

Is the association between long-term care and subjective well-being socio-economically stratified? Evidence from Europe

Ginevra Floridi ^a, Ludovico Carrino ^{b,c} and Karen Glaser ^c

^aSchool of Social and Political Science, The University of Edinburgh, Edinburgh, UK;

^bDepartment of Economics, Business, Mathematics, and Statistics, University of Trieste, Trieste, Italy;

^cDepartment of Global Health and Social Medicine, King's College London, London, UK



ABSTRACT


Informal and formal care receipt can affect the overall subjective well-being of care recipients. While much attention has been devoted to the mechanisms by which care use relates to subsequent well-being, no previous research has examined socio-economic stratification in this association. This question is important given that the proportion of disabled older adults relying exclusively on informal caregivers is expected to rise, especially among lower socio-economic status (SES) groups. This study examines SES gradients in the associations of informal and formal care use with subjective well-being, and across four care contexts (Northern, Western, Southern and Eastern Europe) using data on functionally impaired Europeans aged 50+ from the Survey of Health, Ageing & Retirement in Europe (n=6,012). We investigate how wealth and education moderate the associations between take-up of informal and formal care and changes in subjective well-being (i.e. quality of life and depressive symptoms). We also investigate whether this relationship differs by care context. We find little evidence of SES differences in the association between the onset of care and subjective well-being regardless of the care context. We interpret our findings in light of previous theory and derive implications for future research on the relationship between care receipt and well-being.

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CONTACT Ginevra Floridi  ginevra.floridi@ed.ac.uk  School of Social and Political Science, The University of Edinburgh, Chrystal Macmillan Building, 15a George Square, EH8 9LD Edinburgh, UK

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Introduction

Population ageing is inevitably linked to increases in disability, presenting potential challenges for European long-term care (LTC) systems (Fernandez *et al.* 2016). Disabled older adults may receive help with daily activities or personal care within their home from informal caregivers such as family members, or from formal providers such as professional paid-for caregivers (Colombo *et al.* 2011). Informal and formal care receipt can affect subjective well-being through a variety of pathways, including social integration, self-perceived identity, perceived carer stress, and physical functioning (Berkman *et al.* 2000; Wolff and Agree 2004; Kwak *et al.* 2014; Forder *et al.* 2018). These factors are socio-economically stratified (House 2002; Langagergaard *et al.* 2011; Nazroo 2017). However, to our knowledge, no research has examined socio-economic differences in the association between informal/formal care receipt and subjective well-being. This is evidenced by a recent systematic review of studies investigating the effect of informal/formal care on health and other selected outcomes over the last 20 years (Coe *et al.* 2021).

Potential stratification in the association between care and well-being is important because the proportion of disabled individuals relying almost exclusively on informal care is predicted to increase steeply in the coming decades in Europe (Abbing *et al.* 2023). This is due to recent LTC reforms in some countries that have resulted in a 're-familisation' of care, for example through reductions in public LTC expenditure (Fernandez *et al.* 2016; Saraceno 2016). The increase in the share of those receiving informal care will likely be concentrated among individuals in lower socio-economic status (SES) groups, who are less able to afford privately paid formal care (Saraceno 2010; Abbing *et al.* 2023). As such, the expansion of LTC needs in Europe may have consequences for inequalities in well-being if the associations of informal and formal care with well-being vary by SES.

We study how household wealth and educational attainment moderate the associations of informal and formal care with subjective well-being and across country groups capturing different care contexts. Using longitudinal data on functionally impaired Europeans aged 50 and over, we test for SES differences in the association between the onset of informal/formal care and two aspects of well-being, namely quality of life (CASP-12) and depressive symptoms (EURO-D) (Prince *et al.* 1999; Hyde *et al.* 2003). Overall, we find little evidence of wealth and educational attainment differences in the association between the onset of

informal/formal care and subjective well-being. The exception is a small increase in depressive symptoms subsequent to the receipt of formal care that is detected for higher-educated older adults, with significant differences across educational groups, only in the Eastern European care context. We interpret our findings in light of previous theories and derive implications for future research on the relationship between care receipt and well-being.

Background

Determinants of long-term care utilisation

As this study explores the well-being outcomes of LTC, we start by briefly summarising the conceptual framework we adopt to model the take-up of care, that is, what are the main determinants of care utilisation. We borrow from the seminal paper by Andersen and Newman (2005), whose behavioural model describes the use of care as determined by individual needs (physical and cognitive functioning), predisposing factors (gender and age) as well as enabling factors (human capital as well as material and financial resources, among which are education, family structure, and wealth). As described in the theoretical model by Broese van Groenou *et al.* (2006), all these determinants are likely to be unevenly distributed among socio-economic groups: for example, functional abilities and financial wealth are, on average, lower among lower-SES groups than among higher-SES groups, while family size is larger. Finally, as discussed in Brugiavini *et al.* (2017), the use of care depends on the interaction between individual factors and the institutional context, for example in terms of eligibility rules. As access to care is often subject to needs assessments (which vary across countries/regions and in time), two otherwise similar individuals could have very different probabilities of receiving LTC if they live in countries or regions that implement different eligibility rules (Averdano *et al.* forthcoming).

The relationship between care and well-being

A large body of literature has examined the relationship between informal/formal care receipt and subjective well-being, with ambiguous theoretical predictions and empirical findings (Silverstein and Bengtson 1994; Kwak *et al.* 2014; Forder *et al.* 2018; Coe *et al.* 2021). Studies that integrate sociological perspectives on family ties with the social-

epidemiological paradigm on the relationship between *social integration* and health have mostly focused on instrumental support or informal care (Silverstein and Bengtson 1994; Berkman *et al.* 2000). Within this framework, it is hypothesised that social integration, defined as involvement in social relations, most likely influences health and well-being through the provision of help and support (Berkman *et al.* 2000). Overall, evidence suggests that instrumental help from family members and friends compared to no such support is generally beneficial for well-being, as it provides older adults with (additional) social support (Silverstein and Bengtson 1994). Moreover, research suggests that older adults who receive support from those in their social network may be better able to cope with stress and with functional disability than those who do not receive it (Umberson, Crosnoe, & Reczek, 2010). For example, in a longitudinal analysis of older adults in the United States (US), Yang (2006) finds that perceived social support from informal carers (as opposed to hardly ever perceiving support) lowers depressive symptoms by mitigating the detrimental effects of disability on well-being.

Formal and informal care may also impact well-being through their effects on care recipients' *self-perceived identity* (Kwak *et al.* 2014). Within identity theory, identities emerge from interactions with others, acting to shape individuals' sense of self-worth (Stets and Turner 2006). Kwak *et al.* (2014) suggest that in Western cultures, where autonomy and self-reliance are highly valued, care receipt may lead to the loss of one's self-perceived identity as an independent person. They find that older adults in the US who receive greater amounts of/more hours of formal and informal care perceive their ageing more negatively, and have more depressive symptoms two years later (Kwak *et al.* 2014). Silverstein *et al.* (1996) in another US-based study find that, while assistance from adult children (compared to no assistance) is beneficial for positive mood at moderate levels, excessive support may be harmful by virtue of eroding self-perceptions of competence and autonomy. Similarly, Lin and Wu (2011) find informal care – compared to no care – to be linked with well-being and argue that receiving help may increase depressive symptoms by lowering individuals' sense of control and self-esteem.

Perceived relationships with one's caregivers can also act to mediate the subjective well-being consequences of care receipt (Pristavec and Luth 2020), especially in the case of informal care. As suggested by the stress process model (Pearlin *et al.* 1981), a carer's perception of their experience can generate stresses or uplifts that resonate with the care recipient

(Pristavec and Luth 2020). A study investigating older adults' views suggests that perceiving carer stress may result in decreased well-being (Cahill *et al.* 2009). A study of US informal care recipients suggests that women who perceive the relationship with their primary caregiver as reciprocal and respectful are less likely to be at risk of depression (Wolff and Agree 2004).

