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Caregiving subsidies and spousal early retirement intentions

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Abstract
Balancing caregiving duties and employment can be both financially and emotionally burdensome, especially when care is provided to a spouse at home. Caregiving subsidies can play a role in helping caregivers to cope with such duties. This paper demonstrates how providing financial respite for caregivers can influence individuals' decisions to retire early. We investigate the impact of a reform that extended long-term care (LTC) benefits (in the form of subsidies and supports) on the intention of a caregiving spouse to retire early in Spain. We subsequently examine the effect of austerity spending cuts reducing such publicly funded benefits, and we compare the estimates to the effects of an early retirement reform among private sector workers around the same time. Our preferred estimates suggest evidence of a 10pp reduction in early retirement intentions after the extension of LTC benefits even though the effect is heterogeneous by type of benefit. Consistently, austerity spending cuts in benefits are found to weaken retirement intentions. Even more importantly, our estimates suggest that cuts in caregiving subsidies exert a much stronger effect on early retirement intentions than actual early retirement reforms.

1. Introduction

Informal care is the most common form of support to older-aged individuals with caregiving needs. Approximately 13% of individuals over the age of 50 provide care to old age seniors on a weekly basis in OECD countries, 61% of which are women (OECD, 2019). Informal caregivers are typically adult children, but also partners or spouses who adjust their labour supply and sacrifice their leisure time to be able to supply care (Lilly *et al.*, 2007).[1] Compared to other forms of informal care, care provided by the partner or spouse is often defined as 'care by default', because it is considered as an extension of the love and support exchanged over many years, rather than a choice solely driven by the pursuit of a personal utility gain (Arber and Ginn, 1994). However, the supply of care by a spouse can still put a significant strain on the work–life balance of individuals (Henz, 2004), which can in turn influence their retirement (including early retirement) decisions.

Economic theory typically conceptualises retirement as a planned decision that is commonly influenced by the benefits and costs of employment at older age (Becker, 1976). Individuals are typically expected to face a trade-off between their personal preference for higher consumption and the resulting reduced leisure time if employed. However, such trade-offs are conditioned on other health

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[1]The opposite reaction, namely, the increase in the labour supply of the healthy spouse to offset the reduction in household income is known as the 'added work effect', though there is very little support in empirical literature backing such explanation (Johnson and Favreault, 2001; Coile, 2004).

and household constraints influencing an individual's labour supply and thus retirement intentions. Empirical evidence documents that retirement intentions are the strongest predictor of actual retirement age (Nivalainen, 2022). Given that retirement intentions capture the effect of unobservable effects influencing retirement decisions, retirement plans tend to materialise quite accurately. Adams and Rau (2011) point out that preparing for retirement is a rather multidimensional process involving constraints in several life domains such as expectations on household finances, location, children's choices and the strength of future social networks. However, other household constraints such as being an informal caregiver for a spouse can also influence ones labour supply, and retirement intentions.

Given that labour market participation and caregiving decisions are jointly determined, it is important to understand the effect of caregiving on both labour supply and retirement. To date, the empirical consensus is that the effect of employment on the supply of care is ambiguous. Whilst some studies estimate a significant and negative relationship between labour market participation and the supply of care (Coward and Dwyer, 1990; Dwyer and Coward, 1991; Boaz and Muller, 1992; Pavalko and Artis, 1997; Carmichael and Charles, 2003; Berecki-Gisolf et al., 2008; Bolin et al., 2008; Carmichael et al., 2010; Lilly et al., 2010; Michaud et al., 2010;[2] Nguyen and Connelly, 2014), other studies find no evidence of a significant relationship (Wolf and Soldo, 1994; Stern, 1995; Ettner, 1996; Meng, 2009),[3] or even a negative effect (Schneider et al., 2001).

Given that traditional caregivers tend to be close to retirement age, a contribution to this debate lies in examining the effect of caregiving incentives on labor-force exit, and more specifically the effect of caregiving (resulting from such incetives) on caregivers' early retirement intentions (Dentinger and Clarkberg, 2002; Schils, 2008; Debrand and Sirven, 2009; Meng, 2011; King and Pickard, 2013; Jacobs et al., 2014; Geyer and Korfhage, 2015; Geyer and Korfhage, 2017; Jacobs et al., 2017). This is an important question as early retirement can widen the pension income gap between caregivers and non-caregivers, which in turn can put a strain on the sustainability of the pension system (Boeri et al., 2001; General Secretariat of the Council, 2010). However, the evidence available is limited. Kubicek et al. (2010) documents evidence that caregivers between 53 and 67 years old are less likely to retire early. In contrast, women who work and provide care while performing domestic tasks are found to exhibit a higher probability of early retirement (Van Houtven et al., 2013). This paper attempts to estimate the causal effect of caregiving after the expansion of caregiving subsidies and supports on early retirement intentions.

We exploit the rollout of publicly funded caregiving subsidies and home care supports resulting from the implementation of the System of Autonomy and Attention to Dependence (SAAD) in Spain. The inception of SAAD gave rise to an exogenous variation in both the availability of both formal care supports, and monetary subsidies for informal caregivers (caregiving allowance).[4] Even more importantly, the implementation of SAAD included the government's payment of social insurance contributions to caregivers who otherwise would either not be employed (and not contribute at all), or simply work part-time. Finally, SAAD encompassed two additional reforms, namely: (i) the effect of the 2012 austerity cuts that dwindled the 2007 SAAD benefits (reducing the caregiving subsidy and supports by an average of 25% and wiping out the payment of caregiver's social insurance contributions), and (ii) the 2013 reform, which disincentivised early retirement among private sector employees (see Appendix C for additional detail).

We contribute to the literature as follows. First, we add to the limited literature on the effect of household constraints on spouses' early retirement, and more specifically on the effect of caregiving

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[2]The fact of being an informal co-resident caregiver decreases the future probability of being employed, and at the same time, being employed decreases the future probability of becoming a caregiver.

[3]See Lilly et al. (2007) and Bauer and Sousa-Poza (2015) for a detailed review.

[4]Like in the German system, the Spanish SAAD allows for a choice between economic or in-kind benefits (formal care), unlike the Japanese system which only provides formal care. In contrast to the German system, economic and in-kind benefits cannot be received simultaneously under the SAAD, and regional social services ultimately determine the type of benefit received.

duties on retirement intentions. We show that the introduction of the SAAD-related subsidies and supports reduced the costs of caregiving and, at the margin, provided an incentive to expand labour supply, and hence to delay early retirement.

