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IZA DP No. 11545

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ABSTRACT

The Shadow Prices of Voluntary Caregiving: Using Panel Data of Well-Being to Estimate the Cost of Informal Care

This paper uses the wellbeing valuation (WV) approach to estimate and monetize the wellbeing impacts of informal care provision on caregivers. Using nationally representative longitudinal data from the U.K., we address two challenging methodological issues related to the economic valuation of informal care: (i) the endogeneity of informal care; and (ii) the sensitivity of income estimates used in valuation. We address the endogeneity issue by decomposing wellbeing losses into those associated with caring for a relative who had recently suffered a serious accident and those associated with caring for a relative who had not had an accident. We use of the Fixed Effects Filtered (FEF) estimator to enable the permanent income coefficient to be estimated free from individual fixed effects bias. This estimate is used instead of the transient income effect in the calculation of shadow prices of informal care. Our estimates suggest that permanent income would have to increase by approximately £102k per year on average to just compensate for the wellbeing losses from providing informal care.

JEL Classification: H8, I18, I31

Keywords: informal care, well-being, compensation variations, permanent income, happiness, shadow prices

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1. Introduction

Caring for a family member with a severe disability and/or long-term illness imposes substantial financial and emotional burdens on the voluntary caregivers. Yet, the non-pecuniary cost of caregiving has often been neglected in previous attempts to estimate the societal cost of informal care (e.g., Smith and Wright, 1994; Posnett and Jan, 1996; Arno et al., 1999; Hayman et al., 2001). One reason for this omission is that it has been more straightforward, at least in the past, for researchers to estimate the market value of the care provided by unpaid family members and friends (e.g., using the average weekly number of caregiving hours and average hourly wages of professional caregivers to calculate the average weekly market value of caring per case) and assume that the estimated figures would be enough to compensate for the negative effects of caring on caregivers' experiences. However, there is no compelling reason to suppose that the market value derived from a professional care-giving market accurately reflects the experience of individuals providing voluntary care.

To take into account the experiential implications of voluntary caregiving, recent studies have adopted a new approach – the well-being valuation (WV) method – in their estimation of the monetary value of informal care (e.g., van den Berg and Ferrer-i-Carbonell, 2007; Koopmanschap et al., 2008; Bobinac et al., 2010). This approach involves taking a randomly-selected representative sample of individuals, asking them to rate their experiences such as their life satisfaction or their momentary happiness, and then using regression techniques to work out the implied "shadow price" of informal caregiving, i.e., the additional income required to just compensate – no more, no less – for the well-being losses experienced by voluntary caregivers.

In the WV approach, the outcome is a direct measure of subjective experienced utility, whilst in the stated preference approach it is based on choices and *ex ante* statements of preference that are not always consistent with *ex post* experiences. For these reasons, the WV method has been considered by a growing number of economists as preferable to the revealed and stated preference approaches in the valuation of non-market goods (e.g., Clark and Oswald, 2002; Dolan and Kahneman, 2008). However, while previous WV studies have provided important information about the magnitude of the experiential cost of caregiving to society, the existing approach suffers from at least two major limitations. First, there has been very little attempt in the literature to establish causality between informal care and measures of experienced utility.

And second, no consensus has been reached over which measure of income should be used in the calculation of shadow prices. Currently, the income coefficient of choice is the estimated income coefficient obtained from an individual fixed effects (FE) regression equation, which often produces shadow prices that are too large to be considered realistic.

The current study makes use of two innovations that address each of these issues in turn. The first is to focus on informal care provision following the care receiver being involved in an accident, which helps to ensure causality. The second is to apply the fixed effects filtered (FEF) estimator introduced by Pesaran and Zhou (2016), which allows both permanent and transient income coefficients to be estimated free from individual fixed effects bias and then used in the calculation of the shadow prices or the compensating variation (CV) of informal care. Based on our estimates, we find that the average person would require an increase in their permanent income of around £102,000 to just compensate them for providing such care for a family member who had a serious accident in the previous twelve months. These estimated CVs are notably smaller than those obtained using the estimated transient income coefficient, which are around £3,843,000.

2. Background

2.1. Informal care in the UK

The definition of informal care includes both personal and practical care provided by a member of one's own or another household. The Office of National Statistics (ONS) further defines personal care as "help with activities such as dressing, bathing, washing and feeding" and defines practical care as "help with activities such as mobility (for example, getting out of bed) and paperwork or financial matters" (ONS, 2016). In 2014, just over 2 million people in UK were in receipt of informal care, a figure that had been broadly stable since 2005. However, receipt of full time informal care has risen and, driven by an increase in the proportion receiving continuous (or "round-the-clock") care, the total number of hours of informal care provided has also increased by 24.9% over that period. According to the 2011 census, the ONS (2013) estimates that 5.8 million people in England and Wales were providing some level of unpaid care, amounting to around one in ten members of the population.

These figures highlight the importance of informal care as a complement to, and in some cases a substitute for, formal care provided by the National Health Service and private health care.

In a report for the King's Fund, Malley et al. (2006) suggest that the current reliance on informal care is unsustainable, since the demand for informal care is predicted to rise by around 45 per cent between 2003 and 2026. Providing informal care comes at a high cost to the carer. Some of these costs are directly incurred, such as an additional expenditure on heating and medical supplies, loss of income (Ettner, 1996; Carmichael and Charles, 2003[1]; Heitmueller and Inglis, 2007), and a detriment to pension holdings. However, the indirect and non-financial costs can also be significant. For example, voluntary caregivers have been found to experience deterioration in their personal relationships, as well adverse effects on their own physical and mental health (e.g., van Den Berg et al., 2004; Wolff and Agree, 2004; Schulz and Sherwood, 2008).[2]

Given the significant personal indirect costs of caregiving, it is surprising that the majority of previous research has focused almost exclusively on the estimation of the market value of the time input of the carer (e.g., Smith and Wright, 1994; Posnett and Jan, 1996), and using a proxy good method[3] to value the opportunity cost of time spent providing informal care (e.g., Van den Berg et al., 2006). Van den Berg et al. (2014) highlight the lack of studies aiming to place a value on the indirect costs, and address this gap using perhaps the most comprehensive subjective well-being estimation of the value of informal care. We address this and other relevant literature in what follows.

2.2. The Well-being valuation (WV) method

The WV method involves estimating a regression equation in which a measure of experienced utility (e.g., life satisfaction or momentary happiness) is explained by the occurrence of life events and some measure of income, among other things (see, e.g., Erik et al., 1995; Clark and Oswald, 2002). The relative size of the coefficients on income and a life event of interest, *X*, reveals an implicit rate of substitution between the two variables. More specifically, the ratio of these coefficients represents **how much additional income would be required to generate**

[1] In interesting extensions, Heitmueller (2007) and Carmichael and Charles (2010) explore the reverse relationship, with those earning more being less willing to provide informal care.

[2] While informal caregiving is likely to impose a significant burden on caregivers, there is also some evidence suggesting that caregivers may also gain from becoming closer to a significant other (e.g., Jacob et al., 2003; Andrén and Elmståhl, 2005; Zapart et al., 2007).

3 In the Proxy Good method (also referred to as the replacement cost method), informal care time is valued based on a close substitute with a market price, for example the wage rate of a professional caregiver.

a wellbeing gain that 'just' equals to the wellbeing effect associated with the occurrence of X, or to just offset the wellbeing loss if the effect of X is negative.

