

Costa-i-Font, Joan; D'Amico, Francesco; Vilaplana-Prieto, Cristina

Working Paper

Caring for Carers? The Effect of Public Subsidies on the Wellbeing of Unpaid Carers

CESifo Working Paper, No. 9802

Provided in Cooperation with:

Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

Suggested Citation: Costa-i-Font, Joan; D'Amico, Francesco; Vilaplana-Prieto, Cristina (2022) : Caring for Carers? The Effect of Public Subsidies on the Wellbeing of Unpaid Carers, CESifo Working Paper, No. 9802, Center for Economic Studies and ifo Institute (CESifo), Munich

This Version is available at:

<https://hdl.handle.net/10419/263732>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Caring for Carers? The Effect of Public Subsidies on the Wellbeing of Unpaid Carers

Joan Costa-Font, Francesco D'Amico, Cristina Vilaplana-Prieto

Impressum:

CESifo Working Papers

ISSN 2364-1428 (electronic version)

Publisher and distributor: Munich Society for the Promotion of Economic Research - CESifo GmbH

The international platform of Ludwigs-Maximilians University's Center for Economic Studies and the ifo Institute

Poschingerstr. 5, 81679 Munich, Germany

Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de

Editor: Clemens Fuest

<https://www.cesifo.org/en/wp>

An electronic version of the paper may be downloaded

- from the SSRN website: www.SSRN.com
- from the RePEc website: www.RePEc.org
- from the CESifo website: <https://www.cesifo.org/en/wp>

Caring for Carers? The Effect of Public Subsidies on the Wellbeing of Unpaid Carers

Abstract

We study the effect of long-term care (LTC) subsidies and supports on the wellbeing of unpaid caregivers. We draw on evidence from a policy intervention, that universalized previously means-tested caregiving supports in Scotland, known as *free personal care* (FPC). We document causal evidence of an increase in the well-being (happiness) of unpaid carers after the introduction of FPC. Our estimates suggest economically relevant improvements in the happiness (12pp increase in subjective wellbeing) among caregivers exposed to FPC and that provide at least 35 hours of care per week. Consistently, these results are larger among women and non-actively employed caregivers (17pp increase in happiness). Estimates are not driven by selection into caregiving (we find similar wellbeing effects among caregivers at baseline and caregivers throughout the sample), and are driven by income effects of FPC among caregivers.

JEL-Codes: I180, J220.

Keywords: caregiving, long-term care subsidies, subjective wellbeing, caregiver's wellbeing, Scotland.

*Joan Costa-Font**
Department of Health Policy
London School of Economics / United Kingdom
j.costa-font@lse.ac.uk

Francesco D'Amico
Department of Health Policy
London School of Economics / United Kingdom
damico@lse.ac.uk

Cristina Vilaplana-Prieto
Department of Economics
University of Murcia / Spain
cvilaplana@um.es

*corresponding author

June 2022

We are grateful to Eric Bonsang, Anne Laferrere, Gregory Ponthière, Peter Bakx, Carlm Emmerson, Marco Francesconi, Eric French, Uta Schoenberg, Sergi Jimenez, Prashant Bharadwaj, Sarah Catan, Almudena Sevilla, Berkay Ozcan, Elisabetta De Cao and the participants to the Elderly Care in France and Europe workshop, Paris School of Economics, April 2018, Economics of the Family, October 2019 at the London School of Economics.

1. Introduction

Some studies have documented that unpaid caregiving is responsible for both emotional and monetary losses, including opportunity costs of time (forgone employment and earnings) from the provision of care which reflects in several dimensions of wellbeing (Ettner et al, 1994; Carmichael and Charles, 2003; Heitmueller and Inglis, 2007; van den Berg and Ferrer-i Carbonell, 2007; Coe and Van Houtven, 2009; van den Berg *et al* 2014; Rattinger *et al.*, 2015; Leggett *et al*, 2018, Do *et al.*, 2015). However, there is still fairly limited consensus in the literature, and a metanalysis of previous evidence finds both positive and negative effects of caregiving, although still, the negative effects are more prominent among lower-income individuals (Pinquart and Sorensen, 2003). Other studies even document that caregiving can explain up to 50% of the total costs of dementia among caregivers (Hurd *et al*, 2013), and is documented to increase the use of antidepressants, tranquilizers, painkillers and gastrointestinal agents (Schmitz and Stroka, 2013; Stroka, 2014). However, most estimates in the literature are mostly not causal, namely caregiving decisions are not the result of an exogenous variation in caregiving conditions. A common strategy to retrieve causal estimates lies in examining the effect of policy interventions that exogenously change the conditions under which caregivers provide care¹.

Subsidies that free some caring time or provide financial respite to the care-receiver can impact caregivers wellbeing. Proponents of cash subsidies argue that they increase care-receivers' choice and quality of care (Linsk *et al.*, 1992; Simon-Rusinowitz *et al.*, 1998), by allowing family members to deliver personal care at home (Mahoney *et al.*, 2002). For example, some studies suggest evidence of emotional, physical, and financial wellbeing improvements after the introduction of the

¹ Alternative strategies use instrumental variables to estimate a local average treatment effects, using within household variation in the presence of a single parent (Heger, 2017).

Cash and Counseling Demonstration and Evaluation (CCDE) program which entailed flexible monthly allowances for Medicaid beneficiaries to hire informal caregivers as paid workers (Foster *et al.*, 2003). A growing literature has focused on the effect of long-term care (LTC) subsidisation, on care choices and household behaviour (Ettner, 1994; McKnight, 2006). However, we still know little about the extent to which the expansion of caregiving supports , influence the wellbeing of carers.

This paper examines the causal effect of a specific policy intervention, which resulted from the implementation of the Scottish Community Care and Health Act (CCHA), which universalised the access of care, by offering free personal care (FPC), namely, establishing a network of supports and services to the Scottish population after 2002². This reform eliminated the pre-existing means tests for personal care to individuals with caregiving needs, on the mental and subjective wellbeing of unpaid caregivers in such households. The fact that subsidies remained means-tested in the rest of the United Kingdom (UK), constitutes a natural control group. Next, we consider a number of robustness checks, including evidence that documents that the reforms were driven by individuals that were providing care at baseline, and finally, we show a number of mechanisms explaining the channels of the effect.

We contribute to the literature by retrieving causal estimates of the effects of FPC on caregivers' wellbeing and their mental health. Given that caregiving supports can influence both the decision to become a caregiver, alongside the intensity of caregiving duties, we estimate the effect of caregiving subsidies and supports on caregivers wellbeing at baseline, as well as the total effect. This complements previous findings indicating that caregiving increases depression in different

² According to the Office of National Statistics (2002), a person receiving personal home care in England in 2001, received an average of 7.6 hours/week at a cost of £12/hour.

countries and settings (Bookwala *et al.*, 2009; Hansen and Slagsvold, 2013; Do *et al.* 2015; Hiel *et al.*, 2015; Heger, 2017; Zwart *et al.*, 2017)³.

Our data contains very precise information on intensity (hours) of care provided as well a number of mental health and wellbeing measures, and the CCHA can be captured in the British Household Panel Survey (BHPS). We employ a difference in differences (DiD) strategy for the period 1996-2008 in the UK which contains detailed information on a number of important covariates that serve the role of controls. The sample size of caregivers is large enough to carry out our analysis, and the samples have been verified with administrative records, which are consistent with estimates that indicate that informal caregivers make up 17% of the Scottish population (National Records of Scotland, 2016).

Our findings suggest that that CCHA increased the caregiver's happiness domains of the General Health Questionnaire (GHQ) in the post-reform period, but only among caregivers providing more than 35 hours of care per week, and the effects were expectedly larger for female and caregivers out of the labour market . The results apply to both coresident and non-coresident caregivers, and are driven by changes in income of caregivers, and are not explained by changes in health, hospital care, employment, leisure satisfaction.

The paper is organized as follows. The next section reports related literature, followed by section three that describes the institutional setting of the Scottish reform. Section four reports the data, section five provides the empirical strategy, section six reports the results, robustness checks and heterogeneity, and a final section concludes and includes policy implications.

³ When different European countries are compared, the effects happen to be especially larger in South-Europe (Brenna and Novi, 2016).

2. Wellbeing effects of caregiving

Stress, mental health and life satisfaction. Compared to non-caregivers, caregivers tend to report lower life satisfaction (Hajek and König, 2016) and quality of life (Rafnsson *et al.*, 2017). Caregivers are more likely to suffer from depression and lower quality of life compared to non-caregivers (Papastavrou *et al.*, 2007; Molyneux *et al.*, 2008; Buyck *et al.*, 2011; Brenna and Di Novi, 2016). They are also more likely to consume prescribed medication and health services (Schulz and Martire 2004, Serrano-Aguilar *et al.*, 2006). In particular, the meta-analysis by Vitaliano *et al.* (2003) found that caregivers take more medications for physical illnesses, have 23% higher levels of stress hormones and 15% lower antibody responses compared to non-caregivers. These findings are economically relevant and sustained over a long period of time, specifically, they increase the risk of hypertension and diabetes and reduce resistance to viruses (Vitaliano *et al.*, 2004).

Caregiver captivity effect. Pearlin *et al.* (1990) pointed out that a prominent source of caregiver stress results from the so-called ‘captivity effect’, namely the feeling of being forced to care against one's will. Caregiver depression is directly related to the feeling of being trapped in a particular role with no way out and the expectation that the current situation can only get worse (Ducharme *et al.*, 2007). Informal caregiving is particularly detrimental to wellbeing when caregivers perceive a lack of choice in assuming the caregiving role (Schulz *et al.*, 2012). In fact, recent evidence finds that new-onset Medicaid home care was associated with an improvement of caregivers’ health by 3.39% with respect to average pre-onset mental health (Unger *et al.*, 2021). If a caregiver's health deteriorates to the point where they can no longer provide care, the carereceiver may be at risk of being placed in a nursing home, and awareness of such responsibility adds further pressure on the caregiver (Sanders and Power, 2009).

Caregiver's physical health. Certain groups of caregivers are more at risk of poor physical health. Caregivers experiencing a higher level of burden of disease, tend to be older (Rinaldi *et al.*, 2005), female (Papastavrou *et al.*, 2007; Campbell *et al.*, 2008) and co-resident with care receivers (Conde-Sala *et al.*, 2010)⁴. In a meta-analysis of 176 studies on physical health indicators, Pinquart and Sorensen (2007) conclude that older age, lower socio-economic status and lower levels of informal support are associated with poorer health. Furthermore, higher levels of caregiver behavioural problems are more consistently related to poorer caregiver health, and specifically, overburden is a common mechanism (Orfila *et al.*, 2018). Older individuals and those belonging to lower socio-economic status tend to report poorer health compared to people of higher socio-economic status (Jivraj and Nazroo, 2014), which according to the model of caregiver burden (Pearlin *et al.*, 1990) could make the former more vulnerable to the well-being effects of being a caregiver (Saito *et al.*, 2018; Tough *et al.*, 2020).

Spousal caregivers. Several studies have reported that spousal caregivers experience a higher level of stress compared to other caregivers (Rinaldi *et al.* 2005; Andrén and Elmstahl 2008). Pinquart and Sorenson (2011) find that spousal caregivers report more depressive symptoms. Caregivers of elderly spouses tend to be older, and may have physical limitations that add to the burden of caring for their spouse (AARP Public Policy Institute, 2013, Pearlin *et al.*, 1990; Snyder, 2000). Social isolation is another problem faced by caregivers (Aneshensel *et al.*, 1993) and there is a positive and significant association between social isolation and caregiver burnout (Akkus, 2011).

⁴ Women have traditionally been the main informal caregivers (Eagly and Wood, 1991; Finley, 1989), have shown greater commitment to caregiving than men (Pavalko and Woodbury, 2000) and have endured greater deterioration in their well-being (Pinquart and Sørensen, 2006; Yee & Schulz, 2000). Nevertheless, some studies show some signs of change in the gender gap, resulting from women's entry into the labour market and the effect of equality policies (Glauber, 2017; Langner and Furstenberg, 2020).

Caregiving subsidies and supports. Vulnerable caregivers are at greater risk of caregiver strain when they do not benefit from supports and subsidies services (Sussman and Regehr 2009). However, the caregiver's burden can be alleviated with support (economic or in-kind). Studies of caregivers caring for family members with serious or life-threatening illnesses found that, when caregivers received information related to the progression of the illness, the level of depression considerably declines (Emanuel *et al.*, 2000; McDonagh, *et al.*, 2004). Van den Berg (2006) documents that a cash benefit (€283 on average) paid to a sample of caregivers, reduces caregivers' stress and increases self-reported wellbeing. Similarly, Van den Broek and Grundy (2018) show that a reduction in the availability of home care in Denmark, increases carers' mental health. Consistently, Vandepitte *et al.* (2016) conducted a systematic review and concluded that day care services are effective in decreasing caregiver burden. Hence, both subsidies, as well as services and supports, may improve the wellbeing of caregivers' when they experience financial hardship (Amegbor *et al.*, 2021) or their perceived financial burden (Rajapakshe *et al.*, 2018). In addition, subsidies can improve caregivers' esteem as their work becomes more visible to society (Ma *et al.*, 2018), and influences their sense of control over one's own life (Bjørkløf *et al.*, 2016), their participation in leisure activities (Jeong and Park, 2020), as well as social contact, hence reducing loneliness feelings (Wang *et al.*, 2017).

3. The Scottish Reform

Unlike the rest of the UK, Scotland reformed the funding of personal care in 2001 by introducing 'free' personal care (FPC), which meant that all personal charges were abolished, although charges continued for non-personal care expenses. That is, charges for care at home were

removed, and a flat-rate subsidy for personal care (as well as for nursing care) to people in care homes was set (Glendinning *et al.*, 2004; Bell and Bowes, 2006 and 2012).

One of the features of the Scottish reform was its swiftness. Scotland formally incepted public subsidisation of LTC in the Community Care and Health Act on a tight time scale (Dickinson *et al.*, 2007). Such reform replaced the pre-existing model, still in place in the rest of the UK, of means-tested care whereby local authorities support only individuals whose wealth does not exceed 23,000 pounds. Elderly people in need can only expect to receive a universal attendance allowance (AA). In contrast, under the Community Care and Health (Scotland) Act, people aged 65 years and older are entitled to a flat rate payment of £169 per week, and those who receive care in a nursing home receive an additional £77 per week (as of April 2014).

Additional funds were made available to local authorities on an annual recurrent basis to pay for FPC. Evidence on the Scottish FPC reform to date suggests that costs did not spiral out of control, and that it has overall reduced use of care homes, people on modest incomes benefited the most (Bell and Bowes, 2006 and 2012). The amount spent on care for older people accounted for around 0.2% of Scottish GDP, and the additional costs of providing free personal care for the elderly increased this amount by around 10% after the reform (Bell and Bowes, 2006 and 2012). In contrast, public expenditure projections of LTC estimate expenditure to increase to 1.20% of GDP in 2051 under current funding arrangements, and around 1.45% of GDP in 2051 under a policy of free personal care (Wittenberg *et al.*, 2004). Hence, one can conclude that projections using aggregate macro-simulation analysis rely on a number of assumptions that exaggerate the costs of FPC, rather than on real experimental evidence of FPC.

The welfare effects of FPC are still being quantified . The introduction of the FPC program was mainly politically driven, and linked to the political agenda of the Scottish Labour government

(Dickinson *et al.*, 2007). Therefore, the introduction of the program was largely unanticipated, which makes it suitable to undertake an empirical program evaluation analysis.

Nonetheless, the effects on caregiving arrangements are still contentious. Although Bell and Bowes (2006) do not identify any evidence of short term effects on informal caregivers, Kalsberg-Scaffer (2015), drawing on a longer sample, finds suggestive evidence that the introduction of free LTC in Scotland *increased the probability of women supplying informal care by around 6pp*. Hence, we can conclude that the evidence on the impact of FPC caregiving is mixed. However, all points out that the introduction of FPC sharply increased the demand for home-help by 69% between 2002-2010, which was compensated by an increase in the charges for non-personal care, and a subsequent increase in the intensity of care from an average of 6.9 to 7.6 hours/week (Bell and Bowes, 2012). So far previous studies have not examined the effects on caregivers, and especially, individuals who were caregivers at baseline.

