poza, 2015; Pinquart and Sörensen, 2003; Roth et al., 2015; Vitaliano et al., 2003). More recent studies have moved beyond correlation to identify causal effects. Propensity score matching approaches estimate the average treatment effect on the treated (ATT), comparing caregivers to observationally similar non-caregivers (Bom et al., 2019; Bom and Stöckel, 2021; Schmitz and Westphal, 2015,1). Instrumental variables (IV) strategies exploit exogenous variation in caregiving demand—such as parental health deterioration, parental death, or sibling structure—to estimate the local average treatment effect (LATE) (Coe and Van Houtven, 2009; Crespo and Mira, 2014; Eibich, 2023). These studies typically confirm that caregiving negatively affects mental health, subjective well-being, and sometimes physical health.

The effects are not uniform. Several studies show that the costs of caregiving are disproportionately borne by women (Abrahamsen and Grøtting, 2023; Bom et al., 2019; Colombo et al., 2016; Crespo and Mira, 2014; de Zwart et al., 2017; Schmitz and Westphal, 2015,1; Simard-Duplain, 2022; Wang et al., 2024). Others highlight intensity gradients: high-intensity or long-duration care is associated with more severe declines in health and well-being compared to occasional or low-intensity support (Bom and Stöckel, 2021; Schmitz and Westphal, 2017; Stöckel and Bom, 2022; Van Houtven et al., 2013). A second stream of research has examined economic outcomes. Caregiving can reduce labor force participation, work hours, and wages, although effect sizes vary considerably across studies and contexts (Bolin et al., 2008; Casado-Marín et al., 2011; Crespo and Mira, 2014; Heitmueller, 2007; Kolodziej et al., 2018; Simard-Duplain, 2022). Evidence also points to increased likelihood of early retirement or reduced work intensity among caregivers (Eibich, 2023; Van Houtven et al., 2013), with long-term caregiving associated with wage penalties and slower earnings growth (Schmitz and Westphal, 2017). This literature underscores that informal caregiving carries significant personal costs, particularly for middle-aged women who often face competing demands at home and at work.

One crucial dimension of caregiver well-being, however, has received comparatively little attention: social connectedness. Social ties are foundational to mental and physical health. They provide emotional support, buffer stress, supply practical assistance, and foster identity and belonging. A large body of evidence demonstrates that richer social networks predict lower

depression and anxiety, better coping with stress, and even reduced mortality risk (Fawaz and Mira, 2023; Holt-Lunstad and Smith, 2015; Thoits, 2011). The COVID-19 pandemic further underscored the importance of social ties, as widespread disruptions to social life triggered sharp increases in loneliness, depression, and stress (Marroquín et al., 2020). Against this backdrop, the potential for caregiving to erode social connectedness has far-reaching implications.

Caregiving is time-intensive and emotionally demanding. It can crowd out opportunities for social interaction, limit community involvement, and contribute to isolation and loneliness. Recent studies provide suggestive evidence. For example, Zwar et al. (2020) find that transitioning into caregiving increases loneliness, while Le and Ibuka (2023) document that reduced social activities and network loss are key channels linking caregiving to worse mental health. Yet such studies remain few, and most are correlational rather than causal. We know relatively little about the causal impact of caregiving on the structure and quality of caregivers' social networks, or about how such effects vary by intensity, duration, or institutional context.

Our paper is the first, to our knowledge, to bridge this gap by providing direct causal evidence on the 'social erosion' mechanism—the impact of intensive caregiving on the detailed structure and quality of social networks. To do so, we estimate the causal effect of intense informal caregiving on multiple dimensions of social connectedness among European women aged 50 to 70. Using panel data from SHARE, we implement an instrumental variable strategy that exploits within-person deterioration in a parent's self-rated health between waves as a shock to caregiving demand, following established approaches in the literature (Crespo and Mira, 2014; Eibich, 2023). This design allows us to estimate a LATE for women whose caregiving is responsive to parental health shocks, focusing on the group most likely to bear the costs of care.

Our analytical approach proceeds in two distinct stages. First, we provide rigorous causal evidence that intensive caregiving erodes key dimensions of social connectedness. Second, to underscore the health economic relevance of this mechanism, we conduct a separate predictive analysis to assess whether these specific dimensions of social life are associated with long-term mortality. By causally identifying the effect of caregiving on a health-relevant mechanism, we illuminate a crucial pathway through which the burden of care can translate into tangible health risks.

Our primary contribution leverages SHARE's Social Network (SN) module (waves 4, 6, 8, and 9), which collects uniquely rich data on respondents' personal networks. Unlike other large-scale social surveys that proxy connectedness through role relationships (e.g., spouse, children, co-residence), the SN module uses a name generator: respondents identify up to six confidants (plus one "important person") with whom they discussed important matters in the past year, and provide detailed information about each. This design allows us to construct a multidimensional index of connectedness—building on Litwin et al. (2013)—that captures (i) network size, (ii) geographical proximity, (iii) contact frequency, (iv) emotional closeness, and (v) relationship diversity. We complement this with subjective and behavioral measures, including loneliness (R-UCLA scale), volunteering, and participation in associational activities. Our second contribution is to establish the strong link between these social dimensions and long-term health outcomes. Beyond the well-documented immediate effects of caregiving on stress and depression, diminished social networks may create persistent risks for morbidity and

mortality. We demonstrate the importance of this pathway by showing that the social activities causally crowded out by caregiving are strong predictors of survival. Using 10-year follow-up data and Cox proportional hazard models, we find that women with richer baseline networks are associated with a substantially lower hazard of death, even after controlling for a wide range of baseline health and socioeconomic factors. These findings echo those of Fawaz and Mira (2023) and underscore that the social erosion we identify represents a potentially significant long-term health risk for caregivers.

Finally, as a credibility check, we test whether our IV design recovers the well-established negative effects of caregiving on mental health. This validation step ensures that our empirical strategy can detect known causal impacts before turning to novel outcomes on social connectedness.

The remainder of the paper is structured as follows. Section 2 situates our study in the broader literature and describes the institutional context of long-term care in Europe. Section 3 outlines the SHARE data and our social connectedness measures. Section 4 presents our causal IV strategy. Section 5 reports the main causal estimates of caregiving on social connectedness and explores heterogeneity across European welfare regimes. Section 6 then shifts to a predictive analysis of the long-run health consequences, linking baseline connectedness to subsequent mortality risks using Cox hazard models. Section 7 concludes.

2 Background and Related Literature

2.1 Institutional context of long-term care in Europe

Population ageing and rising dependency ratios have placed long-term care (LTC) at the center of social policy debates. While formal LTC systems exist across Europe, their coverage and generosity differ markedly. A pronounced North–South (and East) gradient persists. Northern countries (Denmark, Sweden, the Netherlands) feature relatively generous, universal LTC systems—public spending often exceeds 2.5–3% of GDP, accompanied by extensive home care and institutional services. In contrast, Southern countries (Italy, Spain, Greece) typically rely on minimal, means-tested public aid, with public expenditure around 0.6% of GDP. These countries, alongside many Eastern European states—which share similarly limited formal LTC infrastructure and high reliance on informal caregiving—constitute one end of the spectrum. Notably, evidence shows that the prevalence of informal care remains relatively high across both Southern and Eastern Europe, while Western and Northern European countries increasingly deploy formal care when limitations in activities of daily living (ADLs) or instrumental ADLs are reported (Viktoria, 2024). Continental states (Germany, France, Austria, Belgium, Switzerland) fall in between, with mixed financing systems and intermediate levels of coverage (Crespo and Mira, 2014).

This institutional variation has direct implications for family caregiving: where formal LTC is scarce, families—especially women—become the primary caregivers. As Crespo and Mira (2014) emphasize, this interacts with gendered patterns of labour market attachment—stronger in Northern than in Southern/Eastern Europe—to produce varying opportunity costs of caregiving. These cross-regional differences provide a natural backdrop for studying both the prevalence

of informal care and its consequences for caregivers.

To illustrate this gradient in practice, Figure 1 reports the share of daughters aged 50–70 who provide any care to a parent, and the subset who provide daily (intense) care, using SHARE waves 4 to 9. The cross-country variation is striking. Southern and Eastern European countries (Italy, Portugal, Spain, Hungary, Malta, Slovenia, Bulgaria, Poland, Cyprus) exhibit both high prevalence of caregiving and a large share of daily care, consistent with limited public provision of LTC. By contrast, in Northern countries (Denmark, Sweden, Finland) where universal LTC coverage is extensive, caregiving prevalence is markedly lower, and daily care is rare. Continental and Western European countries (Germany, Austria, France, Luxembourg, the Netherlands, Belgium, Switzerland) fall in between. These descriptive patterns align with the institutional differences discussed above: where formal LTC is scarce, families fill the gap, often through daughters, whereas in countries with generous formal provision the reliance on daily informal care is far less pronounced.

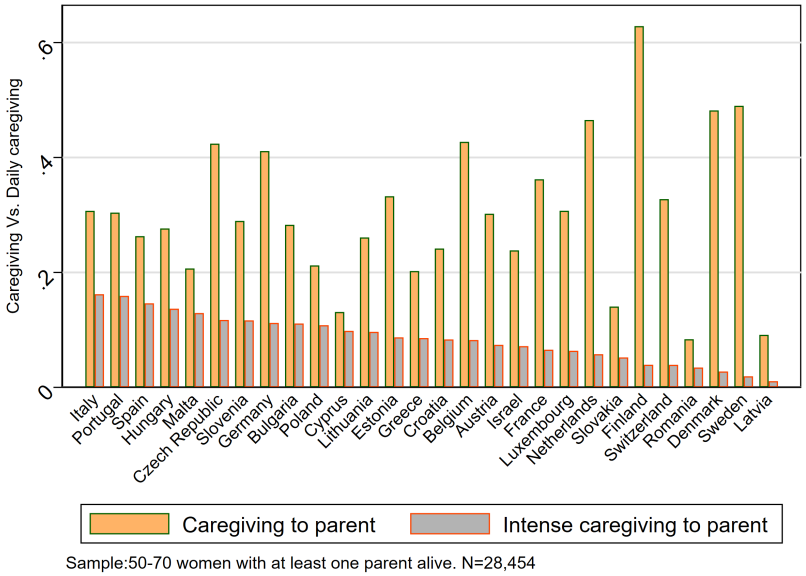


Fig. 1. Informal Caregiving across Countries

Notes:

2.2 Health effects of informal caregiving

A large body of evidence links caregiving to adverse health outcomes. Meta-analyses confirm associations with higher stress, depression, and poorer physical health (Bauer and Sousa-Poza, 2015; Pinquart and Sörensen, 2003; Roth et al., 2015; Vitaliano et al., 2003). More recent studies seek to establish causality. Matching approaches show increased depression and lower life satisfaction among caregivers compared to matched controls (Bom et al., 2019; Bom and Stöckel, 2021; Schmitz and Westphal, 2015,1). Instrumental variables (IV) strategies, exploiting parental health deterioration, parental death, or sibling structure, identify negative effects on mental health and subjective well-being (Coe and Van Houtven, 2009; Crespo and Mira, 2014; Eibich, 2023).

Results are heterogeneous. Care burdens weigh more heavily on women, who are both more likely to provide care and more affected by it (Abrahamsen and Grøtting, 2023; Bom et al., 2019; Colombo et al., 2016; Crespo and Mira, 2014; de Zwart et al., 2017; Simard-Duplain, 2022; Wang et al., 2024). Intensity matters as well: high-frequency or long-duration care amplifies the adverse impacts on mental and physical health (Bom and Stöckel, 2021; Schmitz and Westphal, 2017; Stöckel and Bom, 2022; Van Houtven et al., 2013). Recent reviews note that while mental health effects are robustly negative, evidence on physical health is more mixed; some studies even suggest short-run improvements in self-assessed health due to comparison effects when spending time with sicker relatives (Bom et al., 2019; Di Novi et al., 2015; Eibich, 2023). Long-term studies, however, document persistent adverse consequences for psychological well-being (Schmitz and Westphal, 2015; Stöckel and Bom, 2022), and mechanisms such as social isolation and reduced leisure are increasingly recognized as central channels (Le and Ibuka, 2023; Zwar et al., 2020).

2.3 Labor market effects

A second large literature examines how caregiving affects labor supply. Studies consistently show that caregiving can reduce participation, working hours, and wages, though magnitudes vary across contexts (Bolin et al., 2008; Casado-Marín et al., 2011; Crespo and Mira, 2014; Heitmueller, 2007; Kolodziej et al., 2018; Simard-Duplain, 2022). Instrumental variables analyses find that parental health shocks reduce daughters' employment probabilities, with effects concentrated in Southern Europe where public LTC is scarce (Crespo and Mira, 2014). Some evidence also points to increased early retirement or transitions out of full-time work (Eibich, 2023; Van Houtven et al., 2013). Long-term penalties include lower earnings trajectories and wage scarring (Schmitz and Westphal, 2017).

Heterogeneity again plays a central role. The costs are largest for women, especially those at the margin of labor force participation or in low-wage jobs (Crespo and Mira, 2014). Institutional differences also matter: the negative employment effects of caregiving are negligible in generous Nordic systems but substantial in Mediterranean settings (Crespo and Mira, 2014).

2.4 Social connectedness as a missing dimension

Despite extensive work on health and labor, one crucial margin of caregiver well-being—*social connectedness*—remains understudied. Networks of close ties are key buffers against stress and are powerful predictors of morbidity and mortality (Fawaz and Mira, 2023; Holt-Lunstad and Smith, 2015; Thoits, 2011). Yet caregiving may constrain social interaction and foster isolation. Existing studies provide correlational evidence: Zwar et al. (2020) find increases in loneliness after transitioning into caregiving, while Le and Ibuka (2023) document reductions in social activity as a channel for poorer mental health. However, causal evidence linking caregiving to the structure and quality of social networks is almost nonexistent. This gap is particularly salient given mounting evidence that social isolation itself predicts long-term mortality risk (Fawaz and Mira, 2023).