Over the last two decades, there has been a growing use of the WV method in the economics literature to monetize many different occurrences in life that have no obvious market values. This includes, but is not limited to, the values of marriage (Blanchflower and Oswald, 2004), the extent of social relationships (Powdthavee, 2008), terrorism (Frey *et al*., 2009); air quality (Luechinger, 2009), airport noise (van Praag and Baarsma, 2005), and crime (Powdthavee, 2005).

More notably, the WV approach has been gaining significant attention in health economics as an alternative to the more traditional Stated Preference (SP) approach when it comes to determining the monetary valuation of changes in health (e.g., Ferrer-i- Carbonell and van Praag, 2002; Powdthavee and van den Berg, 2011; Graham et al., 2011; Howley, 2017). This rise in prominence is largely down to how 'utility' is conceptualized differently between the WV and the SP approaches. While the SP method attempts to elicit people's preferences over different hypothetical situations, the WV method argues that the impact of a health state on individual's utility is defined not by how we expect it to be, but instead by the degree to which we attend to that condition in the experience of our lives (Dolan and Kahneman, 2008; Dolan et al., 2009). As a result, the WV method, which elicits people's experiences directly without drawing their attention towards the health condition in question, suffers less from the cognitive pitfalls of the SP approach, including the focusing effect (Schkade and Kahneman, 1998), the inability to accurately predict our future emotional states, our underestimation of our ability to adapt to adverse life events (Wilson and Gilbert, 2003), and the strategic misreporting of preferences (Samuelson, 1954).

One of the first attempts to use this WV approach to monetize the experience of providing informal care was a study by van den Berg and Ferrer-i-Carbonell (2007).[4] In their study, participants were recruited from support centres specifically for carers. Participants completed questionnaires about their caring responsibilities, including an estimate of the SWB. They also provided contingent valuation responses, specifically their willingness to accept for

[4] It is worth noting that other studies examined the relationship between informal care and caregivers' well-being, but did not attempt to estimate monetary values of informal care provision. These include Oshio (2015) and Niimi (2016) in Japan; Bobinac et al. (2010) in the Netherlands; and Hansen et al. (2013) in Norway.

undertaking an additional hour of care. Using the log of net income per month as the income measure of choice, the results of the WV analysis suggests that an extra hour of informal care is worth about 9 or 10 Euros, and that this result was broadly aligned to the contingent valuation figures of between 9 and 11 Euros. Unfortunately, the study is limited by its cross-sectional design in that the authors were not able to correct for the unobserved omitted third variables that simultaneously affect both informal care and income estimates. Moreover, there is also a potential selection effect in the way the sample was collected, since people who participated were older, more likely to have an illness, and likely to provide more hours of care than the national average.

These concerns prompted van den Berg et al. (2014) to conduct a more sophisticated analysis using the Household Income and Labour Dynamics in Australia (HILDA) survey, which is a nationally representative longitudinal dataset for Australia. The panel estimation controls for underlying time-constant variables that could influence both caregiving and subjective wellbeing, such as home environment and personality traits. Conditioning for individual fixed effects, their panel estimates imply that the money equivalent of informal care per hour is 115.20 Australian dollars.

Mentzakis et al. (2012) considered the potential differences between different well-being measures for valuing the cost of informal care. They used the British Household Panel Survey (BHPS), and again exploited the longitudinal nature of the data to control for time invariant confounding factors. Controlling for individual fixed effects, they found that a person providing up to 20 hours of care a week would require between £2,000 and £9,000 additional income per week to be just as happy as if they were not providing that care. The wide range of CVs reflects the differences between measures of well-being, with the CVs produced by life satisfaction being significantly smaller than the CVs produced by the General Health Questionnaire (GHQ-12) scores.[5]

Subsequently, Schneider and Kleindienst (2016) used the 2006–2007 Survey of Health Ageing and Retirement in Europe to provide a cross-country estimate of the effect of informal care provision for family members not living in the same household as the carer. They reported a

[5] The differences in the size of the CVs found in Mentzakis et al. (2012) is consistent with the findings reported in Powdthavee and van den Berg (2011).

positive net effect of providing "moderate" informal care that is equivalent to receiving €93 per week. This positive association between informal care and caregivers' life satisfaction may appear surprising given the negative association that dominates in the rest of the literature, but it could potentially be explained by the fact that caring is provided for someone *outside* the household. They find that providing informal care reduces caregivers' life satisfaction when care is provided for more than 30 hours per week, which is more consistent with previous findings in the literature.

Taken together, the existing literature suggests that there is a negative and statistically robust association between informal care and measures of subjective well-being of caregivers, and that when aggregated across populations and monetized using the WV method, this burden on society is significant in economic terms. However, in order for the WV estimates of the cost of informal care to be taken seriously by health economists and policy makers, the issues concerning (i) causality of informal care and (ii) income specification used in the calculation of shadow prices must be addressed. We address both issues simultaneously in the same single regression equation.

2.3. Causality of informal caregiving

There is little empirical evidence on the causal relationship between providing informal care and carers' subjective wellbeing. Many of previous studies are cross-sectional in nature (e.g., Van den Berg and Ferrer-i-Carbonell, 2007; Schneider and Kleindienst, 2016). Even those that used longitudinal data to study the relationship lack a clear causal story, since there may exist time-varying unobserved factors that simultaneously increase the propensity for caregiving and reduce well-being. In many cases, the provision of informal care increases gradually over time, which ultimately complicates the interpretation of panel data analyses since future informal care provision may be anticipated by potential caregivers, and well-being might change to reflect this in the years leading to individuals becoming carers in the data. This leading effect, if not controlled for in the estimation, can result in an underestimation of the influence of informal care provision on carers' well-being. Another concern is whether the distribution is randomly allocated across the population, since confounding factors such as the level of health or income could influence the probability of requiring and providing informal care.

We address the question of causality by exploiting the longitudinal nature of the data, and adding an additional identifying feature. This is the provision of informal care for someone in the household who has experienced a serious accident between the previous year's and the current year's surveys. The key identifying assumption here is that, conditioning on individual fixed effects that are likely to include personality traits, risk attitudes, and stable environmental features, there is zero anticipation of caregiving for people in this group. In other words, an accident that leads to the need for care is assumed to be exogenous across the sample, which cannot be said for a deterioration in health that leads to the need for care.

2.4. Income estimate

Another major criticism of the WV method is that income is endogenously determined in well-being regressions (Powdthavee, 2010; Fujiwara, 2013)[6]. One way to partially correct for this endogeneity problem is to apply a fixed effects (FE) model on the well-being data, which allows researchers to partial out the time-invariant effects that would otherwise confound the income estimate (Ferrer-i-Carbonell and Frijters, 2004). Yet, the FE model will likely yield an estimated income coefficient that is very small in size – due in part to the attenuation bias typically associated with the FE model – that, in turn, produces estimated CVs that are often too large to be taken seriously by policy makers (Powdthavee, 2010).