4. The Data

The British Household Panel Survey began in 1991 and is a multi-purpose study whose unique value resides in the fact that it follows the same representative sample of individuals over a period of years. It is household-based, interviewing every adult member of sampled households and contains sufficient cases for meaningful analysis of certain groups such as the elderly, which is the main purpose of this study. The wave 1 panel consists of some 5,500 households and 10,300 individuals drawn from 250 areas of Great Britain. Additional samples of 1,500 households in Scotland and Wales were added to the main sample in 1999, and in 2001 a sample of 2,000 households was added in Northern Ireland, making the panel suitable for UK-wide research. This paper uses the BHPS, a longitudinal study with a common structure for all regions of the UK and a

boosted sample for Scotland. The data contains records on mental health indicators, the 12-item version of the General Health Questionnaire (GHQ) developed by Goldberg and Williams (1988).

Our sample employs the General Health Questionnaire (GHQ-12) which is a twelve-item questionnaire that is used to detect psychiatric disorders and is a consistent and reliable instrument when used in the general population (Pevalin, 2000)⁵. Table A1 shows the descriptive statistics for the Scottish sample. This sample is composed of individuals who have provided informal care either at baseline (from 1996 until 2003) or at follow-up (from 2003 until 2008). This choice makes sure that we are able to control both, for people who were caring at baseline and at follow-up, or for allowing the carers composition to change through time. Furthermore, as the number of hours of care provided by an informal caregiver is more reliable when the caregiver is not co-living with the cared-for person, we focus on households with not co-habiting children⁶.

Our treatment refers to individuals living in Scotland after the introduction of FPC, and our control group is composed of respondents living in the rest of the UK. This assumption has been used in field literature (Karlsberg-Schaffer, 2015), which states that carers from both groups were exposed to the same social care funding system before the FPC reform. In our empirical strategy we separate the effect of caregiving at baseline, which allows us to distinguish the effect of selection into caregiving from a change in caregiving intensity among those who were supplying care at baseline.

⁵ The scale asks whether the respondent has experienced the following symptoms or behaviors in the last few weeks: ‘able to concentrate’, ‘lost much sleep over worry’, ‘playing useful part in things’, ‘capable of making decisions’, ‘constantly under strain’, ‘could not overcome difficulties’, ‘enjoy normal activities’, ‘been able to face up problems’, ‘feeling unhappy or depressed’, ‘losing confidence in oneself’, ‘thinking of self as a worthless person’, ‘feeling reasonably happy, all things considered’. Since we are interested in a wider concept of happiness, we focused on the most general domain, i.e. “feeling reasonably happy, all things considered”. For the purpose of the analysis, we have reverted the score of the four-level variable, so that a higher score would represent a more positive feeling (i.e. 1=“much less”, 2=“less so”, 3=“same as usual”, 4=“more than usual”).

⁶ Following McGarry (1999), co-resident children are excluded, as they may give and receive transfers in kind, which may lead to measurement errors in both the dependent and independent variables.

Looking at Table A1, the two groups seem similar for most of the main characteristics, including age, gender, monthly income and caring effort. There are some differences, although they do not look dramatic. For instance, the Scottish sample shows a lower presence of individuals with at least a degree, and a lower proportion of retired individuals. Notably, the proportion of individuals providing care in Scotland seems to have declined after the FPC reform for all intensities of care apart from the highest (50+ hours per week).

5. Empirical Strategy

Our empirical strategy combines an event study with a differences-in-differences (DiD) approach examining the effect of the reform on Caregivers outcomes.

4.1 Event study

To analyze how the outcome of interest evolved after the introduction of subsidised LTC in Scotland, we use a flexible event-study design following equation (1).

$$Y_{irt} = \beta_0 FPC_{irt} + \sum_{k=-6}^{k=-1} \beta_{pre}^k 1[D_{it} = -k] \cdot FPC_{ict} + \sum_{k=0}^{k=6} \beta_{post}^k 1[D_{it} = k] \cdot FPC_{irt} + \beta_2 X_{irt} + \vartheta_t + \tau_i + \varepsilon_{irt} \quad (1)$$

where Y_{irt} is the subjective wellbeing indicator, FPC_i is a binary variable that takes the value 1 if the individual i living in region r at time t is beneficiary of the FPC program $1[D_{it} = .]$ is a binary variable that takes the value 1 if there have elapsed k terms between the time of the interview and the introduction of the FPC. The term $k=0$ corresponds to 2002, when the policy was implemented for the first time. We estimate 6 years before FPC (1996-2001) and 6 years after FPC (2003-2008). X_{irt} denotes a set of controls (gender, age, marital status, having non-cohabiting children, education

level and monthly income), τ_i are individual fixed effects, ϑ_t are time fixed effects and ε_{irt} is an individual-specific error term.

The parameters of interest, β_{pre}^k and β_{post}^k , corresponds to the effect of the FPC relative to year 2002. This specification allows to test for differences in effects by length of time of exposure and helps to provide a more detailed picture of the relationship between the outcome variables the introduction of the FPC. Additionally, it gives the opportunity to test the validity of the difference-in-difference empirical design. If treated and control individuals had similar trends before policy adoption, and only diverged after the implementation of the FPC, this constitutes strong evidence that such changes were caused by the reform rather than an unobservable factor. In this case, we would obtain that β_{pre}^k are indistinguishable from zero.

4.2 Difference in differences

We draw on a differences-in-differences strategy (DiD) where the treatment refers to exposure of FPC in Scotland (after July 2002). Specifically, we are interested in the effect of the reform on a caregivers wellbeing (Y_{irt}) once we account for a set of relevant controls (X_{ict})⁷. To identify a causal effect, we follow a classical strategy as follows:

$$Y_{irt} = \gamma_0 + \gamma_1 FPC_{irt} + \gamma_2 POST_t + \gamma_3 POST_t \cdot FPC_{irt} + \gamma_4 X_{ict} + \mu_t + \varepsilon_{it}$$

where FPC_i is a binary variable that takes the value 1 if the individual i living in region r (Scotland or rest of UK) at time t is beneficiary of the FPC program, $POST_t$ is a binary variable that takes the value 1 for the post-reform period, μ_t are time fixed effects and ε_{it} is an individual-specific

⁷ Such control include gender, age, marital status, having non-cohabiting children, education level and monthly income.

error term. We are interested in γ_3 , which refers to the changes in the number of outcomes resulting from the introduction of LTC subsidisation over and above the effect of time trends. We can measure the subjective wellbeing of the caregiver and the number of hours of caregiving, and we cluster at the UK country level. We use the two-step procedure proposed by Donald and Lang (2007) to obtain standard errors that do not affect the validity of our results⁸. We report baseline results and a number of robustness checks to make sure that the effect of the reform is robust and does not pick up other potential confounding effects.

Our strategy takes a number of considerations into account. FPC was implemented after June 2002, and hence we can identify the effect by comparing the wave before and after for those that would qualify to receive care based on a needs test. However, the effect of the reforms might be nonlinear. In addition, the effects might be different between childless individuals and individuals with children. The latter is particularly important in the presence of ‘bequest motives’⁹.

We should acknowledge two potential limitations of our strategy. One refers to the relatively small sample of size of caregivers which varies by specification and hence might reduce the statistical power of our estimates. Table A1 of the Appendix describes the different covariates employed and Table A2 describes the number of observations by age groups for self-reported wellbeing. However, when we examine the subsample of Scotland, we observe a reasonably large number of observations for ‘home help receipt’ (Table A3). However, small samples are likely to increase the imprecision of our estimates and hence produce attenuation bias, hence our estimates

⁸ Donald and Lang (2007) argue that, when the number of regions (clusters) is small in a DiD setting, applying standard asymptotics implies that the significance of the t-statistics is overstated. In order to address this issue, we use the two-step procedure proposed by them which effectively treats the number of region-years as the number of observations.

⁹ According to the exchange motivation for bequests, theoretical literature on bequests argues that parents reward children who provide informal care and attention with a larger bequest (Bernheim et al., 1984).

should be interpreted as lower bound estimates. A second limitation refers to the institutionalized population at baseline included in the dataset, which have been eliminated from the estimates.

In estimating the DiD model we should acknowledge that although OLS estimates are not designed to handle ordinal outcome variables their use for DiD model estimation is justified for several reasons. First, in a non-linear DiD model, the estimated coefficients are not a proper representation of the magnitude of the treatment effect and, therefore, should not be used when interpreting the results. Instead, Ai and Norton (2003) and Puhani (2012) recommend focusing only on the interaction term. Second, non-linear models violate the common trend assumption of the DiD model (Lechner, 2010). For this reason, it is a common practice to estimate linear models for such ordinal data by applying the assumptions of the linear case to the latent index of the ordinal outcome variable (Puhani 2012).

Third, it is notable that the intervals between the different values of the latent variable are quite similar, e.g., that they are uniformly distributed across the true (unobserved) latent variable. To investigate this, we estimate two ordered logit models: one model that only includes a constant and one that includes all explanatory variables. To analyse whether these models capture the latent variable in a linear fashion, the difference between the different threshold parameters has been obtained. Both specifications return similar differences between threshold parameters (results available upon request).

Next, we perform a series of robustness checks following Rambachan and Roth (2019), who propose robust inference methods that do not require the assumption of parallel trends to hold exactly¹⁰. Rambachan and Roth (2019) propose a model to estimate the year-by-year coefficient and

¹⁰ Pre-trends are informative about what would have happened under the counterfactual, hence a sensitivity analysis is conducted in which confidence sets are reported under different restrictions on the set of possible violations of the parallel trends assumption (Rambachan and Roth, 2019).

the variance-covariance matrix to exclude the effect of the pre-treatment trend and afterwards extrapolate to the post-treatment period. We have estimated the year-by-year coefficient and confidence intervals at different values of the Rambachan and Roth parameter, which are suggestive of the degree of deviation from the previous trend. The estimated coefficient is positive with a 95% confidence interval for all exposure years, even under the assumption of non-linear trends. This result indicates that, although the pre-treatment trend might be different, the effect of FPC on caregivers' wellbeing significant after the treatment (results available upon request).

6. Results

5.1 Event study results

Figure 1 shows the results of the event-study for caregivers as a whole (left column) and only for caregivers at baseline (right column). The corresponding coefficients and standard deviations are shown on Table B1. In 2002 there is an increase in the level of happiness of 16.32pp for the whole sample, 24.77pp for women, 23.70 pp for non-active and 28.55 for the bottom income quintile¹¹. Importantly, there is no significant effect in the year prior to the introduction of FPC. These significant and positive effects are sustained for all subsequent years after the reform, reaching 29.36pp for women and 32.15pp for the non-active in 2007. The effects for the sample of caregivers at baseline are stronger. The overall level of wellbeing increased by 26.21pp in 2002, i.e. 61% higher for all caregivers as a whole. For women, the effect for caregivers at baseline is 122% higher than for all female caregivers.

¹¹ Following the literature review, on the profile of carers whose level of well-being is most affected by being a carer, the analysis is presented for the total sample and also for the sub-samples of women, non-active (retired + unemployed) and people belonging to the lowest income bracket.

Figure 2 and Table B2 show the results of the event-study by hours of care provided. estimates are reported for all caregivers (left column) and only for caregivers at baseline (right column). No significant effect is observed for any year for carers who spend less than 10 hours/week, at least 10 hours/week or at least 20 hours/week. Significant effects are observed for the other three categories. In 2002 there was an increase in the level of happiness of 33.1 for C35, 26.6pp for C50 and 26.3pp for C100. Compared to the previous year, this represents an increase of 178.15%, 48.60% and 126.72%, respectively. Such effects remain in successive years, and become even stronger for the sub-sample of caregivers at baseline.

[Insert Figures 1 and 2 and Tables B1 and B2 about here]

5.2 Trends

Figure 3 reports evidence of the existing trends for our measure of subjective wellbeing (GHQ-12, “general happiness” item). We focus on the caregiver population in Scotland for the treatment group, whilst the control group refers to the caregivier population in the rest of the UK, where FPC was not implemented. Figure 3 reports evidence of parallel trends that vary by intensity of care.

[Insert Figure 3 about here]

Figures 4 to 6 report the trends in wellbeing measured by GHQ of caregivers (specifically, its “general happiness” domain) based on the total hours of care provided overall and specifically by women (most likely to be caregiver), the non-active population, alongside lower income individuals¹². The general picture that emerges in Figure 4, is that pre-trends seem to be fairly parallel and do not show significant differences between Scotland and the rest of the UK. However, trends

¹² The graphical analysis has been completed alongside a test of differences between treated individuals vs. non-treated during the pre-reform period.

seem to show a *different pattern in the period before the reform among those individuals providing at least 35 hours of care weekly*. In Figure 5 we focus on the non-active population alone, and we find a similar picture as in Figure 4, with the treatment and the control group being closer than in the earlier case. In contrast, the trends in Figure 6 referring to the lowest income quintile population, seem to differ in the period after the reform for the caregivers providing 35 weekly hours of care or more. Hence, we can conclude that, as expected, low income earners are more likely to be affected by the reform.

[Insert Figures 4-6 about here]

To further document the hypothesis of common pre-reform period, we regress the outcome variable on the treatment variable and an interaction term of a continuous time variable and an indicator for the treatment variable. If parallel trend holds, we expect the term of the interaction to be statistically insignificant. Consistently, none of the estimated coefficients are significant¹³.

5.3 Difference-in-differences estimates

5.3.1 Effects on caregivers at baseline (providing at least 10 hours of care)

In order to make sure that the effects we find account for selection into caregiving, we report a first set of estimates where include all carers who were caring for at least 10 hours both at baseline and at the follow-up. The main DiD parameter, namely the effect fo Scotland after 2002 (panel A) is estimated using a series of dummies that identify carers who were caring for a number of weekly hours varying from 10 hours up to over 100 at baseline and were also caring at the follow-up years (these specifications are identified in the tables as C10, C20, C35, C50 and C100, depending on the

¹³ Coefficient and standard deviation for each pre-trend regression (p-value between parenthesis): All sample 0.0318 (0.1269); Women: 0.1489 (0.0992); Non-active: 0.095 (0.1202); Lowest income quintile:0.0017 (0.1262)

number of hours cared at baseline). All specifications control for gender, age, marital status, having non-cohabiting children, education level, monthly income, and a polynomial time trend of the second order. Some of the specifications also control for the actual number of hours cared for (panel B), using the categorical variable available within the BHPS data (10-19 hours, 20-34 hours, 35-49 hours, 50-99 hours and 100+ hours). We ran these estimations for the sample of women with and without controls for care hours (panel C and D), the non-active population sample (including retired and unemployed in Panel E and F) and the sample of lower income respondents (panels G and H). The number of observations and units by treatment group are available in the Appendix in Table A4.

Table 1 reports the effect FPC measured as the effect of Scotland interacted with the period post 2002. Estimates point to an average 10-11p increase in caregivers happiness for the overall sample for carers that at least provide 50 hours of care a week (C50 and C100 samples) and the estimates do not vary significantly significantly when we control for care hours provided. Consistently with the assumption that women do bear most of the caregiving responsibility, we find that the effect of FPC is stronger among the female caregivers (we estimate a happiness increase of 13pp (16pp) without (after) controlling for care hours provided). Such estimates suggest evidence of average happiness improvements of 2.2% and 5.7% depending on the hours of care provided. Similar effects are also found for the non-active population groups providing at least 50 hours of care a week (the effects are estimated to be 17pp), and such effect emerge among those providing 35 hours of care at baseline when we control of hours of care. Finally, given that FPC was a universal benefit, it did not change the caregivers in the lowest income groups as they were likely to benefit from previously means tested care available throughout the United Kingdom among individual with wealth below 23,000£.

[Insert Table 1 about here]

5.3.2 Effects on caregivers at baseline (excluding the implementation year)

As a robustness check, we have removed the year 2002 from the analysis, as the information about the reform may have affected the behaviour of carers even before the FPC was implemented in law (see Table 2). These even when we exclude 2002, our estimates confirm the previous findings in Table 1, suggesting that in many instances, effects on general happiness are even stronger. We find an average 10-13pp increase in happiness without controlling by hours of care among those who were providing 35 hours of care or more at baseline (panels A and B). As in the previous results, we find larger effects among women (17pp) both without controlling by hours of care among individuals providing at least 50 hours of care at baseline, and after controlling for them (21pp in panels C and D), and again, effects are larger among non active individuals (19pp without controlling for hours of care, and 23pp when controlling for them in panel E and F). Finally, no effects are found on lower income groups consistently with a benefit extension that was means tested at baseline.

[Insert Table 2 about here]

We have also re-estimated our models controlling for pre-trends and using an ordered probit specification. Results from these analyses are strongly consistent with our main specification, and detailed results have been included in the appendix (see Table B3 and B4).