Figure 2 provides descriptive cross-country evidence consistent with this concern. The figure plots the share of daughters aged 50–70 providing daily care to a parent (mother or father)

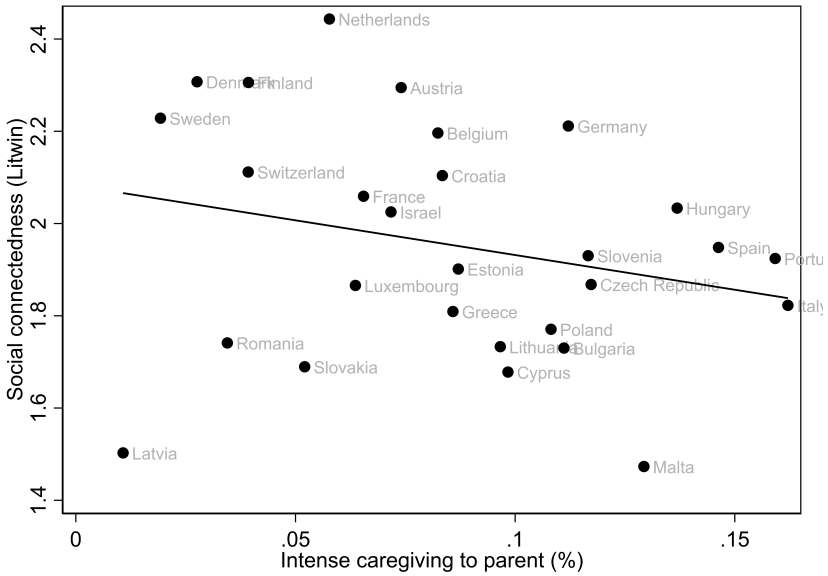


Fig. 2. Descriptive relationship between IC and SN

Notes:

against the average social connectedness index (whose construction we will detail in the next section). The relationship is clearly negative: in countries with more intense caregiving, social connectedness tends to be weaker. While these patterns are absolutely not causal, they illustrate the potential trade-off between time devoted to caregiving and the maintenance of social ties, and motivate our causal analysis below.

3 Data and Measurement

3.1 Data source (SHARE) and Sample Selection

We use the Survey of Health, Ageing and Retirement in Europe (SHARE), a multidisciplinary longitudinal survey of individuals aged 50 and over. SHARE covers health, socioeconomic status, employment, social support, and social networks, and is representative of the community-dwelling older population in 28 European countries and Israel. Data have been collected biennially since 2004. Our analysis uses waves 1 to 9 (2004–2023), excluding the retrospective life-history wave (wave 3). The repeated panel structure allows us to exploit within-individual changes in caregiving status linked to parental health shocks. Starting in wave 4 and repeated in waves 6, 8, and 9, SHARE also fielded the Social Network (SN) module, which provides unusually rich information on close personal networks.

3.2 Sample selection

The analytical sample consists of daughters aged 50 to 70 with at least one living parent. We begin at age 50 because women in this age group are most likely to face parental care demands, while extending the sample up to age 70 increases statistical power and is appropriate given

our focus on social connectedness rather than labor supply. Women older than 70 rarely have a surviving parent, while women younger than 50 are less likely to be observed in caregiving roles.

Starting from the full SHARE dataset, we apply standard cleaning procedures, restrict to women aged 50–70 with a surviving mother whose health was not already poor at baseline, and limit the sample to waves 4, 6, 8, and 9, when the Social Network module is available. These restrictions yield an estimation sample of daughters observed in at least two consecutive waves of SHARE, allowing us to measure maternal health shocks between $t-1$ and t and to link them with contemporaneous outcomes.

Because our specification includes lagged outcomes, we further restrict to respondents observed in at least two Social Network waves. This requirement, together with missing values in some lagged covariates, produces a final estimation sample of 5,681 person-wave observations. More detail on the attrition at each step is provided in Table A.1.

Two possible perspectives are available in SHARE: one is to use the daughters' sample, which records caregiving activities as reported by daughters themselves, together with basic information on parental health; the other is to use the parents' sample, which provides richer information on the health of the parents, including sudden deteriorations and unexpected illnesses. The latter is valuable for instrument construction but does not contain systematic information on daughters' social networks, and the two samples cannot be matched at the individual level. Given our focus, we rely on the daughters' sample.

Table A.2 reports descriptive statistics for the final estimation sample of 5,681 person-wave observations. On average, daughters in our sample have about 12.3 years of education, and three quarters are married. They have roughly two children and live in households of 2.4 persons. About 1.6 grandchildren and one female sibling are reported (92 per cent have at least one sibling). Co-residence with a parent is relatively rare, observed in about 9 percent of cases. These covariates, which enter the regressions in lagged form, provide a rich set of controls for socioeconomic and family context.

3.3 Informal caregiving and parental health deterioration

Informal caregiving in SHARE is recorded through questions on whether respondents provided help to their parents in the past twelve months. Help may include personal care such as dressing or bathing, practical household support such as shopping or repairs, or assistance with paperwork and administrative tasks. For parents living in the same household, caregiving is automatically coded as daily, since such situations typically involve sustained daily assistance. For parents living outside the household, respondents are asked about the frequency of help (daily, weekly, monthly, less often) and about the number of hours devoted.

Following established practice (Crespo and Mira, 2014; Eibich, 2023), we define intense caregiving as providing daily help to one's parent. This threshold captures the situations in which caregiving represents a substantial and regular time burden and is most likely to interfere with other aspects of life. The panel design of SHARE allows us to exploit changes in parental health between consecutive waves to track transitions into and out of intense caregiving.

Our instrument is constructed from the parent's self-rated health, reported by the respondent

on a five-point Likert scale ranging from "excellent" to "very poor." We define a parental health shock as a transition between $t-1$ and t from any non-poor state ("excellent," "very good," "good," or "fair") into a "poor" or "very poor" state. No deterioration is recorded if the parent already reported poor health in $t-1$. We treat entry into poor health as an absorbing state: once a paremt's health status crosses this threshold, we assume it cannot return to a better category in subsequent waves. Although this abstraction simplifies a more complex underlying reality, it provides a consistent way to capture sudden, sustained increases in caregiving demand.

In our estimation sample, about 10 percent of daughters provide daily care to their parent (see Table A.2). Parental health shocks, defined as transitions into poor or very poor health, occur in roughly 24 percent of person-wave observations. These figures highlight that while intense caregiving is a relatively infrequent but important event, health shocks among parents are much more common and provide substantial exogenous variation in caregiving demand.

3.4 Social network outcomes

A distinctive feature of SHARE is the inclusion of a Social Network (SN) module, first introduced in wave 4 and repeated in waves 6, 8, and 9. This was the first large-scale cross-national survey of ageing to introduce a name-generator approach for eliciting personal networks. Most prior studies, including earlier waves of SHARE, the HRS, and ELSA, have relied on an indirect approach, in which ties are inferred from roles such as spouse, children, or co-resident relatives. This role-based approach assumes that certain relationships are necessarily close or meaningful, but it cannot capture variation in the subjective importance of different ties. By contrast, the direct approach used in SHARE relies on a name generator: respondents are asked to list the individuals with whom they most often discussed important matters during the previous twelve months. Up to six names can be provided, with the option of adding a seventh for any other reason.

For each named confidant, detailed information is collected on relationship type, gender, age, geographic proximity, frequency of contact, and emotional closeness. This design allows us to move beyond role-based proxies and to measure the actual composition and quality of respondents' personal networks. The SN module thus provides a uniquely rich basis for studying social connectedness in older age.

Following Schwartz et al. (2017), we construct a Social Connectedness Index (SC Index) that summarizes the key facets of respondents' social networks into a single measure. The index aggregates five dimensions: (1) network size, i.e. the number of persons named in the network roster; (2) proximity, i.e. the number of cited network members living within 25 km; (3) contact frequency, i.e. the number of persons with weekly or more contact; (4) emotional closeness, i.e. the number of persons rated as very or extremely close; and (5) relationship diversity, i.e. the number of different relationship categories represented (spouse, other family including children, friend, other). For the first four components, raw counts are recoded into categorical values: 0 if no such person is present, 1 if one person is cited, 2 if two to three persons are cited, 3 if four to five are cited, and 4 if six to seven are cited. The diversity component ranges from 0 to 4, depending on how many of the four categories are represented. The assumption underlying this scoring is that larger networks, more proximate and frequent ties, and greater emotional

closeness reflect stronger social network resources. Principal component analysis conducted on SHARE Wave 6 confirms that these five items load onto a single factor (see Schwartz et al. (2017)). Summing across the five items yields a total raw score between 0 and 20. We then follow the SHARE calibration and collapse this raw score into four categories: 0 (no network), 1 (scores 1–5), 2 (scores 6–10), 3 (scores 11–15), and 4 (scores 16–20). Because the scale is additive, it naturally gives greater weight to larger networks: respondents with more confidants are more likely to appear in higher categories of connectedness, as they tend to score positively on multiple underlying dimensions.

To complement this size-driven index, we also construct an alternative measure of network quality that focuses on relative composition. Specifically, we calculate the share of confidants who are very or extremely close, the share with frequent contact, and the share living nearby, each relative to the total number of confidants named. This yields a Social Network Quality Index that captures the intensity of connectedness within a given network size. We will refer to that index as "SN Quality". In addition, we use two further measures of network well-being available in SHARE: (i) the satisfaction with one's network, recorded on a 0–10 scale, and (ii) the raw number of confidants named in the roster (network size), excluding the parents to avoid mechanical links with our treatment.

In the estimation sample, daughters report on average about three confidants (excluding parents), with relatively high satisfaction scores (around 9 out of 10), but moderate connectedness overall according to the composite index (see Table A.2 and Figure 3). These measures allow us to capture both the structure and the subjective quality of personal networks, and to distinguish the role of caregiving in shaping not only how large networks are, but also how close, diverse, and satisfying they are perceived to be.

Finally, because we exclude parents from the network roster, the social network outcomes are not mechanically driven by the presence of the care recipient. This design choice is crucial for our identification strategy: parental health shocks directly affect the likelihood of caregiving but do not mechanically inflate our measures of connectedness, ensuring that any estimated effects capture the broader consequences of caregiving for daughters' social lives rather than the trivial substitution of parents into the network roster.

We complement these network measures with broader indicators of social integration and well-being, including the R-UCLA loneliness scale, volunteering, and associational participation such as clubs, religious groups, or political organizations. These variables capture dimensions of social life beyond the intimate network and are recognized correlates of psychological well-being and healthy ageing. Last, we exploit information from the "Time Expenditure" module, introduced for the first time in wave 8. In addition, we will also report results for depressive symptoms (EURO-D). These are not new to the literature but serve as validation outcomes, since prior work consistently documents a causal deterioration in mental health among caregivers (e.g. Eibich (2023); Schmitz and Westphal (2015)).

All regressions include age, marital status, education, whether has siblings, number of female siblings, number of children and grandchildren, household size, and whether lives with parent(s). To absorb broad time and life-cycle patterns as well as cross-country heterogeneity tied to cohorts, we include year-of-interview FE, birth-cohort FE, and country-specific birth cohort

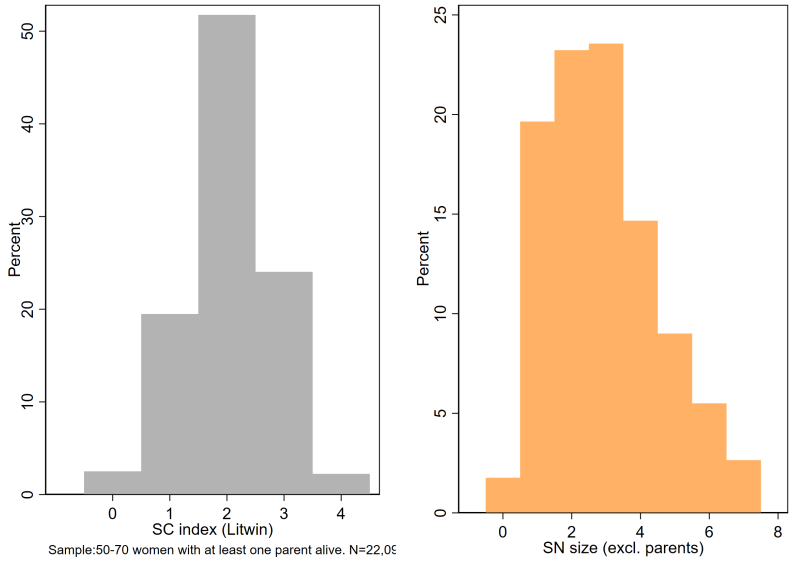


Fig. 3. Distribution of Social Connectedness Index

Notes:

trends.

4 Empirical Strategy

We estimate the causal effect of intense informal caregiving on social connectedness using a two-stage least squares (2SLS) approach, following Crespo and Mira (2014). The central challenge is that caregiving is endogenous: daughters who provide daily care may differ systematically from those who do not, in both observable and unobservable ways. Table A.2 illustrates these differences on observables. For example, daily caregivers in our sample are somewhat less educated, less likely to be married, and more likely to co-reside with their parents compared to non-caregivers. They also tend to have fewer children and live in slightly smaller households. These systematic differences underscore the difficulty of identifying causal effects using simple comparisons, and motivate the use of an instrumental variable approach. To address this, we exploit plausibly exogenous variation in caregiving induced by sudden deterioration in maternal health.