The introduction of SAAD lead to a 10pp reduction in early retirement intentions, although the effect was heterogeneous depending on the type of benefit an individual was entitled to. That is, it reduced early retirement intentions by 22.1pp among those who received a caregiving subsidy but increased such intentions by 15.6pp among caregivers whose disabled partners/spouse received home care supports. As in previous studies, SAAD increased early retirement intentions more men than women.[5] Consistently, the 2012 benefit austerity cuts show a reduction in early retirement intentions (17.6pp reduction), which compared to a more moderate effect of the 2013 early retirement reform (12.4pp reduction) among private sector workers. Thus, we conclude that an expansion of caregiving subsidies can exert a larger effect on retirement intentions than an actual early retirement reform.

In the following section, we discuss how our paper relates to the previous literature. Section 3 explains the institutional setting and the effect of SAAD. Section 4 reports the data and empirical strategy. Sections 5, 6 and 7 present the results, heterogeneity and robustness checks, respectively, and Section 8 concludes.

2. Caregiving and retirement

2.1 Early retirement and caregiving

The constraints to the supply of care are affected by individuals exit of the labour market. Consistently, some studies show a lower supply of round-the-clock care among employed individuals compared to retirees (Vlachantoni, 2010). Caregiving increases the probability of retirement among men, and this is especially the case when the recipient of care is the spouse (Raab, 2017).

Dentinger and Clarkberg (2002) document that the probability of retirement is five times higher for women who care for their spouse or partner compared to those who don't. Similarly, other research finds that women providing at least 20 hours/week of informal care are 1–3 percentage points more likely to retire relative to other women (Jacobs *et al.*, 2017). That said, such effects are more common among 'intensive caregivers' (Jacobs *et al.*, 2014), and are driven by income effects (Schils, 2008). However, to date there is limited evidence of an effect of caregiving on the probability for retirement (Debrand and Sirven, 2009).

2.2 Gender differences in caregiving

A priori, it is not possible to discern whether gender matters for early retirement, as employment can, under some circumstances be a source of respite for caregivers (Mooney *et al.*, 2002; Schneider *et al.*, 2013). Dentinger and Clarkberg (2002) found that men are less willing to exit the labour market, which in turn delays the decision to retire. This is because women are more likely to be the primary caregivers when their spouses need care (Allen, 1994; Neal *et al.*, 1997; Szinovac and Davey, 2004). Consistently, Schneider *et al.* (2013) document that providing care to an older person reduces women's exit from the labour force. However, in some countries, women exhibit an incentive to exit the labour market earlier, even when it has lower knock-on effects on their future pension entitlements, which is typically the case when statutory pension differs by gender (Carr *et al.*, 2018).

2.3 Health shock and retirement

Caregiving decisions can be commonly influenced by health shocks in the household. Johnson and Favreault (2001) report that the probability of retirement increases (for both men and women) if

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[5]These results are consistent with Meng (2011) which documents that the retirement hazard rate of a female caregiver was 74% higher than that of a male caregiver after the introduction of the German LTC insurance.

the partner/spouse is already retired. However, Coile (2004) found evidence of the 'added worker effect' of disability subsidies among men only, that is, disability benefits ameliorate the labour supply response of a caregiver after a spousal health shock. In contrast, the opposite is found among women.[6]

2.4 Care subsidies and supports

So far, there is little evidence that long-term care (LTC) reforms influence retirement decisions. Most of the existing evidence refers to employment effects resulting from reforms in Germany and Japan. Geyer and Korfhage (2015) estimate that caregiving subsidies in Germany reduced the caregiver labour market participation, while supports exert a small positive effect. Similarly, Geyer and Korfhage (2017) found that although the extension of LTC subsidies and supports did not shift the labour supply of women, it had a negative effect on male labout supply (−19.3 pp). Similarly, Korfhage (2019) reports that cash benefits encourage the provision of informal care and the exit from the labour market among lower income individuals.

Consistently, evidence from Japan points towards a negative effect of the provision of care on labour market participation, though it expands employment among caregivers (Shimizutani *et al.*, 2008; Sugawara and Nakamura, 2014). Probably, the closest study to ours is Fu *et al.* (2017), who examines the effect of the implementation of the introduction of LTC insurance in 2000 and the subsequent reform in 2006.[7] In contrast to the evidence form Germany, they find evidence of an expansion of male caregiver's labour supply and a reduction of labour market exit among female caregivers. Yet, the effect vanished completely after the reduction of benefits among recipients with mild care needs. So far, limited attention has been paid on the effect of caregiving subsidies on retirement intentions and behaviours. This is the main contribution of this paper.

3. Institutional background

This paper examines the effect of the 'Promotion of Personal Autonomy and Care of Dependent People' Bill 39/2006 passed on 14 December 2006 (we refer to it with the Spanish acronym SAAD corresponding to *Sistema de Autonomía y Atención a la Dependencia*) and implemented on 1 January 2007 in Spain. The reform was effectively an unanticipated expansion of public funding that resulted from a last-minute end of the year political agreement of different political groups supporting a minority socialist government elected after the 2004 Madrid bombings.[8] This new system universalised a previously means-tested subsidy and increased the access to both caregiving supports (home care, day centres and nursing homes) and caregiving allowances (caregiving subsidy) purely on a needs-based basis. In addition, we exploit the fact that SAAD exhibited a high degree of regional heterogeneity, both in the assessment of caregiving needs and economic status of households.[9]

The SAAD classified individuals into one of the three levels of caregiving needs ('moderate', 'severe' or 'major dependency') according to an official ranking scale.[10] After a needs test an individual's care

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[6]When husbands started receiving a disability benefit, their wives' labour market participation decreased by approximately 6%, being this effect persistent up to 5 years (Chen, 2012).

[7]These cuts consisted of a reduction of the services provided by 'preventive long-term care' (e.g., elimination of domestic tasks) and decrease of monthly upper limit of subsidy payment for 'preventive long-term care'.

[8]Spain's LTC reforms arose from a government formed by a Parliament elected 3 days after the 2004 Madrid bombings (García-Montalvo, 2011). The new minority socialist government only announced an agreement at the end of 2006 to implement a tax-funded subsidisation of the LTC system. It is therefore plausible to assume that the reform was not expected.

[9]White Book of Dependency (Ministerio de Trabajo y Asuntos Sociales, 2005; libroblanco.pdf (imserso.es); Page 437) and IMSERSO (2004).