5.3.3 Effects on alternative definitions of 'caregiving'

Next, we have also estimated a less restrictive version of the model which includes also those carers who were providing any hours of care at any point in time. Results from this specification are provided in Tables 3 and 4. Unlike previous results, estimates in Table 3 are less precise but

consistent and suggest that including 2002 rises happiness by 12-14pp among women providing more than 100 hours of care, and 16-21pp among non active caregivers providing more than 50 hours of care a week. Finally, we find some positive, though less precise estimates, among lower income groups that vary with the inclusion of controls for hours of care.

[Insert Table 3 about here]

Next, we have performed a final robustness check in which we exclude observations from the year 2002 in Table 4, and consistently, we document estimates consistent with Table 1, namely perceived happiness increases by 10-11pp among the overall sample, a finding that is robust to controlling for hours of care. Estimates are larger (17-18pp) among women, and especially, among labour non-active populations (20-24pp).

[Insert Table 4 about here]

5.3.4 Effect of Attendance Allowance Expansion

One potential explananton for our estimates is that some of such effects are driven by a simultaneous increase in the amount of the attendance allowance (AA), a country-wide cash subsidy¹⁴. However, as reported in Table B5, AA after 2002 did not affect the perceived happiness of caregivers. Estimates suggest no evidence of an effect on both the overall sample and the sample of female caregivers (panels A and C). Neither we find an effect when we control for hours of care

¹⁴ The Attendance Allowance is a benefit for people over State Pension age who need help with personal care or supervision because of illness or disability (around £60.00 per week if help needed during day or night; around £60.00 per week if terminally ill or help required day and night).

(panels B and D). Such results are consistent with the hypothesis that cash subsidies might not influence caregivers wellbeing as much as subsidised supports.

5.3.5 Placebos

To enhance the robustness of our results, we have examined the effect of FPC on an unrelated event such as electoral participation in general level elections, as FPC was a devolved responsibility. Consistently, Table B6 reports that, as expected, FPC *does not* modify caregivers participation in a general election.

5.3.6 Mechanisms

Table 5 reports the DiD estimates of the FPC on the income, employment participation, health, hospitalisations and leisure satisfaction of caregivers to examine the potential mechanisms underpinning previous results. Income improvements can result from either further employment, the reduction of paid care or other expenses that would take place in the absence of FPC. Consistently, FPC can influence employment which can improve the well-being of caregivers re-evaluate their social identity after FPC (Mueser et al., 1997), as well as due to improved opportunities for leisure activities, both of which can impact the subjective wellbeing of family caregivers (Schüz et al, 2015). Finally, FPC might free time which can result in stress reduction, and hence improve health and reduce the probability of hospitalisations.

Again, we distinguish the estimates by hours of caregiving and by including 2002 or not. Results in panels A and B suggest that FPC entailed an income increase of caregivers of 10-15pp depending on the hours of care provided and the inclusion of the year 2002 in the analysis. These estimates

suggest that previous results might be driven by changes in caregivers income. Next, we examine whether such estimates are explained by changes in employment. Except for caregivers providing 20 hours of care, where there is an imprecise increase in employee participation, we find no significant effects on employment participation in panels C and D.

Next, examine the effects on caregivers self-reported health as physical health and hospitalisations care have been found to improve after the provision of supports to caregivers. However, our estimates in panels E, F, G and H do not suggest evidence of any significant effects on health and the probability of hospitalisation. Finally, we examine the effect on leisure satisfaction, and our findings in panels I and J suggest no evidence of either effect on leisure satisfaction. These results suggest that although FPC increases wellbeing by providing some respite and additional income for caregivers, most likely resulting from the reduction in the use of paid care, such well-being effect does not affect their health or their leisure satisfaction, not their labour market participation.

[Insert Table 5 about here]

6. Conclusion

This paper examines the effects of the expansion of caregiving supports on the caregiver's happiness. We estimate the causal effect of the introduction of free personal care' (FPC) in Scotland on caregivers using an event study and a difference in difference approach. We estimate an average 10-11p increase in caregivers happiness for the overall sample for carers that at least provide 50 hours of care a week, and the estimates do not vary significantly significantly when we control for

care hours provided. Consistently with the assumption that women do bear most of the caregiving responsibility, we find that the effect of FPC is stronger among the female caregivers. Such estimates suggest evidence of average happiness improvements of 2.2% and 5.7% depending on the hours of care provided. Estimates are consistent when we use ordinal probit estimates. Furthermore, event study results suggest a consistent rise in happiness after the introduction of FPC. The estimates appear to be driven by an upgrade of caregivers' financial conditions as we identify improvement in caregivers income, but no effects on their physical health.

Overall, these results provide us with economically relevant evidence to understand the effects of FPC on caregivers wellbeing. The effects are driven by improvement in the wellbeing of female caregivers, and caregivers that do not participate in the labour market. The mechanisms of the effect include changes in caregivers income which might result from a reduction in paid care. Estimates are robust to placebo tests, overall suggesting that the extension of subsidised care supports can exert important wellbeing effects on caregivers. This is important evidence in light of reforms expanding the subsidy for caregiving supports in the United States.

References

- AARP Public Policy Institute (2013). Listening to family caregivers: the need to include family caregiver assessment in medicaid home- and community-based service waiver programs. National Center on Caregiving, Family Caregiver Alliance.
- Akkuş, Y. (2011) Multiple sclerosis patient caregivers: the relationship between their psychological and social needs and burden levels. *Disability and Rehabilitation* 33(4), 326-333.
- Amegbor, P., Kuuire, V., Yawson, A., Rosenberg, M., Sabel, C. (2021). Social frailty and depression among older adults in Ghana: insights from the WHO SAGE Surveys. *Research on Aging* 43(2), 85-95.
- Aneshensel, C., Pearlin, L., Schuler, R. (1993). Stress, role captivity, and the cessation of caregiving. *Journal of Health and Social Behavior* 34(1), 54-70.
- Bell, D., Bowes, A. (2006). *Financial care models in Scotland and the UK*. Joseph Rowntree Foundation, York.
- Bell, D. N., Bowes, A. (2012). Free personal care in Scotland: (almost) ten years on. In Folbre N, Meyer, M. H. and Wolf, D, *Universal coverage of long-term care in the US: can we get there from here?*, chapter 5, pp79-102. New York: Russell Sage Foundation.
- Bernheim, B., Schleifer, A., Summers, L. (1985). The strategic bequest motive. *Journal of Political Economy* 93, 1045-1076.
- Bjørkløf, G., Engedal, K., Selbæk, G., Maia, D., Coutinho, E., Helvik, A. (2016). Locus of control and coping strategies in older persons with and without depression. *Aging & Mental Health* 20(8),831-839.
- Bookwala, J. (2009). The impact of parent care on marital quality and wellbeing in adult daughters and sons. *Journal of Gerontology Series B-Psychological Sciences and Social Sciences* 64, 339-347.
- Brenna, E., Di Novi, C. (2016). Is caring for older parents detrimental to women's mental health? The role of the European North-South gradient. *Review of Economics of the Household* 14(4), 992-1001.
- Campbell, P., Wright, J., Oyebode, J., Job, D., Crome, P., Bentham, P., Jones, L., Lendon, C. (2008) Determinants of burden in those who care for someone with dementia. *International Journal of Geriatric Psychiatry* 23(10), 1078–1085.
- Carmichael, F., Charles, S. (2003). The opportunity costs of informal care: does gender matter?. *Journal of Health Economics* 22(5), 781-803.
- Coe, N., van Houtven, C. (2009). Caring for mom and neglecting yourself? The health effects of caring for an elderly parent. *Health Economics* 18, 991-1010.
- Conde-Sala J.L., Garre-Olmo J., Turro-Garriga O., Vilalta-Franch J., Lopez-Pousa S. (2010). Differential features of burden between spouse and adult-child caregivers of patients with Alzheimer's disease: an exploratory comparative design. *International Journal of Nursing Studies* 47(10), 1262–1273.
- Dickinson, H., Glasby, J., Forder, J., Beesley, L. (2007). Free personal care in Scotland: A narrative review. *British Journal of Social Work* 37(3), 459-474.
- Do, Y., Norton, E., Stearns, S., Van Houtven, C. (2015). Informal care and caregiver's health. *Health Economics* 24, 224-237.
- Donald, S. G., Lang, K., 2007. Inference with difference-in-differences and other panel data. *Review of Economics Statistics* 89, 221–233.

- Ducharme, F, Lévesque, L, Zarit, SH, Lachance, L, Giroux, F. (2007). Changes in health outcomes among older husband caregivers: a one-year longitudinal study. *International Journal of Aging and Human Development* 65(1), 73-96.
- Ettner, S. L. (1994). The effect of the Medicaid home care benefit on long-term care choices of the elderly. *Economic Inquiry* 32(1), 103–127.
- Finley, N. J. (1989). Theories of family labor as applied to gender differences in caregiving for elderly parents. *Journal of Marriage and Family* 51(1), 79-86.
- Glauber, R. (2017). Gender differences in spousal care across the later life course. *Research on Aging* 39(8), 934-959.
- Glendinning, C., Davies, B., Pickard, L., Comas-Herrera, A. (2004). *Funding long-term care for older people: lessons from other countries*. Joseph Rowntree Foundation.
- Hansen, T., Slagsvold, B. (2013). The psychological effects of providing personal care to a partner: a multidimensional perspective. *Health Psychology Research* 1, e25.
- Heger, D. (2016). The mental health of children providing care to their elderly parents. *Health Economics* 26, 1617-1629.
- Heitmueller, A., Inglis, K. (2007). The earnings of informal carers: wage differentials and opportunity costs. *Journal of Health Economics* 26, 821-841.
- Hiel, L., Beenackers, M., Renders, C., Robroek, S., Burdof, A., Croezen, S. (2015). Providing personal informal care to older European adults: should we care about the caregiver's health? *Preventive Medicine* 70, 64-68.
- Hurd, M. D., Martorell, P., Delavande, A., Mullen, K. J., Langa, K. M. (2013). Monetary costs of dementia in the United States. *New England Journal of Medicine* 368(14), 1326-1334.
- Karlsberg Schaffer, S. (2015). The effect of free personal care for the elderly on informal caregiving. *Health Economics* 24(S1), 104–117.
- Langner, L., Furstenberg, F. (2020). Gender differences in spousal caregivers' care and housework: Fact or fiction? *The Journals of Gerontology: Series B* 75(1), 173-183.
- Lechner, M. (2011). The estimation of causal effects by difference-in-difference methods. *Foundations and Trends in Econometrics* 4(3), 165-224.
- Linsk, N., Keigher, S., Simon-Rusinowitz, L., England, S. (1992). *Wages for caring. Compensating family care of the elderly*. New York: Praeger.
- Mahoney, K., Simon-Rusinowitz, L., Loughlin, D., Desmond, S., Squillace, M. (2002). Determining personal care consumers' preferences for a consumer-directed "Cash and Counseling" option: Survey results from Arkansas, Florida, New Jersey and New York elders and adults with physical disabilities. *Health Services Research* 39(3): 643–664.
- McDonagh, J., Elliott, T., Engelberg, R., Treece, P., Shannon, S., Rubenfeld, G., Patrick, D., Curtis, J. (2004). Family satisfaction with family conferences about end-of-life care in the intensive care unit: increased proportion of family speech is associated with increased satisfaction. *Critical Care Medicine* 32(7), 1484-1488.
- McGarry, K. (1999). Inter vivos transfers and intended bequests. *Journal of Public Economics* 73:321-351.
- McKnight, R. (2006). Home care reimbursement, long-term care utilization, and health outcomes *Journal of Public Economics* 90(1), 293–323.
- Mueser, K., Becker, D., Torrey, W., Xie, H., Bond, G., Drake, R., Dain, B. (1997). Work and nonvocational domains of functioning in persons with severe mental illness: A longitudinal analysis. *Journal of Nervous Mental Diseases* 185, 419–426

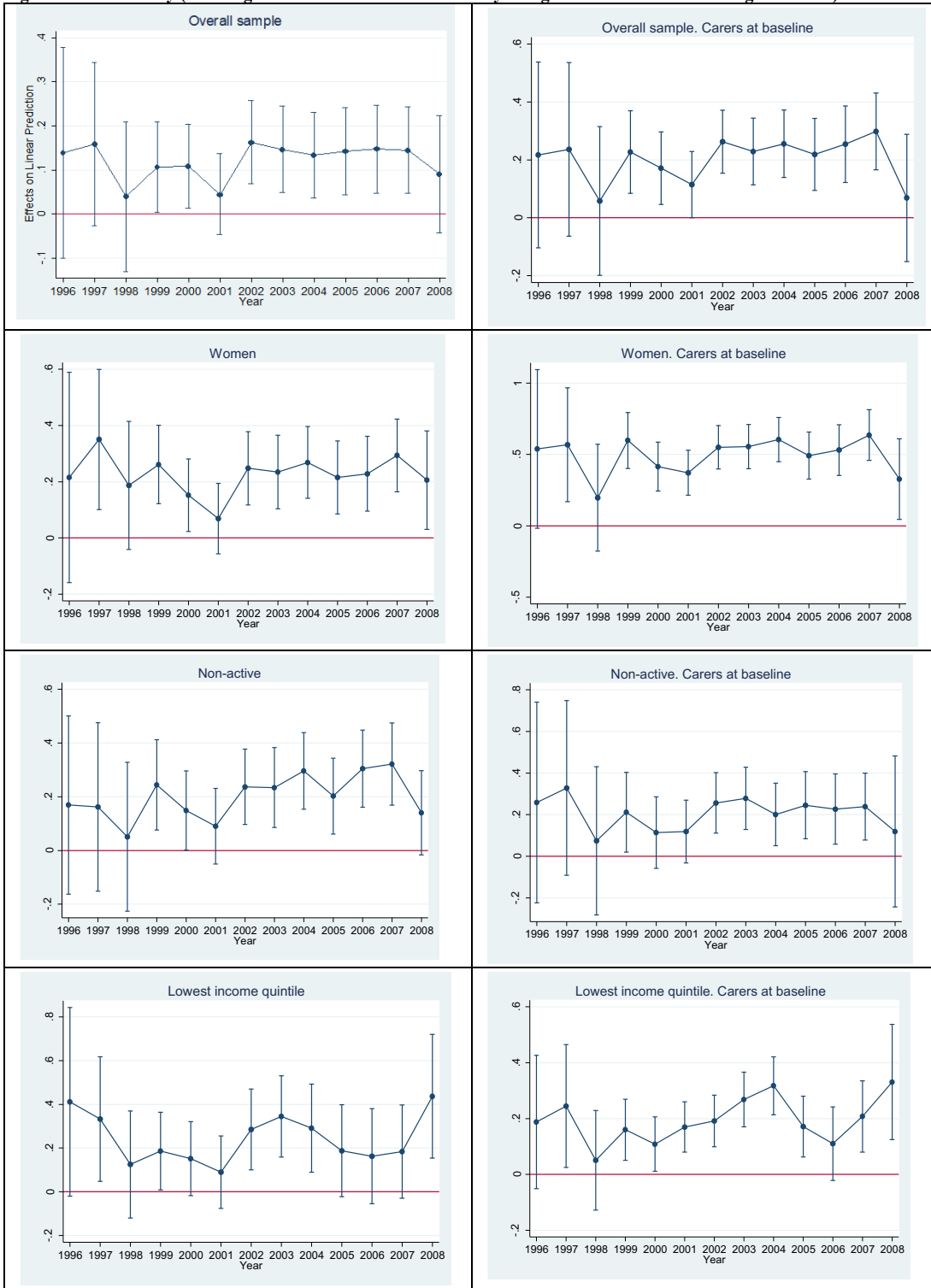
- National Statistics (2002). Community Care Statistics 2001: Home care services for adults, England. National Statistics, Department of Health, London.
- Molyneux, G., McCarthy, G., McEniff, S., Cryan, M., Conroy, R. (2008). Prevalence and predictors of carer burden and depression in carers of patients referred to an old age psychiatric service. *International Psychogeriatrics* 20(6), 1193–1202.
- Orfila, F., Coma-Solé, M., Cabanas, M., Cegri-Lombardo, F., Moleras-Serra, A., Pujol-Ribera, E. (2018). Family caregiver mistreatment of the elderly: prevalence of risk and associated factors. *BMC Public Health* 18(1), 167.
- Papastavrou, E., Kalokerinou, A., Papacostas, S., Tsangari, H., Sourtzi, P. (2007). Caring for a relative with dementia: family caregiver burden. *Journal of Advanced Nursing* 58(5), 446–457.
- Pavalko, E., Woodbury, S. (2000). Social roles as process: Caregiving careers and women's health. *Journal of Health and Social Behavior* 41(1), 91-105.
- Pearlin, L., Mullan, J., Semple, S., Skaff, M. (1990). Caregiving and the stress process: an overview of concepts and their measures. *The Gerontologist* 30, 583–594.
- Pinquart, M., Sörensen, S. (2003). Associations of stressors and uplifts of caregiving with caregiver burden and depressive mood: a meta-analysis. *Journal of Gerontology Series B-Psychological Sciences and Social Sciences* 58, 112-128.
- Pinquart, M., Sörensen, S. (2003) Differences between caregivers and noncaregivers in psychological health and physical health: a meta-analysis. *Psychology and Aging* 18(2), 250-267.
- Pinquart, M., Sörensen, S. (2006). Gender differences in caregiver stressors, social resources, and health: An updated meta-analysis. *The Journals of Gerontology: Series B* 61(1), 33-45.
- Pinquart M, Sörensen S. (2011). Spouses, adult children, and children-in-law as caregivers of older adults: a meta-analytic comparison. *Psychology and Aging* 26(1), 1-14.
- Puhani, P. (2012). The treatment effect, the cross difference, and the interaction term in nonlinear “difference-in-differences” models. *Economics Letters* 115(1), 85-87.
- Rafnsson, S., Shankar, A., Steptoe, A. (2017). Informal caregiving transitions, subjective well-being and depressed mood: findings from the English Longitudinal Study of Ageing. *Aging & Mental Health* 21(1), 104–112.
- Rajapakshe, O., Sivayogan, S. Kulatunga, P. (2019). Prevalence and correlates of depression among older urban community-dwelling adults in Sri Lanka. *Psychogeriatrics* 19(3), 202-211.
- Rambachan, A. Roth, J (2019). Working Paper. An Honest Approach to Parallel Trends. Harvard University. [An Honest Approach to Parallel Trends | Jonathan Roth \(harvard.edu\)](#)
- Rattinger, G. B., Schwartz, S., Mullins, C. D., Corcoran, C., Zuckerman, I. H., Sanders, C., Norton, M. C., Fauth, E. B., Leoutsakos, J.-M. S., Lyketsos, C. G., et al., 2015. Dementia severity and the longitudinal costs of informal care in the cache county population. *Alzheimer's & Dementia* 11(8), 946–954.
- Rinaldi, P, Spazzafumo, L., Mastriforti, R., Mattioli, P., Marvardi, M., Polidori, M., Cherubini, A., Abate, G., Bartorelli, L., Bonaiuto, S., Capurso, A., Cucinotta, D., Gallucci, M., Giordano, M., Martorelli, M., Masaraki, G., Nieddu, A., Pettenati, C., Putzu, P., Tammaro, V., Tomassini, P., Vergani, C., Senin, U., Mecocci, P. (2005). Study Group on Brain Aging of the Italian Society of Gerontology and Geriatrics. Predictors of high level of burden and distress in caregivers of demented patients: results of an Italian multicenter study. *International Journal of Geriatrics and Psychiatry* 20(2), 168-174.