A further feature of our specification is that we always include the lagged dependent variable (e.g. social connectedness at $t-1$) as a control. Individuals differ widely in their baseline levels of connectedness due to many factors that are difficult to observe or measure, such as personality traits, preferences for sociability, or long-standing family arrangements. While some of these differences can be partially captured by observables, the list of available covariates is inevitably limited. Controlling for past social connectedness provides a way to account for this heterogeneity, so that identification comes from within-individual changes rather than from cross-sectional variation.

This choice makes our design particularly demanding. Once past connectedness is controlled

for, only relatively small short-run changes are left to be explained by caregiving. Moreover, if caregiving has cumulative or persistent effects, including the lagged outcome will mechanically bias estimates downward, since past caregiving may already have reduced connectedness at $t-1$. In this sense, our estimates should be seen as conservative lower bounds of the true impact. They capture the marginal erosion of networks induced by new caregiving spells, but not the potentially more important long-term consequences of chronic or repeated caregiving.

4.1 Instrumental variable

Our instrument is based on the parent's self-rated health, reported by the respondent on a five-point scale from "excellent" to "very poor." We define a parental health shock as a transition of either the father or the mother between $t-1$ and t from any non-poor state ("excellent," "very good," "good," or "fair") into "poor" or "very poor." Formally:

$$\text{Health Shock}_{it} = \begin{cases} 1 & \text{if Parental Health}_{i,t-1} \neq \text{Poor and Parental Health}_{it} = \text{Poor}, \\ 0 & \text{otherwise.} \end{cases} \quad [1]$$

Once a parent's health crosses into the "poor" state, we treat this as an absorbing condition: subsequent recoveries, though possible in reality, are ignored to maintain a consistent definition of shock-driven caregiving demand. This abstraction simplifies the dynamics and aligns with our goal of capturing sustained shifts in care needs.

4.2 Econometric specification

The first-stage equation is:

$$\text{Daily Care}_{it} = \pi \cdot \text{Health Shock}_{it} + X'_{i,t-1}\gamma + \delta_t + u_{it}, \quad [2]$$

where Daily Care_{it} is an indicator for whether daughter i provides daily care to any of her parents at time t, Health Shock_{it} is defined in Equation [1], $X_{i,t-1}$ is a vector of predetermined covariates measured at $t-1$, and δ_t are dummies for year of interview, cohort, and country-specific cohort trends.

The second-stage equation is:

$$Y_{it} = \beta \cdot \widehat{\text{Daily Care}}_{it} + X'_{i,t-1}\delta + \delta_t + \varepsilon_{it}, \quad [3]$$

where Y_{it} denotes the social connectedness, and other social networks outcomes.

Our IV strategy relies on three standard assumptions for causal interpretation:

1. *Relevance.* Deterioration in parental health must significantly increase the likelihood that daughters provide daily informal care. We show below that the first-stage coefficient on the health shock is large and precisely estimated.

2. *Exclusion restriction.* A critical assumption of our IV strategy is that a parent's health deterioration affects the daughter's social connectedness exclusively through its impact on

her caregiving provision. A potential threat to this assumption is the direct psychological impact of the health shock—what is sometimes termed the "family effect" (Crespo and Mira, 2014). It is plausible that the emotional distress, anxiety, or anticipatory grief resulting from a parent's sharp decline in health could directly cause a daughter to withdraw from social life, independent of the time and effort spent on caregiving tasks.

While this channel is a valid theoretical concern, several features of our research design mitigate its potential to bias our results. First, our key outcomes are not just subjective feelings but also behavioral measures like participation in associational activities, which are more likely to be constrained by time allocation—the central mechanism of caregiving—than by emotional distress alone. Second, by construction, we exclude the parent from the daughter's network roster, ensuring our results are not driven by a mechanical substitution of the parent into the network. Finally, we will empirically test the robustness of our main findings to this concern in Section 5. If the "family effect" were the primary driver, we would expect that controlling for the daughter's own contemporaneous mental health would absorb the effect of our instrumented caregiving variable. We will conduct this test by including the daughter's own measure of depressive symptoms (EURO-D scale) as an additional control in our second-stage regressions. This provides a direct test of whether our results are driven by the burden of caregiving itself, rather than being solely a byproduct of the daughter's emotional response.

3. *Monotonicity.* Parental health deterioration should weakly increase, but never decrease, the likelihood that daughters provide daily care. That is, there are no "defiers" who would stop providing care because their parent's health worsened.

Under these conditions, the coefficient β in equation [3] can be interpreted as the local average treatment effect (LATE) of providing daily care on social connectedness, for those daughters whose caregiving responds to parental health shocks (Imbens and Angrist, 1994). Our IV estimates do not capture the average effect of caregiving across all caregivers, but rather the causal effect for the specific subpopulation of "compliers." In our context, these are the women who are induced to provide intensive, daily care precisely because their parent experiences a health shock. This group is likely on the margin of the caregiving decision and may differ from women who would provide care regardless of a shock ("always-takers") or those who would never provide such care ("never-takers"). The social disruption of transitioning into intensive care may be particularly acute for these compliers, and thus our estimates may not be generalizable to the entire population of long-term caregivers. However, this group is of significant policy interest. Compliers are precisely the individuals whose caregiving decisions are most likely to be influenced by the availability and generosity of formal long-term care services. Understanding the social costs borne by this marginal group is therefore crucial for designing policies that effectively support family caregivers.

4.3 First Stage

Table 1 reports the first-stage estimates from equation [2], where the dependent variable is an indicator for providing daily care to one's parent. The key regressor is the parental health

instrument.

We consider two versions of the instrument. The "cross-sectional" (CS) instrument equals one whenever a parent reports poor or very poor health at time t, regardless of his/her prior status. This variable captures contemporaneous variation in parental health, but does not isolate changes. The "panel" instrument, by contrast, exploits longitudinal variation: it equals one only when parental health deteriorates from a non-poor state at $t-1$ into poor or very poor health at t. The panel version is more consistent with our identification strategy, since the theoretical model emphasizes the role of unexpected health shocks in triggering caregiving responses.[2]

Across columns (1)–(4) we report estimates using the CS instrument with progressively richer sets of controls. Column (5) reports results with the panel instrument. The sample is held fixed across all specifications (restricted to the set of observations used in column 5) to facilitate comparability. As described in Section 3, this consists of daughters aged 50–70 with a surviving parent not already in poor health at baseline, observed in at least two consecutive waves of the Social Network module.

In all specifications, the parental health instrument is a strong predictor of caregiving. The coefficient on the CS instrument is around 0.07, with a tightly estimated standard error of 0.010–0.011, while the panel instrument yields an identical coefficient of 0.071 (s.e. 0.010). The associated first-stage F-statistics are well above the conventional threshold of 10, ranging from 44 to 49 depending on the specification. These results confirm the relevance of our instrument and provide reassurance that the 2SLS estimates in the next section are not driven by weak identification.

Figure 4 illustrates the first stage graphically. The probability of providing daily care rises by about 8 percentage points when the parent experiences a health shock, defined as a transition into poor or very poor self-rated health. This shift is visible across the age range of 50 to 70 and confirms that parental health deterioration is a powerful predictor of caregiving behavior. We focus on intense (daily) caregiving, since—consistent with Crespo and Mira (2014)'s time-allocation model—it is this form of care that represents a meaningful burden competing with other uses of time and that is most relevant for our hypotheses. For completeness, we show that a first stage also exists for non-intense caregiving, but the relationship is notably weaker.

As Crespo and Mira (2014) emphasize, instruments based on parental health are attractive precisely because they capture exogenous increases in the demand for care. The intuition is straightforward: when parents are in good health, few daughters provide daily help, but when health deteriorates, a sizeable group of compliers is induced into caregiving. Our figure mirrors this logic, with the "jump" in caregiving probability at the onset of poor health corresponding to the mass of compliers. Echoing this argument, Eibich (2023) shows that many instruments (siblings, parental survival) face validity or weak instrument concerns (especially for men) and that only parental health-based shocks are strongly predictive and theoretically aligned with the caregiving decision. In line with this reasoning, our estimated first-stage F-statistics exceed 40, alleviating concerns about weak instruments and supporting the use of parental health shocks

[2] In particular, we posit that caregiving responds to changes in parental health rather than to static levels. Using the CS version risks conflating long-run differences in families where the parent has always been in poor health with genuine responses to shocks.

Table 1: First Stage estimates- Dep. variable: Intense caregiving

	(1)	(2)	(3)	(4)	(5)
Parental health shock	0.073***	0.072***	0.072***	0.072***	0.071***
	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)
Instrument version	CS	CS	CS	CS	Panel
Basic controls	No	Yes	Yes	Yes	Yes
Siblings	No	No	Yes	Yes	Yes
Coresidence	No	No	No	Yes	Yes
F-Stat	45.3	44.2	45.1	49.8	46.7
R2	0.07	0.07	0.09	0.14	0.14
Observations	5681	5681	5681	5681	5681

Notes: Standard errors in parentheses, clustered at individual level.
All regressions include country, year, cohort FE, and cohort trend X country FE. Dependent variable is a dummy for daily caregiving to father or mother. Basic controls: age, married, education, number of children and grandchildren, size of household. All covariates are lagged.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

to identify the causal impact of caregiving on social connectedness.

5 Empirical Results

5.1 Reduced Form Estimates: Impact of Maternal Health Deterioration on Social Networks

Table 2 reports reduced form estimates of the impact of parental health shocks on daughters' social connectedness. The coefficients are mixed in sign and generally small in magnitude. For the composite index (column 1) and network size (column 3), the point estimates are close to zero, while for network quality (column 2) the coefficient is negative but imprecisely estimated. The only statistically significant effect appears for network satisfaction (column 4), where a parental health shock is associated with a decline of about 0.06 points on a 0–10 scale.

Taken together with the strong first stage in Table 1, where maternal health shocks increase the likelihood of providing daily care by about 8 percentage points, these reduced form results suggest that the 2SLS estimates will reflect at most modest impacts of caregiving on social connectedness. Intuitively, the 2SLS estimate is the ratio of the reduced form to the first stage: it captures how much connectedness changes per unit increase in caregiving induced by a parental health shock. Given the weak reduced form, we should expect 2SLS coefficients to be small and imprecise in the pooled sample, consistent with the idea that any aggregate effect may be limited or masked by heterogeneity across contexts.

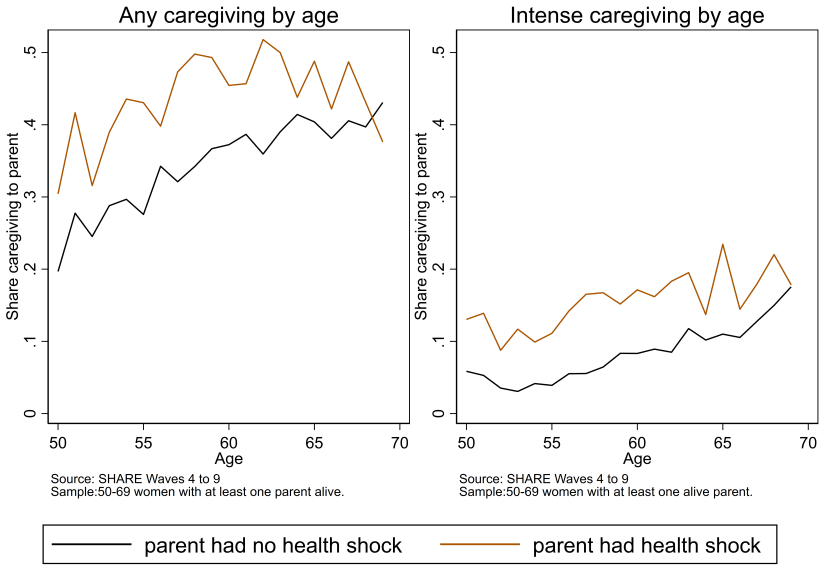


Fig. 4. Probability of Caregiving by age

Table 2: Reduced form estimates- Dep. variable: Social Connectedness: Quality, Quantity, and Satisfaction

	(1) SC index	(2) SN Quality	(3) SN Size	(4) SN Satisfaction
Parental health shock	0.011	-0.780	0.058	-0.060*
	(0.022)	(0.614)	(0.044)	(0.035)
Mean	2.10	67.04	3.00	9.06
R2	0.241	0.227	0.272	0.143
N	5,655	5,655	5,655	5,641

Notes: Standard errors in parentheses, clustered at individual level.
All regressions include country, year, cohort FE, and cohort X country FE. Controls: age, married, education, number of children and grandchildren, size of household, siblings, female siblings, coresidence, and lagged outcome. All covariates are lagged.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.2 OLS Vs. 2SLS Estimates: Non-Causal and Causal Impacts of Intense Caregiving on Social Networks

Table 3 contrasts OLS and 2SLS estimates of the effect of intense caregiving on social connectedness. Panel A reports OLS estimates (with the lagged outcome). Conditional on past connectedness, OLS coefficients are small and imprecise: the composite index and satisfaction are near zero, network size is essentially null, and network quality is slightly positive. Given the endogeneity of caregiving, these associations should not be interpreted causally; unobserved

Table 3: OLS Vs. 2SLS Estimates- Dep. variable: Social Connectedness: Quality, Quantity, and Satisfaction

	Panel A: OLS			
	(1) SC Index	(2) SN Quality	(3) SN Size	(4) SN Satisfaction
Intense caregiving to parent	0.0177	1.160	-0.00290	0.0360
	(0.0338)	(0.958)	(0.0632)	(0.0508)
	Panel B: 2SLS			
Intense caregiving to parent	0.0837	-10.66	0.636	-1.066**
	(0.310)	(8.686)	(0.621)	(0.520)
F-test (IV)	46.66	46.95	46.66	46.62
Hausman p-value	0.83	0.16	0.29	0.02
Observations	5681	5681	5681	5667

Notes: Standard errors in parentheses, clustered at individual level.
All regressions include country, year, cohort FE, and cohort X country FE. Controls: age, married, education, number of children and grandchildren, size of household, siblings, female siblings, coresidence, and lagged outcome. All covariates are lagged.
The F-test for the excluded instrument is the Kleibergen-Paap rk F-statistic. The Hausman p-value tests the endogeneity of intensive caregiving. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

factors jointly influencing caregiving and networks are unlikely to be fully absorbed by controls plus the lagged outcome.