Finally, the effect of formal and informal care on subjective well-being may be mediated by the extent to which care improves older adults' *physical functioning* and ability to perform daily tasks. For example, informal care compared to no care may have positive consequences for well-being by relieving older adults of negative affect caused by health deterioration (Silverstein and Bengtson 1994). A study based on a sample of English recipients of community-based LTC (i.e. publicly funded, self-funded, and informal) finds that the level of services provided is linked to higher care-related quality of life, with the most impaired individuals benefitting the most (Forder *et al.* 2018). In France, Barnay and Juin (2016) find that informal care (compared to no care) reduces the risk of depression, while formal care improves general mental health by satisfying physical needs and improving functional ability. In Europe, Carrino *et al.* (2022) also find that receiving formal care (compared to not receiving formal care) significantly reduces depressive symptoms, perceived loneliness and increases quality of life.

One of the main difficulties in estimating causal effects of informal and formal care on well-being is health-related confounding. Indeed, worse or deteriorating health is both a determinant of care use and a factor associated with lower subjective well-being (Steptoe *et al.* 2015). The literature based on cross-sectional or longitudinal associations suggests that informal care receipt has mixed effects on well-being, which may depend on the intensity, type and quality of support (Silverstein *et al.* 1996; Lin and Wu 2011). Within this literature, formal care recipients tend to have lower well-being (e.g. depression and anxiety) than informal care recipients, who in turn have worse outcomes than those receiving no care (Andersson and Monin 2017; Broese Van Groenou 2020). However, such results might be subject to negative estimation bias in that people whose health decline faster have both lower well-being and a higher need for formal care (which is typically more skilled than the informal care sources) than people with a less pronounced health decline. Indeed, studies using quasi-experimental approaches or instrumental variables (IVs) to disentangle the endogenous relationship between well-being and care use find a positive effect of formal and

informal care on well-being and mental health (Barnay and Juin 2016; Carrino *et al.* 2022). However, these studies are difficult to generalise, as results are only valid for individuals whose care receipt is affected by specific policies, long-term care eligibility rules, or caregivers' availability, such as the proportion of individuals receiving a care allowance in the respondents' region of residence (Barnay and Juin 2016). Moreover, given their reliance on policy instruments, these studies are mostly limited to one or few countries.

Socio-economic differences in the relationship between care receipt and well-being

Despite much theoretical and empirical work on the relationship between care receipt and well-being, its socio-economic stratification has been overlooked. SES may act to moderate the association between informal and formal care and well-being as previous studies consistently find that each pathway noted above is socio-economically stratified (i.e. social integration, self-perceived identity, feelings of being a burden, and physical functioning) (Thoits 1991; House 2002; Nazroo 2017). For instance, the association of informal care with well-being and mental health may be socio-economically patterned given SES differences in social integration prior to care receipt (House 2002). Higher-SES older adults tend to have larger social networks, report greater civic engagement and are also more likely to be involved in leisure, cultural, and volunteering activities than lower-SES individuals (Nazroo 2017). Thus, other things being equal, higher-SES individuals are generally more socially integrated than lower-SES individuals prior to the onset of health deterioration and care receipt. Studies also suggest that the benefits of informal assistance (compared to no assistance) are greater for those who, prior to receiving help, were more socially isolated (Silverstein *et al.* 1996). To the extent that informal care enhances well-being by expanding care recipients' social networks and/or strengthening social ties (Berkman *et al.* 2000), the marginal benefits of informal care may be greater among lower-SES – relative to higher-SES – individuals. Within this framework, it also follows that the well-being benefits of receiving informal care among the less advantaged may be greater than those derived from the receipt of formal care.

Self-perceived identity (e.g. one's self-perceived autonomy and independence) is also socio-economically stratified. Higher-SES individuals tend to have greater coping resources than lower-SES individuals

against identity-threatening experiences such as the onset of functional health deterioration and care receipt (Thoits 1991). Therefore, beginning to receive informal or formal care may be less damaging for well-being among higher-SES individuals.

Similarly, perceived carer stress may vary by SES. The literature on informal carers' well-being suggests that providing care may represent a greater stressor for lower-SES individuals, who face competing demands from other care roles and greater marginal economic losses from providing support (Broese van Groenou and De Boer 2016). Lower ability to financially reciprocate the support received may also contribute to strain in the relationship with caregivers among lower-SES individuals (Wolff and Agree 2004). In this case, informal care receipt may be more detrimental for lower-SES individuals relative to their higher-SES counterparts, due to stronger perceptions of carer stress (Cahill *et al.* 2009). Moreover, little is known about how formal care receipt may affect perceived carer stress given that informal caregivers are increasingly likely to act as coordinators of care (i.e. managing care between unpaid and paid care) as few disabled older adults exclusively rely on formal care (Wolff *et al.* 2016). A recent cross-sectional study of a sample of caregivers in the US finds that the level of care coordination increases the experience of perceived carer stress which may then affect relationships with caregivers (although the study did not look at differences in the association by SES) (Lee and Williams 2023).

Finally, a consistent empirical finding in the literature on health inequalities is that higher-SES individuals have better physical (as well as cognitive) functioning in mid- and later life than low-SES individuals (Nazroo 2017). The literature on physical functioning as a mediator of the relationship between informal/formal care receipt and well-being suggests that marginal improvements in well-being are greater among individuals in worse health (Forder *et al.* 2018). Thus, it follows that lower-SES individuals may benefit more from informal or formal care than higher-SES individuals.

Long-term care in the European context

We examine how SES gradients in the association between informal/formal care onset and subjective well-being vary across European care contexts. Prior work on the SES patterning of the receipt of informal/formal care among older Europeans shows variations across countries

with, for example, the highest use of informal care among the poorest (as captured by the lowest quintile of household wealth) in the Czech Republic at 39% versus 18% in Switzerland. With respect to the use of formal care, this ranges from a high of 33% among the poorest in the Netherlands to 9% among the poorest in Italy (Rodrigues *et al.* 2018). Such differences partly reflect variations across European care regimes in the degree of familism and de-familisation in LTC, on a hypothetical spectrum from regimes where the family is assumed to be entirely responsible for care provision (complete familism), to regimes where public provision of care is universalistic (complete de-familisation) (Saraceno 2016; Brandt *et al.* 2023; Verbakel *et al.* 2023). Previous research has proposed various classifications of European care regimes (Leitner 2003; Saraceno and Keck 2010). Following an earlier study (Floridi *et al.* 2022), we refer to a geographical classification into Northern, Western, Southern, and Eastern Europe, aimed at capturing different care contexts. Northern Europe is characterised by relatively universalistic, service-based approaches to formal care provision that relieve families of intensive care tasks. Western Europe has high levels of formal care combined with public measures to support family care. Southern Europe represents the most ‘familistic’ model, with low provision of formal care services and monetary support to family care. Finally, Eastern Europe is characterised by a universalistic approach to formal care combined with scarce provision and quality of services, which mean that the bulk of care responsibilities is left to families (Leitner 2003; Haggard and Kaufman 2008; Saraceno and Keck 2010). While these country groupings do not capture the exact nature of differences in formal care provision across countries, they nevertheless reflect broad similarities in long-term care systems (Saraceno and Keck 2010; Floridi *et al.* 2022).

Empirical evidence suggests that the re-familisation of care in some European countries will lead to widening inequalities in informal and formal care (Floridi *et al.* 2021; Verbakel *et al.* 2023). In contexts where public and institutional formal care provision is limited, the poor may be unable to afford privately paid care and thus more likely to rely exclusively on family members (Saraceno 2010). Given that increased reliance on exclusively informal care is likely to be concentrated among lower-SES groups, it is important to study socio-economic stratification in the associations between different forms of care and well-being. Particularly in more familistic regimes, the re-familisation of care in Europe may widen inequalities in subjective well-being among older disabled adults if informal care is associated with lower well-

being among lower-SES individuals, or if formal care is linked with higher well-being among higher-SES compared to lower-SES groups.

Conceptual framework and hypotheses

As our discussion of theoretical mechanisms shows, the direction of SES moderation in the associations of informal and formal care with well-being is complex. Based on the socio-economic stratification of all four mediators of interest and differences in care contexts/regimes, we formulate expectations on how the association of informal/formal care receipt with subsequent well-being varies by SES. To date and to the best of our knowledge, there have been no attempts to conceptualise or empirically assess socio-economic stratification in this association (Coe *et al.* 2021). This is important in order to identify potential sources of inequality in well-being among older disabled adults. In Figure 1, we propose a model integrating SES as a moderator in the relationship between care and well-being.