[10]The rating scale evaluates 47 tasks grouped into ten activities (eating and drinking, control of physical needs, bathing and basic personal care, other personal care, dressing and undressing, maintaining one's health, mobility, moving outside home and housework). Each task is assigned a different weight, and there is a different scale for individuals with mental illness or cognitive disability. Additionally, the evaluation considers the degree of supervision required to perform each task. The final

plan was designed by regional welfare authorities to determine the package of supports that best match the applicant's needs, and those of his/her family which include a choice between access to weekly hours of home care supports[11] and a caregiving subsidy.[12] Although caregivers and the care receivers can disclose their caregiving preference for care supports, or cash subsidies, the final decision regarding an individual's care plan is made by the Regional Department of Social Services[13], and more specifically, by an independent evaluator.

In addition to a network of caregiving supports, a new caregiving subsidy was designed to compensate informal caregivers who satisfied the following requirements: (i) some level kinship (up to third degree of consanguinity with the care receiver), (ii) co-residence with the dependent and (iii) having access to suitable housing conditions. Such caregiving subsidies included the payment of social insurance (security) contributions which increased the caregivers future retirement benefits. We distinguish individuals according to whether (i) the caregiver was already receiving some retirement or unemployment benefit at the time of the reform, in which case she could receive the caregiving subsidy, but the payment of social insurance contributions would not be recognised; (ii) whether the caregiver was not working at the time of the reform, and was not receiving any kind of benefit, in which case the caregiver was entitled to some minimum social insurance contribution; (iii) and finally whether the caregiver was actually working part-time, in which case social security contributions would supplement its pension contribution to match the amount received before going part-time.

The amount of caregiving subsidy varied significantly over time and according to individuals' caregiving needs. It ranges from a maximum amount of €390/month for 'major dependency' level 1 and about €487/month for 'major dependency' level 2 in 2007. Such benefits increased over time, and in 2011, the maximum amount for 'major dependency' level 1 was already €417 and €530/month for 'major dependency' level 2 but dropped to €387 and €442 in 2013. Finally, individuals exhibiting mild disability were then included into a new level 3 and allocated a caregiving subsidy that ranged between €180 and €300 in 2011.[14] Figure 1 summarises the implementation of the SAAD over time (and specifically the progressive incorporation of less severe dependency levels, as well as the amount of caregiving subsidies and home care hours). In addition, the beneficiaries of such benefits were expected to co-pay based on their income and needs, but there was a wide regional disparity in the design of these co-payments (Vilaplana-Prieto, 2011). In this paper we exploit such variation in the implementation of the reform. Previous evidence has shown that the introduction of this caregivng subsidy increased the supply of informal caregiving by 20-22 percentual points (Costa-Font et al., 2022) and a reduction of savings among beneficiaries (Costa-Font and Vilaplana, 2017).

Table A0 in the appendix also compares the amount of the caregiving subsidy (excluding social security contributions) and the monetary value of home care support (number of hours per month

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score is the sum of the weights of the tasks for which the individual has difficulty times the degree of supervision required. The degree of dependency is determined as the result of the sum: not eligible (less than 25 points), moderate dependence (between 25 and 49 points), severe dependence (between 50 and 74 points) and major dependence (above 74 points). Royal Decree 504/2007, of April 20th that approves the dependency rating scale established by the law 39/2006, of December 14, of promotion of personal autonomy and attention to people in dependency situation.

[11]Home care services are provided by professional caregivers and include services related to household work and services related to personal care. Quality standards are defined and professional services to become home caregivers are accredited by regional authorities. This formal caregiver is hired and paid directly by the social services and not by the family of the dependent person.

[12]Cash is deposited in the care receiver's bank account. However, it is important to note that SAAD is not a model of consumer-directed care, as the Cash and Counselling Demonstration and Evaluation of the US (Brown *et al.*, 2007).

[13]There were differences based on how each region articulated the system of subsidies and supports (in which the forms of access, systems of provision of places and quality criteria were unified), as well as the rules on accreditation of centres and financial participation of the user in the cost of the services (Asociación Estatal de Directores y Gerentes de Servicios Sociales de España, 2009).

[14]For a better understanding, they can be compared with minimum wage: €570.60/month (2007), €641.40/month (2011), €645.30/month (2013).
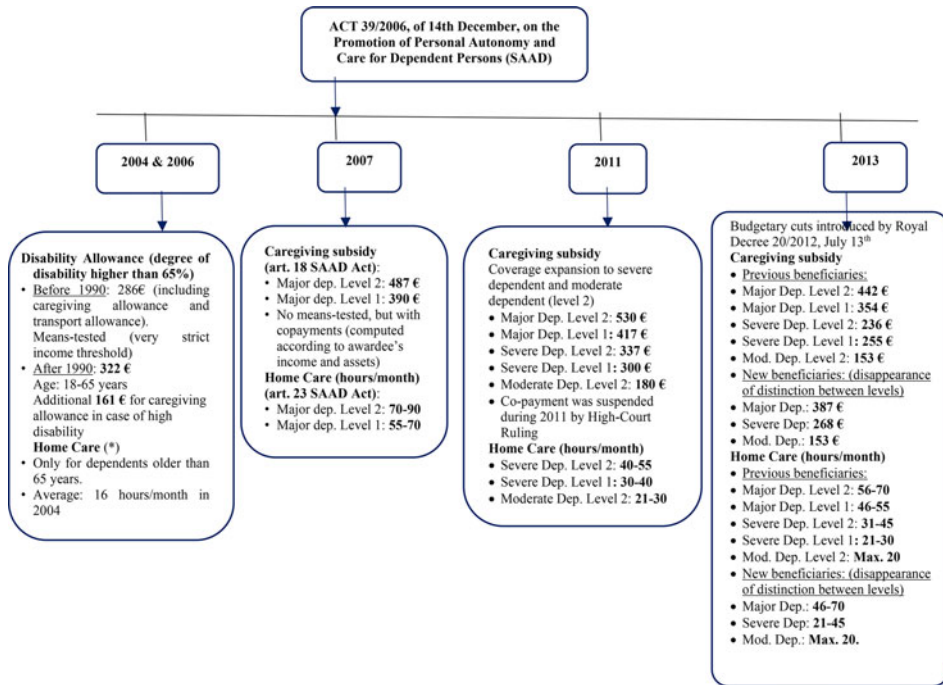
Figure 1. Long-term care benefits in Spain per SHARE wave. Implementation of the SAAD. Wave field time overview: Wave 1: April–December 2004; Wave 2: October–December 2006 and January–October 2007; Wave 4: January–November 2011; Wave 5: February–October 2013. For a better understanding of the amount of caregiver allowance and disability allowance, they can be compared with minimum wage: €460.50/month (2004), €540.90/month (2006), €570.60/month (2007), €641.40/month (2011), €645.30/month (2013) (nominal euros). (*) Las personas mayores en España. IMSERSO (2004).

according to the level of dependency multiplied by the public price of one hour of home care). For all years and all levels of dependency, we find that the economic value of home care is higher than that of the caregiving subsidy, which rules out a pecuniary incentive as a motivation to choose caregiving subsidies. However, austerity cuts in 2012 led to an implicit bailout of the Spanish economy and the implementation of severe budgetary cuts of SAAD in July 2012 (Royal Decree 20/2012, 13 July 2012 of measures to guarantee budget stability and foster competitiveness).[15] Importantly, social insurance contributions for informal caregivers were discontinued. Similarly, the hours of subsidised home care supports were slashed. For example, home care support decreased from 70–90 hours/month to 56–70 hours/month.