Panel B instruments caregiving with parental health shocks. The 2SLS results are mixed: the effect on network satisfaction is negative and statistically significant (about 1.07 on a 0–10 scale), while the estimates for the composite index (+0.08) and network size (+0.64) are positive but imprecisely estimated, and the estimate for network quality is negative but very imprecise (10.7 with a large standard error). First-stage F-statistics are robust (46 across columns), and the Hausman test indicates endogeneity matters for satisfaction (p = 0.02) but not for the other outcomes.

Taken together, these results suggest that while caregiving induced by parental health shocks is associated with a deterioration in satisfaction, there may also be some tendency for the raw size of the network to increase. This pattern motivated the construction of our Social Network Quality Index, which focuses on the shares of confidants who are extremely close, seen weekly, or living nearby, rather than just their absolute number. As shown here, satisfaction and this quality index appear to react negatively to caregiving, consistent with the idea that any increase in the number of confidants may mask a decline in their closeness or supportive character.

Overall, the IV evidence points to a sizeable deterioration in perceived network satisfaction among caregivers, with inconclusive effects on other dimensions in the pooled sample. Motivated by the large cross-country differences in informal care intensity (Figure 1), the next section examines whether effects vary systematically across welfare regimes, where the first stage is

stronger and the social costs of caregiving may be more salient.

One might wonder whether these null and imprecise effects on social networks in the pooled sample are simply due to a lack of statistical power. To investigate this, as pre-specified, we validate our IV strategy by asking whether it recovers the well-established effect of caregiving on mental health outcomes. Table A.4 in the Appendix presents the 2SLS estimates for three outcomes: depressive symptoms (measured by the EURO-D scale, which sums 12 depression symptoms), a composite loneliness index (the R-UCLA scale), and the specific indicator for feeling isolated .[3] Our findings complement recent causal evidence on caregiving and mental health. Schmitz and Westphal (2015), using German SOEP data and a propensity score approach, show that women providing at least two hours of care per day suffer a short-run decline of around two points on the SF-12 mental health summary scale (0.2 standard deviations), with effects attenuating after several years. Eibich (2023), exploiting longitudinal ELSA data for England and focusing on parental care among adults aged 40 to state pension age, uses CES-D depression scores and finds mostly null effects for women, with some deterioration for men. By contrast, our IV estimates point to a much larger impact: intensive caregiving increases EURO-D depressive symptoms by 4.5 points, which corresponds to about 2.1 standard deviations in our sample (a standard deviation is 2.13). This difference can be explained by design: we restrict to women aged 50–70 with at least one living parent, use parental health deterioration as an instrument for daily caregiving (capturing the most intense and disruptive episodes), and exploit cross-country variation where informal care prevalence ranges from minimal to very high.

We acknowledge that mental health outcomes are especially vulnerable to the so-called "family effect," whereby a parent's deterioration could directly harm the daughter's psychological well-being even absent caregiving. However, our specification controls for past EURO-D scores, so identification comes from within-individual changes; if anything, this likely renders our estimates conservative.

The results for loneliness reveal a more nuanced pattern. As shown in column 2, we find no statistically significant effect on the composite R-UCLA loneliness scale; the coefficient of 0.80 is imprecisely estimated. However, this null result masks a crucial detail. When we isolate the key component of this scale most related to social integration—the indicator for feeling isolated from others—we find a strong and statistically significant causal effect (column 3). Specifically, intensive caregiving increases this feeling of isolation by 0.75 units (significant at 1%). This specific finding aligns perfectly with our broader hypothesis of social erosion. It suggests that while caregiving may not affect all dimensions of subjective well-being equally, it directly triggers the experience of social isolation. This resonates with our earlier (though imprecise) findings on declining network satisfaction, indicating that the primary burden of caregiving manifests as a decline in the perceived quality and sufficiency of social relationships. This validation exercise is therefore crucial. It confirms that our model can detect known causal effects on depression and provides early, complementary evidence for our central mechanism—social isolation. The fact that these subjective psychological effects are present in the pooled sample, while the effects on the objective structure of social networks are not, presents a puzzle. It strongly suggests that

[3]The R-UCLA index sums 3 items -how much of the time they felt a sense of being left out, a lack of companionship, and feeling isolated- into one single measure of loneliness. Each item can take on 3 values, 1 is hardly ever or never, 2 is some of the time and 3 is often, so the index lies between 3 and 9.

the social costs of caregiving are not monolithic but heterogeneous. This directly motivates our subsequent analysis of country-level differences, where we seek to resolve this puzzle by examining whether the structural erosion of social networks emerges precisely where the burden of care is highest.

5.3 Country Heterogeneity

To explore cross-country heterogeneity, we restrict attention to those contexts where informal caregiving is most intensive. The choice of countries follows a transparent selection rule based on OECD data on informal care intensity (see Colombo et al. (2016) for the full report and data). Specifically, we use the OECD indicator "Share of informal carers aged 45–64 providing high-intensity informal care, defined as 20 hours or more per week, women". The European average of this measure is 17.9 percent, with most Northern and Continental countries lying well below this value (e.g. Austria 15.1, Germany 14.1, Netherlands 8.7, France 8.0, Belgium 9.5). We set a cutoff at 22.5 percent—just above the upper bound for Sweden (22.5), the highest-intensity country outside the South and East—thereby isolating the group of countries where high-intensity caregiving is systematically more prevalent. This rule yields Spain, Italy, Greece, Poland, Portugal, Croatia, Bulgaria, Malta, and Slovakia. These countries represent the institutional contexts in which informal caregiving remains particularly demanding, and where the social costs of caregiving are most likely to materialize.

Table 4: First Stage estimates- By clusters of countries- Dep. variable: Intense caregiving

	(1) All	(2) Southern	(3) Western	(4) Northern	(5) Eastern	(6) East_South
Parental health shock	0.071***	0.153***	0.028*	0.005	0.113***	0.162***
	(0.010)	(0.031)	(0.015)	(0.015)	(0.021)	(0.025)
F-Stat	46.7	24.9	3.6	0.1	28.3	40.8
R2	0.14	0.20	0.12	0.07	0.16	0.19
Observations	5681	899	2390	625	1698	1390

Notes: Standard errors in parentheses, clustered at individual level.
All regressions include country, year, cohort FE, and cohort X country FE. Dependent variable is a dummy for daily caregiving to mother. Basic controls: age, married, education, number of children and grandchildren, size of household. All covariates are lagged.
Southern countries include: Spain, Italy, Greece, Portugal, Cyprus. Western countries include: Austria, Germany, the Netherlands, France, Switzerland, Belgium, Luxemburg. Northern countries include: Sweden, Denmark, Finland. Eastern countries include: Czech Republic, Poland, Hungary, Slovenia, Estonia, Croatia, Lithuania, Bulgaria, Latvia, Romania, and Slovakia. Countries in last column include: Spain, Italy, Greece, Poland, Portugal, Croatia, Bulgaria, Malta, and Slovakia.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4 applies our preferred first stage specification (with a longitudinal instrument) across clusters of countries. In the all-countries pooled sample (column 1), parental health shocks increase the probability of daily caregiving by about 7 percentage points, consistent with the results shown in Table 1. When broken down by country groups, however, large differences emerge. In Southern countries (column 2), the effect more than doubles to 15 percentage points, while in Eastern countries (column 5) the effect is around 11 percentage points. By

contrast, the estimates for Western Europe (column 3) indicate a 3 pp effect, and those for Northern Europe (column 4) are close to zero and not statistically significant, reflecting the stronger reliance on formal care services in those regions.

The final column combines Southern and Eastern countries (those exceeding the OECD threshold for high-intensity informal care). In this group, a parental health shock raises the probability of daily caregiving by about 16 percentage points. This is the strongest first stage we obtain for a cluster of countries, with an F-statistic of above 40, and it lines up with the ex-ante criterion described earlier. These results clearly show that the identifying variation in our IV strategy comes from countries where caregiving responsibilities are particularly heavy, consistent with institutional differences in long-term care provision.

Table A.5 in the Appendix reports the first stage estimates restricted to the set of countries identified by our OECD-based selection rule (Spain, Italy, Greece, Poland, Portugal, Croatia, Bulgaria, Malta, and Slovakia). Relative to the all-countries sample in Table 1, the coefficient on parental health shocks is much larger—around 0.16–0.17 across specifications, more than twice the effect in the full sample (0.07). Substantively, this implies that in these countries a transition of a parent into poor health raises the probability of daily caregiving by arount 17 percentage points.

The associated F-statistics (around 40–46) remain well above conventional thresholds, confirming the strength of the instrument, and the R^2 values are also higher than in the pooled sample, particularly once additional controls are included. This pattern aligns with the institutional context: in settings where formal long-term care provision is more limited, parental health shocks translate more directly into intense caregiving by daughters.

Table 5: Reduced form estimates- Sample of selected countries- Dep. variable: Social Connectedness: Quality, Quantity, and Satisfaction

	(1) SC index	(2) SN Quality	(3) SN Size	(4) SN Satisfaction
Parental health shock	-0.027	-3.687***	-0.008	-0.156**
	(0.044)	(1.248)	(0.078)	(0.073)
Mean	1.92	71.97	2.55	9.12
R2	0.272	0.179	0.298	0.113
N	1,382	1,382	1,382	1,379

Notes: Standard errors in parentheses, clustered at individual level.
All regressions include country, year, cohort FE, and cohort X country FE. Controls: age, married, education, number of children and grandchildren, size of household, siblings, female siblings, coresidence, and lagged outcome. All covariates are lagged.
Countries selected include: Spain, Italy, Greece, Poland, Portugal, Croatia, Bulgaria, Malta, and Slovakia.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5 reports reduced form estimates for the subset of countries with particularly high-intensity informal care (Spain, Italy, Greece, Poland, Portugal, Croatia, Bulgaria, Malta, and

Slovakia). Compared to the pooled sample in Table 2, the coefficients are larger in absolute value and more consistently negative. In these countries, parental health shocks are associated with a decline of about 0.03 points on the composite connectedness index (column 1), a substantial drop of nearly 3.7 points on the quality index (column 2, significant at the 1% level), and a reduction of 0.16 points on satisfaction (column 4, significant at the 5% level). The coefficient on network size (column 3) is also negative, though not statistically significant. To gauge magnitudes, the satisfaction effect corresponds to roughly 0.15–0.20 standard deviations, while the quality index effect is about 0.15–0.20 standard deviations as well. These are meaningful impacts given that they arise from a single health shock within the observation window, and they suggest that in high-intensity caregiving contexts, shocks to parental health translate more directly into measurable losses in the quality and satisfaction dimensions of daughters' social networks.

Overall, the negative effects of caregiving on connectedness become clearer once we restrict to the set of countries where caregiving intensity is highest and the first stage is strongest. This pattern aligns with the institutional heterogeneity discussed earlier: in Southern and Eastern Europe, where formal long-term care provision is more limited, caregiving induced by parental health shocks carries significant social costs.

Given that both the first stage and the reduced form are stronger in this restricted set of countries, it follows that the 2SLS estimates will also reflect more pronounced negative effects of caregiving on social connectedness. In other words, the ratio of the reduced form to the first stage in these contexts highlights the causal impact of caregiving more clearly than in the pooled sample. We now turn to the 2SLS results.

Table 6 contrasts OLS and 2SLS estimates of the effect of intense caregiving on social connectedness for the restricted set of high-intensity caregiving countries. Panel A shows OLS estimates with the lagged dependent variable. As in the pooled sample, the OLS coefficients are small and imprecise: they hover around zero for the composite index, size, and satisfaction, and are slightly negative but insignificant for the quality index. These estimates suggest no systematic association once past connectedness is controlled for, but they are not informative about causal effects given the endogeneity of caregiving.

Panel B presents the 2SLS results, instrumenting caregiving with parental health shocks. The pattern changes markedly. The coefficients on network quality (–20.9) and satisfaction (–0.96) are both negative and statistically significant, indicating that daily caregiving leads to a sizeable deterioration in the perceived quality of ties and in satisfaction with one's network. The estimated effect on satisfaction corresponds to nearly one full point on a 0–10 scale, while the effect on the quality index is equivalent to about a quarter of a standard deviation. The effects on the composite index (–0.18) and network size (–0.08) are also negative but not statistically significant. The first stage remains strong (F-statistics around 40), and Hausman tests confirm that endogeneity is relevant for quality and satisfaction.