The figure summarises the discussion on the above predicted relationship between care receipt and subjective well-being as potentially mediated by *social integration*, *self-perceived identity*, *perceived carer stress*, and *physical functioning*. Figure 1 shows how SES may potentially moderate each of these pathways. The resulting difference in subjective

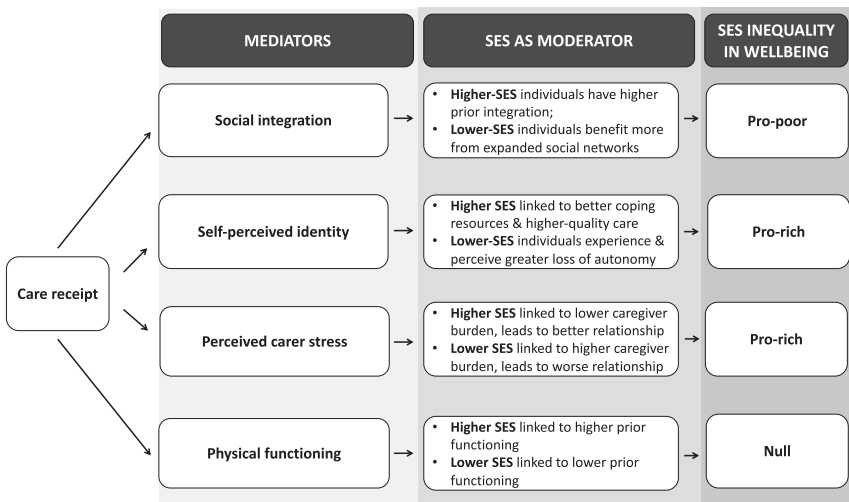


Figure 1. Conceptual model of SES moderation in the association between care and subjective well-being.

well-being may be pro-poor (i.e. lower-SES individuals gain more and/or lose less in terms of subjective well-being from care than higher-SES individuals), pro-rich (i.e. higher-SES individuals gain more and/or lose less from care than lower-SES individuals), or null (i.e. there is no reason to expect a clear SES gradient in the association). In the remaining part of the paper, we empirically test for SES inequality in the association between informal/formal care receipt and well-being.

We evaluate wealth and educational attainment stratification in how the receipt of informal-only and any-formal care is associated with subsequent subjective well-being among Europeans aged 50 and over with disabilities. We use longitudinal data from the Survey of Health, Ageing and Retirement in Europe (SHARE), described in greater detail below. To account for potential health selection (Steptoe *et al.* 2015), we adopt a lagged dependent variable approach and control for a wide range of health characteristics, both prior and contemporary to care use. In the 'Robustness' section below, we discuss the identification challenges inherent in this specification. We focus on two measures of subjective well-being: quality of life (the CASP-12 scale), and depressive symptoms (the EURO-D scale). Well-being is a broad concept with no accepted definition, capturing evaluations of one's life that can be assessed by measuring, among other things, quality of life and the number of depressive symptoms (Lawton 1983; Newman 1989). The CASP-12 scale is used here as an overall measure of positive quality of life at older ages, including self-assessed control, autonomy, pleasure, and self-realisation (Hyde *et al.* 2003). The EURO-D scale is used here to capture the mental health aspects of well-being as it measures depressive symptoms including depressed mood, irritability, appetite, and sleep quality (Prince *et al.* 1999).

We focus on two dimensions of SES for disabled older adults: household financial wealth and educational attainment, which are preferred to income or occupation given that most disabled older adults are no longer in paid employment. Financial wealth is the most appropriate measure of available economic resources for older and disabled individuals who are unlikely to participate in the labour market and receive incomes (Tanaka *et al.* 2011). Measuring financial wealth at household level allows us to capture family resources, which are important in shaping the availability of informal caregivers (Broese van Groenou and De Boer 2016). At the same time, financial wealth is preferred to total wealth given the large margin of error for self-reported housing values. Educational attainment instead captures individual resources that may relate to one's self-

perceived identity as well as the ability to navigate the LTC system (Langagergaard *et al.* 2011). Education also has an influence on later-life wealth. As such, its total effect on care includes a direct effect, as well as an indirect effect through wealth. In our analysis, we take the antecedence of education relative to wealth into account by including education as a control variable in the models for wealth stratification, and excluding wealth as a control in the models for educational attainment stratification in the association between onset of care and subjective well-being (Elwert and Winship 2014). Graphically, this is depicted in Appendix Figure A1.

We study differences in the association of each form of care with subjective well-being across four European care regimes with available data: Northern Europe (Denmark, the Netherlands, and Sweden), Western Europe (Austria, Belgium, France, Germany, Luxembourg, and Switzerland), Southern Europe (Greece, Italy, and Spain), and Eastern Europe (Czech Republic, Estonia, Poland, and Slovenia). We model SES moderation by testing for interactions between SES and informal/formal care receipt in a regression equation for subjective well-being. Our conceptual model presented in Figure 1 guides our hypotheses on the associations between informal/formal care and subjective well-being by mapping each indicator onto a relevant potential mediator of the relationship. We expect the associations to be the same regardless of the well-being outcome. Our hypotheses are as follows:

H1: SES moderation in the association between informal/formal care receipt and subjective well-being is pro-poor if care receipt mainly acts on social integration. Given that the benefits of care for social integration may be greater for informally provided care (Silverstein and Bengtson 1994; Berkman *et al.* 2000), under this hypothesis we expect to observe stronger pro-poor SES moderation in those outcomes for informal-only as opposed to any-formal care.

H2: SES moderation in the association between informal/formal care receipt and subjective well-being is pro-rich if care receipt mainly acts on self-perceived identity or perceived carer stress. As outlined in Figure 1, pro-rich inequality is in line with both self-perceived identity and perceived carer stress as the prevailing potential mediating mechanisms in the association between both informal-only and any-formal care receipt and well-being.

H3: SES moderation in the association between informal/formal care receipt and subjective well-being is null if care receipt mainly acts on physical functioning. Since formal care usually represents a response to higher care needs (Andersen and Newman 2005), negative health selection may be particularly pronounced for any-formal as opposed to informal-only care receipt. Because of this potential selection based on health deterioration, we expect

any negative association between informal-only and any-formal care and subsequent well-being to become null when better accounting for selection. Thus, while any-formal care may be associated with larger declines in well-being than informal-only care, we expect the differences to become null once selection is better accounted for.

H4: SES moderation in the association between informal/formal care receipt and subjective well-being is pro-rich in more familistic countries. As evidence suggests that those in lower SES groups are more likely to receive informal care in countries with fewer alternatives to family care, if the onset of informal care is associated with worse well-being among lower SES groups (as hypothesised through the mechanisms of self-perceived identity and perceived carer stress) we expect the association between the onset of care and subjective well-being to be pro-rich in more familistic settings (e.g. Southern Europe) compared to those characterised by more de-familised long-term care systems (e.g. Northern Europe).

Materials and methods

Data and sample selection

SHARE is a multidisciplinary longitudinal survey representative of community-dwelling individuals aged 50 and over across Europe (Börsch-Supan *et al.* 2013). It contains information on respondents' demographic, socio-economic and health characteristics, including subjective well-being. It also provides information on receipt of home-based care from formal and informal providers. We use data from the first (2004), second (2006), fifth (2013), sixth (2015) and seventh (2017) waves of SHARE. We exclude the third wave (2009) which only contains retrospective information; the fourth wave (2011), which does not contain comparable questions on formal care receipt; and the eight wave (2020), which was conducted during the COVID-19 pandemic, a period when formal home-based care was largely unavailable.

We study socio-economic stratification in the association between changes in care use and subjective well-being, considering changes in care use between a baseline and a follow-up period, which are two years apart. Baseline and follow-up years are, alternatively: 2004–2006 (waves 1–2); 2013–2015 (waves 5–6); and 2015–2017 (waves 6–7). We restrict our analytic sample to individuals who are aged 50 and over, who are functionally impaired (defined hereafter), and who do not receive any care at baseline. Appendix 2, Table A2.1 outlines the sample sizes for each progressive restriction. We investigate wealth and educational attainment differences in the association between the onset

of care by follow-up and changes in well-being between baseline and follow-up. We define functional impairment based on Instrumental Activities of Daily Living (IADL) and Activities of Daily Living (ADL) and identify our sample as 6,012 individuals aged 50 and over with at least one limitation with their IADLs or ADLs who do not receive care at baseline. Our sample includes respondents from 16 countries, namely: Austria, Belgium, Czech Republic, Denmark, Estonia, France, Germany, Greece, Italy, Luxembourg, the Netherlands, Poland, Slovenia, Spain, Sweden, and Switzerland. As outlined above, we classify these countries into Northern, Western, Southern, and Eastern Europe. Appendix 2, Table A2.2 contains details of sample size and percentage of respondents receiving each type of care by country group. Our analytic sample includes 895 respondents in Northern Europe, 2,178 respondents in Western Europe, 1,556 respondents in Southern Europe and 1,383 in Eastern Europe.