4. Data and empirical strategy

4.1 Data

We use a sample for Spain obtained from five waves of the Survey of Health, Ageing and Retirement in Europe (SHARE) including Wave 1 (2004), Wave 2 (2006/2007), Wave 4 (2011), Wave 5 (2013), Wave 6 (2015) and Wave 7 (2017).[16] SHARE is the largest pan-European social science study on the effects of health, social, economic over the life-course of people aged 50 or older. The study began in 2004,

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[15]SAAD exhibited significant spending cuts, as well as delays in entitlements from July 2012 (Royal Decree 20/2012, 13th July 2012). Specifically, the caregiving subsidy for the lowest need individuals, named as 'moderate dependency' was delayed until 2015, and caregiving subsidies were reduced between 15% and 25% conditional upon the dependency level.

[16]Unfortunately, wave 3 could not be included as it is not comparable with the other waves.

and since then, 380,000 in-depth interviews from 28 European countries and Israel have been conducted.[17]

Given that our sample is designed to contain enough information on both the receipt of LTC benefits and the caregiver's early retirement intentions, we have selected the sample as follows. First, from the initial sample containing the six cross-section waves ($N = 28,814$), we have identified all married or partnered individuals[18] ($N = 20,699$). Second, we have selected individuals who were employed ($N = 3,337$), discarding those who were self-employed, since early retirement is not available to them in Spain.[19] Third, we have considered only working individuals aged between 50 and 59 years, restricting the age range to those workers who still did not qualify for early retirement ($N = 2,541$).[20]

Given that the same individual may be interviewed in several waves, we allow for their economic activity to vary over time (e.g., going through periods of unemployment). For this reason, we have consistently checked which individuals are classified as 'employed' in several waves, because only for them we can measure their retirement intentions in the waves in which they are employed. To prevent these observations from distorting the sample, we have kept only those individuals who are consecutively employed in one or more waves ($N = 2,499$).

4.1.1 Caregiver identification

We define an individual as an informal caregiver if he/she provides care in basic activities of daily life to their spouse or partner.[21] We have tracked an individual's trajectory in the years before and after being identified as a caregiver in each wave to detect changes in caregiving status (from non-caregiver to carer, from carer to non-caregiver). To ensure the stable unit treatment assumption, we define the sample so that all individuals in the treatment group have always been caregivers and all individuals in the control group are always non-caregivers.

Our sample identifies individuals as caregivers who only provide care for their spouse or partner ($N = 433$). For such individuals, we can identify whether the care receiver actually receives the same benefit too. We have dropped those individuals who simultaneously looked after their partner/spouse and, other care recipient, or those who looked after another person different from partner/spouse. The reason being that when the care recipient is different from the partner/spouse, we cannot know

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[17]The SHARE data collection has been funded by the European Commission through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812), FP7 (SHARE-PREP: GA N°211909, SHARE-LEAP: GA N°227822, SHARE M4: GA N°261982, DASISH: GA N°283646) and Horizon 2020 (SHARE-DEV3: GA N°676536, SHARE-COHESION: GA N°870628, SERISS: GA N°654221, SSHOC: GA N°823782) and by DG Employment, Social Affairs & Inclusion. Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the US National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN271201300071C) and from various national funding sources is gratefully acknowledged (see www. share-project.org).

[18]The fact of restricting the analysis to informal caregivers of spouses or partners does not detract from the relevance of the study since it has been found that being married increases the probability of receiving informal care (McCann *et al.*, 2011). In our initial sample, 53.02% of informal caregivers look after his/her partner/spouse.

[19]Self-employed individuals are not entitled to early retirement, and therefore, they do not answer the question of early retirement intention. Only those who at an earlier point in their working career paid contributions as an employee (and for a certain period) are entitled to early retirement. However, the information available in SHARE does not allow us to identify whether self-employed individuals have previously worked as employees and the duration of such a contract. To avoid additional heterogeneity between different types of self-employed, we have chosen not to include them in the sample.

[20]We have not used panel data for two reasons. First, the sample size would be considerably reduced (1,321 observations). Second, because the number of people receiving caregiving benenfits (caregiving subsidy or home care) even smaller (only 86 individuals receive LTC benefits). This is due to the high probability that the caregiving spouse/partner in one wave becomes widowed/partnerless in the next wave.

[21]Two downsides of SHARE data are that first, caregiving intensity is only provided for caregivers outside the household, so we ignore this information, and second, we do not have information about working conditions. Its with mentioning that intensive caregiving has an enormous impact on women's labour force outcomes (Carmichael and Charles, 2003; Heitmueller, 2007; Lilly *et al.*, 2010; Van Houtven *et al.*, 2013).

whether the care receiver receives any kid of LTC benefits. The final sample contains 2,134 observations: 1,701 employed individuals who are not caregivers (in any wave) and 433 employed individuals who are caregivers for their spouse or partner[22] (see Table A1 for a description of the survey by wave). Almost 80% of respondents work in the private sector; 20% are caregivers of his/her partner/spouse, and among those partners/spouses who receive an LTC benefit, approximately 60% are caregiving subsidies.[23] Finally, we have tested whether SAAD induced some caregivers to leave their employment before reaching the statutory early retirement age. However, our data suggest that only 15 people retired to supply care to a spouse during the period 2004–2015 as shown in Appendix Figure AA, and such observations are evenly distributed over such period, which suggest that it is unlikely that SAAD gave rise to 'selective early retirement'.[24]

4.1.2 Controls

We include the following control variables: (i) characteristics of the respondent (age, gender, type of occupation (white collar, blue collar), public–private employee, income from employment, percentage of respondent's employment income as a share of total household income, whether the respondent has a retirement plan, number of consultations with a doctor/nurse), (ii) characteristics of the partner/spouse (age, gender, level of dependency measured by the Katz's index,[25] suffering a mental disorder), (iii) household characteristics (household size, number of children living at home and outside home, household wealth, having a mortgage), (iv) other environmental and local labour market characteristics (size of municipality and regional unemployment rate to take into account job opportunities at the regional level).