- Saito, T., Kondo, N., Shiba, K., Murata, C., Kondo, K. (2018). Income-based inequalities in caregiving time and depressive symptoms among older family caregivers under the Japanese long-term care insurance system: A cross-sectional analysis. *PLoS One* 13(3), e0194919.
- Sanders, S, Power, J. (2009). Roles, responsibilities, and relationships among older husbands caring for wives with progressive dementia and other chronic conditions. *Health Social Work* 34(1), 41-51.
- Schmitz, H., Stroka, M. (2013). Health and the double burden of full-time work and informal care provider. Evidence from administrative data. *Labour Economics* 24, 305-322.
- Schulz, R., Martire, L. (2004). Family caregiving of persons with dementia: prevalence, health effects, and support strategies. *The American Journal of Geriatric Psychiatry: Official Journal of the American Association for Geriatric Psychiatry* 12(3), 240–249.
- Schulz, R., Beach, S., Cook, T., Martire, L., Tomlinson, J., Monin, J. (2012). Predictors and consequences of perceived lack of choice in becoming an informal caregiver. *Aging & Mental Health* 16, 712–721.
- Schüz, B., Czerniawski, A., Davie, N., Miller, L., Quinn, M., King, C., Carr, A., Elliott K., Robinson A., Scott J. (2015). Leisure Time Activities and Mental Health in Informal Dementia Caregivers. *Applied Psychology: Health and Well Being* 7(2), 230-248.
- Serrano-Aguilar P., Lopez-Bastida J., Yanes-Lopez V. (2006). Impact on health-related quality of life and perceived burden of informal caregivers of individuals with Alzheimer’s disease. *Neuroepidemiology* 27(3), 136–142.
- Simon-Rusinowitz, L., Mahoney, K., Benjamin, A. (1998). Payments to families who provide care: an option that should be available. *Generations* 22, 69-75.
- Snyder J. (2000). Impact of caregiver-receiver relationship quality on burden and satisfaction. *Journal of Women & Aging* 12(1–2), 147–167.
- Stroka, M. (2014). The mental and physical burden of caregiving. Evidence from administrative data. Ruhr Economic Papers No. 474.
- Sussman, T., Regehr, C. (2009). The influence of community-based services on the burden of spouses caring for their partners with dementia. *Health Social Work* 34(1), 29-39.
- Tough, H., Brinkhof, M., Siegrist, J., Fekete, C. (2020). Social inequalities in the burden of care: a dyadic analysis in the caregiving partners of persons with a physical disability. *International Journal of Equity in Health* 19, 3.
- Unger, E., Grabowski, D., Chen, J., Berkman, L. (2021). Association between new-onset Medicaid home care and family caregivers’ health. *JAMA Health Forum* 2(9), e212671.
- Van den Berg, B. (2007). External Effects of Paying Informal Caregivers. iHEA 2007 6th World Congress: Explorations in Health Economics Paper, Available at SSRN: <https://ssrn.com/abstract=993888>
- Van den Berg, B., Ferrer-i Carbonell, A. (2007). Monetary valuation of informal care: the wellbeing valuation method. *Health Economics* 16 (11), 1227–1244.
- Van den Berg, B., Fiebig, D. G., Hall, J. (2014). Wellbeing losses due to care-giving. *Journal of Health Economics*, 35, 123-131.
- Van den Broek, T., Grundy, E. (2020). Does long-term care coverage shape the impact of informal care-giving on quality of life? A difference-in-difference approach. *Ageing and Society* 40(6), 1291-1308.
- Vandepitte, S., Van Den Noortgate, N., Putman, K., Verhaeghe, S., Verdonck, C., Annemans, L. (2016). Effectiveness of respite care in supporting informal caregivers of persons with

- dementia: a systematic review. *International Journal of Geriatric Psychiatry* 31(12), 1277-1288.
- Vitaliano, P., Zhang, J., Scanlan, J. (2003) Is caregiving hazardous to one's physical health? a meta-analysis. *Psychological Bulletin* 129, 946-972.
- Vitaliano, P., Young, H., Zhang, J. (2004). Is caregiving a risk factor for illness? *Current Directions in Psychological Science* 13, 13-16.
- Yee J. L., Schulz R. (2000). Gender differences in psychiatric morbidity among family caregivers: A review and analysis. *The Gerontologist* 40, 147–164.
- Wang, G., Hu, M., Xiao, S., Zhou, L. (2017). Loneliness and depression among rural empty-nest elderly adults in Liuyang, China: a cross-sectional study. *BMJ Open* 7(10), e016091.
- Zwart, P., Bakks, P., van Doorslaer, E. (2017). Will you still need me, will you still feed me when I'm 64? The health impact of caregiving to one's spouse. *Health Economics* 26, 127-138.

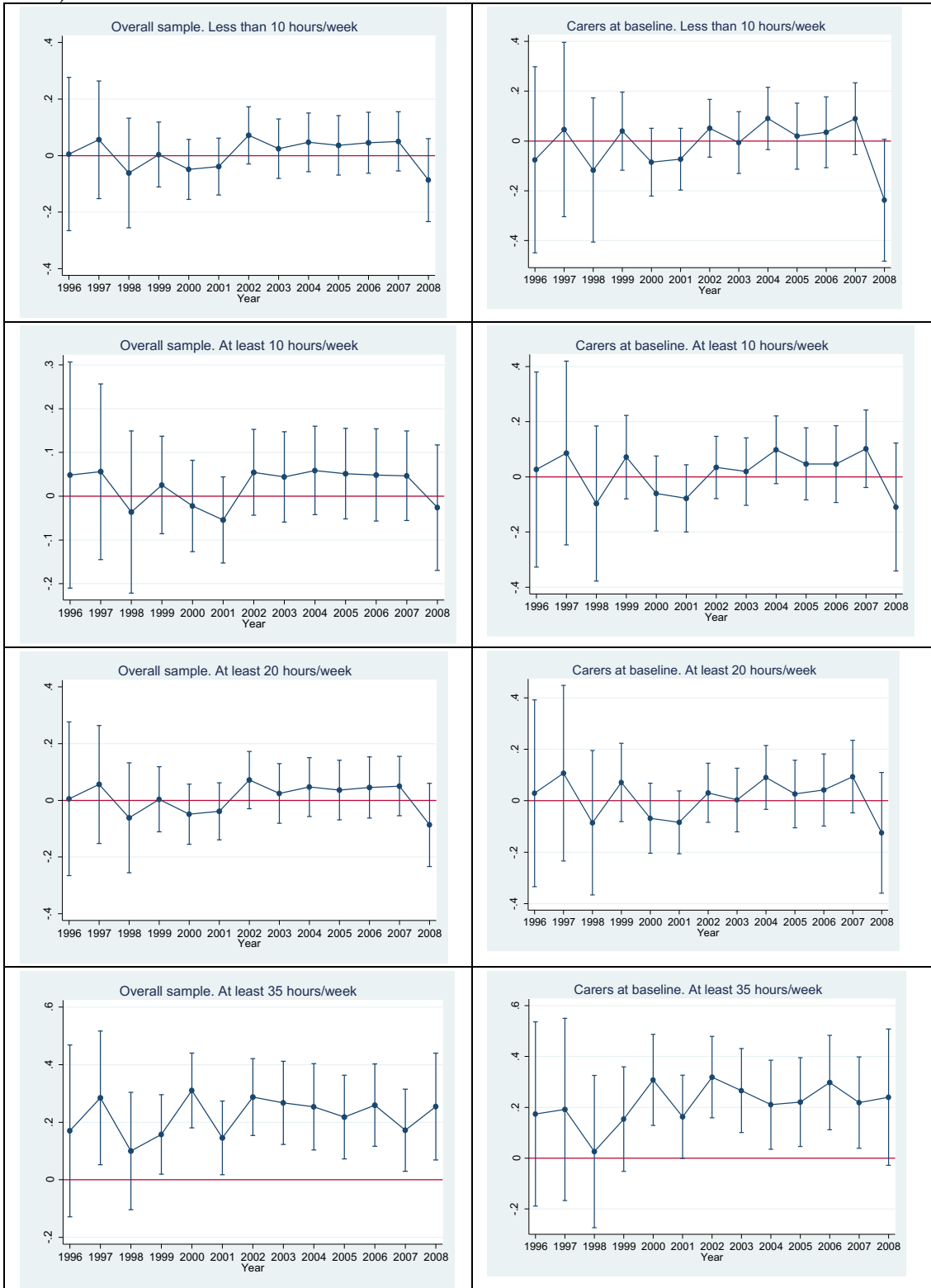
Tables and Figures

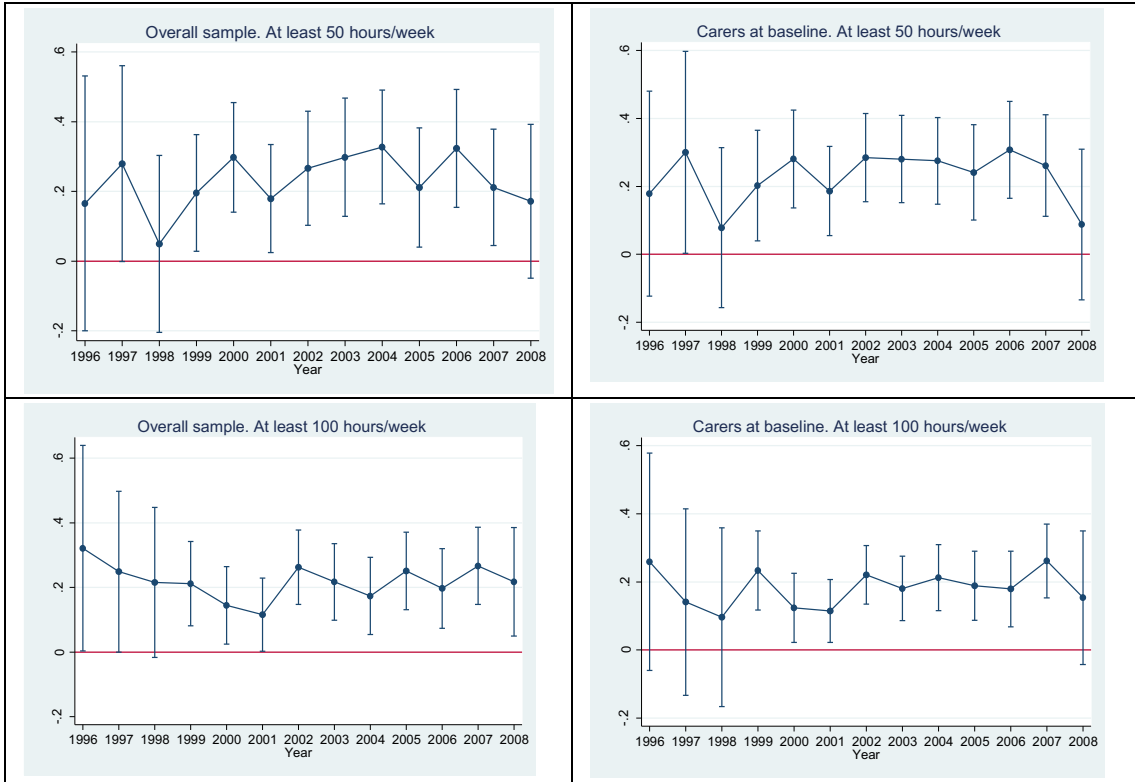
Figure 1. Event study (all caregivers in the left column and only caregivers at baseline on the right column)



Note: This figure corresponds to an event study created by regressing the outcome variable for a respondent-by-term-by-year cell on a full set of event time indicators interacted with a binary variable for “treatment” and on a set of control variables. This figure reports the coefficients for event-time, that is, the time path of outcome variables in treated vs. untreated individuals before and after of policy implementation and the 95% confidence intervals with robust standard errors clustered at the region-level.