Measures

Outcomes

We consider two indicators for subjective well-being (Steptoe *et al.* 2015). SHARE collects information on two validated scales: the CASP-12 scale for quality of life, and the EURO-D scale for depressive symptoms. Both scales are described in Appendix 3. The CASP-12 scale gives an overall score for quality of life as the sum of four sub-scales for self-appraised control, autonomy, self-realisation, and pleasure (Hyde *et al.* 2003). The EURO-D scale measures the number of depressive symptoms, which include indicators of depressed mood, irritability, appetite, and sleep quality (Prince *et al.* 1999). An increased score on the CASP-12 scale for the same respondent indicates higher subjective quality of life, while an increased score on the EURO-D scale indicate worse subjective mental health.

Care receipt

Our independent variable of interest is ‘onset of care use by follow-up’, identified as the self-reported receipt of help with daily tasks (e.g. bathing, dressing, eating) in the previous 12 months, among functionally impaired respondents who reported not receiving any care at baseline. Based on respondents’ information on caregivers’ identity, we categorise individuals at follow-up based on whether they report receiving (i) no care; (ii) exclusively informal care (‘informal-only’, with no formal

care); or (iii) any formal care ('any-formal', with or without additional informal care). Informal care is defined as kin or non-kin care (e.g. partners, children, friends) at least once per week. Formal care takes the form of professional or paid home-care.¹

Socio-economic status

We operationalise SES using household financial wealth and individual educational attainment. We measure household financial wealth as the sum of financial assets minus debts, excluding housing wealth. We equalise financial wealth for household composition, and measure it in Purchasing Power Parity (PPP) Euros. For comparability of our measure across countries, we code household financial wealth into percentiles (from 1 to 100), where percentiles are obtained separately by country and year of observation. We measure educational attainment using the International Standard Classification of Education (ISCED) 1997 codes. We classify older disabled adults into three levels of education: 'low' (up to lower secondary education, ISCED 0–2), 'intermediate' (upper secondary education and vocational training, ISCED 3–4) and 'high' (tertiary education, ISCED 5–6).

Health status

We measure health at baseline (time 1) and follow-up (time 2). We define interval-level variables for the number of limitations with ADLs, IADLs, and mobility items, as well as number of diagnosed chronic conditions. We code self-rated health into five categories (from 'very good' to 'poor'). Grip strength is measured using a hand-held dynamometer on a scale from 1 to 100. Cognitive functioning is indicated by a memory score (number of words recalled out of 20 words, ranging from 0 to 20) and a verbal fluency score (number of different animals the respondent can name in 60 s, ranging from 0 to 50 in our sample).

Other covariates

We control for sex (female vs. male) and age in years, measured at follow-up. Country and baseline wave-year controls account for country- and period-specific confounders.

¹In wave 5, the question on informal care provided by someone living outside the respondent's household is only asked to the 'family respondent', the first person in a couple to start the main interview. The question asks family respondents about care or help received by themselves or their partner. We only attribute informal care receipt to a respondent if both of the following conditions are satisfied: (i) either the respondent or their partner report care or help receipt from outside the household and (ii) the respondent has at least one limitation with IADLs or ADLs.

Missing data and attrition

Appendix Table A4.1 gives a summary of missing values for the baseline and follow-up variables in the study. It should be noted that the large number of missing values for CASP-12 scores at baseline is due to the fact that, in SHARE wave 1, the CASP questionnaire was administered through a self-completion survey, with lower participation rates. To account for missing data in the covariates and outcomes, we perform multiple imputation by chained equations (MICE). The variables for the imputation model are presented in Appendix Table A4.2. The imputation is performed by linear regression for all interval variables, and by ordinal logistic regression for two ordinal categorical variables with missing values: educational attainment and self-rated health. The imputation model includes all the complete-case variables in the study, as well as the following auxiliary variables: household size, whether living with one's partner, and household net worth including housing value, all measured at follow-up.

Besides cross-sectionally missing values, our dataset is affected by panel attrition, which is likely related to care use and subjective well-being, as well as SES. Nearly 26% of sampled individuals drop out between waves 1–2, and 22% drop out between waves 5–6. 72% of the sample at wave 6 does not answer the regular questionnaire at wave 7, but this is mostly due to the completion of the SHARELIFE retrospective survey among those who had not completed it at wave 3, and the sample attrition rate is around 19%. To mitigate sample selection bias due to attrition, we calculate inverse probability weights (IPW) as the inverse of the probability of being observed at time 2 based on time 1 covariates, and we weight all models by the resulting IPWs. Appendix Table A5.1 reports the coefficients from the probit model predicting non-response at time 2. In addition to all the variables in the main models of the study, the attrition model includes marital status, coded into four categories ('married', 'never married', 'separated or divorced', and 'widowed'); binary variables for whether the respondent works for pay, and whether they own their own home; number of social activities performed at least once a month in the past year, including voluntary work, educational or training courses, sports, and social clubs, and taking part in religious or political organisations. The attrition prediction model also includes variables for whether the respondent has children, and if so, whether any children live with them; as well as dichotomous indicators for whether the respondent's mother and father are still alive.

Statistical analysis

We study socio-economic stratification in the associations between changes in care use (beginning to receive informal and/or formal care) and changes in subjective well-being, using ordinary least squares (OLS) linear regressions with lagged dependent variables (Cong and Silverstein 2008). We first explore variations in subjective well-being by care receipt, socio-economic indicators and care, at baseline and follow-up. Next, we fit lagged dependent variable linear models for the numeric scores corresponding to CASP-12 and EURO-D scales, as described in equations (1) and (2).

$$y_{t+1} = y_t + \beta_1 care_{t+1} + \beta_2 SES_t + \beta_3 care_{t+1} \cdot SES_t + health_t + \varepsilon_{t+1} \quad (1)$$

$$y_{t+1} = y_t + \beta_1 care_{t+1} + \beta_2 SES_t + \beta_3 care_{t+1} \cdot SES_t + health_{t+1} + \varepsilon_{t+1} \quad (2)$$

We regress each outcome at follow-up on their baseline values (y_t), and care receipt status ($care_{t+1}$) at follow-up, indicating change from receiving no care at baseline (true of all analytic sample respondents) to either continuing to receive no care, receiving informal-only care, or receiving any-formal care at follow-up. We interact the onset of care indicator with wealth percentile and educational attainment before care onset (SES_t). As specified in Appendix Figure A1, the models for wealth moderation include a control for education, while the models for educational attainment do not include wealth percentile controls. Our coefficient of interest β_3 captures socio-economic differences in the association between starting to receive care (informal-only or any-formal) and changes in subjective well-being among functionally impaired people who do not use care at baseline, where the reference is continuing not to receive care. We cluster standard errors at the respondent level, to avoid artificially inflating sample size due to respondents appearing in more than two consecutive periods. We fit the regression models for the whole sample, as well as separately by country group (North, West, South, and East). To check the sensitivity of our results to attrition, we report the results from the IPW-weighted models in the main text, and from the unweighted models in Appendix 5.

Robustness

Due to the nature of the available data, we refrain from interpreting the results we obtain as the causal effect of care onset on well-being. The main reason for this lies in the endogenous nature of care-use choices

and physical and psychological health status (Steptoe *et al.* 2015). Stated otherwise, while our aim is to evaluate the wellbeing consequences of receiving a treatment such as ‘care-use’, the assignment of respondents to ‘treated’ (e.g. receiving care rather than not receiving care) is not random, yet it depends on some of the main determinants of wellbeing. Indeed, a common result in the long-term care literature in social sciences is that health needs are among the most important determinants of care use (Andersen and Newman 2005). This relationship is valid also for our sample. In Appendix Table A6.1 we show the results from a regression analysis estimating the correlates of care use. The analysis confirms that health is the main correlate of care use. However, another well-known result is that individuals with more health limitations are also more likely to report lower levels of overall well-being (Steptoe *et al.* 2015). Hence, failure to fully capture the influence of functional limitations on care use is likely to bias our results towards finding a negative association between care onset on wellbeing, because less healthy people are more likely to use care and report lower well-being.