Table A2 reports the descriptive statistics for both the total sample and a sample that differentes between the treatment group and the control group. The treatment group is made up of respondents who are *caregivers* (of their partner/spouse) and whose partners/spouses receive some LTC benefit (caregiving subsidy or home care supports), while the control group is made up of respondents who are *not caregivers* and whose partners/spouses do not receive any caregiving subsidy or home care support. 66.82% of the sample reveals a desire to retire as soon as possible, and the figure is only slightly higher among caregivers (67.52%) and slightly lower among public sector workers (65.45%). About four-fifths of the sample are private sector workers, and compared to the control group, the treatment group exhibits a higher share of women (57.94% vs. 42.94%), consultations with doctors/nurses (6.36 vs. 4.81) and a smaller share of people residing in large cities (17.24% vs. 22.43%). Finally, the treatment group exhibits a larger share of people in the first two lower income quartiles (55.15% vs. 50.71%).

4.2 The empirical strategy

Our empirical strategy identifies the impact of SAAD related subsidies and supports on early retirement intentions of the caregiving partner or spouse. Our empirical strategy attempts to answer the following questions: (i) Do caregiving subsidies or home care supports influence early retirement intentions? (ii) How did the 2012 austerity cuts alter early retirement intentions? (iii) How do such estimates compare to the 2013 reform that incentivised early retirement among private sector employees?

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[22]We have verified that there is not any caregiver providing care to a non-disabled spouse/partner and that all disabled individuals receive informal care from his/her spouse/partner.

[23]Geyer and Korfhage (2015) document that 73% of individuals receiving caregiving subsidy out of the total with some LTC benefit. However, their sample includes workers aged 35–65 years and is not limited to partner/spouse caregivers but includes any co-resident in a dependency situation.

[24]Furthermore, the percentage of people who retired early to become caregivers compared to the total is less than 2%. This is not a surprise as SAAD was highly unanticipated hence it is unlikely that people brought forward their retirement.

[25]The dependency degree is approximated using the Katz's Index (Katz, 1983). The Katz Index determines the functional status as a measurement of the ability to perform six daily living activities independently. We have computed this index using the information on daily living activities provided by SHARE.

Although the labour market effects of SAAD may be potentially heterogeneous, our focus is on the effect on retirement intentions, differentiating between subsidies and home care supports. The effect of each type of subsidy and support is far from trivial. Whilst the receipt of caregiving subsidies may increase the probability of intended retirement if subsidies are perceived as an extra household income, they might alternatively decrease retirement intentions, if the government pays additional social insurance contributions (which incentivises individuals to stay in the labour force). In the latter case, it is possible that spousal caregivers benefiting from home care supports may find it easier to reconcile work and care, and thus home care supports might discourage intended retirement as a result. Austerity cuts in subsidies and supports after 2012 might have also exerted a significant and counter impact on retirement intentions. The reduction in the subsidy and the suspension of the social insurance contributions arguably may revert the additional incentive to delay retirement intentions, unless earnings are perceived to be indispensable for the subsistence of the household. Similarly, the reduction home care supports may increase retirement intentions.

Given that access to early retirement is different among those employed in the public or private sector, we examine the effect of an early retirement reform for private sector employees after 1 January 2013, which significantly tightened the eligibility conditions and reduced the amount of pension that could be received. Caregivers working in the private sector were exposed to both SAAD budget cuts and the tightening of early retirement incentives. A unique contribution of this paper lies in examining the effect size of both LTC and early retirement reforms on retirement intentions.

The literature examining the effect of informal caregiving on early retirement decisions has addressed the potential endogeneity of the supply of informal care resulting from reverse causality and omitted variable bias. Indeed, a search for a better work and life balance might incentivise caregivers to opt for early retirement, but early retirement might, in turn, make individuals more likely to become informal caregivers. Hence, it seems important to exploit the exogenous variation of a quasi-experimental reform such as SAAD in the probability of providing care. Furthermore, we examine early retirement intentions rather than ex-post retirement decisions, given that decisions might take some time to materialise, whilst intentions tend to adjust more immediately. We focus on the following question from the SHARE questionnaire: 'Thinking about your present job, would you like to retire early from this job?'. This question is only addressed to respondents who are working at the time of the survey. In other words, we are not able to capture the early retirement intention of unemployed or inactive individuals.

Given that our sample refers to employed individuals between the age of 50 and 59 years old, it is reasonable to assume that individuals who respond affirmatively to a retirement intention question are clearly expressing their 'true' early retirement intentions. We define the dependent variable '*early retirement*' ER_{it} as a binary variable that takes the value 1 if it answers affirmatively to the previous question and 0 otherwise.

We exploit the introduction of SAAD, distinguishing two periods: (i) short-term effects: 2004–2011 (prior to the cuts in the SAAD and the reform of the retirement system) and (ii) long-term effects: 2004–2017 (which includes the two reforms mentioned above).

Short-term effects (2004–2011) are captured by the equation below:

$$ER_{it} = \beta_0 + (\beta_1 + \beta_2 LTC_{it})IC_{it} + [\beta_3 + \beta_4 LTC_{it} + (\beta_5 + \beta_6 LTC_{it})IC_{it}]T_t^{7-11} \\ + \beta_7 LTC_{it} + \beta_8 UR_t + X'_{it}\gamma + C_c + T_t + \varepsilon_{it}; \ LTC_{it} = \{CA_{it}, HC_{it}\}. \tag{1}$$

IC_{it} takes the value 1 if the interviewee is an informal caregiver of a partner/spouse in need of care LTC_{it} is a binary variable that refers to the reception of long-term care benefits. Since the care receiver cannot benefit from both the caregiving subsidy and home care supports simultaneously, we proceed to define two different binary variables, namely caregiving subsidies (CA_{it}) and public home care supports (HC_{it}).

T_t^{7-11} is a binary variable that takes the value 1 in the post-reform period (2007–2011), and 0, otherwise X'_{it} denotes a vector of controls. Controls capture the effect of some alternative explanations for individual differences in early retirement intentions,[26] such as (i) individual characteristics including age, sex, type of occupation,[27] public/private sector employee income from employment, percentage of respondent's employment income as a share of total household income, number of consultations with doctor/nurse, having a retirement plan,[28] (ii) characteristics of the partner/spouse (age, sex, state of dependence approximated by the Katz index, suffering from mental illness), and (iii) household characteristics (number of sons/daughters living at home and outside home, household wealth, household size, having mortgage) and the size of municipality. Finally, UR_t refers to the unemployment rate at the regional level (NUTS-2) to account for differences in regional labour markets. Finally, C_c and T_t denote regional fixed effects and year fixed effects, and ε_{ict} is an error term. We cluster our standard errors by region to capture heterogeneity in the implementation of the SAAD across regions.