Another drawback of the FE model is that it only uses the within variance and disregards the between variance, which means that it does not allow the estimation of time-invariant variables (Baltagi, 2001; Hsiao, 2003). This implies is that all of the income estimates produced by the FE models in previous studies are essentially estimates of the transient income effect on individual's well-being. Yet, according to a recent study by Cai and Park (2016), individual's well-being is more likely to be influenced by permanent rather than transitory income shocks. Their findings are consistent with Friedman's permanent income hypothesis, which assumes

[6] There is also another major criticism of the WV approach, and that is the size of the estimated income coefficient appears to vary significantly across different well-being measures (Powdthavee and van den Berg, 2011). While this is also an important issue that requires further debates and discussions, recent studies have since recommended life satisfaction to be the well-being measure of choice for policy makers to target when designing policies (Clark et al., 2017). There are several reasons for this recommendation. First, it is comprehensive – it refers to the whole of a person's life. Second, it is clear to the reader – it requires no process of aggregation by researchers. Third, it is democratic – it allows individuals to assess their lives on the basis of whatever they consider important to themselves without imposing anybody else's views of what emotions or experiences are valuable. Finally, and most importantly, it has a history of having a robust statistical relationship with income.

that a person's consumption is determined not only by current income but also expected income in the future as well (Friedman, 1957). Building upon this logic, one might argue that a more appropriate income measure in the calculation of CVs is not transient but permanent income, which is likely to either be slow-moving or time-invariant in panel data.

We attempt to address this methodological issue in our paper by applying Pesaran and Zhou's Fixed Effects Filtered (FEF) estimator on our well-being data (Pesaran and Zhou, 2016), which enables both transient and permanent income coefficients to be estimated simultaneously free from individual fixed effects bias.

3. Data

The dataset comes from the British Household Panel Survey (BHPS). This is a nationally representative sample of the UK population, containing over 25,000 unique individuals over 18 years. The survey has been conducted mainly between September and Christmas of each year from 1991 to 2009 (Taylor et al., 2002).

For our main outcome variable, we draw on the life satisfaction question in the BHPS, which was included as part of the self-reported section of the survey from wave 6 to 18 (with one exception in wave 9). The exact wording in the BHPS is: "*All things considered, how satisfied or dissatisfied are you with your life overall using a 1-7 scale? 1 = very dissatisfied, ..., 7 = very satisfied*".

In every wave of the BHPS, the respondents are asked, "*Is there anyone living with you who is sick, handicapped or elderly whom you look after or give special help to (for example, a sick or handicapped (or elderly) relative/husband/wife/friend, etc.)?*", and, "*Who is the (sick, handicapped, or elderly) person/people you look after?*". They are also asked, "*How many hours a week are spent caring, categorising this in bands of hours (0-4h; 5-9h; 10-19h; 20-34h; 35-49h; 50-99h; 100+h), or as continuous care?*". The data also records whether care is provided for more than or less than 20 hours per week, in cases where duration of care varies from week to week.

Each wave also asks each respondent whether he or she had an accident in the last 12 months, "*Since [T-1], have you had any kind of accident as a result of which you saw a doctor or went*

to hospital?", where T-1 is one year previously. We then matched the respondent's caring variable with other family members' accident to generate the "*Caring for other household members who had an accident in the last 12 months*" variable.

To assess the severity of the accident, we use two variables that had been derived from the following questions: "*Does your health in any way limit your daily activities compared to most people of your age?*", and "*Does your health limit the type of work or the amount of work you can do?*". We classify a person as having had a severe accident if they state that their health limits their work and their daily activities. We classify the accident as moderate if they self-report to have had an accident in the last 12 months, but their current health does not limit their daily activities/work activities.

With respect to the income variable, we use log of real equivalised household income (otherwise known as "OECD equivalence income scale"), which allows different weights to be assigned to each child (0.5) and each additional adult (0.7) in the household. The log of real equivalised household income variable is averaged within-person over time to create a measure of permanent income.

We use data from Waves 6-18 in the BHPS[7]. We restrict the sample to contain those of working age (16-65) with information on life satisfaction and informal care. This yields an unbalanced sample of 129,524 observations (23,091 unique individuals) in total. Approximately 5.5% of respondents (or 7,171 observations) in our sample provide informal care for at least one member of the household (5.1% of men, 5.9% of women). Of those informal carers, 8.3% provide care following an accident befalling the person being cared for (8.9 % for male carers, 7.9% for female carers). The proportion providing 100 or more hours of informal care per week is 1.12% of the sample aged up to 65.[8]

To get a sense of the correlation between life satisfaction of carers and non-carers, Figure 1 reports the average life satisfaction of non-carers, carers of a non-accident victim, and carers of an accident victim. We can see that the average life satisfaction scores of carers are noticeably lower than those of non-carers, on average. In addition, there appear to be some

[7] Note that life satisfaction (and domain satisfaction) is not asked of respondents in Wave 11 of the BHPS.
[8] See Appendix A1 for descriptive statistics.

differences in terms of average life satisfaction between carers of accident victims and carers of people who did not have an accident, though these differences may not be statistically significantly different from zero at least in the raw data.

4. Empirical strategy

Consider the following life satisfaction regression equation:

$$LS_{it} = \alpha + \gamma C_{it} + \beta \ln y_{it} + \delta \ln Y_i + X'_{it}\theta + u_i + \varepsilon_{it}, \quad (1)$$

where $i = 1, 2, \ldots, N$; $t = 1, 2, \ldots, T$; LS_{it} is self-reported life satisfaction score for individual i in time t; C_{it} is a dummy variable representing caring for other family members; $\ln y_{it}$ is a log of transient income that varies across i and t; $\ln Y_i$ is a log of permanent income that only varies across i; X'_{it} is a vector of individual characteristics; u_i is the unobserved individual-specific effects; and ε_{it} is the random error term. It is clear from Equation (1) that, without further restrictions on u_i, δ cannot be easily identified in a cross-sectional regression.

To estimate δ, we utilize the longitudinal nature of the BHPS and apply the FEF estimator to equation (1)[9], which can be computed using the following two-step procedure:

Step 1: Using equation (1), compute the individual fixed-effects estimators of γ, β and θ, denoted by $\hat{\gamma}, \hat{\beta}$ and $\hat{\theta}$, and the associated residuals $\hat{\varepsilon}_{it}$, which is defined by

$$\hat{\varepsilon}_{it}, = LS_{it} - \hat{\gamma} C'_{it} - \hat{\beta} \ln y_{it} - \hat{\theta} X'_{it}, \quad (2)$$

Step 2: Compute the within-person averages of these residuals, $\bar{\hat{\varepsilon}}_i = T^{-1} \sum_{t=1}^{T} \bar{\hat{\varepsilon}}_{it}$. Regress $\bar{\hat{\varepsilon}}_i$ on $\ln Y_i$ with an intercept to obtain $\hat{\delta}_{FEF}$, where

[9] Alternative models to FEF estimator include Fixed Effects Vector Decomposition (FEVD) (Plumper and Troeger, 2007) and, in the case where one or more of the time-invariant regressors are endogenous and there are valid instrumental variables (IVs), the Hausman-Taylor random coefficient panel data model (Hausman & Taylor, 1981). Given that we do not have valid IVs for our time-invariant variables and that the variance estimator proposed for FEVD estimator is inconsistent (Green, 2011; Breusch et al., 2011), our preference is to use FEF model, which has been shown to be consistent under fairly general conditions. In addition to this, the FEF model has been shown to produce estimates with extremely small bias even with N=100 (Note that N=94 in most cases in our paper).

$$\hat{\delta}_{FEF} = \left[\sum_{i=1}^{N}\left(\ln Y_i - \overline{\ln Y}\right)\left(\ln Y_i - \overline{\ln Y}\right)'\right]^{-1} \sum_{i=1}^{N}\left(\ln Y_i - \overline{\ln Y}\right)\left(\bar{\hat{\varepsilon}}_i - \bar{\hat{\varepsilon}}\right)', \quad (3)$$

and

$$\hat{\alpha}_{FEF} = \bar{\hat{\varepsilon}} - \hat{\delta}'_{FEF}\bar{Y}, \quad (4)$$

where $\bar{\hat{\varepsilon}} = N^{-1}\sum_{i=1}^{N}\bar{\hat{\varepsilon}}_i$.