Taken together, these results suggest that in countries where caregiving intensity is highest, intense caregiving erodes the subjective and qualitative dimensions of social connectedness, even if the raw size of networks does not change much. This distinction is important: the number of confidants may remain stable, but their closeness and the satisfaction they provide appear to

Table 6: OLS Vs. 2SLS Estimates- Sample of selected countries- Dep. variable: Social Connectedness: Quality, Quantity, and Satisfaction

	Panel A: OLS			
	(1) SC Index	(2) SN Quality	(3) SN Size	(4) SN Satisfaction
Intense caregiving to parent	0.00857	-0.269	0.0723	0.0921
	(0.0578)	(1.756)	(0.103)	(0.0877)
	Panel B: 2SLS			
Intense caregiving to parent	-0.181	-20.88**	-0.0830	-0.963**
	(0.267)	(8.399)	(0.478)	(0.470)
F-test (IV)	41.02	40.25	40.67	40.67
Hausman p-value	0.46	0.01	0.73	0.01
Observations	1390	1390	1390	1387

Notes: Standard errors in parentheses, clustered at individual level.
All regressions include country, year, cohort FE, and cohort X country FE. Controls: age, married, education, number of children and grandchildren, size of household, siblings, female siblings, coresidence, and lagged outcome. All covariates are lagged.
Countries selected include: Spain, Italy, Greece, Poland, Portugal, Croatia, Bulgaria, Malta, and Slovakia.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

decline when caregiving demands rise.

5.3.1 Robustness to the "Family Effect" Channel

As discussed in Section 4.2, a potential concern for our identification strategy is that a parent's health shock could affect a daughter's social life directly through emotional distress (the "family effect"), rather than solely through the burden of caregiving. To address this, we test the robustness of our main findings by re-estimating our 2SLS models while explicitly controlling for the daughter's own contemporaneous mental health, measured by her EURO-D score. The results of this demanding test, presented in Table A.7 in Appendix, strongly support our main conclusions. Panel A shows that for the full sample of countries, the coefficients on our social network outcomes remain small and statistically insignificant, reinforcing that our initial null findings were not driven by confounding from the caregiver's mental health. Panel B presents the key results for our preferred subsample of Eastern and Southern countries. The findings are remarkably stable. The coefficient on intensive caregiving for SN Quality is now -23.73 (significant at the 1% level), and for SN Satisfaction it is -0.854 (significant at the 10% level). These magnitudes are remarkably stable compared to our baseline estimates of -20.88 and -0.963 in Table 6, respectively. The fact that the coefficients do not attenuate towards zero demonstrates that our findings are not simply an artifact of the daughter's psychological distress. Even after accounting for this alternative channel, the burden of caregiving itself has a distinct and powerful negative impact on the quality of caregivers' social networks. This provides

strong evidence that our main results are identified through the intended mechanism of time and resource constraints.

6 Mechanisms

6.1 Unpacking the effects of caregiving on social networks components

To better understand the mechanisms behind the overall effects, we now open the black box of social connectedness for the group of countries where the first stage is strongest and the 2SLS results are most consistent. Figure 5 plots the coefficients from the 2SLS regressions across the different network dimensions. Recall that we did not detect a significant effect on the composite Litwin index itself. Looking inside, however, one specific dimension stands out: emotional closeness. The number of confidants rated as "extremely close" declines significantly with caregiving, while the other components of size, proximity, frequency, and diversity react negatively but never in a significant manner.

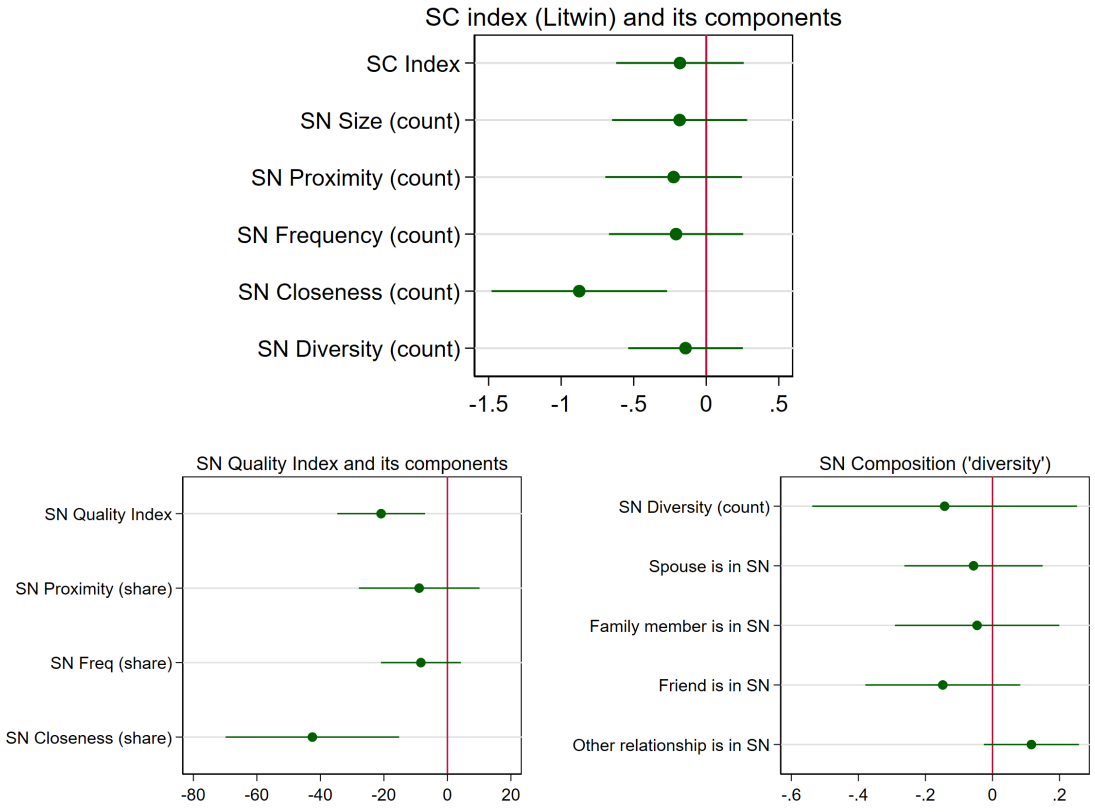


Fig. 5. 2SLS estimates of impact of caregiving on SN items

Notes: 90% CI are plotted along the corresponding coefficient. Countries selected include: Spain, Italy, Greece, Poland, Portugal, Croatia, Bulgaria, Malta, and Slovakia.

Turning to our Social Network Quality Index, which re-weights the same dimensions in shares rather than counts, we again see that the main effect comes from closeness. This confirms that

the result is not about the absolute size of the network, but about the perceived intensity of ties: caregivers do not mention less confidants, but they do mention feeling less close to them.

Finally, we explore network diversity and composition. Here the coefficients are small and mostly negative: caregivers appear somewhat less likely to include a spouse, a family member, or a friend in their core network, and somewhat more likely to report an "other" relationship instead (who could be a co-worker, neighbor, or even an ex-spouse). These shifts suggest that caregiving may erode the presence of the closest kin and friend ties, with only partial substitution toward weaker or more peripheral relationships. This finding dovetails with the significant decline we documented in emotional closeness: if the composition of the network tilts away from spouses, children, and friends, the overall level of closeness reported within the network is likely to fall. In other words, the reduction in closeness is not only about how ties are experienced, but also about who remains in the network.

For completeness, Appendix Figure A.1 replicates the component-by-component analysis for the full set of countries. As expected, the effects are generally smaller in magnitude and less precisely estimated than in the restricted sample, reflecting the weaker first stage in the pooled sample. Nevertheless, one pattern remains visible: caregiving reduces emotional closeness. While this effect is not apparent when using counts of confidants, it becomes clearer when focusing on the share of network members rated as "extremely close." This distinction highlights that the impact of caregiving is not about network size, but rather about the quality of ties. Even in the broader European sample, caregiving appears to erode the perceived closeness of relationships at the very core of the social network. This is consistent with the evidence on network satisfaction, which also declines as a consequence of becoming a caregiver, even in the all-countries sample, reinforcing the idea that caregiving primarily undermines the subjective and qualitative dimensions of connectedness rather than its quantity.

6.2 Impact of caregiving on associational activities

We next examine participation in associational activities, which represents an important dimension of social networks. Since wave 1 (wave 4 in our case), respondents have been asked about their participation in various social activities over the past twelve months. These activities include voluntary or charity work, attending educational or training courses, going to sports, social, or other clubs, and participating in political or community-related organizations.

As emphasized in Fawaz and Mira (2023), following Steptoe et al. (2013), participation in social activities is a central element of social isolation indices and one of the strongest predictors of health outcomes in later life.[4] Beyond its role as a marker of isolation, associational participation is also widely used in the social capital literature as a behavioral proxy for otherwise hard-to-observe norms of trust and reciprocity. Following Alesina and La Ferrara (2000), we rely on measures of whether respondents engage in voluntary or charity work, attend a sport, social, or other type of club, participate in political or community organizations. [5] As argued

[4] Fawaz and Mira (2023) show that exposure to social isolation at baseline is associated with a 20–30% increase in the mortality hazard. Among the three items used in their isolation index (living alone, no participation in associational activities, and infrequent contact with children), the absence of social activities was found to drive almost the entire association with mortality.

[5] Participation in religious activities is not considered, since this information was only collected in the early

by Putnam (1995), it is precisely these forms of face-to-face civic engagement that generate the externalities associated with social capital. In this sense, our analysis of associational activities captures a dimension of social connectedness that is simultaneously central to healthy ageing and to the production of social capital.

Figure 6 presents 2SLS estimates for different types of associational activities, separately for the full sample and for the subset of Southern and Eastern European countries where our first stage is strongest. In this figure, all outcomes have been standardized (within each sample) so that coefficients are expressed in standard deviation units. This harmonization is necessary because the original outcomes were measured on different scales (0-10 for satisfaction with activities, 0-4 for the count of activities, and 0-1 for the participation indicators). The estimates therefore show directly how many standard deviations each outcome shifts in response to caregiving induced by parental health shocks, facilitating comparison across outcomes.

The results point to consistent negative effects. In both the pooled sample (left panel) and the South/East subsample (right panel), caregiving significantly reduces the likelihood of participation in social or civic activities, with particularly large declines in volunteering and charity work, as well as in overall activity counts. Satisfaction with activities also falls substantially, by about one standard deviation in the South/East subsample, confirming that the subjective dimension of engagement is especially vulnerable to caregiving pressures. Confidence intervals are narrower in the restricted sample, reflecting the stronger first stage in these countries.These results highlight that one channel through which caregiving erodes social connectedness is by crowding out associational participation—the very activities that sustain broader social ties and civic engagement.

For transparency, Appendix Figure A.2 reports the same estimates without standardizing outcomes, leaving them in their original scales. The substantive patterns are unchanged, but expressing coefficients in SD units as in the main text makes the magnitudes comparable across heterogeneous outcomes. We stress that this standardization was applied only to associational activities. For social network outcomes we retain the original SHARE scales, and for time allocation we report effects in minutes, so that magnitudes remain directly interpretable.

To gauge magnitudes, Table A.3 shows that in the full sample about 48% of respondents take part in any activity, 29% in clubs, and 20% in volunteering or charity work. A decline of 0.25 SD corresponds to a 10–12 percentage point reduction in participation, which is substantial relative to these baseline rates. Similarly, the average number of activities is 0.76; a 0.25 SD decline translates into a loss of about a quarter of one activity. For satisfaction with activities (mean 0.83, SD 0.18 on a 0–1 scale), the estimated effect of roughly –0.25 SD implies a drop of 4–5 percentage points, equivalent to nearly half a point on the original 0–10 scale. These magnitudes confirm that the coefficients are not only statistically significant but also substantively meaningful.

SHARE waves. Likewise, solitary pastimes such as reading or doing puzzles are excluded, as they do not reflect the social dimension of networks.

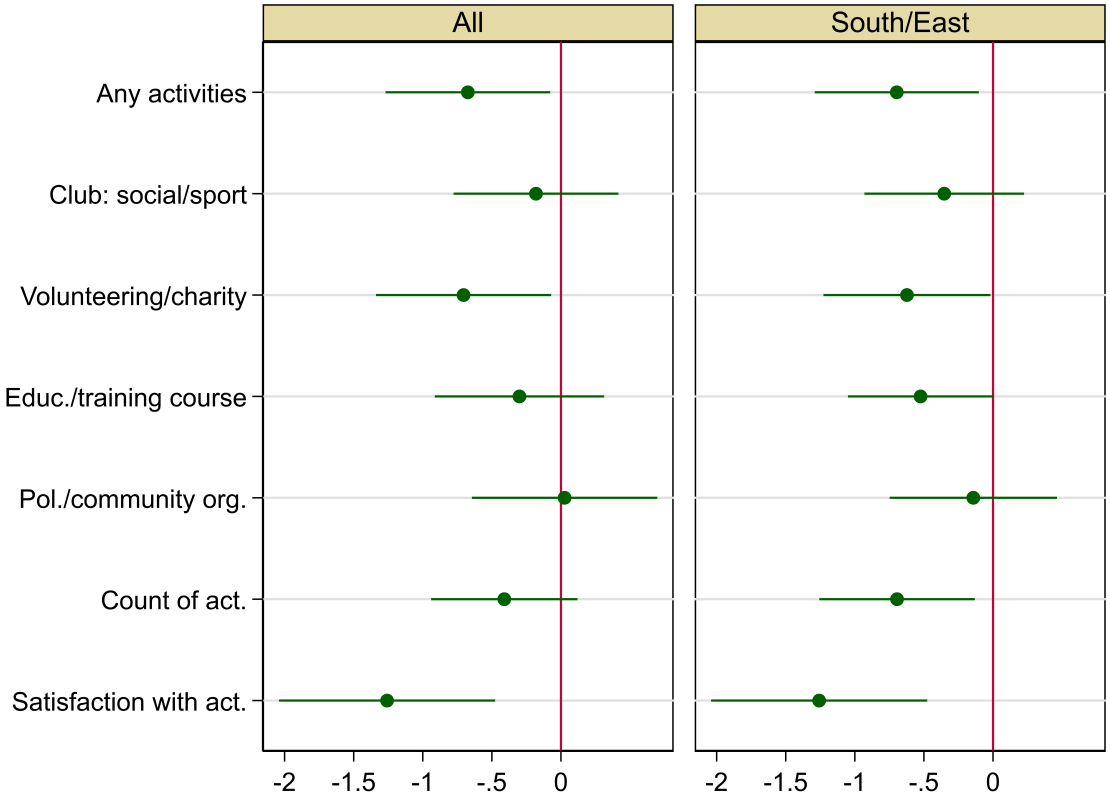


Fig. 6. 2SLS estimates of impact of caregiving on activities

Notes: 90% CI are plotted along the corresponding coefficient. Countries in "South/East" region include: Spain, Italy, Greece, Poland, Portugal, Croatia, Bulgaria, Malta, and Slovakia.
Outcomes were standardized within sample.