We are interested in identifying (1), namely whether there exists an 'added worker effect', which is identified by $\beta_1 < 0$, and (2) whether the introduction of SAAD changed early retirement intentions of caregivers. Specifically, we test whether caregiving subsidies ($\beta_6 < 0$ for the model estimated with CA_{it}), or home care supports ($\beta_6 < 0$ for the model estimated with HC_{it}) gave rise to a change of retirement intentions.

Long-term effects (2004–2017) are measured as follows:

Next, we examine not only the introduction of the SAAD but its subsequent austerity cuts, as well as a further early retirement reform among private sector workers. To identify private sector employees, we define a binary variable PR_{it} that takes the value 1 if the worker is employed in the private sector and 0 otherwise.

$$
\begin{aligned}
ER_{it} = {} & \alpha_0 + \alpha_1 LTC_{it} + (\alpha_2 + \alpha_3 LTC_{it})PR_{it} + [\alpha_4 + \alpha_5 LTC_{it} + (\alpha_6 + \alpha_7 LTC_{it})IC_{it}]T_t^{7-11} \\
& + [\alpha_8 + \alpha_9 LTC_{it} + (\alpha_{10} + \alpha_{11}LTC_{it})PR_{it} + (\alpha_{12} + \alpha_{13}LTC_{it} + \alpha_{14}PR_{it})IC_{it}]T_t^{13-17} \\
& + [\alpha_{15} + (\alpha_{16} + \alpha_{17}PR_{it}T_t^{13-17})LTC_{it} + \alpha_{18}PR_{it}]IC_{it} + \alpha_{19}UR_t + X'_{it}\delta + C_c + T_t + \epsilon_{it}; \\
LTC_{it} = {} & \{CA_{it}, HC_{it}\}.
\end{aligned}
$$

$$(2)$$

We are interested in contrasting (i) the long-term 'added work effect' ($\alpha_{15} < 0$), (ii) whether the cuts in SAAD had a significant effect on early retirement intentions, and (iii) whether such effects are different between public and private sector workers, given that the reform affected mainly early retirement of private sector workers ($\alpha_{17} \neq 0$ for CA_{it} and/or HC_{it}).

Assumptions of the model: To identify the effects of SAAD on early retirement intentions, we need to verify that two common assumptions: (i) stable unit treatment and (ii) common trends (Lechner,

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[26]Control variables have been selected following previous studies and include gender (van Solinge, 2012), education (Petoska and Earl, 2009), marital status (Szinovacz and DeViney, 2000), health (Bloom *et al.*, 2005; Davey, 2008), cognitive ability (Parker *et al.*, 2013), income and wealth (Aranki and Macchiarelli, 2013), planning and personal assets (Coile and Gruber, 2007; Whitaker and Bokemeier, 2014), family-related variables (Szinovacz *et al.*, 2001; Damman *et al.*, 2015).

[27]The type of occupation (blue collar vs. white collar) can also influence the retirement decision. Blue-collar workers are more likely to perform tiring or more physically demanding tasks. In principle, this variable could be problematic due to the ambiguous relationship between retirement and health status (Chirikos and Nestel, 1991). However, given that our focus in on early retirement intentions and not to a retirement decisions we avoid this problem.

[28]The introduction of variables related to health status poses problems due to its potential endogeneity with respect to retirement. Not being in good health can be a reason to intent to retire but continuing to work can also lead to a worsening of health status (Kerkhofs *et al.*, 1999). Additionally, some studies have found that there may be a tendency to overstate health problems to justify leaving the labour market. This 'justification bias' is associated with the use of subjective health measures (Disney *et al.*, 2006; Jones *et al.*, 2010). To avoid this problem, a health indicator less likely to suffer from self-reported bias is used in this study: the number of consultations with doctor/nurse in the last year.

2011). The *stable unit treatment assumption* states that the treatment should only affect the treatment group. That is, the control group should not be affected in any way by the interaction between members of the population, and the treatment group should not be affected by reforms taking place before the implementation period.[29]

Given that caregiving subsidies in SAAD can only be received under the assumption of co-residence between caregiver and care receiver, and that our sample is restricted to spouses (or cohabiting partners), it is unlikely that individuals strategically change their living arrangements to receive any caregiving benefit. In the robustness checks section, we show consistent evidence when we hold constant the composition of the household.

Similarly, we rule out that decisions regarding early retirement after the 2013 early retirement reform could have affected the equilibrium salary and, consequently, we have a stable control group. Notice that when we examine the effect of the early retirement reform, the control group consists of civil servants. Although these individuals have more advantageous conditions of early retirement, it does not seem plausible that private sector workers (over 50 years of age) switch to public employment to become eligible for early retirement.

The *common trends assumption* implies that both the treatment and control groups must be influenced by the same pre-trends. In other words, the potential non-treatment outcomes are expected to follow the same trend regardless of the group to which they belong. This assumption can be relaxed if the covariates give rise to different time trends that are identifiable. In such a case, the common trend assumption must be met conditional on these covariates.[30] As the reform was presented to the parliament on 26 April 2006, and the legislative process of the reform was heavily amended in Parliament and it only was approved in the last month of the year, it was practically impossible to anticipate a specific outcome.[31] To further test the plausibility of the common time trends, we formally tested whether the treated individuals had deviating linear pre-trends by estimating the following specification:

$$ER_{it} = \varphi_0 LTC_{it} \cdot t + \varphi_1 C_c \cdot t + \varphi_2 UR_t + X'_{it}\delta + C_c + T_t + \varepsilon_{it} \tag{3}$$
$$LTC_{it} = \{CA_{it}, HC_{it}\}.$$

For both caregving subsidies and home care supports we find that the interaction $\varphi_0 LTC_{it} \cdot t$ is not significant (results available upon request).

As for estimation method, in a non-linear model, the common trend assumption is only satisfied if there is no group-specific difference in the dependent variable. This implies that the treatment and control groups should start at the same average level of early retirement before treatment (Lechner, 2011). As this assumption is not met with our data, we have opted to estimate a linear model.

4.3 Robustness checks

To address potential endogeneity concerns, we proceed to estimate a first stage regression estimating the probability of being caregiver using as an instrument the number of informal caregivers outside the home. Instruments commonly used include health indicators of potential care receivers, which

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[29]As previously mentioned, we have checked that individuals in the control group are always non-caregivers and individuals in the treatment group are always caregivers.