Hence, the FEF estimator produces a set of coefficients that are important for the calculation of the CVs for informal caregiving: the coefficients on informal caring, transient income, and permanent income that are orthogonal to individual fixed effects. Given that informal caregiving, C_{it}, can be further decomposed into caring for accident and non-accident victims, we can reasonably assume that caring for an accident victim is exogenously determined in a fixed effects regression (i.e., $COV\left(C_{it}^{accident}, \varepsilon_{it}\right) = 0$), whereas caring for a non-accident victim is relatively more likely to be confounded by unobserved time-varying factors that correlate with both informal caring and life satisfaction. Unfortunately, we are unable to find a valid instrumental variable for permanent income, which implies that $\hat{\delta}_{FEF}$ is still subject to omitted time-varying bias. Yet, given that we are able to correct for the unobserved heterogeneity bias in $\hat{\delta}_{FEF}$, and that life satisfaction and permanent income are both largely determined by factors that are fixed over time (e.g., ability, early life circumstances, personality traits), we believe that the true estimate of $\hat{\delta}$ is not too unbelievably different from our estimated version of $\hat{\delta}_{FEF}$. Nevertheless, we would still urge readers to exercise cautions when interpreting the permanent income coefficient.

With that in mind, in order to calculate (i) the transient income loss equivalent to providing care for an accident victim, and (ii) the permanent income loss equivalent to providing care for an accident victim, we simply compare the size of caring for an accident victim coefficient ($\hat{\gamma}$) with the size of the coefficients on transient income ($\hat{\beta}$) and permanent income ($\hat{\delta}_{FEF}$), respectively. Given that the income is in a log form, the shadow price formula for providing care for an accident victim can be written as:

$$\hat{\beta}\ln\left(y + CV_{Care\_acc}^{Tran\_inc}\right) - \hat{\gamma} = \hat{\beta}\ln y,$$

which can be rearranged to give

$$\ln\left(y + CV_{Care\_acc}^{Tran\_inc}\right) = \ln y + \frac{\hat{\gamma}}{\hat{\beta}},$$

$$CV_{Care\_acc}^{Tran\_inc} = y \times \left(\exp\frac{\hat{\gamma}}{\hat{\beta}} - 1\right), \quad (5)$$

and

$$CV_{Care\_acc}^{Perm\_inc} = Y \times \left(\exp\frac{\hat{\gamma}}{\hat{\delta}_{FEF}} - 1\right), \quad (6)$$

where $CV_{Care\_acc}^{Tran\_inc}$ and $CV_{Care\_acc}^{Perm\_inc}$ are the estimated CV or "shadow price" required to compensate an average person for the provision of informal accident care using transient income and permanent income, respectively. The intuitive explanation is that, holding other things constant, a person providing informal care for a family member who had an accident in the last year with a transient income of $y + CV_{Care\_acc}^{Tran\_inc}$ **or** a permanent income of $Y + CV_{Care\_acc}^{Perm\_inc}$ will have the same level of life satisfaction as someone who is not providing informal care with a transient income of y or a permanent income of Y. Based on previous studies on the effect of transient and permanent income on life satisfaction (e.g., Powdthavee, 2010; Cai and Park, 2016), it is conjectured that $CV_{Care\_acc}^{Tran\_inc} \geq CV_{Care\_acc}^{Perm\_inc}$.

Pooled OLS can be used to estimate $\hat{\delta}_{FEF}$. However, the current study uses the STATA code "*xtfef*", which was originally generated by Qiankun Zhou, to run the regression model. We include the standard control variables in all of the FEF regressions reported in this study. These control variables include age and its square, dummies for different levels of education, marital status, employment status, self-assessed health, the number of days spent in hospital in the last 12 months, the number of children in the household, the proportion of "other" household members who had a serious accident within last year (whether or not they are being cared for by the respondent), regional dummies to control for geographical variation, and survey wave identifiers.

One objection of Eq. (1) is that life satisfaction of the carer is affected not only by providing informal care, but also by the shock and/or empathy of having a family member going through a serious accident in the past year. In an attempt to separate the two effects, we also include, as separate control variables, the number of "other" household members who had a serious accident in the last year in all of our regressions.

5. Results

We report in Table 1 a selected set of the first- and second-stage FEF life satisfaction estimates for the entire sample, as well as for men and women separately. The first-stage FEF estimates, which are fixed effects estimates on the time-varying variables, include estimates for providing and receiving informal care with and without a preceding accident, proportion of "other" household members who had a serious accident within last year, being a widow/widower, and log of real equivalent household, i.e., transient income. For the second-stage, we only have a between-person estimate for the within-person average log of real equivalent household, i.e., permanent income.

Looking at the full sample estimates reported in Column 1, we can see that all six of the selected life events exhibit negative and statistically significant coefficients, whilst both transient and permanent income measures enter the FEF regressions in a positive and statistically well-determined manner. One of the largest negative effects on life satisfaction comes from bereavement; becoming a widow is associated with a statistically significant decline of around 0.22 points in life satisfaction, on average. This is closely followed by the effect of having experienced an accident in the last 12 months and being cared for by another household member; the coefficient associated with having an accident and being cared for is -0.20 with a standard error of 0.07. The third most negative effect is looking after a family member who had an accident within the last 12 months ($\beta = -0.192$, $S.E. = 0.050$); followed by having not had experienced an accident but being cared for by another household member ($\beta = -0.129$, $S.E. = 0.038$); caring for other household member who did not have an accident within the last 12 months ($\beta = -0.087$, $S.E. = 0.023$); and having one household member (other than the respondent themselves) who had an accident within the last 12 months ($\beta = -0.046$, $S.E. = 0.023$). Finally, we can see that the estimates for transient and permanent incomes are 0.035 ($S.E.$ = 0.006) and 0.096 (S.E. = 0.024), respectively.[10] Consistent with Cai

[10] It is worth noting that running a random-effects model – in other words, not filtering out the individual fixed effects from biasing the permanent income estimate – produces an estimated permanent income coefficient of

and Park (2016), we also find the estimated coefficient of permanent income to be significantly larger than that of the transient income in a life satisfaction regression equation.

Finally, there are some notable differences in the estimated coefficients across genders. Women report statistically significantly lower life satisfaction for all of the life events in Table 1, except for the proportion of other members of the household who had a serious accident during the year. In contrast, men do report a statistically significantly lower life satisfaction in this case, but not in the year of becoming a widower, nor when caring for another household member who did not have an accident.