6.3 Impact of caregiving on time allocation

The time use module in wave 8 of SHARE records respondents' allocation of time on the day prior to the interview, asking about hours and minutes spent in specific activities such as paid work, caregiving, leisure, and sleep. Although this information was not yet available when Crespo and Mira (2014) developed their model, it speaks directly to the mechanism they emphasized: caregiving competes with other uses of time, and daughters reallocate hours between market work, care provision, and leisure in response to parental health shocks. Their theoretical framework formalized the daughter's time endowment as being split between employment, caregiving, and leisure, and predicted that daily caregiving represents a significant burden in this allocation. The SHARE time use data now allow us to observe these trade-offs directly. By comparing the time spent on alternative activities between caregivers and non-caregivers, we can provide empirical evidence on how caregiving displaces other uses of time, particularly social and leisure activities that sustain connectedness.

Figure 7 plots the 2SLS estimates. Across both the pooled sample and the subset of Southern and Eastern European countries, the picture is clear: caregiving time rises sharply—by roughly four to five hours per day (240–285 minutes)—while time devoted to paid work falls by

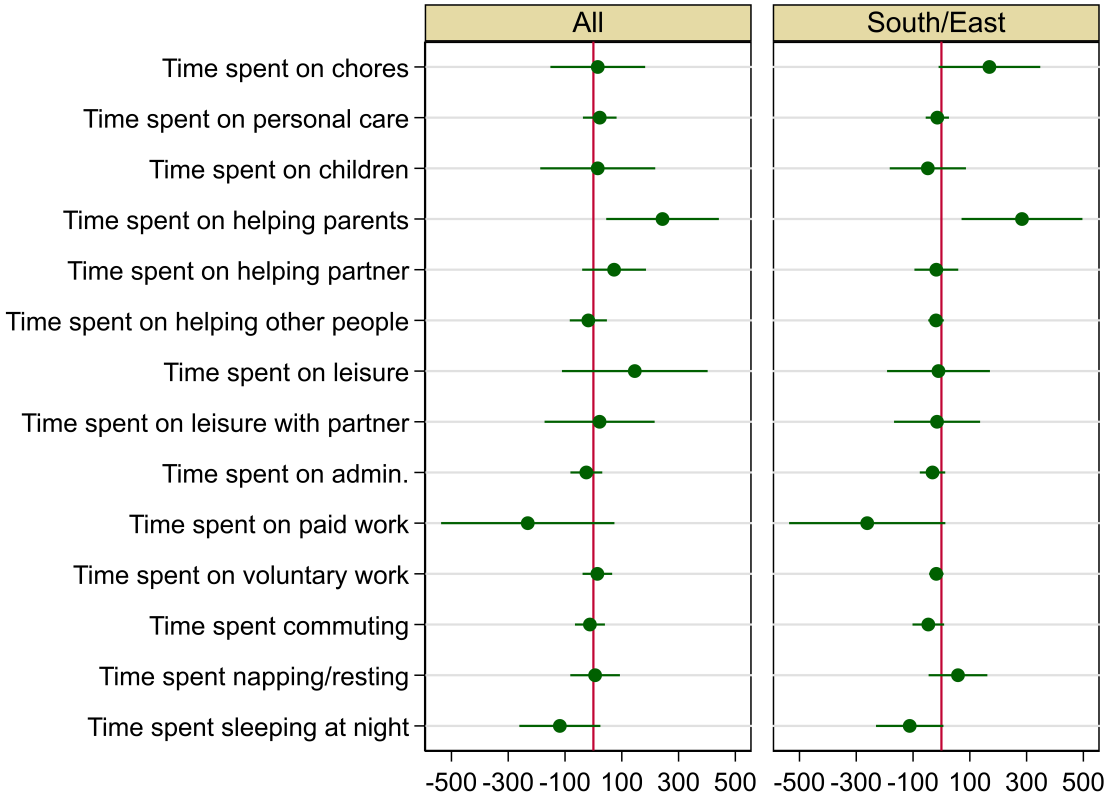


Fig. 7. 2SLS estimates of impact of caregiving on time allocation

Notes: 90% CI are plotted along the corresponding coefficient. Countries in "South/East" region include: Spain, Italy, Greece, Poland, Portugal, Croatia, Bulgaria, Malta, and Slovakia. Time is expressed in minutes.

about four hours (–231 to –261 minutes), and sleep contracts by close to two hours (–112 to –118 minutes). Leisure time also declines modestly (–10 to –18 minutes), while other activities such as household chores, child care, or volunteering show no systematic changes. Despite the small sample size of the time-use module (around 1,580 observations in the pooled sample and about 390 in the South/East subsample), the consistency of these patterns is striking. They provide direct support for the Crespo–Mira framework: caregiving shocks tighten the time constraint and crowd out activities that sustain social life and personal well-being. This mechanism helps explain the declines we observe in network closeness, satisfaction, and associational participation—caregivers simply have fewer hours available to invest in social ties once parental care demands intensify.

6.4 Summary of the results

Our results provide a consistent picture of the social costs of caregiving. First, the first-stage evidence shows that parental health shocks are powerful predictors of daughters' entry into daily caregiving, particularly in Southern and Eastern European countries where formal long-term care provision is scarce. Second, the reduced form and 2SLS estimates indicate that caregiving affects the quality and composition of social networks more than their sheer size. While the num-

ber of confidants remains broadly stable—and in some specifications even slightly larger—these quantitative measures mask important qualitative changes: emotional closeness to confidants declines, satisfaction with one's network falls, and caregivers are somewhat less likely to include spouses, close family members, or friends in their core networks, with partial substitution toward weaker or more peripheral ties. Focusing only on size metrics would therefore miss the more meaningful ways in which caregiving reshapes social connectedness.

Third, our analysis of associational activities and time use sheds light on the mechanism. Caregiving crowds out both the participation in civic and social activities and the satisfaction derived from them, reducing engagement in volunteering, clubs, and courses. Time-use data further confirm the trade-off highlighted by Crespo and Mira's framework: caregiving requires daughters to reallocate substantial amounts of time away from paid work, sleep, and leisure into parental care. These reallocations tighten the time constraint and limit opportunities to sustain social ties and civic involvement. The consistency of these patterns, despite modest sample sizes in some modules, underscores caregiving as a key driver of social erosion in later life.

In sum, caregiving induced by parental health shocks leaves women with networks that may not look smaller in size but are weaker in terms of closeness, composition, and engagement. These findings highlight why assessments of connectedness must go beyond headcounts of ties to capture their quality, composition, and the activities that sustain them.

7 Consequences of caregiving-induced social erosion

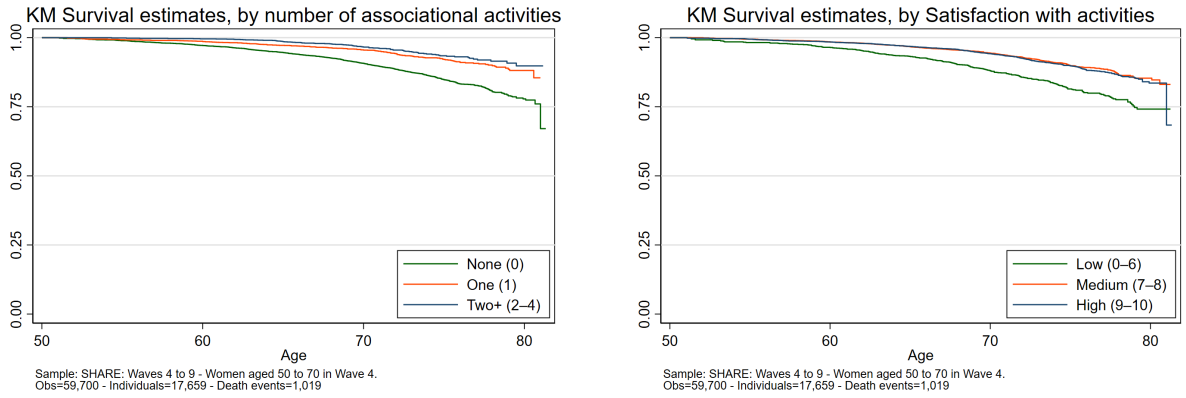
The preceding analysis has shown that caregiving erodes the quality and composition of social networks, crowds out associational participation, and constrains time allocation. A natural next question is whether these changes have consequences for caregivers' own well-being and health. A large literature documents strong associations between social connectedness and health outcomes. Steptoe et al. (2013) show that social isolation predicts increased mortality among older adults in England, while Holt-Lunstad et al. (2015) provide meta-analytic evidence that weak social ties are as detrimental to survival as many biomedical risk factors. More recently, Fawaz and Mira (2023) demonstrate using SHARE data that social isolation increases ten-year mortality hazards among older Europeans by 20–30 percent, with the absence of associational activities driving most of this effect.

Motivated by this evidence, we now ask whether the erosion of social connectedness induced by caregiving also translates into worse outcomes for caregivers themselves. Specifically, we examine three sets of consequences: loneliness and depressive symptoms as markers of psychological well-being; self-rated health and functional limitations as indicators of physical health; and ten-year survival as a long-run outcome. This allows us to move from mechanisms to consequences, and to assess whether the social costs of caregiving carry over into tangible health risks.

7.1 Descriptive evidence: associational activities and survival

We now turn to descriptive evidence on the long-run consequences of associational engagement, focusing on the same group of women aged 50 to 70 in Wave 4 as in our main analysis, and following them until Wave 9. Unlike before, we do not restrict the sample to women with a surviving parent, since here we are not using the instrumental-variable strategy. Relaxing this condition increases the number of observations and allows us to study survival patterns in a larger population.

We concentrate on the two outcomes that emerged as most strongly affected by caregiving in our causal analysis: the *number of associational activities* and *satisfaction with activities*. To mitigate concerns of reverse causality (e.g. poor health leading both to reduced participation and to higher mortality), we measure these variables at baseline (Wave 4) and then examine subsequent mortality hazards over time. In practice, we estimate Kaplan–Meier survival curves by baseline category of participation, and trace how many individuals die in each group as they age.



(a) By number of associational activities

(b) By satisfaction with activities

Fig. 8. Kaplan–Meier survival curves by associational activities at baseline (Wave 4).

Figure 8(a) displays survival curves by number of associational activities. Women who do not participate in any activity at baseline experience substantially lower survival than those who take part in one, and the survival advantage is even larger for those with two or more activities. A log-rank test rejects the equality of survivor functions across the three groups at the 1% level ($\chi^2(2) = 125.5$, $p < 0.001$), confirming that the differences are statistically significant. Figure 8(b) shows a similar gradient when stratifying by satisfaction with activities: women reporting low satisfaction (0–6 on the 0–10 scale) exhibit higher mortality hazards than those with medium (7–8) or high (9–10) satisfaction. In both cases, the separation of the curves becomes more visible after age 70, consistent with the idea that differences in social engagement early on manifest in differential mortality risks over time.

These descriptive patterns show that women with richer and more satisfying associational lives survive longer. This makes our causal findings all the more relevant, as they indicate that caregiving undermines precisely those dimensions of social life that are strongly linked to long-term survival.

7.2 Cox models with baseline health controls

The descriptive Kaplan–Meier curves showed that women with richer associational lives at baseline survive longer. To assess whether these relationships remain once we account for baseline health, we estimate Cox proportional hazards models, closely following Fawaz and Mira (2023), using *associational engagement at baseline* as the main predictor. Specifically, we consider the *number of associational activities* (0–4) fixed at wave 4.

All models include a rich set of baseline health controls—self-assessed health, the number of chronic diseases, functional limitations (sum of ADLs and IADLs), word-recall as a measure of cognition, and depressive symptoms (EURO-D). A further control is a frailty index based on the five-item phenotype originally developed by Fried et al. (2001). The index sums unintended weight loss, reported fatigue, reduced grip strength, slow walking speed, and low levels of physical activity. Scores of three or more are typically taken to indicate clinical frailty, a syndrome strongly linked to elevated risks of disability, hospital admission, and premature death. Recent studies confirm both the high prevalence of frailty in European ageing populations and its strong predictive value for adverse outcomes (Kim and Rockwood, 2024), underscoring the importance of including this marker in our analysis. We also control for socio-demographic characteristics (education, employment, income and wealth quartiles, parity) and country and wave fixed effects. To mitigate reverse-causality concerns (e.g., poor baseline health both reducing participation and precipitating near-term death), we restrict the sample to respondents with at least 24 months of follow-up after baseline (i.e deaths occurring within the first two years are excluded from the risk set).

This specification allows us to assess whether, and to what extent, associational engagement retains predictive power for survival after conditioning on detailed baseline health and socio-demographics. While these adjustments bring us closer to isolating the independent role of associational life, unobserved confounders may remain; estimates should therefore be read as *predictive associations*, not causal effects.