We take several steps to limit the extent of the endogeneity bias within our empirical model. First, our specifications control for a full set of self-assessed and objective measures of physical and cognitive health. Controlling for baseline health (equation 1) captures health prior to the onset of care, thus accounting for differential selection into care. Controlling for follow-up health (equation 2) additionally accounts for changes between baseline and follow-up, which is important in order to avoid attributing changes in subjective well-being to care receipt while, in fact, the onset of care was caused by health deterioration. At the same time, controlling for follow-up health may lead to over-adjustment as follow-up health may be influenced by the onset of care. For these reasons, we report and compare the socio-economic gradients in the association between onset of care use and subjective well-being obtained from both sets of models. When progressively including different types of health variables at follow-up in the models, we find that variables related to functional health (number of ADL, IADL, and mobility limitations) are responsible for most of the differences in the coefficients on the association between care and well-being.

Second, we test the robustness of our results to an alternative estimation model. Our main empirical framework is based on the lagged dependent variable model. Such models may introduce bias due to the correlation between the error term (ε_{t+1}) and the lagged dependent

variable y_t . In particular, under residual autocorrelation, the coefficients on the explanatory variables may be downward biased, leading to more ‘conservative’ results. However, given that the outcome in question relates to subjective well-being, for which benchmarks differ substantially between individuals, a dynamic model for the association between care use and change in well-being is appropriate. The use of a lagged dependent variable approach in this case is preferred to a fixed-effect estimation for three reasons: (i) the spacing between observations in SHARE is highly uneven, with a large gap (2007–2013) due to no data on care receipt at wave 3 (2009) and no data on formal care receipt at wave 4 (2011); (ii) we are interested in transitions from no care into care receipt that occur between baseline and follow-up, and the lagged dependent variable model on a sample of functionally impaired individuals who do not receive care at baseline allows us to isolate those changes, while the fixed-effect model does not distinguish variation due to beginning to receive care from that attributable to stopping care; (iii) we are interested in socio-economic differences between individuals in the association between care and well-being, rather than in how changes in SES for the same individual (such as an increase in wealth) may moderate the association. In a model with individual fixed-effects and interactions, the time-invariant indicator for education would not have a main effect, while the time-varying indicator for wealth percentile would conflate changes in subjective well-being due to changes in care with those attributable to changes in the relative wealth position.

An alternative estimation strategy to the lagged dependent variable model comes from the set of approaches based on inverse probability weighting (IPW), which estimate the treatment effect by creating a “pseudo-population” in which the treatment is independent of the measured confounders (Kurz 2022). We test that our main conclusions do not change when we adopt an alternative specification such as the augmented inverse probability weighting (AIPW), which is a flexible estimator for average treatment effects that has been shown to be more robust and efficient with respect to the IPW (Kurz 2022). As described by Kurz (2022), ‘the AIPW estimator involves 2 basic steps: first, fitting a propensity score model (i.e. the estimated probability of treatment assignment conditional on observed baseline characteristics), and second, fitting 2 models that estimate the outcome under treatment and control conditions. Each outcome is then weighted by the propensity score from the previous step to produce a weighted average of the 2 outcome

models'. We estimate the AIPW model with the Stata package *teffects aipw*, and we report our results in Appendix 7. The main results of our paper all fully confirmed.

Results

Descriptive sample characteristics

Table 1 shows descriptive sample characteristics for all variables in the study. 75.8% of the sample continue to receive no care at follow-up (non-switchers). 18.5% begin to receive informal-only care, while 5.8% report receiving at least some formal home-care. Switchers have lower quality of life (31.4 and 31.3 compared to 35.3 on the CASP-12 score), and a higher number of depressive symptoms (above 4 compared to 3 EURO-D symptoms) than non-switchers. Switchers are – on average – older, in worse physical and cognitive health, lower-educated and less likely to work than non-switchers, both at baseline and follow-up. In line with previous research, respondents receiving informal-only care have a lower relative position in terms of household wealth than the rest of the sample (Floridi *et al.* 2021).

Associations of care use, socio-economic status, and health with well-being

As a preliminary step, we investigate the association between receiving informal-only/any-formal care (as opposed to no-care) and subjective well-being. Table 2 reports coefficients from the OLS models for CASP-12 and EURO-D on contemporaneous SES and health characteristics, at baseline and at follow-up. The coefficients show that there are no substantive differences in subjective well-being across categories of care use. At baseline but not at follow-up, individuals who receive informal-only care have very slightly lower quality of life (by 0.43 on the CASP-12 scale) and higher depressive symptoms (by 0.14 on the EURO-D scale). Both associations are negligible, corresponding to 0.001 standard deviations for CASP-12 and 0.06 standard deviations for EURO-D. Individuals at higher percentiles of wealth and with higher education generally report higher subjective well-being (Steptoe *et al.* 2015), as do individuals who are older. Relative to men, women report higher quality of life but also more depressive symptoms. As expected, contemporaneous health is strongly correlated with subjective well-being, with individuals in better self-rated, physical and cognitive health scoring

Table 1. Descriptive sample characteristics.

Variable	No care	Informal-only	Any-formal
CASP (mean)	35.30	31.38	31.28
EURO-D (mean)	2.99	4.28	4.75
Female (%)	63.06	67.21	65.75
Age (mean)	69.09	73.96	77.17
Baseline health			
SRH: excellent (%)	2.53	0.86	0.83
very good (%)	8.33	3.10	3.31
good (%)	30.02	18.50	23.42
fair (%)	41.16	43.55	38.02
poor (%)	17.96	33.99	34.44
IADL: (mean)	1.14	1.62	1.73
ADL: (mean)	0.66	0.92	0.90
Mobility limitations (mean)	3.21	4.57	4.46
Diagnosed cond. (mean)	2.15	2.58	2.54
Grip strength (mean)	30.36	26.37	24.49
Memory (mean)	8.05	6.73	6.26
Fluency (mean)	18.33	15.83	15.28
Follow-up health			
SRH: excellent (%)	2.24	0.77	0.82
very good (%)	9.79	2.84	1.92
good (%)	30.93	16.75	12.88
fair (%)	41.29	41.15	38.73
poor (%)	15.75	38.49	44.66
IADL: (mean)	0.63	1.85	2.58
ADL: (mean)	0.35	1.17	1.65
Mobility limitations (mean)	2.64	5.01	5.28
Diagnosed cond. (mean)	2.09	2.92	3.02
Grip strength (mean)	30.27	25.29	23.95
Memory (mean)	8.28	6.61	5.70
Fluency (mean)	18.49	15.22	14.65
Wealth percentile (mean)	44.01	39.82	41.62
Education: low (%)	53.39	65.30	61.52
intermediate (%)	32.02	25.54	25.58
high (%)	14.60	9.15	13.20
Number of individuals	4781	1165	365
% of total	75.76	18.46	5.78

higher on the CASP-12 and lower on the EURO-D scale. These cross-sectional differences between individuals are in line with previous studies on subjective well-being (Coe *et al.* 2021), but cannot be interpreted meaningfully in terms of the relationship between socio-economic and health traits and well-being, as they are heavily subject to the selection of individuals with different traits into reporting different subjective well-being scores (Steptoe *et al.* 2015).

Socio-economic differences in the association between care use and subjective wellbeing

Our research question asks whether the link between care use and well-being differs by relative wealth position within one's country, and

**Table 2.** OLS model for variation in CASP and EURO-D by care receipt, socio-economic status, and health, at baseline and follow-up.