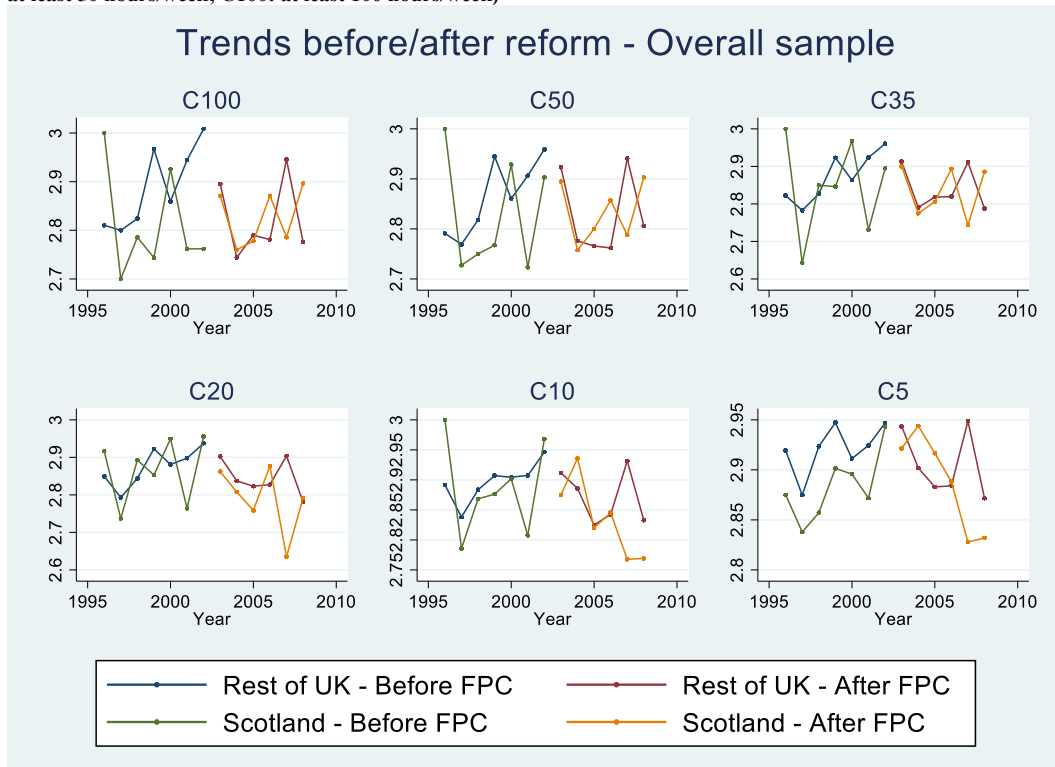
Figure 2. Event study distinguishing by caregiving hours. (all caregivers on the left column and only caregivers at baseline on the right column)





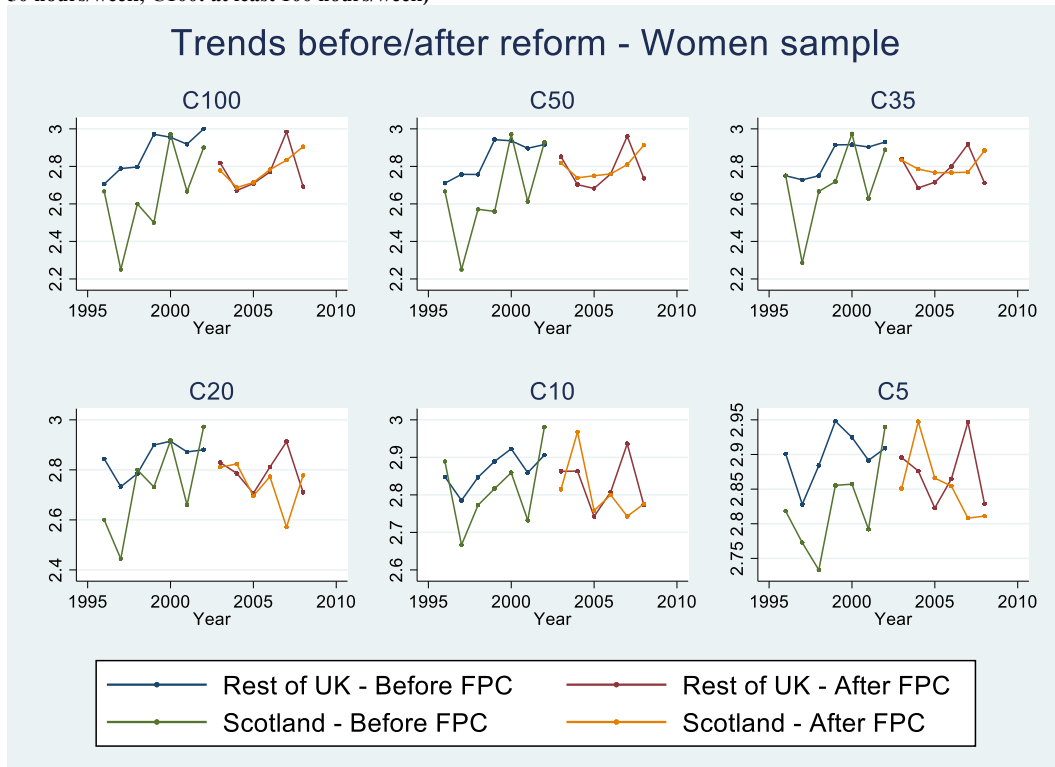
Note: This figure corresponds to an event study created by regressing the outcome variable for a respondent-by-term-by-year cell on a full set of event time indicators interacted with a binary variable for “treatment” and on a set of control variables. This figure reports the coefficients for event-time, that is, the time path of outcome variables in treated vs. untreated individuals before and after of policy implementation and the 95% confidence intervals with robust standard errors clustered at the region-level.

Figure 3. Comparison of caregiving hours before and after Scottish reform at different levels of caring support.
 (C10: carers providing at at least 10 hours/week at baseline and follow-up; C20: at least 20 hours/week; C35: at least 35 hours/week; C50: at least 50 hours/week; C100: at least 100 hours/week)



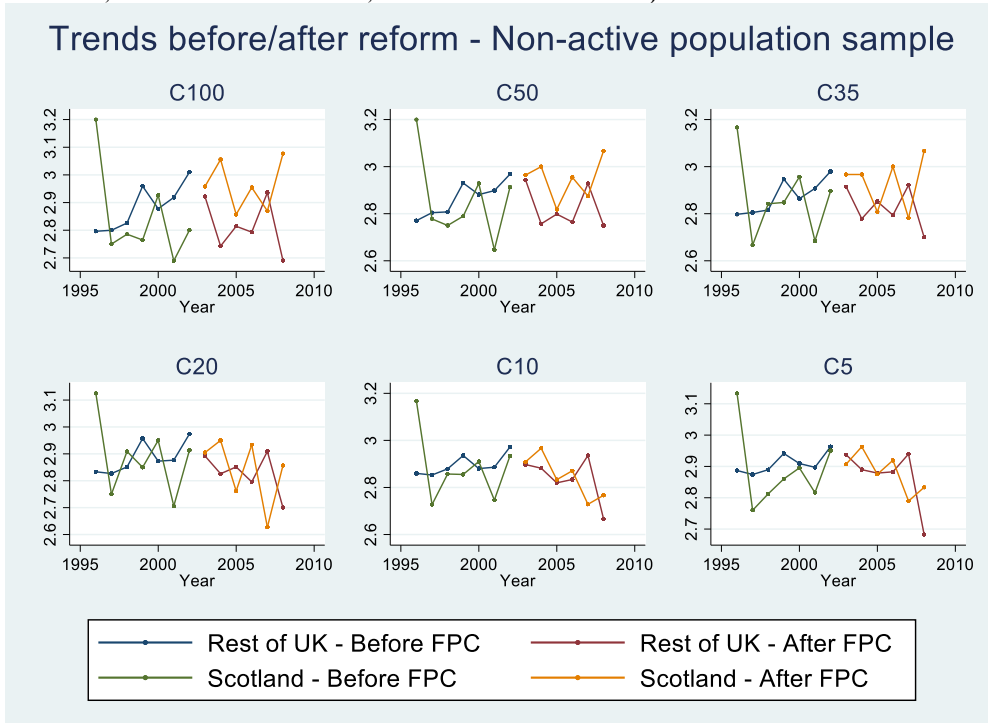
Source: Own work using BHPS waves from 1996 to 2008.
 Pre-reform years: 1996 and 2002. Post-reform years: 2003 to 2008.

Figure 4. Comparison of caregiving hours before and after Scottish reform at different levels of caring support for the women sample. (C10: carers providing at at least 10 hours/week at baseline and follow-up; C20: at least 20 hours/week; C35: at least 35 hours/week; C50: at least 50 hours/week; C100: at least 100 hours/week)



Source: Own work using BHPS waves from 1996 to 2008.
Pre-reform years: 1996 and 2002. Post-reform years: 2003 to 2008

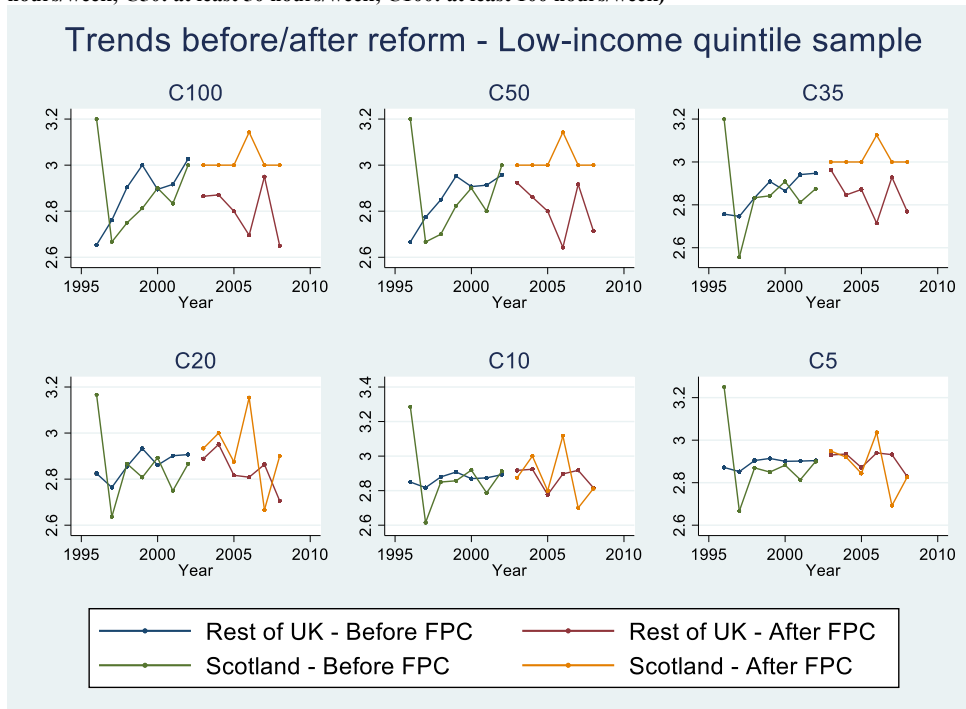
Figure 5. Comparison of caregiving hours before and after Scottish reform at different levels of caring support for the non-active population sample. (C10: carers providing at at least 10 hours/week at baseline and follow-up; C20: at least 20 hours/week; C35: at least 35 hours/week; C50: at least 50 hours/week; C100: at least 100 hours/week)



Source: Own work using BHPS waves from 1996 to 2008.

Pre-reform years: 1996 and 2002. Post-reform years: 2003 to 2008

Figure 6. Comparison of caregiving hours before and after Scottish reform at different levels of caring support for the low-income quintile sample. (C10: carers providing at at least 10 hours/week at baseline and follow-up; C20: at least 20 hours/week; C35: at least 35 hours/week; C50: at least 50 hours/week; C100: at least 100 hours/week)



Source: Own work using BHPS waves from 1996 to 2008.
Pre-reform years: 1996 and 2002. Post-reform years: 2003 to 2008

Table 1. Estimation of the difference in difference model of FPC on caregivers happiness (C10: carers providing at at least 10 hours/week at baseline and follow-up; C20: at least 20 hours/week; C35: at least 35 hours/week; C50: at least 50 hours/week; C100: at least 100 hours/week)

GHQ rev. (general happiness domain)	C10	C20	C35	C50	C100
A Overall sample					
Scotland	-0.033 (0.047)	-0.041 (0.052)	-0.037 (0.061)	-0.067 (0.068)	-0.086 (0.073)
After 2002	0.023 (0.022)	0.023 (0.022)	0.023 (0.022)	0.023 (0.022)	0.023 (0.022)
Scotland * After 2002	0.053 (0.050)	0.043 (0.052)	0.078 (0.054)	0.105** (0.053)	0.111** (0.054)
N	15,863	15,863	15,863	15,863	15,863
R ²	0.013	0.013	0.013	0.013	0.013
B. Overall sample - controlling for care hours provided					
Scotland	-0.020 (0.056)	-0.019 (0.063)	-0.010 (0.074)	-0.028 (0.084)	-0.052 (0.091)
After 2002	0.023 (0.022)	0.024 (0.022)	0.023 (0.022)	0.023 (0.022)	0.023 (0.022)
Scotland * After 2002	0.068 (0.054)	0.057 (0.056)	0.097* (0.058)	0.117** (0.056)	0.129** (0.058)
N	14,598	14,598	14,598	14,598	14,598
R ²	0.019	0.018	0.019	0.019	0.019
C. Women					
Scotland	-0.037 (0.067)	-0.054 (0.079)	-0.056 (0.099)	-0.120 (0.118)	-0.120 (0.118)
After 2002	-0.001 (0.031)	0.000 (0.031)	0.000 (0.031)	0.000 (0.031)	0.000 (0.031)
Scotland * After 2002	0.084 (0.058)	0.067 (0.063)	0.077 (0.071)	0.129** (0.064)	0.129** (0.064)
N	9,471	9,471	9,471	9,471	9,471
R ²	0.007	0.007	0.007	0.007	0.007
D. Women - controlling for care hours provided					
Scotland	-0.035 (0.079)	-0.047 (0.095)	-0.050 (0.121)	-0.107 (0.150)	-0.107 (0.150)
After 2002	-0.012 (0.032)	-0.011 (0.032)	-0.011 (0.032)	-0.011 (0.032)	-0.011 (0.032)
Scotland * After 2002	0.105 (0.065)	0.090 (0.071)	0.112 (0.082)	0.162** (0.075)	0.162** (0.075)
N	8,688	8,688	8,688	8,688	8,688
R ²	0.017	0.017	0.017	0.017	0.017
E. Non-active					
Scotland	-0.045 (0.057)	-0.050 (0.062)	-0.042 (0.073)	-0.071 (0.083)	-0.081 (0.088)
After 2002	0.011 (0.028)	0.012 (0.028)	0.011 (0.028)	0.011 (0.028)	0.012 (0.028)
Scotland * After 2002	0.085 (0.069)	0.070 (0.075)	0.131 (0.082)	0.170* (0.088)	0.160* (0.093)
N	9,426	9,426	9,426	9,426	9,426
R ²	0.020	0.020	0.020	0.020	0.020
F. Non-active - controlling for care hours provided					
Scotland	-0.039 (0.069)	-0.039 (0.077)	-0.027 (0.091)	-0.040 (0.106)	-0.054 (0.113)
After 2002	0.010 (0.029)	0.011 (0.029)	0.010 (0.029)	0.010 (0.029)	0.010 (0.029)
Scotland * After 2002	0.108 (0.080)	0.098 (0.089)	0.171* (0.099)	0.206* (0.108)	0.202* (0.115)
N	8,521	8,521	8,521	8,521	8,521
R ²	0.028	0.028	0.029	0.029	0.028
G. Lowest income quintile					
Scotland	-0.017 (0.084)	-0.004 (0.095)	0.015 (0.107)	-0.018 (0.133)	-0.030 (0.134)
After 2002	0.042 (0.052)	0.044 (0.052)	0.043 (0.051)	0.043 (0.051)	0.043 (0.051)
Scotland * After 2002	0.073 (0.105)	0.056 (0.118)	0.103 (0.129)	0.160 (0.138)	0.173 (0.138)
N	3,496	3,496	3,496	3,496	3,496
R ²	0.018	0.018	0.018	0.018	0.018
H. Lowest income quintile - controlling for care hours provided					
Scotland	-0.035 (0.106)	-0.026 (0.127)	-0.011 (0.144)	-0.016 (0.187)	-0.031 (0.189)
After 2002	0.034 (0.055)	0.035 (0.055)	0.034 (0.055)	0.035 (0.054)	0.035 (0.054)
Scotland * After 2002	0.106 (0.127)	0.099 (0.148)	0.155 (0.167)	0.205 (0.189)	0.219 (0.190)
N	3,169	3,169	3,169	3,169	3,169
R ²	0.026	0.026	0.027	0.027	0.027

Note: C100 includes only unpaid carers who provided at baseline 100 hours or more of weekly care, C50 those who provided at least 50 hours, C35 those who provided at least 35 hours, C20 those who provided at least 20 hours, C10 those who provided at least 10 hours. At follow-up all the carers

have provided at least 10 hours of care. All models presented in the above table control for: gender, age, marital status, having non-cohabiting children, education level, monthly income, and a polynomial time trend of the second order. Additionally, all treated units reside in Scotland.