[30]Under both assumptions, the effect on the treatment group can be estimated using a regression analysis. Therefore, it nets out the biases resulting from the permanent differences between the treatment and control groups, as well as those derived from macro-trends that are not correlated with the change in the LTC policy and early retirement (Imbens and Wooldridge, 2009).

[31]Deadlines for amendments, until 20 June. The Parliament passed the draft bill on 5 October 2006. The draft bill was referred to the Senate on 18 October 2006. Deadline for amendments finished on 6 November 2006. Parliamentary groups registered three amendments to reject the bill and 260 amendments to modify specific aspects of the bill. Parliament passed the Act on 30 November 2006 and was published on the Official State Bulletin on 14 December 2006.

could be positively correlated with the demands for care; for example, parent's age (Bolin *et al.*, 2008), parent's health (Bolin *et al.*, 2008; Ciani, 2012; Van Houtven *et al.*, 2013), parent's or parents-in-law living status (Bolin *et al.*, 2008; Van Houtven *et al.*, 2013), number of people who are sick or dependent in the home (Heitmueller, 2007; Ciani, 2012; Meng, 2013). However, Hassink and Van der Berg (2011) cast doubts on this type of instruments as they ignore the fact that some care tasks are 'time-bounded' (e.g., eating, going to the toilet, getting in or out of bed), while others can be performed at different times of the day (e.g., bathing) or even moved from one day to another (e.g., shopping).

In this paper, we use the number of caregivers outside the household as an instrument, since help from non-co-residential caregivers could plausibly influence the spousal burden of care. An identification concern refers to whether receiving some benefit from the SAAD affects the composition of the household to reinforce the provision of care. For this reason, the models are re-estimated by restricting the sample to households whose composition has not changed throughout the period of analysis.

5. Results

5.1 Descriptive evidence: differences between treatment and control groups

Figure 2 displays the retirement intention trends of the treatment and control groups throughout the period of analysis. The trends of the treatment group (spouses/partners who provide informal care and whose spouse/partner receives a public LTC benefit) suggest a reduction in the early retirement intentions coinciding with the introduction of the SAAD (2007). In contrast, in the control group (spouses/partners who do not provide informal care), we barely find evidence of such a decrease. Consistently, we identify a change in the trend in 2013 amidst the spending cuts, but its is not different by spousal caregiving status. The contraction of early retirement intentions after the introduction of the SAAD is much larger for female caregivers, and is almost reversed in 2013. In contrast, for male caregivers, such contraction in retirement intentions is slightly smoothed after 2013.

Given that the conditions around access to early retirement (which affect both caregivers and non-caregivers) are different between public and private sector workers, Figure 3 displays the evolution of early retirement intentions by activity sector. Importantly, we find that in the pre-SAAD period, early retirement intentions are similar among male employees in the private sector, and among females employees in the public sector. However, the implementation of SAAD coincides with a decline of early retirement intentions for caregivers in both sectors. For men working in the private sector, we find a reduction in retirement intentions in 2013 which is more pronounced among caregivers. Among women working in the private sector, we identify an increased willingness to retire after 2013, a trend that is more pronounced among caregivers.

Figure 4 displays the density function of the number of hours worked per week by caregivers and non-caregivers in the pre-reform (2004–2006) and post-reform (2007–2011) periods. The density function is considerably flatter among caregivers compared to non-caregivers and flattens even more after SAAD implementation, which results from a higher share of workers with reduced working times among caregivers (according to the data in Table A2, only 22.69% of the non-caregivers exhibit a reduced working day compared to 42.25% among caregivers).

5.2 Extensive margin (short-term)

Table 1 reports the estimates of the short-term effects of the introduction of SAAD using a stepwise approach that incorporates progressively new explanatory variables.[32] We find that prior to the reform,

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[32]The model M1 only includes respondent's characteristics (age and gender), year fixed effects, region fixed effects and unemployment rate. M2 includes the same variables as M1 and additional respondent's characteristics (blue/white-collar
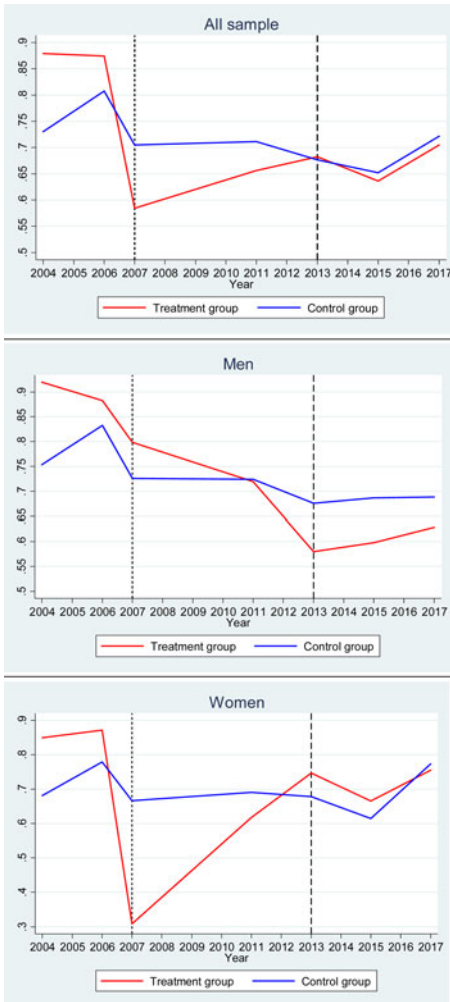
Figure 2. Early retirement intention. Difference between treatment and control group. Note: The blue line depicts the control group, that is, spouses/partners who do not provide informal care and are working in public or private sector at the time of the survey. The red line depicts the treatment group, that is, spouses/partners who provide informal care to their respective spouse/partner and whose spouse/partner receives a public long-term care benefit. The black dotted vertical line represents the implementation of the System of Autonomy and Attention to Dependent People (SAAD). The black dashed vertical line represents the first SHARE wave that identifies the effect of budgetary cuts of SAAD and restrictions in access to early retirement for workers in the private sector.

being a caregiver increased early retirement intentions by 26.9pp (39.84% compared to the mean intention). However, we find no effects among individuals that received means-tested caregivers' subsidies before SAAD. In contrast, the introduction of SAAD led to a 10pp reduction in the early retirement intentions (−11.30% with respect to the mean intention). That is, regardless of the type of LTC benefit, SAAD led to a decrease in the early retirement intentions among spousal caregivers. However, those who received home care supports improved their work–life balance and are less likely to intend to retire (−11.7pp); whilst those who received a caregiving subsidy benefited both from a higher income and from the government top up of the difference in social security contributions which was an additional incentive influencing early retirement at the margin (−10pp).