How much additional income is required to offset the negative well-being effect of informal caregiving? To answer this question, Table 2 reports the CVs, using either transient or permanent income coefficient, for all of the life events listed in Table 1. Looking at the full sample estimates, we find that an average individual with a real equivalent income of £16k would require an additional income of $£16{,}000 \cdot e^{\frac{0.192}{0.096}} = £102$k (that is, approximately $144k US dollars) in the first year of caring to compensate for having to care for a family member who recently had an accident if the permanent income coefficient is used in the calculation of the CV. On the other hand, the same individual would require a staggering extra income of $£16{,}000 \cdot e^{\frac{0.192}{0.034}} =$£3,843k (or approximately £3.8 million/$5.4 million US dollars) if the transient income coefficient is used in the calculation of the CV. Note also that these estimated CVs are significantly larger than the CVs obtained for caring for family members who did not have an accident within the last 12 months.

It should also be emphasized here that the estimated CV of £102k is **independent** of the hedonic damage from having one other household member experienced a serious accident in the last 12 months. That estimated CV is approximately $£16{,}000 \cdot e^{\frac{0.046}{0.096}} = £10$k in the first year following the accident, which interestingly is similar to the currently lump sum payment of £12,980 that is typically being given to the bereaves in the UK courts by the Fatal Accidents Act 1976. Hence, this makes the total effect of informal caring and hedonic damage suffered by the carer from having a family member experienced a serious accident would be £102k +

0.108 (S.E. = 0.013), which is approximately 12.5% larger than the FEF coefficient on permanent income. Hence, the FEF model appears to be successful at filtering out any omitted time-invariant variables such as innate ability, early life family background, and personality traits that place an upward bias on the permanent income coefficient.

£10k = £112k in the first year. However, we will keep these two effects separated and shall be focusing on the caring effect only when discussing the CV for informal caregiving.

Splitting the sample by gender, the estimated CVs for informal caring for an accident victim range from £36k (permanent income) to £477k (transient income) for men[11], and £151k (permanent income) to an unbelievable £47.6 million (transient income) for women.

Looking at other estimated CVs that utilised the permanent income coefficients, we can see that they range from a small, statistically insignificant increase of $£16{,}000 \cdot e^{\frac{0.010}{0.123}} = £1\text{k}$ in permanent income for men providing non-accident care, up to $£16{,}000 \cdot e^{\frac{0.267}{0.099}} = £221\text{k}$ for a woman who had become a widow. For CVs that utilised the transient income coefficients, these equivalent estimates range from $£16{,}000 \cdot e^{\frac{0.010}{0.042}} = £4\text{k}$ for the men providing non-accident care, up to $£16{,}000 \cdot e^{\frac{0.267}{0.029}} = £159{,}433\text{k}$ for women for becoming a widow.

Together, these results demonstrate that the implied monetary values of informal caregiving can vary significantly between caring for accident and non-accident family members, as well as across different income dimensions. Assuming that permanent income that is independent of individual fixed effects bias is conceptually more relevant as a long-term predictor of life satisfaction, our findings suggest that previous CVs of informal care, and of many life events across a range of domains, may have been severely over-estimated when transient income is used as the denominator in the shadow price equation.

As a robustness check, we introduce in Table 3 an interaction term for long-hours care, which we define as caring for 100 hours or more per week. We then report the implied CVs for long hours caring in Table 4.

Here, we can see that the interaction term, "*Caring for other member who had an accident × long hours caring (100+ hours per week)*", is negative albeit statistically insignificantly different from zero in all three samples. This implies that although the average CVs for providing long hours care are larger than the CVs for providing shorter hours care, e.g., £442k versus £126k per year, their monetary values are unlikely to be statistically significant different

[11] Though the CVs for men are not statistically significantly different from zero.

from each other. As in previous tables, female carers continue to suffer more well-being losses from informal caring than male carers.

We next focus on how different severities of the disability of the person being cared for can produce different CVs. Specifically, we set out to investigate whether there are any differences in the effects of caring on life satisfaction depending on whether the person receiving care has a disability that prevents them from doing their daily activities. We do this by decomposing caring for an accident victim category into two: those whose disability does not prevent them from doing their daily activities, and those who cannot manage their daily activities. Results are presented in Tables 5 and 6.

We start with the full sample analysis in Column 1. Here, we can see that there is a negative albeit statistically insignificant effect of providing care for an accident victim who can still do their daily activities on the respondent's life satisfaction. The same nonsignificant finding applies even when we split the sample by gender. By contrast, providing accident care for someone who cannot do their activities generates a significant decline in life satisfaction in the full sample, and especially in the female sub-sample.

In terms of CVs based on the permanent income coefficient, Table 6 demonstrates that real equivalent income would need to rise by £59k just to compensate an average person for providing accident care for someone who can still do their daily activities. On the other hand, it would have to rise by £99k per year to compensate an average person for providing care for an accident victim that results in him or her being in an incapacitated state. Like the effects for long-hours care, these results are mostly driven by the effects for women.

Having established that caregiving results in significant wellbeing losses in the year that the care provision begins, we next ask whether people adapt quickly and completely to different caregiving experiences. To test this, we expand Equation (1) to include leads and lags for each category of informal caring (accident and non-accident) – two-year leads and two-year lags. This allows us to compare the well-being dynamics before, during, and after becoming an informal carer in year *t*. We then estimate this new equation using the FE estimator on a sample in which at least five years of life satisfaction and informal care status are consecutively observed (because of the need to go backward two periods and forward two periods). Our

empirical strategy here is similar to that adopted by Clark et al. (2008) and Frijters et al. (2011). Given that the table produces a large number of coefficients, we choose to present only the graphical representations of the implied dynamics of life satisfaction before, during, and after each type of informal caregiving in Figure 2.

There are some interesting patterns from the leads and lags regressions. For example, there is little evidence of a negative anticipation effect to becoming a carer for either accident or non-accident victim. This seems to be the case even for women who go on to experience a significant drop in life satisfaction in the year of becoming a caregiver. What is more interesting is that, for female carers, there is little adaptation to providing informal care for either accident or non-accident victim even two years afterwards. Hence, we have provided some evidence to suggest that informal caregiving hurts if you are a woman, and it does not seem to hurt any less the longer you remain a caregiver for another member of your family.

One important question is, "Why are women more adversely affected by informal caregiving than men?" A first response is that female caregivers of working age (16-65 years old) are more likely to assume the primary caregiving role, whereas male caregivers are more likely to split their time between full-time employment and caregiving and, hence, are more likely to obtain formal and informal assistance with caregiving. Another plausible answer is that female caregivers face greater social pressure to become caregivers, whereas male caregivers are more likely to feel that they have chosen to assume the caregiving role. Additionally, female caregivers are also more likely than male caregivers to stay in the caregiver role even if it becomes stressful (e.g., Miller and Cafasso, 1992; Pinquart and Sorensen, 2003).