Table 2. Estimation of the difference in difference model of FPC on caregivers happiness excluding observations from year 2002 (C10: carers providing at at least 10 hours/week at baseline and follow-up; C20: at least 20 hours/week; C35: at least 35 hours/week; C50: at least 50 hours/week; C100: at least 100 hours/week)

GHQ rev. (general happiness domain)	C10	C20	C35	C50	C100
A Overall sample					
Scotland	-0.047 (0.052)	-0.054 (0.056)	-0.056 (0.065)	-0.090 (0.071)	-0.110 (0.077)
After 2002	0.042 (0.025)	0.042* (0.025)	0.042 (0.025)	0.042 (0.025)	0.042 (0.025)
Scotland * After 2002	0.068 (0.055)	0.055 (0.056)	0.097* (0.055)	0.128** (0.051)	0.136** (0.054)
N	14,388	14,388	14,388	14,388	14,388
R ²	0.012	0.012	0.012	0.012	0.012
B. Overall sample - controlling for care hours provided					
Scotland	-0.034 (0.061)	-0.031 (0.069)	-0.027 (0.079)	-0.048 (0.089)	-0.072 (0.098)
After 2002	0.041 (0.026)	0.042 (0.026)	0.042 (0.026)	0.042 (0.026)	0.042 (0.026)
Scotland * After 2002	0.086 (0.060)	0.073 (0.061)	0.118* (0.061)	0.142** (0.056)	0.156** (0.061)
N	13,243	13,243	13,243	13,243	13,243
R ²	0.019	0.019	0.020	0.020	0.020
C. Women					
Scotland	-0.066 (0.075)	-0.082 (0.089)	-0.084 (0.112)	-0.162 (0.132)	-0.162 (0.132)
After 2002	0.002 (0.035)	0.003 (0.035)	0.003 (0.035)	0.003 (0.035)	0.003 (0.035)
Scotland * After 2002	0.115* (0.065)	0.097 (0.069)	0.108 (0.081)	0.175** (0.073)	0.175** (0.073)
N	8,621	8,621	8,621	8,621	8,621
R ²	0.006	0.006	0.006	0.007	0.007
D. Women - controlling for care hours provided					
Scotland	-0.066 (0.087)	-0.075 (0.107)	-0.077 (0.135)	-0.144 (0.165)	-0.144 (0.165)
After 2002	-0.017 (0.036)	-0.015 (0.036)	-0.015 (0.036)	-0.015 (0.036)	-0.015 (0.036)
Scotland * After 2002	0.142* (0.074)	0.127 (0.081)	0.149 (0.095)	0.210** (0.090)	0.210** (0.090)
N	7,921	7,921	7,921	7,921	7,921
R ²	0.018	0.018	0.018	0.018	0.018
E. Non-active					
Scotland	-0.057 (0.066)	-0.057 (0.071)	-0.058 (0.083)	-0.096 (0.093)	-0.111 (0.099)
After 2002	0.042 (0.033)	0.043 (0.033)	0.042 (0.033)	0.042 (0.033)	0.042 (0.033)
Scotland * After 2002	0.097 (0.078)	0.077 (0.086)	0.147 (0.092)	0.196** (0.095)	0.191* (0.102)
N	8,556	8,556	8,556	8,556	8,556
R ²	0.019	0.019	0.019	0.019	0.019
F. Non-active - controlling for care hours provided					
Scotland	-0.048 (0.080)	-0.042 (0.089)	-0.039 (0.103)	-0.059 (0.118)	-0.077 (0.127)
After 2002	0.042 (0.035)	0.043 (0.034)	0.041 (0.034)	0.041 (0.034)	0.042 (0.034)
Scotland * After 2002	0.121 (0.092)	0.107 (0.103)	0.189* (0.111)	0.231** (0.118)	0.232* (0.128)
N	7,736	7,736	7,736	7,736	7,736
R ²	0.029	0.029	0.030	0.030	0.030
G. Lowest income quintile					
Scotland	-0.020 (0.098)	-0.007 (0.114)	0.016 (0.126)	-0.042 (0.149)	-0.057 (0.150)
After 2002	0.044 (0.057)	0.046 (0.057)	0.045 (0.057)	0.045 (0.056)	0.045 (0.056)
Scotland * After 2002	0.078 (0.123)	0.061 (0.139)	0.103 (0.152)	0.183 (0.153)	0.198 (0.154)
N	3177	3177	3177	3177	3177
R ²	0.018	0.018	0.018	0.018	0.018
H. Lowest income quintile - controlling for care hours provided					
Scotland	-0.033 (0.123)	-0.025 (0.151)	-0.003 (0.168)	-0.031 (0.209)	-0.048 (0.211)
After 2002	0.045 (0.059)	0.047 (0.058)	0.046 (0.058)	0.047 (0.058)	0.047 (0.058)
Scotland * After 2002	0.109 (0.148)	0.105 (0.175)	0.154 (0.195)	0.226 (0.211)	0.243 (0.213)
N	2885	2885	2885	2885	2885

R ²	0.029	0.029	0.029	0.029	0.029
----------------	-------	-------	-------	-------	-------

Note: C100 includes only unpaid carers who provided at baseline 100 hours or more of weekly care, C50 those who provided at least 50 hours, C35 those who provided at least 35 hours, C20 those who provided at least 20 hours, C10 those who provided at least 10 hours. At follow-up all the carers have provided at least 10 hours of care. All models presented in the above table control for: gender, age, marital status, having non-cohabiting children, education level, monthly income, and a polynomial time trend of the second order. Additionally, all treated units reside in Scotland.

Table 3. Estimation of the difference in difference model of FPC on caregivers happiness (C10: carers providing at at least 10 hours/week at baseline and follow-up; C20: at least 20 hours/week; C35: at least 35 hours/week; C50: at least 50 hours/week; C100: at least 100 hours/week)

GHQ rev. (general happiness domain)	C10	C20	C35	C50	C100
A Overall sample					
Scotland	0.003 (0.049)	-0.036 (0.049)	-0.018 (0.057)	-0.052 (0.063)	-0.084 (0.073)
After 2002	0.023 (0.022)	0.023 (0.022)	0.023 (0.022)	0.023 (0.022)	0.023 (0.022)
Scotland * After 2002	0.016 (0.048)	0.026 (0.050)	0.040 (0.053)	0.070 (0.049)	0.083 (0.054)
N	15863	15863	15863	15863	15863
R ²	0.013	0.013	0.013	0.013	0.013
B. Overall sample - controlling for care hours provided					
Scotland	0.025 (0.055)	-0.006 (0.057)	0.019 (0.068)	-0.004 (0.077)	-0.041 (0.090)
After 2002	0.024 (0.022)	0.024 (0.022)	0.024 (0.022)	0.024 (0.022)	0.024 (0.022)
Scotland * After 2002	0.014 (0.053)	0.022 (0.056)	0.036 (0.059)	0.059 (0.056)	0.080 (0.063)
N	14598	14598	14598	14598	14598
R ²	0.019	0.018	0.019	0.019	0.019
C. Women					
Scotland	-0.052 (0.061)	-0.079 (0.070)	-0.058 (0.084)	-0.133 (0.098)	-0.158 (0.106)
After 2002	-0.000 (0.031)	0.000 (0.031)	0.001 (0.031)	0.000 (0.031)	0.000 (0.031)
Scotland * After 2002	0.070 (0.059)	0.061 (0.064)	0.040 (0.069)	0.095 (0.060)	0.119* (0.063)
N	9471	9471	9471	9471	9471
R ²	0.007	0.007	0.007	0.008	0.008
D. Women - controlling for care hours provided					
Scotland	-0.037 (0.069)	-0.058 (0.081)	-0.034 (0.100)	-0.103 (0.122)	-0.135 (0.136)
After 2002	-0.011 (0.032)	-0.010 (0.032)	-0.010 (0.032)	-0.010 (0.032)	-0.010 (0.032)
Scotland * After 2002	0.072 (0.064)	0.064 (0.070)	0.051 (0.078)	0.105 (0.069)	0.136* (0.075)
N	8688	8688	8688	8688	8688
R ²	0.017	0.017	0.016	0.017	0.017
E. Non-active					
Scotland	-0.037 (0.051)	-0.045 (0.057)	-0.032 (0.066)	-0.074 (0.074)	-0.106 (0.086)
After 2002	0.012 (0.028)	0.012 (0.028)	0.011 (0.028)	0.011 (0.028)	0.011 (0.028)
Scotland * After 2002	0.064 (0.063)	0.061 (0.070)	0.112 (0.076)	0.160** (0.078)	0.166* (0.089)
N	9426	9426	9426	9426	9426
R ²	0.020	0.020	0.020	0.020	0.020
F. Non-active - controlling for care hours provided					
Scotland	-0.023 (0.061)	-0.024 (0.070)	-0.006 (0.081)	-0.035 (0.093)	-0.072 (0.111)
After 2002	0.011 (0.029)	0.011 (0.029)	0.010 (0.029)	0.010 (0.029)	0.010 (0.029)
Scotland * After 2002	0.080 (0.073)	0.080 (0.083)	0.143 (0.091)	0.191** (0.096)	0.209* (0.113)
N	8521	8521	8521	8521	8521
R ²	0.028	0.028	0.029	0.029	0.028
G. Lowest income quintile					
Scotland	0.041 (0.052)	0.042 (0.052)	0.042 (0.052)	0.042 (0.051)	0.042 (0.051)
After 2002	-0.044 (0.074)	-0.045 (0.081)	-0.024 (0.088)	-0.047 (0.106)	-0.078 (0.126)
Scotland * After 2002	0.089 (0.098)	0.098 (0.105)	0.141 (0.115)	0.185 (0.112)	0.220* (0.131)
N	3496	3496	3496	3496	3496
R ²	0.018	0.018	0.018	0.018	0.018
H. Lowest income quintile - controlling for care hours provided					
Scotland	-0.053	-0.058	-0.036	-0.033	-0.078

	(0.091)	(0.105)	(0.116)	(0.145)	(0.180)
After 2002	0.033	0.034	0.034	0.035	0.035
	(0.055)	(0.055)	(0.055)	(0.054)	(0.054)
Scotland * After 2002	0.108	0.126	0.177	0.213	0.265
	(0.116)	(0.128)	(0.145)	(0.150)	(0.181)
N	3169	3169	3169	3169	3169
R ²	0.027	0.027	0.027	0.027	0.027

Note: C100 includes only unpaid carers who provided at baseline 100 hours or more of weekly care, C50 those who provided at least 50 hours, C35 those who provided at least 35 hours, C20 those who provided at least 20 hours, C10 those who provided at least 10 hours. At follow-up all the carers have provided at least 1 hour of care. All models presented in the above table control for: gender, age, marital status, having non-cohabiting children, education level, monthly income, and a polynomial time trend of the second order. Additionally, all treated units reside in Scotland.

Table 4. Estimation of the difference in difference model of FPC on caregivers happiness excluding observations from year 2002 (C10: carers providing at at least 10 hours/week at baseline and follow-up; C20: at least 20 hours/week; C35: at least 35 hours/week; C50: at least 50 hours/week; C100: at least 100 hours/week)

GHQ rev. (general happiness domain)	C10	C20	C35	C50	C100
A Overall sample					
Scotland	-0.011	-0.056	-0.042	-0.084	-0.117
	(0.055)	(0.051)	(0.060)	(0.065)	(0.076)
After 2002	0.042*	0.042*	0.042*	0.042*	0.042
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Scotland * After 2002	0.030	0.046	0.064	0.102**	0.116**
	(0.054)	(0.054)	(0.054)	(0.048)	(0.053)
N	14388	14388	14388	14388	14388
R ²	0.012	0.012	0.012	0.012	0.012
B. Overall sample - controlling for care hours provided					
Scotland	0.011	-0.026	-0.004	-0.034	-0.071
	(0.062)	(0.061)	(0.071)	(0.080)	(0.095)
After 2002	0.043	0.043	0.042	0.042	0.042
	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)
Scotland * After 2002	0.030	0.045	0.063	0.094*	0.115*
	(0.059)	(0.060)	(0.061)	(0.055)	(0.064)
N	13243	13243	13243	13243	13243
R ²	0.019	0.019	0.019	0.019	0.019
C. Women					
Scotland	-0.084	-0.108	-0.081	-0.17	-0.205*
	(0.067)	(0.078)	(0.093)	(0.108)	(0.118)
After 2002	0.002	0.003	0.004	0.003	0.002
	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)
Scotland * After 2002	0.105	0.092	0.066	0.135**	0.168**
	(0.065)	(0.071)	(0.077)	(0.068)	(0.071)
N	8621	8621	8621	8621	8621
R ²	0.006	0.007	0.006	0.007	0.007
D. Women - controlling for care hours provided					
Scotland	-0.069	-0.085	-0.055	-0.133	-0.175
	(0.076)	(0.09)	(0.11)	(0.133)	(0.148)
After 2002	-0.016	-0.015	-0.014	-0.015	-0.015
	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)
Scotland * After 2002	0.11	0.098	0.079	0.144*	0.186**
	(0.072)	(0.078)	(0.088)	(0.081)	(0.088)
N	7921	7921	7921	7921	7921
R ²	0.018	0.018	0.018	0.018	0.018
E. Non-active caregivers					
Scotland	-0.054	-0.055	-0.049	-0.102	-0.137
	(0.058)	(0.065)	(0.074)	(0.081)	(0.096)
After 2002	0.042	0.043	0.042	0.041	0.042
	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)
Scotland * After 2002	0.081	0.071	0.129	0.188**	0.198**
	(0.07)	(0.08)	(0.084)	(0.083)	(0.097)
N	8556	8556	8556	8556	8556
R ²	0.019	0.019	0.019	0.019	0.019
F. Non-active - controlling for care hours provided					
Scotland	-0.039	-0.031	-0.02	-0.059	-0.098
	(0.07)	(0.08)	(0.09)	(0.103)	(0.124)
After 2002	0.042	0.043	0.041	0.041	0.041
	(0.035)	(0.035)	(0.034)	(0.034)	(0.034)
Scotland * After 2002	0.099	0.092	0.162	0.221**	0.241*
	(0.083)	(0.095)	(0.101)	(0.104)	(0.125)
N	7736	7736	7736	7736	7736
R ²	0.029	0.029	0.030	0.030	0.030
G. Lowest income quintile					
Scotland	-0.048	-0.051	-0.023	-0.061	-0.1
	(0.084)	(0.093)	(0.1)	(0.117)	(0.14)
After 2002	0.043	0.044	0.044	0.044	0.044
	(0.057)	(0.057)	(0.057)	(0.057)	(0.056)
Scotland * After 2002	0.095	0.105	0.140	0.198	0.241*
	(0.111)	(0.119)	(0.13)	(0.123)	(0.144)
N	3177	3177	3177	3177	3177

R ²	0.018	0.018	0.018	0.018	0.018
H. Lowest income quintile - controlling for care hours provided					
Scotland	-0.054 (0.104)	-0.061 (0.121)	-0.032 (0.131)	-0.043 (0.159)	-0.099 (0.198)
After 2002	0.045 (0.059)	0.046 (0.058)	0.045 (0.058)	0.046 (0.058)	0.046 (0.058)
Scotland * After 2002	0.114 (0.131)	0.136 (0.147)	0.18 (0.163)	0.23 (0.165)	0.294 (0.200)
N	2885	2885	2885	2885	2885
R ²	0.029	0.029	0.029	0.029	0.030

Note: C100 includes only unpaid carers who provided at baseline 100 hours or more of weekly care, C50 those who provided at least 50 hours, C35 those who provided at least 35 hours, C20 those who provided at least 20 hours, C10 those who provided at least 10 hours. At follow-up all the carers have provided at least 1 hour of care. All models presented in the above table control for: gender, age, marital status, having non-cohabiting children, education level, monthly income, and a polynomial time trend of the second order. Additionally, all treated units reside in Scotland.

Table 5. Mechanisms. Estimation of the difference in difference of FPC on Caregivers Income, Employment, Health and Hospitalisations (carers providing at at least 10 hours/week at baseline and follow-up).