Formally, we estimate

$$h_i(t \mid X_i) \;=\; h_0(t)\,\exp\!\Big(\beta_1 \cdot \text{Activities}_{i0} \;+\; \gamma' \text{Health}_{i0} \;+\; \delta' Z_{i0}\Big),$$

where $h_i(t)$ is the hazard of death at time t for individual i, $h_0(t)$ is the baseline hazard, Activities_{i0} is the number of activities at baseline (Wave 4), Health_{i0} is the vector of baseline health indicators listed above, and Z_{i0} includes socio-demographic controls as well as country and wave fixed effects. We report hazard ratios (exponentiated coefficients); values below one indicate lower mortality risk associated with higher participation.

Table 7: Cox models: Effect of Social Connectedness at Wave 4 on Mortality up to Wave 9.

	(1)	(2)	(3)	(4)	(5)	(6)
Participation in associational act.	0.700***	0.792***	0.878**	0.895*		0.782***
	(0.037)	(0.044)	(0.049)	(0.052)		(0.073)
Frailty index			1.315***	1.303***	1.323***	1.300***
			(0.052)	(0.055)	(0.052)	(0.055)
Number of chronic diseases			1.048*	1.062**	1.045*	1.062**
			(0.027)	(0.029)	(0.026)	(0.029)
Number of limitations			1.073***	1.058**	1.072***	1.059**
			(0.026)	(0.028)	(0.026)	(0.028)
Depression score (EuroD)			0.975	0.975	0.975	0.974
			(0.017)	(0.018)	(0.017)	(0.018)
Cognitive recall test (higher is good)			0.905***	0.897***	0.900***	0.898***
			(0.021)	(0.023)	(0.021)	(0.023)
Basic	yes	yes	yes	yes	yes	yes
Socio-Demo	no	yes	yes	yes	yes	yes
Health	no	no	yes	yes	yes	yes
Follow-up >24m	no	no	no	>24 mo	no	>24 mo
Cutoff	no	no	no	no	no	>0
Observations	52032	52032	52032	47601	52032	47601
Individuals	15267	15267	15267	14740	15267	14740

Exponentiated coefficients; Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Main explanatory variable is the Number of Associational Activities (0-4). Basic controls: age, age squared, sex. Socio Demo controls: education categories, whether employed, whether has at least one child, income and wealth quartiles, living in a house (vs building), rural (versus urban). All regressions include wave and country-specific fixed effects. All covariates are fixed at Wave 4.

Table 7 summarizes the Cox estimates using participation in associational activities at baseline (Wave 4) as the main explanatory variable. The sample includes all women aged 50–70 in Wave 4, without restrictions on parental survival status or parental health histories. In column (1), where we only condition on basic controls (age, age squared), the estimated association is very large: each additional activity is linked to a 30% lower mortality hazard. Adding socio-demographic characteristics such as education, employment, income, and wealth (column 2) reduces the size of the coefficient but the effect remains strong, at roughly 20%. Once we include the full set of baseline health controls—frailty, self-assessed health, number of chronic conditions, functional limitations, depressive symptoms, and cognition—the association weakens further but is still highly significant, at about 12% (column 3). Restricting the sample to individuals with more than 24 months of follow-up to reduce reverse-causality concerns (columns 4–6) lowers the precision of the estimates, but the coefficients remain negative and statistically different from zero.

It is worth stressing that the estimated hazard ratios are highly stable across specifications for the health controls themselves: whether or not associational activities are included, frailty, chronic disease burden, limitations, and cognition all retain the expected predictive power for mortality. This suggests that the association between participation and survival is not simply driven by omitted health dimensions.

How should the magnitude be interpreted? The number of activities ranges from 0 to 4, and the reported hazard ratio captures the *average marginal effect of an additional activity.* For example, the hazard ratio of about 0.80 in column (2) means that, on average, moving from n to $n+1$ activities is associated with a 20% lower mortality risk. This is not limited to a particular transition (e.g. 0 to 1 or 1 to 2), but rather reflects the overall gradient. To better understand where the association is concentrated, column (6) replaces the count with a binary indicator for having at least one activity. The results show that most of the action occurs at the extensive margin: even with the follow-up restricted to more than 24 months, women who participate in at least one activity have a markedly lower mortality hazard than those with none. The effect is large, precisely estimated, and robust to the full set of controls.

Our findings point to a clear and robust message: baseline participation in associational activities is strongly predictive of long-run survival among women aged 50–70, even after accounting for detailed socio-demographics and health. The extensive margin appears especially important—simply being engaged in at least one activity is associated with a substantial reduction in mortality risk.

8 Conclusion

This paper contributes to the literature on informal caregiving by documenting its impact on social connectedness and, ultimately, on caregivers' health. Using rich panel data from SHARE and an IV design based on parental health shocks, we provide new causal evidence on how caregiving shapes the social lives of European women aged 50–70.

Our results show that, in the pooled sample, effects on the standard social network indexes are modest. Yet once we exploit cross-country heterogeneity, a clearer picture emerges: in

Southern and Eastern Europe, where formal long-term care provision is limited and the burden of family care is greatest, intense caregiving significantly erodes the qualitative dimensions of networks. Satisfaction with one's network and the perceived closeness of ties decline substantially, even if the number of confidants remains unchanged. This demonstrates that looking only at size-based measures risks missing the more meaningful ways in which caregiving reshapes connectedness.

Beyond the network module, we find strong and consistent effects on other dimensions of social life. Caregiving crowds out associational participation and lowers satisfaction with activities—precisely the forms of engagement that sustain civic ties and social capital. The time-use data corroborate this mechanism: daughters reallocate large amounts of time from paid work, leisure, and sleep into caregiving, tightening the time constraint and reducing opportunities for social interaction. Together, these findings point to a robust mechanism of "social erosion" through which caregiving affects well-being. While our analysis focuses on the acute effects of transitioning into care, an important avenue for future research is to examine whether these social costs accumulate or intensify with the duration of caregiving spells, a question that will require even larger panel datasets to credibly answer.

Finally, we extend the analysis to health outcomes. Here, relying on a careful Cox design controlling for a wide range of baseline health markers, we show that associational participation is strongly predictive of survival. Simply being engaged in at least one activity at baseline is associated with a markedly lower mortality hazard over the following decade. This confirms the broader relevance of our question: the dimensions of social life most eroded by caregiving are also shown to be highly predictive of future mortality.

Taken together, our findings establish that informal caregiving carries hidden social costs that go beyond the well-documented labor market and mental health consequences. These costs are especially acute in contexts where family caregiving substitutes for formal long-term care, and they operate through mechanisms—such as participation in social activities—that have direct implications for mortality. Recognizing and addressing these social costs should be central to policies aimed at supporting caregivers in ageing societies.

References

Abrahamsen, S. A. and Grøtting, M. W. (2023). Formal care of the elderly and health outcomes among adult daughters. *Health Economics*, 32(2):436–461.

Alesina, A. and La Ferrara, E. (2000). Participation in heterogeneous communities. *The quarterly journal of economics*, 115(3):847–904.

Bauer, J. M. and Sousa-Poza, A. (2015). Impacts of informal caregiving on caregiver employment, health, and family. *Journal of population Ageing*, 8:113–145.

Bolin, K., Lindgren, B., and Lundborg, P. (2008). Your next of kin or your own career?: Caring and working among the 50+ of europe. *Journal of health economics*, 27(3):718–738.

Bom, J., Bakx, P., Schut, F., and Van Doorslaer, E. (2019). Health effects of caring for and about parents and spouses. *The Journal of the Economics of Ageing*, 14:100196.

Bom, J. and Stöckel, J. (2021). Is the grass greener on the other side? the health impact

of providing informal care in the uk and the netherlands. *Social Science & Medicine*, 269:113562.

Casado-Marín, D., García-Gómez, P., and López-Nicolás, Á. (2011). Informal care and labour force participation among middle-aged women in spain. *SERIEs*, 2:1–29.

Coe, N. B. and Van Houtven, C. H. (2009). Caring for mom and neglecting yourself? the health effects of caring for an elderly parent. *Health economics*, 18(9):991–1010.

Colombo, F., Llena-Nozal, A., Mercier, J., and Tjadens, F. (2016). Help wanted. *Providing and paying for long-term care*, 1.

Crespo, L. and Mira, P. (2014). Caregiving to elderly parents and employment status of european mature women. *Review of Economics and Statistics*, 96(4):693–709.

de Zwart, P., Bakx, P., and van Doorslaer, E. (2017). Will you still need me, will you still feed me when i'm 64? the health impact of caregiving to one's spouse. *Health Economics*, 26(S2):127–138.

Di Novi, C., Jacobs, R., and Migheli, M. (2015). The quality of life of female informal caregivers: from scandinavia to the mediterranean sea. *European journal of population*, 31(3):309–333.

Eibich, P. (2023). Instrumental variable estimates of the burden of parental caregiving. *The Journal of the Economics of Ageing*, 26:100467.

European Commission (2022). The 2021 long-term care report. https://ec.europa.eu/social/main.jsp?langId=en&catId=89&furtherNews=yes&newsId=10382. Accessed: 2024-06-18.

Fawaz, Y. and Mira, P. (2023). Social isolation, health dynamics, and mortality: evidence across 21 european countries. *Journal of Population Economics*, 36(4):2483–2518.

Fried, L. P., Tangen, C. M., Walston, J., Newman, A. B., Hirsch, C., Gottdiener, J., Seeman, T., Tracy, R., Kop, W. J., Burke, G., et al. (2001). Frailty in older adults: evidence for a phenotype. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, 56(3):M146–M157.

Heitmueller, A. (2007). The chicken or the egg?: Endogeneity in labour market participation of informal carers in england. *Journal of health economics*, 26(3):536–559.

Holt-Lunstad, J. and Smith, T. B. e. a. (2015). Loneliness and social isolation as risk factors for mortality: A meta-analytic review. *Perspectives on Psychological Science*, 10(2):227–237.

Imbens, G. W. and Angrist, J. D. (1994). Identification and estimation of local average treatment effects. *Econometrica*, 62(2):467–475.

Kim, D. H. and Rockwood, K. (2024). Frailty in older adults. *New England Journal of Medicine*, 391(6):538–548.

Kolodziej, I. W., Reichert, A. R., and Schmitz, H. (2018). New evidence on employment effects of informal care provision in europe. *Health Services Research*, 53(4):2027–2046.

Le, D. D. and Ibuka, Y. (2023). Understanding the effects of informal caregiving on health and well-being: heterogeneity and mechanisms. *Social Science & Medicine*, 317:115630.

Litwin, H., Stoeckel, K., Roll, A., Shiovitz-Ezra, S., and Kotte, M. (2013). Social network measurement in share wave four. *SHARE wave*, 4:18–38.

Marroquín, B., Vine, V., and Morgan, R. (2020). Mental health during the covid-19 pandemic: Effects of stay-at-home policies, social distancing behavior, and social resources.

Psychiatry research, 293:113419.

Pinquart, M. and Sörensen, S. (2003). Differences between caregivers and noncaregivers in psychological health and physical health: a meta-analysis. *Psychology and aging*, 18(2):250.

Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, 6:65–78.

Roth, D. L., Fredman, L., and Haley, W. E. (2015). Informal caregiving and its impact on health: A reappraisal from population-based studies. *The Gerontologist*, 55(2):309–319.

Schmitz, H. and Westphal, M. (2015). Short-and medium-term effects of informal care provision on female caregivers' health. *Journal of health economics*, 42:174–185.

Schmitz, H. and Westphal, M. (2017). Informal care and long-term labor market outcomes. *Journal of health economics*, 56:1–18.

Schwartz, E., Litwin, H., and Kotte, M. (2017). Measuring social network and network changes in share wave 6. *SHARE wave*, 6:22–39.

Simard-Duplain, G. (2022). Heterogeneity in informal care intensity and its impact on employment. *Journal of Health Economics*, 86:102647.

Steptoe, A., Shankar, A., Demakakos, P., and Wardle, J. (2013). Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences*, 110(15):5797–5801.

Stöckel, J. and Bom, J. (2022). Revisiting longer-term health effects of informal caregiving: Evidence from the uk. *The Journal of the Economics of Ageing*, 21:100343.

Thoits, P. A. (2011). Mechanisms linking social ties and support to physical and mental health. *Journal of Health and Social Behavior*, 52(2):145–161.

Van Houtven, C. H., Coe, N. B., and Skira, M. M. (2013). The effect of informal care on work and wages. *Journal of health economics*, 32(1):240–252.

Viktoria, T. (2024). Informal and formal long-term care in europe: Regional patterns and policy implications. Technical report, Global Observatory on Long-Term Care. Accessed: 2025-08-19.

Vitaliano, P. P., Zhang, J., and Scanlan, J. M. (2003). Is caregiving hazardous to one's physical health? a meta-analysis. *Psychological bulletin*, 129(6):946.

Wang, J., Zhang, M., and Zhang, Y. (2024). The effect of informal caregiving on caregivers' healthcare utilization in china. *Applied Economics*, 56(37):4405–4419.

Zwar, L., König, H.-H., and Hajek, A. (2020). Psychosocial consequences of transitioning into informal caregiving in male and female caregivers: findings from a population-based panel study. *Social Science & Medicine*, 264:113281.