In an attempt to explain the underlying mechanisms behind the gender differences in life satisfaction between male and female caregivers, Table 7 estimates, separately for men and women, nine panel regressions and ten cross-section regressions on different self-reported outcomes. This includes one measure of mental strain in the General Health Questionnaire (GHQ-12) measured in all waves, eight domain satisfactions measured in Waves 6-10 and 12-18, and ten different measures of SF-36 mental health in Wave 9. By focusing only on the estimated effect of informal caring following a family member's accident, Table 7 shows that self-reported mental strain levels are almost three times larger for female caregivers than that of male caregivers. Women also report a significant drop in financial satisfaction in the year of

becoming carers, whereas the equivalent coefficient is positive albeit marginally significant for men. Additionally, female caregivers are more likely to report feeling downhearted and low, feeling tired, feeling nervy, and less likely to have been a happy person in the past month than female non-caregivers. By contrast, male caregivers only report feeling slightly more nervy in the past month compared to male non-caregivers. These findings are consistent with the hypothesis that women are more likely than men to become the primary caregivers. Table 7's results also suggest that female caregivers are more likely than male caregivers to worry about their future incomes following an injury sustained by at least one of their family members from an accident.

Moreover, it is worth noting here that our regressions produce estimated income coefficients that are generally larger for men than for women, which is consistent with previous studies in the well-being literature that find the marginal effect of income on life satisfaction to be larger for men than women (e.g., Frijters et al., 2004). Hence, this helps to explain why the CVs for informal caring are much larger for women than for men.

6. Conclusion

This article provides new empirical evidence on the amount of additional income required to compensate for the negative experience of informal caregiving on caregivers' well-being. Using combined data on accidents and informal care, as well as the (permanent) income coefficient that is free from individual fixed effects bias as the denominator, we find that an additional £102k per year is required to fully compensate the average person for providing an informal care for an accident victim, which works out to be around £8,500 per month[12]. This estimated CV is much larger than the one obtained for informal caregiving of a non-accident victim, i.e., £24k per year (or £2,000 per month). It is, however, significantly smaller than the equivalent CV obtained using the transient income estimate, i.e., £3.8 million per year. We also find the results to be far stronger for female than male caregivers, and find that there is little hedonic adaptation to providing care for either accident or non-accident victims in the

[12] Our implied value of informal care is clearly greater than that implied by the proxy good method, which values informal care provision using the market price of professional care provision. It should come as no surprise that caring for a household member, with the associated emotional burdens, results in a larger implied cost.

household. Assuming that accidents that befell other family members are randomly distributed across carers in a fixed effects regression, the results provide some of the first causal, large-scale evidence of the experienced utility effect of informal caregiving, as well as their shadow prices.

In conclusion, it appears that an unexpected move into informal caregiving is one of the most depressing life events for women. This can be explained largely by the fact that, compared to male caregivers, female caregivers are significantly more likely to be primary caregivers; provide more intensive and complex care; have difficulty with care provision and balancing caregiving with other family and employment responsibilities; have relatively little formal caregiving support; and suffer from poorer emotional health secondary to caregiving (see Table 7's results). As such, it should probably come as no surprise that we find a stronger statistically significantly negative effect of informal caring for women than for men (e.g., Pinquart and Sorensen, 2003).

Aside from the policy-relevant estimates of the societal value of the SWB losses resulting from the provision of informal care, we hope to have presented a valuable new approach to estimating CVs based on a permanent income coefficient that has been estimated free from individual fixed effects bias. We strongly believe that by adopting the FEF approach in the WV method, we can improve the way cost-benefit analysis is typically carried out in policy decision-making.

Like all other studies in social sciences, our paper is not without limitations. One major criticism is that both transient and permanent income measures are endogenously determined even when individual fixed effects are already accounted for in the estimation. Short of having randomly assigned income that shifts people's average life-time earnings, such as lottery windfalls of life-changing amounts, there is little that can be definitely done about the endogeneity of permanent income in standard data sets. This is an important point, and one that should stimulate future research in this area. Nevertheless, we believe that we make a significant contribution to the WV literature by being able to estimate and subsequently compare the implied CVs across different income coefficients.

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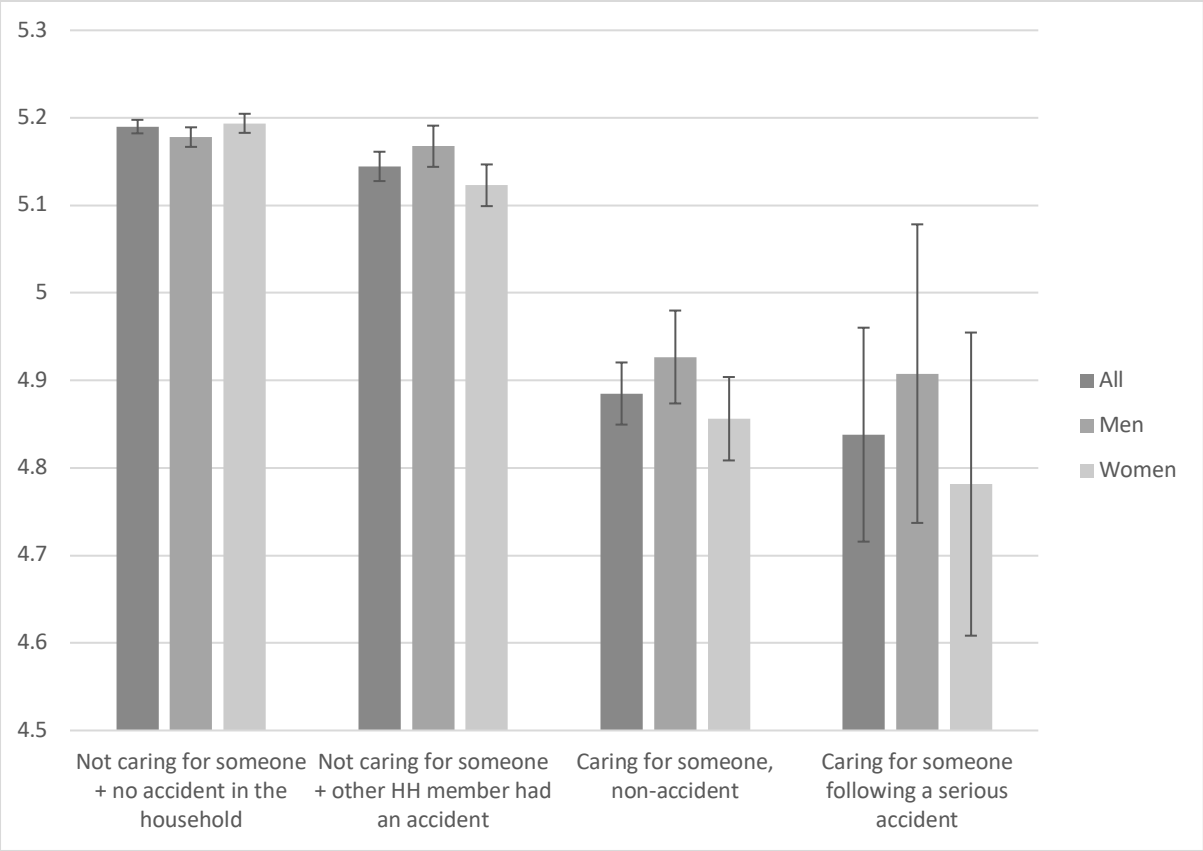
Figure1: Average life satisfaction by informal caring



Note 4-standard-error bars (95% C.I.), 2 S.E. above, 2 S.E. below

Table 1: Fixed Effects Filtered Regressions of Life Satisfaction and Informal Caring, BHPS 1996-2008