	CASP				EURO-D			
	Baseline		Follow-up		Baseline		Follow-up	
	coef	st.err.	coef	st.err.	coef	st.err.	coef	st.err.
Care: none								
Informal only	-0.429	(0.147)**	0.094	(0.207)	0.142	(0.057)*	0.152	(0.083)
Any formal	-0.376	(0.218)	-0.266	(0.278)	0.011	(0.083)	-0.098	(0.111)
Wealth percentile	0.026	(0.002)***	0.023	(0.003)***	-0.004	(0.001)***	-0.001	(0.001)
Education: low								
Intermediate	0.498	(0.153)***	0.538	(0.217)*	-0.117	(0.060)*	-0.094	(0.087)
High	0.660	(0.200)***	0.559	(0.269)*	-0.084	(0.079)	-0.005	(0.109)
Female	0.558	(0.177)**	0.138	(0.244)	0.532	(0.068)***	0.528	(0.098)***
Age	0.039	(0.007)***	0.004	(0.012)	-0.036	(0.003)***	-0.026	(0.005)***
Self-rated health: excellent (ref)								
Very good	-1.603	(0.496)***	-0.405	(0.757)	-0.002	(0.195)	0.026	(0.312)
Good	-1.989	(0.453)***	-1.947	(0.696)**	0.505	(0.178)**	0.355	(0.288)
Fair	-3.692	(0.455)***	-3.901	(0.695)***	1.088	(0.179)***	1.026	(0.288)***
Poor	-5.934	(0.475)***	-6.660	(0.720)***	1.989	(0.186)***	2.107	(0.298)***
N. ADL limitations	-0.076	(0.059)	-0.032	(0.080)	0.080	(0.023)***	0.082	(0.032)**
N. IADL limitations	-0.237	(0.054)***	-0.479	(0.072)***	0.089	(0.021)***	0.155	(0.029)***
N. mobility limitations	-0.290	(0.032)***	-0.218	(0.044)***	0.086	(0.012)***	0.049	(0.018)**
N. diagnosed conditions	-0.106	(0.038)**	-0.228	(0.052)***	0.146	(0.015)***	0.139	(0.021)***
Grip strength	0.042	(0.008)***	0.016	(0.013)	-0.016	(0.003)***	-0.006	(0.005)
Memory	0.080	(0.022)***	0.053	(0.030)	-0.052	(0.009)***	-0.037	(0.012)**
Fluency	0.055	(0.011)***	0.048	(0.015)**	-0.013	(0.004)**	-0.018	(0.006)**
Country dummies	yes		yes		yes		yes	
Wave dummies	yes		yes		yes		yes	
N	7290		3735		8594		3905	

***, **, * indicate $p < 0.001$, $p < 0.01$, $p < 0.05$, respectively. Sample of individuals in 16 SHARE countries, who are aged 50 and over, with 1 IADL or 1 ADL limitation at baseline, and who do not receive any care at baseline.

educational attainment. To isolate changes within (rather than between) individuals, we adopt a lagged dependent variable approach in our main models. Table 3 reports the Average Marginal Effects (AME) with 95% confidence intervals for the association between beginning to receive informal-only and any-formal care and subjective well-being. These are obtained from the model described in equation (1) above, where health variables are controlled for at their baseline values. The models are fitted on the sample of non-attriters who do not receive any care at baseline but have at least one IADL or ADL limitation, after performing MICE with five imputations, and adjusted by IPW. The corresponding unweighted results are reported in Appendix Table A5.2, while the full regression coefficients are reported in Appendix Table A6.2.

When controlling for differential health status prior to the onset of care, beginning to receive both informal-only and any-formal care is associated with lower subjective well-being. On average, informal-only

Table 3. Average marginal effects with 95% confidence intervals for the association between onset of care and CASP-12/EURO-D. All health controls measured at baseline, with observations weighted by Inverse Probability Weighting.

CASP-12	Informal-only care		Any formal care	
	AME	95% CI	AME	95% CI
Wealth percentile				
10 th	-1.401	(-2.054; -0.748)***	-2.691	(-3.829; -1.552)***
30 th	-1.558	(-2.041; -1.074)***	-2.324	(-3.153; -1.494)***
50 th	-1.714	(-2.184; -1.244)***	-1.957	(-2.785; -1.128)***
70 th	-1.870	(-2.493; -1.248)***	-1.590	(-2.725; -0.454)***
90 th	-2.027	(-2.883; -1.170)***	-1.222	(-2.801; 0.356)
Education				
Low	-1.912	(-2.542; -1.282)***	-2.254	(-3.221; -1.287)***
Intermediate	-1.598	(-2.333; -0.862)***	-2.198	(-3.692; -0.705)***
High	-0.729	(-1.875; 0.417)	-1.106	(-3.246; 1.034)
EURO-D	Informal-only care		Any formal care	
	AME	95% CI	AME	95% CI
Wealth percentile				
10 th	0.699	(0.431; 0.965)***	1.164	(0.610; 1.717)***
30 th	0.763	(0.566; 0.960)***	1.153	(0.761; 1.544)***
50 th	0.827	(0.644; 1.011)***	1.142	(0.800; 1.484)***
70 th	0.891	(0.656; 1.128)***	1.131	(0.687; 1.574)***
90 th	0.956	(0.633; 1.279)***	1.120	(0.493; 1.748)***
Education				
Low	0.881	(0.639; 1.123)***	1.092	(0.644; 1.539)***
Intermediate	0.698	(0.406; 0.991)***	1.160	(0.470; 1.851)***
High	0.635	(0.109; 1.162)*	1.367	(0.574; 2.161)***
N. observations	4,278		4,278	
N. imputations	5		5	

***, **, * indicate $p < 0.001$, $p < 0.01$, $p < 0.05$, respectively. Sample of individuals in 16 SHARE countries, who are aged 50 and over, with 1 IADL or 1 ADL limitation at baseline, and who do not receive any care at baseline.

care is associated with a lower CASP-12 score by 1.6 points (equal to 0.25 standard deviations), while any-formal care with a lower CASP-12 score by 2.1 points (0.32 standard deviations). AMEs are calculated separately at different wealth percentile levels (10th, 30th, 50th, 70th, 90th) and by educational attainment (low, intermediate, and high). In all cases, for CASP-12 and EURO-D, we find no socio-economic gradients in the negative association between informal-only and any-formal care onset and subjective well-being. In fact, across wealth levels and educational attainment groups, the AMEs are broadly similar and in the same direction, and the confidence intervals widely overlap. This result is confirmed in both IPW-weighted (Table 3) and unweighted models (Appendix Table A5.2), so it is unlikely to derive from differential sample attrition probabilities across SES groups.

As discussed above, controlling for health at baseline does not account for changes in health between baseline and follow-up that may have led to both changes in subjective well-being as well as care receipt. In Table 4, we report AMEs and 95% confidence intervals by SES controlling for all health variables at follow-up, as specified in equation (2) above. The full model coefficients are reported in Appendix Table A6.3. When contemporaneous health is taken into account, we find no association between the onset of either form of care and subjective quality of life (as expressed by CASP-12). The overall AME for informal care is -0.35 (a decrease by 0.05 standard deviations) and not statistically significant. For any-formal care, the corresponding value is -0.25 and not statistically significant. For depressive symptoms, we do find some evidence of a small positive association with the onset of care ($+0.3$ for informal and $+0.4$ for formal). However, the AMEs are small (0.12 and 0.16 standard deviations for the EURO-D score, respectively). When addressing our main question of interest, we find no socio-economic gradients in the association by either wealth or educational attainment, as shown by the similar magnitude of the coefficients and overlapping confidence intervals. The same is true when the models are not weighted by IPW (Appendix Table A5.2).

Controlling for health changes between baseline and follow-up shifts the magnitude of the association between informal and formal care and well-being, but not its wealth and education gradients, which remain null for both outcomes under study. This suggests that the SES gradient in the association between informal care and well-being is unlikely to be heavily affected by health confounding, giving us confidence in the null result.

Table 4. Average marginal effects with 95% confidence intervals for the association between onset of care and CASP-12/EURO-D. All health controls measured at follow-up, with observations weighted by Inverse Probability Weighting.