	C10	C20	C35	C50	C100
A Income					
Scotland	-0.084 (0.061)	-0.101* (0.059)	-0.086 (0.069)	-0.115 (0.077)	-0.122 (0.079)
After 2002	-0.095*** (0.035)	-0.097*** (0.035)	-0.097*** (0.035)	-0.097*** (0.035)	-0.097*** (0.035)
Scotland * After 2002	0.016 (0.062)	0.065 (0.051)	0.102* (0.055)	0.128** (0.060)	0.105* (0.059)
N	16249	16249	16249	16249	16249
R ²	0.233	0.233	0.233	0.233	0.233
B. Income – no 2002					
Scotland	-0.089 (0.068)	-0.118* (0.062)	-0.110 (0.072)	-0.143* (0.078)	-0.139* (0.084)
After 2002	-0.103** (0.042)	-0.104** (0.042)	-0.105** (0.042)	-0.105** (0.042)	-0.104** (0.042)
Scotland * After 2002	0.018 (0.075)	0.079 (0.063)	0.124* (0.068)	0.155** (0.073)	0.120* (0.071)
N	14732	14732	14732	14732	14732
R ²	0.230	0.230	0.230	0.230	0.230
C Employment					
Scotland	-0.006 (0.021)	0.006 (0.025)	0.013 (0.029)	0.009 (0.032)	0.010 (0.035)
After 2002	-0.003 (0.012)	-0.002 (0.012)	-0.002 (0.012)	-0.002 (0.012)	-0.002 (0.012)
Scotland * After 2002	0.015 (0.029)	0.006 (0.036)	0.004 (0.040)	-0.005 (0.046)	0.002 (0.049)
N	16245	16245	16245	16245	16245
R ²	0.011	0.011	0.011	0.011	0.011
D Employment - no 2002					
Scotland	-0.066 (0.045)	-0.104** (0.047)	-0.082 (0.052)	-0.070 (0.058)	-0.078 (0.063)
After 2002	-0.031* (0.017)	-0.031* (0.017)	-0.031* (0.017)	-0.031* (0.017)	-0.031* (0.017)
Scotland * After 2002	0.044 (0.047)	0.089* (0.051)	0.074 (0.058)	0.103 (0.068)	0.114 (0.073)
N	13539	13539	13539	13539	13539
R ²	0.437	0.437	0.437	0.437	0.437
E Health					
Scotland	-0.203** (0.083)	-0.213** (0.089)	-0.268*** (0.097)	-0.208** (0.102)	-0.229** (0.110)
After 2002	0.019 (0.031)	0.021 (0.031)	0.020 (0.031)	0.020 (0.031)	0.020 (0.031)
Scotland * After 2002	0.052 (0.086)	-0.022 (0.099)	0.067 (0.102)	0.039 (0.116)	0.043 (0.124)
N	15777	15777	15777	15777	15777
R ²	0.086	0.086	0.086	0.085	0.085
FHealth - no 2002					
Scotland	-0.185** (0.089)	-0.180* (0.098)	-0.229** (0.107)	-0.155 (0.110)	-0.180 (0.120)
After 2002	0.014 (0.040)	0.016 (0.040)	0.014 (0.040)	0.014 (0.040)	0.014 (0.040)
Scotland * After 2002	0.031 (0.102)	-0.058 (0.118)	0.025 (0.124)	-0.018 (0.139)	-0.011 (0.151)

N	14260	14260	14260	14260	14260
R ²	0.086	0.086	0.086	0.085	0.085
G Hospitalisations					
Scotland	0.001 (0.025)	0.019 (0.031)	0.035 (0.036)	0.031 (0.039)	0.035 (0.043)
After 2002	0.0001 (0.015)	0.001 (0.014)	0.001 (0.014)	0.001 (0.014)	0.001 (0.014)
Scotland * After 2002	0.008 (0.033)	-0.007 (0.040)	-0.018 (0.045)	-0.026 (0.051)	-0.023 (0.055)
N	14728	14728	14728	14728	14728
R ²	0.011	0.011	0.011	0.011	0.011
H. Hospitalisations - no 2002					
Scotland	0.001 (0.025)	0.019 (0.031)	0.035 (0.036)	0.031 (0.039)	0.035 (0.043)
After 2002	0.000 (0.015)	0.001 (0.014)	0.001 (0.014)	0.001 (0.014)	0.001 (0.014)
Scotland * After 2002	0.008 (0.033)	-0.007 (0.040)	-0.018 (0.045)	-0.026 (0.051)	-0.023 (0.055)
N	14728	14728	14728	14728	14728
R ²	0.011	0.011	0.011	0.011	0.011
I Leisure Satisfaction					
Scotland	-0.315 (0.193)	-0.280 (0.199)	-0.315 (0.232)	-0.301 (0.248)	-0.346 (0.262)
After 2002	-0.081 (0.062)	-0.081 (0.062)	-0.083 (0.062)	-0.084 (0.062)	-0.084 (0.062)
Scotland * After 2002	-0.041 (0.160)	-0.061 (0.139)	0.039 (0.149)	0.079 (0.170)	0.056 (0.182)
N	12505	12505	12505	12505	12505
R ²	0.121	0.120	0.120	0.120	0.120
J. Leisure Satisfaction - no 2002					
Scotland	-0.173 (0.224)	-0.076 (0.237)	-0.061 (0.268)	-0.097 (0.293)	-0.141 (0.317)
After 2002	0.068 (0.111)	0.069 (0.110)	0.066 (0.110)	0.064 (0.110)	0.064 (0.110)
Scotland * After 2002	-0.180 (0.191)	-0.262 (0.172)	-0.211 (0.186)	-0.122 (0.208)	-0.144 (0.229)
N	11028	11028	11028	11028	11028
R ²	0.120	0.119	0.119	0.119	0.119

Note: C100 includes only unpaid carers who provided at baseline 100 hours or more of weekly care, C50 those who provided at least 50 hours, C35 those who provided at least 35 hours, C20 those who provided at least 20 hours, C10 those who provided at least 10 hours. At follow-up all the carers have provided at least 10 hours of care. All models presented in the above table control for: gender, age, marital status, having non-cohabiting children, education level, monthly income, and a polynomial time trend of the second order. Additionally, all treated units reside in Scotland

Appendix A

Table A1. Descriptive statistics for the BHPS sample

	Rest of the UK				Scotland			
	1996-2002		2003-2008		1996-2002		2003-2008	
Characteristics of the caregiver	Mean	N	Mean	N	Mean	N	Mean	N
GHQ (general happiness, reverted)	2.95	16,302	2.93	15,792	2.95	2,884	2.94	3,490
Age	61.57	16,863	63.90	16,898	60.74	2,996	63.22	3,681
Female	0.58	16,863	0.59	16,662	0.58	2,996	0.58	3,624
Married / Civil partnership	0.75	16,860	0.72	16,885	0.71	2,996	0.68	3,680
Single	0.18	16,863	0.22	16,898	0.22	2,996	0.25	3,681
Couple	0.77	16,863	0.73	16,898	0.73	2,996	0.69	3,681
Lone parent	0.05	16,863	0.05	16,898	0.05	2,996	0.05	3,681
Has children (outside the household)	0.26	16,863	0.23	16,898	0.23	2,996	0.21	3,681
No qualification	0.38	16,863	0.31	16,898	0.35	2,996	0.30	3,681
Up to A-levels	0.29	16,863	0.29	16,898	0.35	2,996	0.31	3,681
Degree or greater	0.30	16,863	0.36	16,898	0.27	2,996	0.33	3,681
Employed	0.40	16,498	0.39	14,921	0.38	2,930	0.39	3,228
Retired	0.45	16,498	0.47	14,921	0.45	2,930	0.46	3,228

Monthly income (thousands £)	0.95	16,853	1.15	16,497	0.88	2,994	1.14	3,566
Care 100 hour or more per week	0.05	15,873	0.05	15,730	0.07	2,829	0.05	3,411
Care 50 hour or more per week	0.06	15,873	0.05	15,730	0.08	2,829	0.06	3,411
Care 35 hour or more per week	0.07	15,873	0.07	15,730	0.09	2,829	0.07	3,411
Care 20 hour or more per week	0.10	15,873	0.10	15,730	0.12	2,829	0.10	3,411
Care 10 hour or more per week	0.16	15,873	0.16	15,730	0.18	2,829	0.16	3,411
Care 5 hour or more per week	0.25	15,873	0.25	15,730	0.25	2,829	0.26	3,411

Source: Own work using BHPS waves from 1996 to 2008. Using calibrated sampling weights.

Table A2. Number of observation by age groups for self-reported wellbeing

	Self-Reported Wellbeing
60-70	687
70-80	612
80+	287

Source: Own work using BHPS waves from 1996 to 2008. Using calibrated sampling weights.

Table A3. Number of observations for home help in Scotland

	Home help
1998	332
1999	1,212
2000	1,257
2001	1,271
2002	1,140
2003	1,098
2004	1,973
2005	1,047
2006	1,050
2007	1,009
2008	981
Total	11,470

Source: Own work using BHPS waves from 1996 to 2008. Using calibrated sampling weights.

Table A4. Number of treated units and control for the Overall sample

Model	Treatment		Control	
	Units	Obs.	Units	Obs.
C10	98	677	4,570	15,186
C20	77	545	4,590	15,318
C35	62	449	4,605	15,414
C50	49	360	4,618	15,503
C100	47	337	4,620	15,526

Note: C100 includes only unpaid carers who provided at baseline 100 hours or more of weekly care, C50 those who provided at least 50 hours, C35 those who provided at least 35 hours, C20 those who provided at least 20 hours, C10 those who provided at least 10 hours. At follow-up all the carers have provided at least 10 hours of care. All models presented in the above table control for: gender, age, marital status, having non-cohabiting children, education level, monthly income, and a polynomial time trend of the second order. Additionally, all treated units reside in Scotland.

Appendix B

Table B1. Event-study coefficients

	All caregivers			
	All sample	Women	Non-active	Lowest income quintile
1996	0.1390 (0.1218)	0.2149 (0.1909)	0.1692 (0.1692)	0.4113 (0.2202)
1997	0.1584 (0.0947)	0.3502*** (0.1270)	0.1624 (0.1599)	0.3327 (0.1454)
1998	0.0400 (0.0868)	0.1872 (0.1162)	0.0511 (0.1413)	0.1251 (0.1250)
1999	0.1070* (0.0526)	0.2610*** (0.0712)	0.2442*** (0.0855)	0.1858 (0.0907)
2000	0.1083*** (0.0489)	0.1521*** (0.0657)	0.1489** (0.0750)	0.1515 (0.0863)
2001	0.0445 (0.0469)	0.0688 (0.0638)	0.0902 (0.0718)	0.0892 (0.0846)
2002	0.1632*** (0.0483)	0.2477*** (0.0666)	0.2370*** (0.0716)	0.2855*** (0.0943)
2003	0.1465*** (0.0499)	0.2343*** (0.0666)	0.2341*** (0.0758)	0.3448*** (0.0950)
2004	0.1332*** (0.0494)	0.2686*** (0.0652)	0.2963*** (0.0729)	0.2908*** (0.1028)
2005	0.1425*** (0.0504)	0.2153*** (0.0662)	0.2023*** (0.0722)	0.1879 (0.1075)
2006	0.1472*** (0.0511)	0.2284*** (0.0678)	0.3048*** (0.0733)	0.1630 (0.1112)
2007	0.1453*** (0.0498)	0.2936*** (0.0660)	0.3215*** (0.0781)	0.1838 (0.1091)
2008	0.0906 (0.0683)	0.2058*** (0.0893)	0.1405** (0.0799)	0.4370*** (0.1443)
	Only caregivers at baseline			
	All sample	Women	Non-active	Lowest income quintile
1996	0.2169 (0.1639)	0.5387 (0.2838)	0.2582 (0.2461)	0.1995 (0.2320)
1997	0.2362 (0.1530)	0.5680** (0.2040)	0.3284 (0.2141)	0.2404 (0.2294)
1998	0.0576 (0.1311)	0.1970 (0.1914)	0.0744 (0.1818)	-0.2749 (0.1679)
1999	0.2268*** (0.0728)	0.5986*** (0.0998)	0.2118** (0.0977)	-0.0402*** (0.0838)
2000	0.1714*** (0.0640)	0.4154*** (0.0873)	0.1136 (0.0876)	-0.1214* (0.0686)
2001	0.1146** (0.0583)	0.3717*** (0.0806)	0.1186 (0.0771)	-0.0065 (0.0581)
2002	0.2631*** (0.0555)	0.5504*** (0.0775)	0.2565*** (0.0743)	0.1447*** (0.0595)
2003	0.2288*** (0.0587)	0.5550*** (0.0792)	0.2780*** (0.0764)	0.3011*** (0.0665)
2004	0.2558*** (0.0593)	0.6042*** (0.0790)	0.2007** (0.0768)	0.3044*** (0.0705)
2005	0.2190*** (0.0635)	0.4922*** (0.0842)	0.2450*** (0.0824)	0.0520 (0.0818)
2006	0.2542*** (0.0674)	0.5310*** (0.0910)	0.2265*** (0.0862)	-0.0529 (0.0993)
2007	0.2987*** (0.0676)	0.6366*** (0.0907)	0.2387*** (0.0818)	0.1890* (0.0996)
2008	0.0685 (0.1121)	0.3277** (0.1440)	0.1193 (0.1853)	0.3869** (0.1887)

Note: This figure corresponds to an event study created by regressing the outcome variable for a respondent-by-term-by-year cell on a full set of event time indicators interacted with a binary variable for “treatment” and on a set of control variables. This figure reports the coefficients for event-time, that is, the time path of outcome variables in treated vs. untreated individuals before and after of policy implementation and the 95% confidence intervals with robust standard errors clustered at the region-level.

Table B2. Event-study coefficients by caregiving hours

	All caregivers					
	Less 10 hours/week	C10	C20	C35	C50	C100
1996	0.005 (0.138)	0.048 (0.132)	0.045 (0.134)	0.155 (0.152)	0.166 (0.187)	0.321 (0.162)
1997	0.056 (0.106)	0.056 (0.102)	0.064 (0.103)	0.327 (0.101)	0.280 (0.143)	0.249 (0.127)
1998	-0.061 (0.099)	-0.036 (0.095)	-0.033 (0.096)	0.050 (0.079)	0.050 (0.129)	0.216 (0.119)
1999	0.003 (0.059)	0.025 (0.057)	0.020 (0.057)	0.136* (0.029)	0.195*** (0.085)	0.212*** (0.067)
2000	-0.049 (0.054)	-0.022 (0.053)	-0.032 (0.053)	0.366*** (0.023)	0.298*** (0.080)	0.145** (0.061)
2001	-0.039 (0.051)	-0.054 (0.050)	-0.050 (0.051)	0.119*** (0.022)	0.179*** (0.079)	0.116** (0.058)
2002	0.072 (0.052)	0.055 (0.050)	0.055 (0.051)	0.331*** (0.026)	0.266*** (0.084)	0.263*** (0.059)
2003	0.024 (0.054)	0.044 (0.053)	0.030 (0.053)	0.301*** (0.034)	0.298*** (0.086)	0.217*** (0.060)
2004	0.047 (0.053)	0.059 (0.052)	0.046 (0.052)	0.280*** (0.038)	0.327*** (0.083)	0.173*** (0.061)
2005	0.036 (0.054)	0.052 (0.053)	0.039 (0.053)	0.227*** (0.035)	0.211*** (0.087)	0.251*** (0.061)
2006	0.045 (0.055)	0.049 (0.054)	0.047 (0.054)	0.289*** (0.033)	0.324*** (0.086)	0.197*** (0.063)
2007	0.050 (0.053)	0.047 (0.052)	0.043 (0.052)	0.158*** (0.033)	0.211*** (0.085)	0.267*** (0.061)
2008	-0.087 (0.075)	-0.026 (0.073)	-0.045 (0.074)	0.282*** (0.066)	0.172 (0.113)	0.217 (0.086)
	Only caregivers at baseline					
	Less 10 hours/week	C10	C20	C35	C50	C100
1996	-0.075 (0.191)	0.027 (0.180)	0.029 (0.185)	0.160 (0.175)	0.168 (0.180)	0.289 (0.193)
1997	0.046 (0.178)	0.086 (0.170)	0.107 (0.174)	0.188 (0.172)	0.350 (0.177)	0.111 (0.159)
1998	-0.117 (0.148)	-0.097 (0.143)	-0.086 (0.143)	-0.061 (0.127)	0.018 (0.129)	0.044 (0.150)
1999	0.040 (0.080)	0.072 (0.077)	0.071 (0.078)	0.131** (0.055)	0.204*** (0.073)	0.250*** (0.038)
2000	-0.085 (0.070)	-0.060 (0.069)	-0.068 (0.070)	0.362*** (0.035)	0.321*** (0.059)	0.085*** (0.027)
2001	-0.073 (0.063)	-0.078 (0.062)	-0.084 (0.062)	0.144*** (0.024)	0.179*** (0.049)	0.072*** (0.020)
2002	0.051 (0.059)	0.034 (0.057)	0.030 (0.059)	0.379*** (0.021)	0.327*** (0.048)	0.231*** (0.015)
2003	-0.006 (0.064)	0.019 (0.062)	0.003 (0.063)	0.299*** (0.024)	0.321*** (0.047)	0.171*** (0.022)
2004	0.091 (0.064)	0.098 (0.062)	0.091 (0.063)	0.216*** (0.032)	0.313*** (0.047)	0.219*** (0.023)
2005	0.020 (0.068)	0.047 (0.067)	0.026 (0.067)	0.231*** (0.032)	0.262*** (0.056)	0.183*** (0.027)
2006	0.035 (0.072)	0.046 (0.071)	0.042 (0.071)	0.346*** (0.040)	0.362*** (0.058)	0.169*** (0.034)
2007	0.090 (0.074)	0.102 (0.072)	0.094 (0.072)	0.228*** (0.035)	0.292*** (0.063)	0.292*** (0.032)
2008	-0.238 (0.125)	-0.110 (0.118)	-0.125 (0.120)	0.260*** (0.103)	0.031 (0.119)	0.130 (0.099)

Note: This figure corresponds to an event study created by regressing the outcome variable for a respondent-by-term-by-year cell on a full set of event time indicators interacted with a binary variable for “treatment” and on a set of control variables. This figure reports the coefficients for event-time, that is, the time path of outcome variables in treated vs. untreated individuals before and after of policy implementation and the 95% confidence intervals with robust standard errors clustered at the region-level.