A Appendix Tables

Table A.1: Sample construction

Restriction	Observations remaining	Deleted
Full SHARE sample (raw)	616,415	–
Minor SN cleaning (parent-exclusion consistency)	477,612	138,803
Drop wave 3 and COVID waves 82/91	477,532	80
Keep waves ≥ 4	409,258	68,274
Keep women	230,906	178,352
Keep age 50–70	128,618	102,288
Mother or father alive	44,334	84,284
Exclude mothers already in poor health at baseline	39,685	4,649
Exclude fathers already in poor health at baseline	38,839	846
Social Network module available (waves 4/6/8/9)	22,090	16,749
Require two consecutive SN waves (lagged outcome)	8,015	14,075
Exclude missing lagged covariates	5,681	2,334
Final estimation sample	5,681	–

Table A.2: Descriptive statistics: Main outcomes and Covariates

	Intense Care=0		Intense Care=1		All	
	mean	sd	mean	sd	mean	sd
Outcomes, Endogenous regressor and instrument						
Social Connectedness Index	2.11	(0.78)	2.03	(0.77)	2.10	(0.78)
SN quality index	66.79	(21.52)	68.96	(21.04)	67.00	(21.48)
SN size (excl. parents)	3.02	(1.60)	2.80	(1.48)	3.00	(1.59)
SN satisfaction	9.05	(1.15)	9.05	(1.15)	9.05	(1.15)
Intense caregiving to parent	0.00	(0.00)	1.00	(0.00)	0.10	(0.30)
Parental health shock	0.23	(0.42)	0.41	(0.49)	0.24	(0.43)
Covariates (lagged)						
Years of Education	12.36	(4.16)	12.09	(3.85)	12.33	(4.13)
Married	0.76	(0.42)	0.73	(0.45)	0.76	(0.43)
Number of Children	2.00	(1.18)	1.83	(1.10)	1.98	(1.17)
Household Size	2.36	(1.05)	2.42	(0.99)	2.37	(1.04)
Number of grandchildren	1.62	(2.16)	1.81	(2.19)	1.64	(2.16)
Whether has Siblings	0.92	(0.27)	0.81	(0.39)	0.91	(0.29)
Number of Female Siblings	1.08	(1.15)	0.84	(1.04)	1.06	(1.14)
Lives with Parent	0.06	(0.24)	0.34	(0.47)	0.09	(0.29)
Observations	5133		548		5681	

Note: This table presents the descriptive statistics for the main variables used in the study, including measures of social connectedness (social network satisfaction, emotional closeness, and feelings of loneliness), caregiving variables (daily care and health shock), and various demographic and control variables.

Table A.3: Descriptive statistics: Secondary outcomes

	Intense Care=0		Intense Care=1		All	
	mean	sd	mean	sd	mean	sd
Associational Activities						
Any activities	0.49	(0.50)	0.43	(0.50)	0.48	(0.50)
Club: social/sport	0.30	(0.46)	0.24	(0.43)	0.29	(0.46)
Volunteering/charity	0.20	(0.40)	0.22	(0.42)	0.20	(0.40)
Educ./training course	0.21	(0.41)	0.14	(0.35)	0.20	(0.40)
Pol./community org.	0.06	(0.24)	0.06	(0.23)	0.06	(0.24)
Count of act.	0.77	(0.95)	0.66	(0.90)	0.76	(0.95)
Frequency act.: almost every day	0.10	(0.30)	0.15	(0.36)	0.11	(0.31)
Satisfaction with act. (rescaled to 0-1)	0.83	(0.17)	0.81	(0.19)	0.83	(0.18)
Observations	5118		548		5666	

Note:

Table A.4: OLS Vs. 2SLS Estimates- Dep. variable: Mental Health and Loneliness

	Panel A: OLS		
	(1) Euro-D	(2) R-UCLA	(3) Lonely
Intense caregiving to parent	0.205**	0.0700	0.0339
	(0.0920)	(0.0552)	(0.0250)
	Panel B: 2SLS		
Intense caregiving to parent	4.500***	0.796	0.749***
	(1.080)	(0.491)	(0.249)
F-test (IV)	43.67	48.04	42.94
Hausman p-value	0.00	0.13	0.00
Observations	5595	5632	5451

Notes: Standard errors in parentheses, clustered at individual level.
The dependent variables are depressive symptoms (EURO-D scale), the R-UCLA loneliness scale, and an indicator for feeling isolated.
All regressions include country, year, cohort FE, and cohort X country FE.
Controls: age, married, education, number of children and grandchildren, size of household, siblings, female siblings, coresidence, and lagged outcome.
All covariates are lagged.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.5: First Stage estimates- Sample of countries with higher share of women informal caregivers- Dep. variable: Intense caregiving

	(1)	(2)	(3)	(4)	(5)
Parental health shock	0.171***	0.173***	0.173***	0.170***	0.162***
	(0.027)	(0.027)	(0.027)	(0.025)	(0.025)
Instrument version	CS	CS	CS	CS	Panel
Basic controls	No	Yes	Yes	Yes	Yes
Siblings	No	No	Yes	Yes	Yes
Coresidence	No	No	No	Yes	Yes
F-Stat	39.4	41.1	41.3	45.5	40.8
R2	0.13	0.14	0.15	0.20	0.19
Observations	1390	1390	1390	1390	1390

Notes: Standard errors in parentheses, clustered at individual level.
All regressions include country, year, cohort FE, and cohort X country FE. Dependent variable is a dummy for daily caregiving to mother. Basic controls: age, married, education, number of children and grandchildren, size of household. All covariates are lagged.
Countries selected include: Spain, Italy, Greece, Poland, Portugal, Croatia, Bulgaria, Malta, and Slovakia.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.6: Descriptive Statistics for Main Variables

	mean	sd	min	max
Social network satisfaction	9.005	1.188	1	10
Average social network emotional closeness	3.294	0.602	1	4
Feeling of loneliness	3.918	1.383	3	9
Average contact with SN person	6.164	0.904	1	7
Average contact with SN person excluding parents	6.174	0.895	1	7
Daily care	0.021	0.143	0	1
Health shock	0.016	0.127	0	1
Coresidence	0.094	0.292	0	1
Age	67.325	10.354	14	111
Marital status	2.312	2.013	1	6
Education level	2.851	1.473	0	6
Number of children	2.165	1.371	0	19
Number of grandchildren	2.736	2.993	0	20
Health status	3.201	1.067	1	5
Number of siblings	1.989	1.948	0	38

Note: This table presents the descriptive statistics for the main variables used in the study, including measures of social connectedness (social network satisfaction, emotional closeness, and feelings of loneliness), caregiving variables (daily care and health shock), and various demographic and control variables. The statistics include the mean, standard deviation, minimum, and maximum values for each variable.

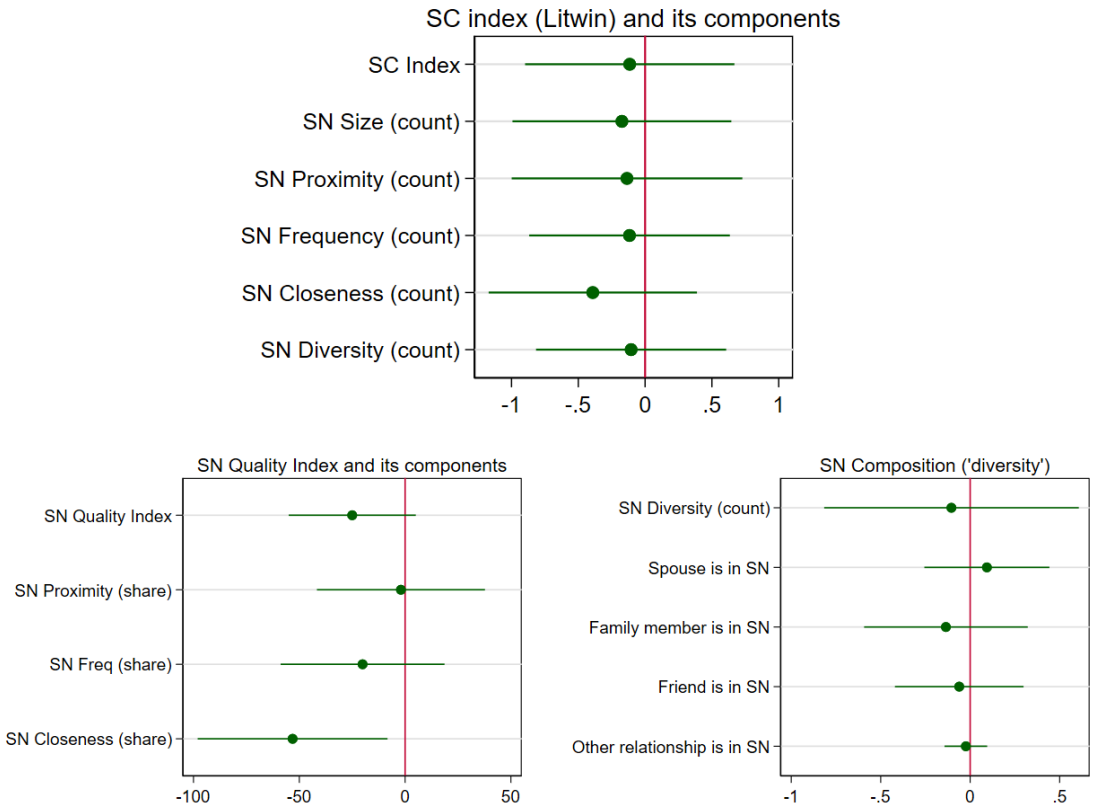


Fig. A.1. 2SLS estimates of impact of caregiving on SN items- All countries sample.

Notes: 90% CI are plotted along the corresponding coefficient. All countries.

Table A.7: 2SLS Estimates- Dep. variable: Social Connectedness: Quality, Quantity, and Satisfaction-Robustness to Controlling for Caregiver's Mental Health

	Panel A: All Countries			
	(1) SC Index	(2) SN Quality	(3) SN Size	(4) SN Satisfaction
Intense caregiving to parent	0.136	-8.637	0.699	-0.648
	(0.330)	(9.180)	(0.663)	(0.529)
	Panel B: Subsample of East/South Countries			
Intense caregiving to parent	-0.203	-23.73***	-0.0726	-0.854*
	(0.279)	(8.873)	(0.500)	(0.482)
F-test (IV)	39.19	38.61	38.90	38.96
Hausman p-value	0.42	0.00	0.75	0.02
Observations	1369	1369	1369	1367

Notes: Standard errors in parentheses, clustered at individual level.
All regressions include country, year, cohort FE, and cohort X country FE. Controls: age, married, education, number of children and grandchildren, size of household, siblings, female siblings, coresidence, and lagged outcome. All covariates are lagged.
Countries selected in Panel B include: Spain, Italy, Greece, Poland, Portugal, Croatia, Bulgaria, Malta, and Slovakia.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

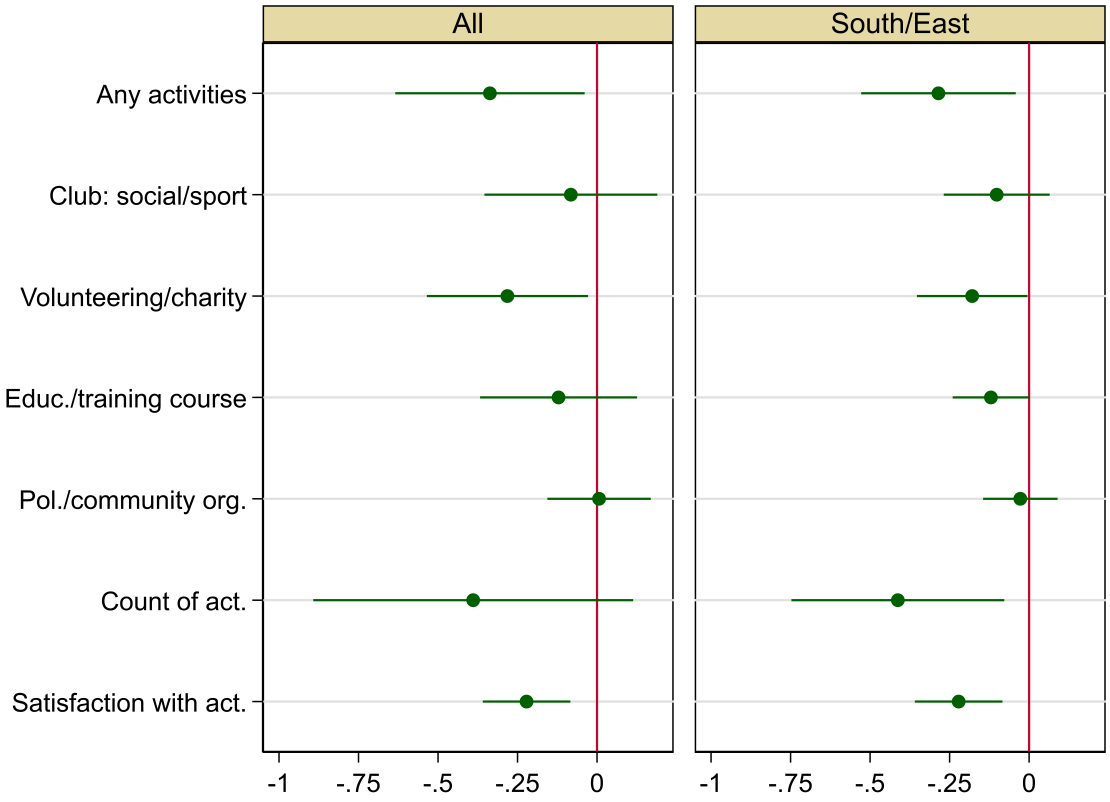


Fig. A.2. 2SLS estimates of impact of caregiving on activities

Notes: 90% CI are plotted along the corresponding coefficient. Countries in "South/East" region include: Spain, Italy, Greece, Poland, Portugal, Croatia, Bulgaria, Malta, and Slovakia.