CASP-12	Informal-only care		Any formal care	
	AME	95% CI	AME	95% CI
Wealth percentile				
10 th	-0.170	(-0.791; 0.450)	-0.255	(-1.392; 0.882)
30 th	-0.288	(-0.754; 0.178)	-0.251	(-1.093; 0.590)
50 th	-0.406	(-0.860; 0.048)	-0.248	(-1.052; 0.555)
70 th	-0.524	(-1.118; 0.070)	-0.245	(-1.296; 0.806)
90 th	-0.641	(-1.452; 0.169)	-0.242	(-1.684; 1.200)
Education				
Low	-0.557	(-1.150; 0.036)	-0.262	(-1.219; 0.696)
Intermediate	-0.353	(-1.075; 0.368)	-0.625	(-1.978; 0.727)
High	0.279	(-0.760; 1.318)	0.424	(-1.524; 2.372)
EURO-D	Informal-only care		Any formal care	
	AME	95% CI	AME	95% CI
Wealth percentile				
10 th	0.201	(-0.064; 0.467)	0.194	(-0.323; 0.710)
30 th	0.231	(0.028; 0.434)*	0.320	(-0.051; 0.691)
50 th	0.261	(0.072; 0.450)**	0.446	(0.129; 0.734)**
70 th	0.291	(0.059; 0.523)*	0.572	(0.177; 0.968)**
90 th	0.321	(0.012; 0.631)*	0.699	(0.147; 1.250)*
Education				
Low	0.303	(0.065; 0.542)*	0.297	(-0.140; 0.734)
Intermediate	0.170	(-0.131; 0.472)	0.496	(-0.100; 1.092)
High	0.163	(-0.321; 0.646)	0.740	(0.067; 1.413)*
N. observations	4,278		4,278	
N. imputations	5		5	

***, **, * indicate $p < 0.001$, $p < 0.01$, $p < 0.05$, respectively. Sample of individuals in 16 SHARE countries, who are aged 50 and over, with 1 IADL or 1 ADL limitation at baseline, and who do not receive any care at baseline

Control variables: SHARE baseline wave; country; sex; age; self-rated health; n. ADL; n. IADL; n. mobility limitations; n. diagnosed conditions; grip strength; cognitive functioning. The models for the stratification in wealth include controls for educational attainment.

Differences by country group

The apparent lack of a socio-economic gradient in the association between care receipt and well-being across 16 European countries could be due to differences across contexts averaging each other out towards zero. In Figures 2 and 3, we report AMEs with 95% confidence intervals by country group, indicating the predicted marginal change in the CASP-12 and EURO-D scores for care recipients by type of care onset relative to those continuing to receive no care at follow-up. These are obtained from separate models by country group, with sample sizes indicated in Appendix Table A2.2. Given the small sample sizes especially for some sub-groups, the AMEs need to be interpreted with caution and are mainly aimed at highlighting potential differences across contexts that may cancel one another out in the overall results.

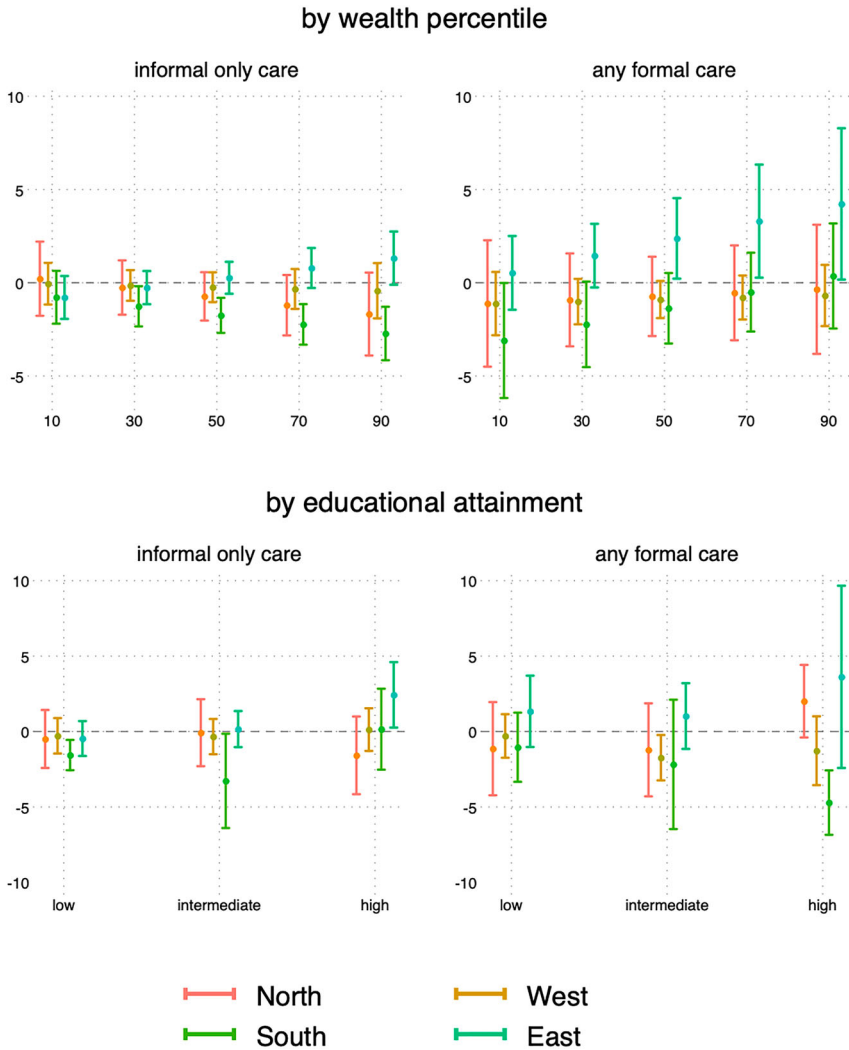


Figure 2. Predicted marginal change in CASP-12 scores for care recipients relative to those continuing to receive no care, by SES and country group. All health controls are measured at follow-up.

For each well-being measure, we report AMEs by wealth percentile and educational attainment. All control variables are held at their observed values, and health controls are measured at follow-up. In Appendix 6, we report the same figures with health controls measured at baseline.

Figure 2 shows that the absence of wealth or educational attainment gradients in the association between informal-only and any-formal care and quality of life (CASP-12) is reflected across all country groups. The

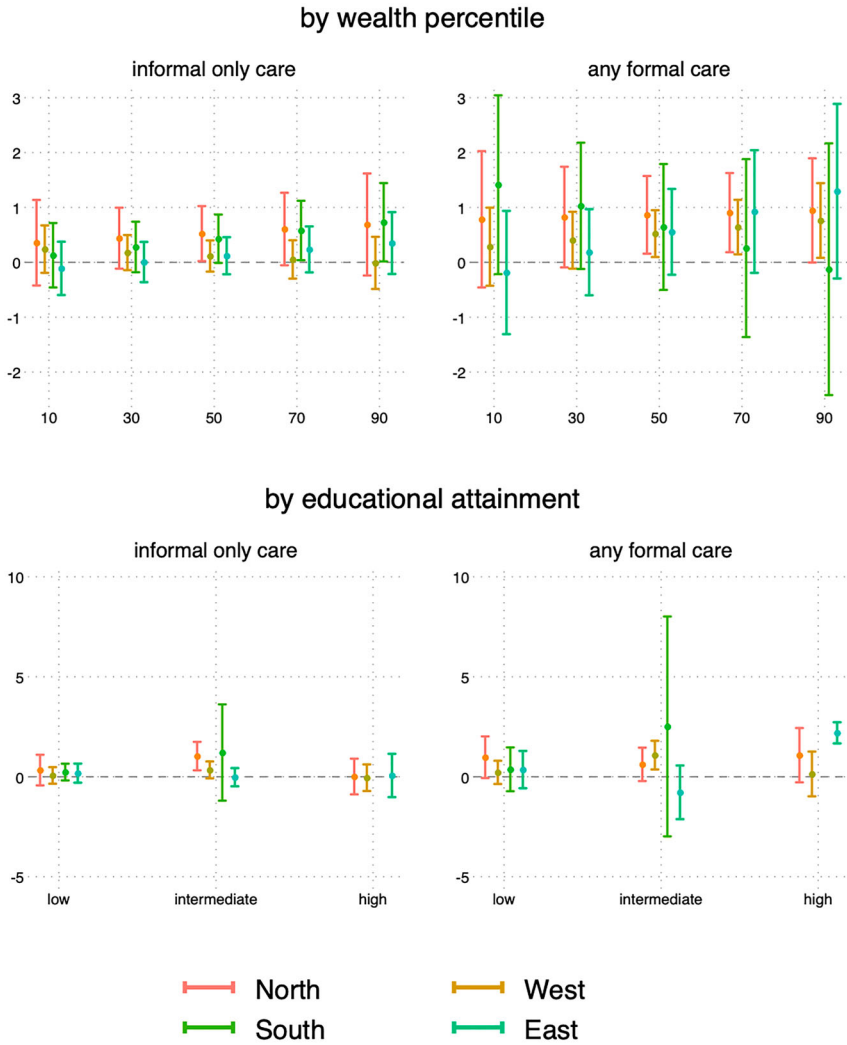


Figure 3. Predicted marginal change EURO-D scores for care recipients relative to those continuing to receive no care, by SES and country group. All health controls are measured at follow-up.