Table B3. Estimation of the difference in difference model with pre-trends (carers providing at at least 10 hours/week at baseline and follow-up).

GHQ rev. (general happiness domain)	C10	C20	C35	C50	C100
A Overall sample					
Scotland	-0.033 (0.047)	-0.042 (0.052)	-0.038 (0.061)	-0.067 (0.068)	-0.086 (0.073)
After 2002	0.194 (0.164)	0.196 (0.164)	0.194 (0.163)	0.194 (0.163)	0.195 (0.163)
Scotland * After 2002	0.053 (0.050)	0.043 (0.052)	0.078 (0.054)	0.105** (0.053)	0.110** (0.054)
N	15,863	15,863	15,863	15,863	15,863
R ²	0.013	0.013	0.013	0.013	0.013
B. Overall sample - controlling for care hours provided					
Scotland	-0.020 (0.056)	-0.020 (0.063)	-0.011 (0.074)	-0.028 (0.084)	-0.052 (0.091)
After 2002	0.214 (0.170)	0.215 (0.170)	0.214 (0.170)	0.214 (0.170)	0.214 (0.170)
Scotland * After 2002	0.068 (0.054)	0.057 (0.056)	0.097* (0.058)	0.117** (0.056)	0.129** (0.058)
N	14598	14598	14598	14598	14598
R ²	0.019	0.019	0.019	0.019	0.019
C. Women					
Scotland	-0.037 (0.067)	-0.054 (0.079)	-0.056 (0.099)	-0.120 (0.118)	-0.120 (0.118)
After 2002	-0.035 (0.231)	-0.033 (0.231)	-0.034 (0.231)	-0.033 (0.231)	-0.033 (0.231)
Scotland * After 2002	0.084 (0.058)	0.067 (0.063)	0.077 (0.071)	0.129** (0.064)	0.129** (0.064)
N	9,471	9,471	9,471	9,471	9,471
R ²	0.007	0.007	0.007	0.007	0.007
D. Women - controlling for care hours provided					
Scotland	-0.035 (0.079)	-0.047 (0.096)	-0.050 (0.121)	-0.107 (0.150)	-0.107 (0.150)
After 2002	-0.040 (0.245)	-0.039 (0.245)	-0.039 (0.245)	-0.039 (0.245)	-0.039 (0.245)
Scotland * After 2002	0.105 (0.065)	0.090 (0.071)	0.112 (0.082)	0.162** (0.075)	0.162** (0.075)
N	8,688	8,688	8,688	8,688	8,688
R ²	0.017	0.017	0.017	0.017	0.017
E. Non-active					
Scotland	-0.046 (0.057)	-0.051 (0.062)	-0.042 (0.073)	-0.071 (0.083)	-0.081 (0.088)
After 2002	0.126 (0.206)	0.127 (0.206)	0.124 (0.206)	0.124 (0.206)	0.124 (0.206)
Scotland * After 2002	0.085 (0.069)	0.070 (0.075)	0.131 (0.082)	0.170* (0.088)	0.160* (0.093)
N	9,426	9,426	9,426	9,426	9,426
R ²	0.020	0.020	0.020	0.020	0.020
F. Non-active - controlling for care hours provided					
Scotland	-0.039 (0.069)	-0.039 (0.077)	-0.027 (0.091)	-0.040 (0.106)	-0.054 (0.113)
After 2002	0.132 (0.214)	0.134 (0.214)	0.131 (0.214)	0.132 (0.214)	0.131 (0.214)
Scotland * After 2002	0.108 (0.080)	0.098 (0.089)	0.171* (0.099)	0.206* (0.107)	0.202* (0.115)
N	8,521	8,521	8,521	8,521	8,521
R ²	0.028	0.028	0.029	0.029	0.029
G. Lowest income quintile					
Scotland	-0.019 (0.084)	-0.007 (0.095)	0.012 (0.107)	-0.021 (0.133)	-0.034 (0.133)
After 2002	0.500 (0.364)	0.500 (0.364)	0.497 (0.364)	0.496 (0.364)	0.497 (0.364)
Scotland * After 2002	0.075 (0.105)	0.059 (0.118)	0.106 (0.129)	0.160 (0.137)	0.173 (0.138)
N	3,496	3,496	3,496	3,496	3,496
R ²	0.018	0.018	0.018	0.018	0.018
H. Lowest income quintile - controlling for care hours provided					
Scotland	-0.037 (0.106)	-0.029 (0.126)	-0.012 (0.143)	-0.018 (0.186)	-0.033 (0.188)
After 2002	0.468 (0.371)	0.470 (0.371)	0.468 (0.371)	0.466 (0.372)	0.466 (0.372)
Scotland * After 2002	0.107 (0.127)	0.102 (0.147)	0.157 (0.166)	0.205 (0.188)	0.219 (0.189)
N	3,169	3,169	3,169	3,169	3,169
R ²	0.027	0.027	0.027	0.027	0.027

Note: C100 includes only unpaid carers who provided at baseline 100 hours or more of weekly care, C50 those who provided at least 50 hours, C35 those who provided at least 35 hours, C20 those who provided at least 20 hours, C10 those who provided at least 10 hours. At follow-up all the carers

have provided at least 10 hours of care. All models presented in the above table control for: gender, age, marital status, having non-cohabiting children, education level, monthly income, and a polynomial time trend of the second order. Additionally, all treated units reside in Scotland.

Table B4. Estimation of the difference in difference model using an ordered probit (carers providing at at least 10 hours/week at baseline and follow-up).

GHQ rev. (general happiness domain)	C10	C20	C35	C50	C100
A Overall sample					
Scotland	-0.068 (0.098)	-0.094 (0.105)	-0.081 (0.123)	-0.144 (0.133)	-0.183 (0.140)
After 2002	0.058 (0.050)	0.059 (0.049)	0.058 (0.049)	0.058 (0.049)	0.058 (0.049)
Scotland * After 2002	0.130 (0.113)	0.120 (0.119)	0.190 (0.127)	0.234* (0.126)	0.240* (0.128)
N	15,863	15,863	15,863	15,863	15,863
R ²	0.008	0.008	0.008	0.008	0.008
B. Overall sample - controlling for care hours provided					
Scotland	-0.046 (0.115)	-0.058 (0.128)	-0.034 (0.150)	-0.068 (0.168)	-0.119 (0.177)
After 2002	0.062 (0.051)	0.063 (0.051)	0.062 (0.051)	0.063 (0.051)	0.063 (0.051)
Scotland * After 2002	0.169 (0.121)	0.161 (0.127)	0.246* (0.135)	0.270** (0.129)	0.291** (0.132)
N	14,598	14,598	14,598	14,598	14,598
R ²	0.011	0.011	0.011	0.011	0.011
C. Women					
Scotland	-0.064 (0.122)	-0.097 (0.141)	-0.089 (0.174)	-0.205 (0.196)	-0.205 (0.196)
After 2002	0.004 (0.064)	0.006 (0.063)	0.007 (0.063)	0.007 (0.063)	0.007 (0.063)
Scotland * After 2002	0.179 (0.121)	0.147 (0.132)	0.152 (0.148)	0.220* (0.131)	0.220* (0.131)
N	9,471	9,471	9,471	9,471	9,471
R ²	0.004	0.004	0.004	0.004	0.004
D. Women - controlling for care hours provided					
Scotland	-0.069 (0.145)	-0.096 (0.172)	-0.090 (0.215)	-0.183 (0.258)	-0.183 (0.258)
After 2002	-0.014 (0.067)	-0.012 (0.066)	-0.011 (0.066)	-0.011 (0.066)	-0.011 (0.066)
Scotland * After 2002	0.228* (0.134)	0.203 (0.145)	0.236 (0.165)	0.286** (0.142)	0.286** (0.142)
N	8,688	8,688	8,688	8,688	8,688
R ²	0.009	0.009	0.009	0.009	0.009
E. Non-active					
Scotland	-0.093 (0.116)	-0.107 (0.125)	-0.080 (0.146)	-0.138 (0.161)	-0.161 (0.168)
After 2002	0.030 (0.066)	0.032 (0.066)	0.030 (0.066)	0.030 (0.066)	0.031 (0.066)
Scotland * After 2002	0.188 (0.147)	0.157 (0.161)	0.292* (0.176)	0.353* (0.182)	0.318* (0.189)
N	9,426	9,426	9,426	9,426	9,426
R ²	0.012	0.012	0.012	0.012	0.012
F. Non-active - controlling for care hours provided					
Scotland	-0.090 (0.142)	-0.094 (0.157)	-0.060 (0.185)	-0.081 (0.212)	-0.111 (0.223)
After 2002	0.031 (0.070)	0.033 (0.070)	0.030 (0.069)	0.032 (0.069)	0.033 (0.069)
Scotland * After 2002	0.253 (0.172)	0.234 (0.190)	0.408* (0.212)	0.454** (0.223)	0.430* (0.236)
N	8,521	8,521	8,521	8,521	8,521
R ²	0.016	0.016	0.017	0.017	0.016
G. Lowest income quintile					
Scotland	-0.001 (0.160)	0.026 (0.179)	0.075 (0.202)	0.021 (0.240)	-0.011 (0.240)
After 2002	0.086 (0.115)	0.089 (0.115)	0.087 (0.114)	0.087 (0.114)	0.087 (0.114)
Scotland * After 2002	0.122 (0.217)	0.088 (0.239)	0.191 (0.265)	0.271 (0.252)	0.303 (0.251)
N	3,496	3,496	3,496	3,496	3,496
R ²	0.010	0.010	0.010	0.010	0.010
H. Lowest income quintile - controlling for care hours provided					
Scotland	-0.052 (0.206)	-0.039 (0.244)	-0.000 (0.280)	0.018 (0.359)	-0.019 (0.361)
After 2002	0.073 (0.125)	0.076 (0.124)	0.075 (0.124)	0.077 (0.123)	0.077 (0.123)
Scotland * After 2002	0.207 (0.263)	0.203 (0.301)	0.329 (0.346)	0.370 (0.363)	0.407 (0.364)
N	3,169	3,169	3,169	3,169	3,169

R ²	0.016	0.016	0.016	0.016	0.016
----------------	-------	-------	-------	-------	-------

Note: C100 includes only unpaid carers who provided at baseline 100 hours or more of weekly care, C50 those who provided at least 50 hours, C35 those who provided at least 35 hours, C20 those who provided at least 20 hours, C10 those who provided at least 10 hours. At follow-up all the carers have provided at least 10 hours of care. All models presented in the above table control for: gender, age, marital status, having non-cohabiting children, education level, monthly income, and a polynomial time trend of the second order. Additionally, all treated units reside in Scotland.

Table B5. Estimates of the effect of Attendance Allowance on happiness

GHQ rev. (general happiness domain)	C10	C20	C35	C50	C100
A Overall sample					
Scotland	-0.019 (0.045)	-0.037 (0.052)	-0.026 (0.062)	-0.061 (0.070)	-0.080 (0.074)
After 2002	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Scotland * After 2002	0.031 (0.050)	0.027 (0.056)	0.057 (0.059)	0.088 (0.057)	0.093 (0.058)
N	14208	14208	14208	14208	14208
R ²	0.014	0.015	0.015	0.015	0.015
B. Overall sample - controlling for care hours provided					
Scotland	-0.007 (0.049)	-0.018 (0.058)	-0.002 (0.067)	-0.020 (0.077)	-0.040 (0.082)
After 2002	0.022 (0.024)	0.022 (0.024)	0.021 (0.024)	0.022 (0.024)	0.022 (0.024)
Scotland * After 2002	0.041 (0.053)	0.037 (0.058)	0.072 (0.062)	0.091 (0.060)	0.098 (0.062)
N	13076	13076	13076	13076	13076
R ²	0.019	0.019	0.019	0.019	0.019
C. Women					
Scotland	-0.029 (0.067)	-0.046 (0.079)	-0.037 (0.098)	-0.109 (0.121)	-0.109 (0.121)
After 2002	-0.014 (0.033)	-0.013 (0.033)	-0.013 (0.033)	-0.014 (0.033)	-0.014 (0.033)
Scotland * After 2002	0.065 (0.064)	0.045 (0.070)	0.042 (0.079)	0.098 (0.070)	0.098 (0.070)
N	8492	8492	8492	8492	8492
R ²	0.010	0.010	0.010	0.010	0.010
D. Women - controlling for care hours provided					
Scotland	-0.026 (0.072)	-0.036 (0.086)	-0.028 (0.107)	-0.081 (0.135)	-0.081 (0.135)
After 2002	-0.017 (0.034)	-0.017 (0.034)	-0.016 (0.034)	-0.016 (0.034)	-0.016 (0.034)
Scotland * After 2002	0.077 (0.069)	0.055 (0.075)	0.064 (0.084)	0.105 (0.076)	0.105 (0.076)
N	7786	7786	7786	7786	7786
R ²	0.018	0.018	0.018	0.018	0.018

Table B6. Estimates of the effect of of FPC on electoral participation in general elections

GHQ rev. (general happiness domain)	C10	C20	C35	C50	C100
A Overall sample					
Scotland	-0.017 (0.044)	-0.066 (0.046)	-0.074 (0.049)	-0.087 (0.054)	-0.072 (0.056)
After 2002	0.022 (0.018)	0.022 (0.018)	0.022 (0.018)	0.022 (0.018)	0.022 (0.018)
Scotland * After 2002	-0.004 (0.044)	-0.000 (0.048)	0.002 (0.052)	-0.028 (0.056)	-0.028 (0.058)
N	14547	14547	14547	14547	14547
R ²	0.025	0.025	0.025	0.025	0.025
B. Overall sample - controlling for care hours provided					
Scotland	0.017 (0.019)	0.017 (0.019)	0.017 (0.019)	0.018 (0.019)	0.018 (0.019)
After 2002	-0.032 (0.045)	-0.086* (0.047)	-0.087* (0.049)	-0.103* (0.055)	-0.091 (0.058)
Scotland * After 2002	0.015 (0.046)	0.022 (0.050)	0.013 (0.054)	-0.011 (0.058)	-0.002 (0.061)
N	13370	13370	13370	13370	13370
R ²	0.026	0.026	0.026	0.026	0.026
C. Overall sample - Excluding 2002					
Scotland	-0.017 (0.048)	-0.053 (0.050)	-0.062 (0.053)	-0.075 (0.057)	-0.057 (0.061)
After 2002	0.025 (0.024)	0.026 (0.024)	0.025 (0.024)	0.026 (0.024)	0.026 (0.024)
Scotland * After 2002	-0.003 (0.048)	-0.012 (0.052)	-0.009 (0.058)	-0.037 (0.060)	-0.040 (0.064)
N	13034	13034	13034	13034	13034
R ²	0.028	0.028	0.028	0.028	0.028
D. Overall sample - Excluding 2002 & controlling for care hours provided					

Scotland	-0.030	-0.071	-0.067	-0.084	-0.071
	(0.049)	(0.052)	(0.055)	(0.060)	(0.065)
After 2002	0.008	0.008	0.008	0.008	0.008
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Scotland * After 2002	0.013	0.007	-0.006	-0.028	-0.021
	(0.051)	(0.055)	(0.059)	(0.062)	(0.066)
N	11979	11979	11979	11979	11979
R ²	0.029	0.029	0.029	0.029	0.029