VARIABLES	All	Men	Women
Panel A: First-Stage FE Regression			
Informal caring			
Caring for other member who did not have an accident within last year	-.087***	-.009	-.148***
	(.023)	(.034)	(.031)
Caring for other member who had an accident within last year	-.192***	-.144**	-.232***
	(.050)	(.071)	(.072)
Widowhood and own experience of accident			
Widow/widower	-.221***	-.110	-.267***
	(.069)	(.130)	(.082)
Had serious accident within last year and being cared for	-.202**	-.194	-.207**
	(.073)	(.118)	(0.092)
No accident within last year and being cared for by another member	-.129***	-.134**	-.118**
	(.038)	(.061)	(.047)
Number of "other" household members who had a serious accident within last year			
One other person	-.046**	-.043	-.051
	(.023)	(.030)	(.036)
From 2 up to 4 other people	-.085	-.023	-.154
	(.079)	(.107)	(.116)
Log of real equivalent household income	.035***	.042***	.029***
	(.006)	(.009)	(.009)
Panel B: Second-Stage FEF Regression			
Within-person average of log of real equivalent household income	.096***	.123***	.099***
	(.024)	(.034)	(.026)
Observations	129,524	59,551	69,960
Number of individuals	23,091	10,919	12,172

Note: ***<1%; **<5%; *<10%. Standard errors are in parentheses. Other control variables used in the first stage regression includes age, age squared, highest completed education, marital status, employment status, self-assessed health, the number of days spent in hospital in the last 12 months, the number of children in the household, regional dummies to control for geographical variation, and survey wave identifiers.

Table 2: Compensating variations using estimates for permanent and transient incomes

Compensating Variations (CVs in £1,000s)	All	Men	Women
How much does permanent income has to rise in order to 'just' compensate for:			
Caring for other member who did not have an accident within last year	*£24*	£1	*£55*
Caring for other member who had an accident within last year	*£102*	*£36*	*£151*
Widow/widower	*£143*	£23	*£221*
Had serious accident within last year and being cared for	*£115*	£64	*£113*
No accident within last year but being cared for by another member	*£45*	*£32*	*£37*
Number of "other" household member who had a serious accident within last year = 1	*£10*	£7	£11
Number of "other" household member who had a serious accident within last year = 2-4	£23	£3	£60
How much does transient income has to rise in order to 'just' compensate for:			
Caring for other member who did not have an accident within last year	*£176*	£4	*£2,617*
Caring for other member who had an accident within last year	*£3,843*	*£477*	*£47,697*
Widow/widower	*£8,822*	£204	*£159,433*
Had serious accident within last year and being cared for	*£5,119*	£1,761	*£20,125*
No accident within last year but being cared for by another member	*£621*	*£373*	*£920*
Number of "other" household member who had a serious accident within last year = 1	*£44*	£28	£77
Number of "other" household member who had a serious accident within last year = 2-4	£165	£12	£3,223

Note: All figures are in £1,000 and are calculated based on the same average real equivalent household income of £16,000 per annum. Numbers in italics represent statistical significance at least at the 5% level in both informal care and income estimates.

Table 3: The provision of care, focusing on long-hours provision

VARIABLES	All	Men	Women
Panel A: First-Stage FE Regression			
Informal caring			
Caring for other member who did not have an accident within last year	-.061**	-.002	-.108***
	(.023)	(.034)	(.026)
Caring for other member who did not have an accident × long hours caring (100+ hours per week)	-.148***	-.059	-.188***
	(.041)	(.063)	(.041)
Caring for other member who had an accident within last year	-.174***	-.129*	-.211***
	(.053)	(.072)	(.067)
Caring for other member who had an accident × long hours caring (100+ hours per week)	-.148	-.161	-.127
	(.134)	(.249)	(0.158)
Log of real equivalent household income	.035***	.043***	.029***
	(.006)	(.009)	(.008)
Panel B: Second-Stage FEF Regression			
Within-person average of log of real equivalent household income	.096***	.123***	.098***
	(.024)	(.034)	(.026)
Implied effects			
Caring for other member who did not have an accident and long hours caring	*-.210****	*-.061*	*-.296****
	(.032)	*(.051)*	*(.041)*
Caring for other member who had an accident and long hours caring	*-.322****	*-.290*	*-.340****
	(.102)	*(.178)*	*(.127)*
Observations	129,511	59,551	69,960
Number of individuals	23,091	10,919	12,172

Note: ***<1%; **<5%; *<10%. Standard errors are in parentheses. See Table 1 for other control variables.

Table 4: Compensating variations for providing long hours care

Compensating Variations (CVs in £1,000s)	All	Men	Women
How much does permanent income has to rise in order to 'just' compensate for:			
Caring for other member who did not have an accident and long hours caring	*£126*	£10	*£312*
Caring for other member who had an accident and long hours caring	*£442*	£153	*£493*
How much does transient income has to rise in order to 'just' compensate for:			
Caring for other member who did not have an accident and long hours caring	*£6,439*	£50	*£434,761*
Caring for other member who had an accident and long hours caring	*£158,338*	£13,569	*£1,968,103*

Note: All figures are in £1,000 and are calculated based on the same average real equivalent household income of £16,000 per annum. Numbers in italics represent statistical significance at least at the 5% level in both informal care and income estimates.

Table 5: The provision of care, focusing on the severity of the care needed by including the effect of the recipient's disability on their daily activities

VARIABLES	All	Men	Women
Panel A: First-Stage FE Regression			
Caring for other member who did not have an accident within last year	-.052*	.003	-.105***
	(.028)	(.042)	(.038)
Caring for other member who had an accident within last year + cannot do daily activities	-.176***	-.129	-.221***
	(.061)	(.087)	(.085)
Caring for other member who had an accident within last year + can still do daily activities	-.138	-.107	-.167
	(.089)	(.127)	(.122)
Log of real equivalent household income	.033***	.042***	.027***
	(.007)	(.011)	(.010)
Panel B: Second-Stage FEF Regression			
Within-person average of log of real equivalent household income	.089***	.142***	.090***
	(.028)	(.044)	(.028)
Observations	111,212	51,118	60,094
Number of individuals	21,244	10,171	11,243