graphs suggest that, in Southern European countries, beginning to receive informal-only care is associated with lower quality of life, while in Western European countries the receipt of any-formal care is linked with marginally lower CASP-12 scores (−0.8 points overall, equal to 0.12 standard deviations for CASP-12 scores in Western Europe, and not conventionally statistically significant). In Eastern European countries, receiving informal-only care is associated with higher quality

of life among those with higher education (by 2.45 points, equal to 0.38 standard deviations), while receiving any-formal care is associated with higher CASP-12 scores for those at the 90th wealth percentile (by 2.92, equal to 0.46 standard deviations). However, no socio-economic gradients emerge, as shown by the overlapping confidence intervals for the AMEs across socio-economic groups. Holding health controls at baseline (Appendix Figure A6.1) gives similar SES gradients, with the only difference of a negative overall association between care onset and well-being as shown in Table 3.

Figure 3 displays AMEs for the EURO-D scale. It should be noted that, due to small sample size, AMEs for the association between formal care and EURO-D for higher-educated Southern Europeans could not be calculated. Again, we find no evidence of wealth or educational gradients in the association between informal-only care and well-being. For formal care, the small positive association between care onset and depressive symptoms is driven mainly by individuals in Northern and Western European countries having higher EURO-D scores after beginning to receive formal care. In Eastern European countries, we find an educational attainment gradient in the association between the onset of formal care and depressive symptoms. Within this care regime, formal care is not associated with EURO-D among individuals with low and intermediate education, but it is associated with significantly higher number of symptoms (by 2.15, equal to 0.88 standard deviations) for the higher-educated group. The same SES gradients are found when holding health controls at baseline (Appendix Figure 6.2), with a positive association between care onset and depressive symptoms as found in Table 3.

Discussion

This is, to our knowledge, the first study to test for socio-economic moderation in the association between care receipt and subjective well-being. We find no evidence of an association between beginning to receive care and subsequent quality of life as measured by CASP-12, and little evidence of an increase in depressive symptoms as measured by EURO-D subsequent to the onset of care. In either case, we find no wealth and educational attainment gradients in the association between informal and formal care with well-being. While our model specifications may not fully account for health confounding, we show that socio-economic gradients remain null for both outcomes regardless of whether we control

for baseline or follow-up health. Moreover, the absence of wealth or education gradients in the association is confirmed when conducting separate analyses by country groups that reflect different care contexts (Leitner 2003; Saraceno and Keck 2010). Overall as well as across SES groups, coefficients and AMEs for the association between care and well-being are substantively small. The only exception is a positive association between any-formal care and depressive symptoms among higher-educated individuals, but not among lower-educated individuals, in Eastern European countries. The results are confirmed whether or not the regression models are adjusted by IPW. Overall, these findings lead toward the conclusion of a null result, with little change in subjective well-being associated with changes in the receipt of care, and little variation across socio-economic groups.

The association between the onset of care and well-being is complex, and theoretical predictions come to opposite conclusions (Figure 1). Therefore, it is possible that the overall null association and the lack of SES gradients are the result of complex interactions between different factors. On the one hand, the null result may indicate that SES does not act as a moderator in the association between onset of care and subjective well-being through some of the mechanisms hypothesised (i.e. *social integration*, *self-perceived identity* and *perceived carer stress*). Our third hypothesis predicts a null socio-economic gradient in the association when SES acts to moderate the association of care and subjective well-being through *physical functioning*, and is most closely verified in the results. On the other hand, it may be that the severity of functional impairment that leads to care confounds the association between care receipt and well-being. Thus, our null result may be due to the contradictory relationships of the different factors involved; for example, the greater social integration subsequent to informal care receipt which we expect to be beneficial for well-being may coexist with greater perceived loss of autonomy or perceived carer stress, which would be negatively associated. The nature of the data at hand does not make it possible to separately test for the potential mediators of the association between care and well-being, nor their socio-economic stratification.

Our stratified analyses by country group suggest that the null SES gradients in the association between care and well-being are not the result of differences across contexts cancelling one another out, as we similarly find no wealth or educational attainment gradients in the association across care regimes. The main exception to our null result is a small positive association between formal care and elevated depressive symptoms

among higher-educated individuals in Eastern Europe. This finding contradicts our fourth hypothesis which predicts pro-rich inequalities in well-being due to those in lower-SES groups perceiving greater loss of autonomy due to formal care in comparison to those in higher-SES groups.

The overall implication of our results is that the re-familisation of care occurring across European countries may not generate inequalities in well-being. However, given the different potential reasons for the null result outlined above, more research on the topic is needed. Beyond the focus on care recipients, the re-familisation of care assumes that families will be able to take over the care responsibilities previously held by formal providers. Thus, the shift towards reduced emphasis on public care should be accompanied by greater support to informal caregivers, for example in the form of care leave schemes and services providing carer respite or additional resources (Courtin *et al.* 2014).

Our results emphasise the need for caution in interpreting the negative associations between care and well-being detected in cross-sectional or associational studies (Andersson and Monin 2017; Broese Van Groenou 2020). In general, for both types of care, we note that once follow-up health is controlled for, any negative association is very close to zero. This implies that receiving either form of care may be protective against the decline in well-being subsequent to health deterioration (Forder *et al.* 2018). As such, maintaining the availability of LTC options for older individuals – especially those without available family caregivers – should be prioritised in any LTC policy measure.

This study has limitations. As highlighted throughout the study, we cannot make causal claims about the association between the onset of care and well-being, due to the observational nature of the data as well as potential health selection as discussed above. Due to the small size of the samples for individual countries in SHARE, it is not possible to conduct separate analyses by country, and we resort to separate analyses by country group, which ignore the large variability in the availability and types of LTC provided across and within European countries as well as cultural differences in normative perceptions relating to care (Floridi *et al.* 2021). Similarly, while we acknowledge that changes in well-being upon care use may differ between men and women (Floridi *et al.* 2022), we prioritise the stratification of the analyses into separate country regimes, and leave sex/gender differences to explore as an important avenue for future research.

We focus on the relationship between changes in care and health over shorter periods in SHARE given the long breaks between some waves due to missing information, but recognise that longer-term associations may be different. We do not have information on quality of care, which is likely to be related to SES and well-being. Similarly, we do not have information on the frequency of care received in terms of hours, which would be helpful in determining individuals' care needs to better account for selection. Finally, we focus on two measures of well-being widely used in studies of the effects of formal and informal care: quality of life and depressive symptoms (i.e. CASP-19 and EURO-D) (Coe *et al.* 2021). However, as a recent review shows, these measures only capture one of several dimensions of well-being; namely, subjective psychological well-being. Receipt of care may impact other dimensions of well-being such as social (i.e. social interactions and connections to others), physical (i.e. experiences of pain or discomfort) or spiritual well-being (i.e. connection to something greater than oneself) (Linton *et al.* 2016). In addition, we use the composite scores of both indicators to capture well-being rather than separately investigating each of the domains or items. While using composite measures is likely to increase their reliability as it is based on multiple rather than single indicators, nonetheless this may mask differences between individual indicators and detail on specific dimensions may be lost (Kara *et al.* 2022). Nevertheless, our study provides a first investigation of SES differences in the association between care onset and well-being for disabled older adults. Our review of the existing literature shows that the onset of informal and formal care may influence well-being through a variety of psychological and practical mechanisms. Future research will benefit from data collection on psychological aspects of care need and care use, including social integration, relationships with caregivers, and perceived quality of care.

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Data availability statement

This study uses data from the SHARE survey, available upon registration at <https://share-eric.eu/>. The full replication code for this article can be downloaded from <https://ginevrafloridi.com/#/research>.

ORCID

Ginevra Floridi  <http://orcid.org/0000-0003-1417-2631>

Ludovico Carrino  <http://orcid.org/0000-0002-5082-5508>

Karen Glaser  <http://orcid.org/0000-0002-4436-1305>

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