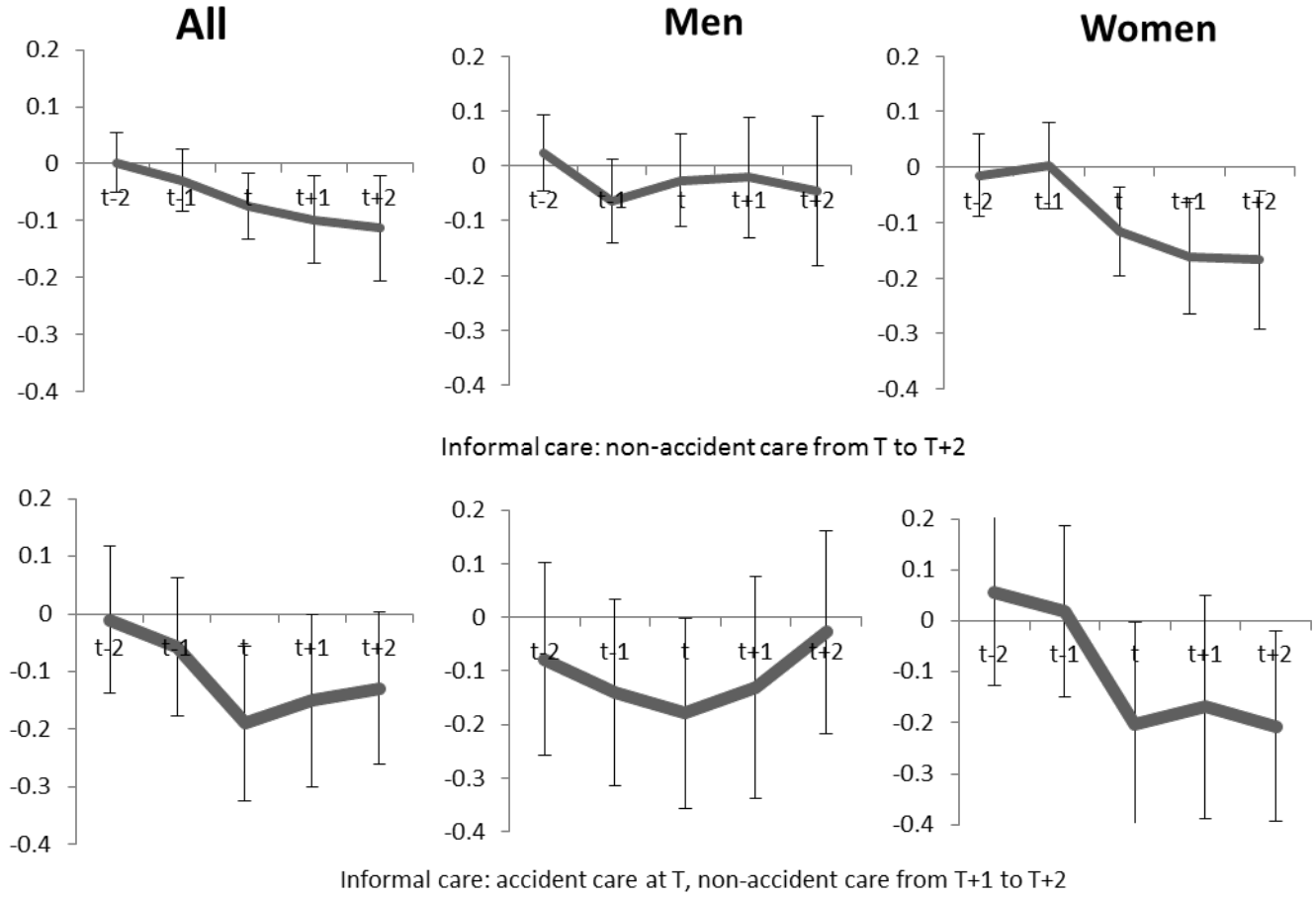
Note: ***<1%; **<5%; *<10%. Standard errors are in parentheses. See Table 1 for other control variables.

Table 6: Compensating variations: focusing on the severity of the care needed by including the effect of the recipient's disability on their daily activities.

Compensating Variations (CVs in £1,000s)	All	Men	Women
How much does permanent income has to rise in order to 'just' compensate for:			
Caring for other member who had an accident within last year + cannot do daily activities	*£99*	£24	*£170*
Caring for other member who had an accident within last year + can still do daily activities	*£59*	£18	£86
How much does transient income has to rise in order to 'just' compensate for:			
Caring for other member who had an accident within last year + cannot do daily activities	*£3,298*	£329	*£57,382*
Caring for other member who had an accident within last year + can still do daily activities	*£1,031*	£188	£7,752

Note: All figures are in £1,000 and are calculated based on the same average real equivalent household income of £16,000 per annum. Numbers in italics represent statistical significance at least at the 5% level in both informal care and income estimates.

Figure 2: leads and lags in the provision of informal care to a person in the household. Panel A shows the effects where no accident occurs, and Panel B shows the effects where an accident occurs at time T.



Note: 4-standard errors (two above, two below) or 95% confidence intervals are reported. Informal caring took place at time t=0. Each value represents the lead and lag coefficients of the relevant informal caring variable.

Table 7: Explaining gender differences in the effect of informal caring following an accident

The estimated effect of caring for someone who had an accident in the last 12 months on different subjective outcomes	Men	Women
A) Fixed effects		
Mental strain		
GHQ-12 (Caseness)	.277**	.801***
Domain satisfaction		
Health satisfaction	.017	.018
Financial satisfaction	.146*	-.179**
Housing satisfaction	.116	-.088
Partner satisfaction	-.122	.085
Job satisfaction	.110	.123
Social life satisfaction	-.018	-.146
Amount of leisure satisfaction	-.046	-.188
Use of leisure satisfaction	-.053	-.188
B) OLS - Wave 9 only		
SF36 - Mental health		
Past month: felt full of life	.177	-.138
Past month: been very nervy	.317*	.336**
Past month: felt down in the dump	.035	.190
Past month: felt calm and cheerful	-.082	-.110
Past month: had lots of energy	.129	-.199
Past month: felt downhearted and low	-.133	.311**
Past month: felt worn out	.121	.097
Past month: been a happy person	-.096	-.307**
Past month: felt tired	- .110	.350**
Past month: health limited social life	.018	.071

Note: ***<1%; **<5%; *<10%. Standard errors are in parentheses. See Table 1 for other control variables. GHQ-12 (Caseness) is a 13-point scale measure of psychological distress that ranges from 0 = best psychological well-being (low anxiety/stress) to 12 = worst psychological well-being (high anxiety/stress). Domain satisfaction is measured on a 7-point scale that ranges from 1 = completely dissatisfied to 7 = completely satisfied. SF-36 mental health, which was measured in Wave 9, elicits the respondent's mental health and is measured on a 6-point scale that ranges from 1 = none of the time to 6 = all the time.

Appendix A1
Variable Summary

	Mean	S.D.
Life satisfaction*	5.163	1.262
Within-person average of log of real equivalent household income*	9.439	0.536
Log of real equivalent household income*	9.468	0.703
Caring for other member who did not have an accident within last year	0.0508	0.220
Caring for other member who had an accident within last year	0.00460	0.0677
Had serious accident within last year and being cared for	0.00310	0.0556
No accident within last year and being cared for by another member	0.0210	0.143
Proportion of "other" household members who had a serious accident within last year	0.0966	0.240
Age*	39.39	13.79
Age-squared*	1742.1	1113.3
Disabled	0.0497	0.217
Unemployed	0.0405	0.197
Self-employed	0.0781	0.268
Retired	0.0627	0.242
Not in the labour force	0.163	0.369
Married	0.531	0.499
Cohabiting	0.137	0.344
Divorced	0.0569	0.232
Separated	0.0191	0.137
Health: Poor	0.0811	0.273
Health: Fair	0.215	0.411
Health: Good	0.437	0.496
Health: Excellent	0.244	0.429
Highest qualification: Higher degree	0.0290	0.168
Highest qualification: 1st degree	0.115	0.319
Highest qualification: HND, HNC, teaching	0.0708	0.256
Highest qualification: A-level	0.214	0.410
Highest qualification: O-level	0.278	0.448
Highest qualification: CSE	0.0596	0.237
Homeowner	0.743	0.437
Number of days spent in the hospital in the last 12 months*	0.644	4.998
Number of children in the household	0.620	0.987

Note: N=129,524. * denotes non-binary variables.