worker, public/private sector worker and number of consultations with doctor/nurse in the last year). M3 also includes household's characteristics (having sons/daughters living at home, having sons/daughters living outside home, household size higher than two people). M4 also includes partner/spouse's characteristics (age, gender, Katz's index (grouping levels 0–1, 2, 3, 4–5 and 6) and having mental illness). Finally, M5 includes size of municipality, household wealth, respondent's income from employment, percentage of respondent's employment income with respect to total household income, having a retirement plan and having a mortgage. As CA and HC are mutually exclusive benefits, in order for the control group to include only those individuals who do not receive any benefits, we define a binary variable for HC to and CA.
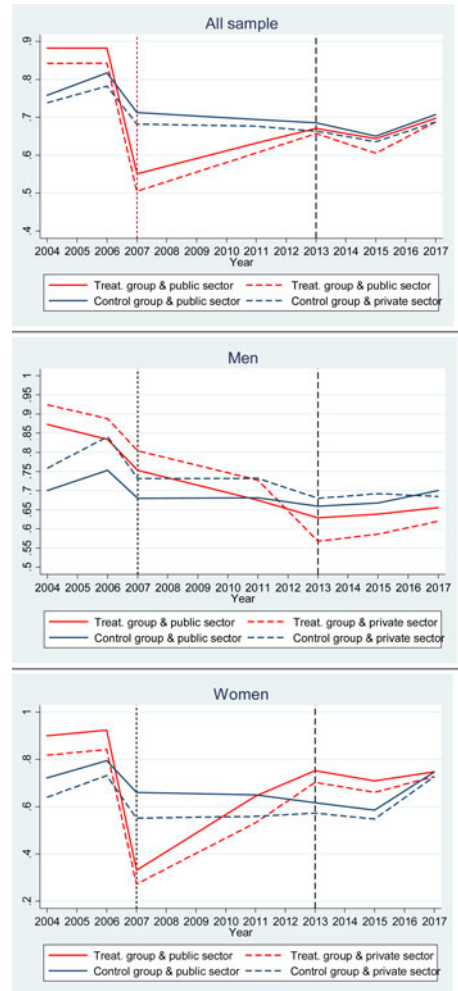
Figure 3. Early retirement intention. Difference between employees in the private and public sector. Note: The red straight line depicts trends of employees in the public sector who are caregivers of spouse/partner and whose partner/spouse receives a public LTC benefit. Red dashed line depicts trends of employees in the private sector who are caregivers of a spouse/partner and whose partner/spouse receives a public LTC benefit. The blue straight line depicts trends of workers in the public sector who are not caregivers of spouse/partner and whose partner/spouse does not receive a public LTC benefit. The blue dashed line depicts employees in the private sector who are not caregivers of a spouse/partner and whose partner/spouse does not receive a public LTC benefit. The black dotted vertical line represents the implementation of the System of Autonomy and Attention to Dependent People (SAAD). The black dashed vertical line depicts the first SHARE wave that gathers the effect of budgetary cuts of SAAD and restrictions in access to early retirement for workers in the private sector.
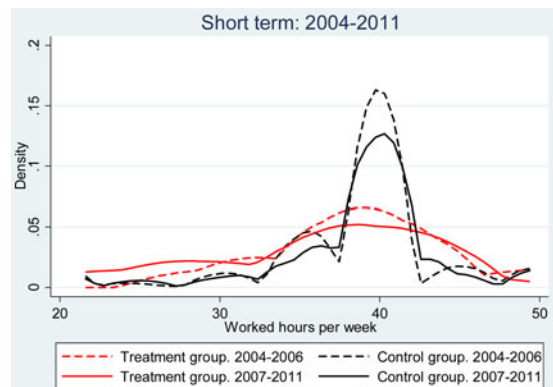
Figure 4. Kernel density functions for the number of working hours per wave. The red dashed line depicts the density functions of working hours per week for the treatment group (caregivers) before the implementation of the SAAD (2004–2006). The red straight line depicts the density functions of working hours per week for the treatment group (caregivers) after the implementation of the SAAD (2007–2011). The black dashed line depicts the density functions of working hours per week for the control group (non-caregivers) before the implementation of the SAAD (2004–2006). The black straight line depicts the density functions of working hours per week for the control group (non-caregivers) after the implementation of the SAAD (2007–2011).

Table 1. Effect of the implementation of the SAAD on the early retirement intention

	M1	M2	M3	M4	M5
Any LTC benefit					
Informal care (IC)	0.281***	0.290***	0.283***	0.283***	0.269***
	(0.079)	(0.079)	(0.090)	(0.089)	(0.090)
IC × LTC benefit	0.236**	0.231**	0.249**	0.133	0.070
	(0.102)	(0.102)	(0.118)	(0.129)	(0.131)
IC × LTC benefit × post SAAD	−0.143***	−0.134***	−0.141***	−0.138***	−0.113***
	(0.039)	(0.039)	(0.046)	(0.048)	(0.050)
Constant	0.910***	0.879***	1.403***	1.193***	1.010***
	(0.210)	(0.215)	(0.257)	(0.272)	(0.287)
N	796	796	796	796	796
R^2	0.259	0.265	0.294	0.314	0.335
F	5.260	3.528	3.514	2.886	2.681
p	0.000	0.002	0.001	0.002	0.001
Caregiving subsidy (CA)					
Informal care (IC)	0.335***	0.340***	0.333***	0.327***	0.331***
	(0.083)	(0.083)	(0.092)	(0.092)	(0.084)
IC × LTC benefit	0.278**	0.270**	0.259**	0.219	0.157
	(0.107)	(0.108)	(0.122)	(0.134)	(0.136)
IC × LTC benefit × post SAAD	−0.120***	−0.123***	−0.115***	−0.106***	−0.100***
	(0.038)	(0.039)	(0.046)	(0.048)	(0.050)
Constant	0.904***	0.876***	1.407***	1.196***	1.026***
	(0.210)	(0.215)	(0.257)	(0.272)	(0.287)
N	796	796	796	796	796
R^2	0.386	0.391	0.428	0.449	0.470
F	4.977	3.328	3.739	2.995	2.742
p	0.001	0.003	0.000	0.001	0.001
Home care supports (HC)					
Informal care (IC)	0.278***	0.285***	0.281***	0.269***	0.268***
	(0.094)	(0.094)	(0.093)	(0.092)	(0.089)
IC × LTC benefit	0.245*	0.242*	0.174	−0.019	−0.091
	(0.124)	(0.124)	(0.143)	(0.159)	(0.160)
IC × LTC benefit × post SAAD	−0.134***	−0.125***	−0.124***	−0.120***	−0.117***
	(0.038)	(0.038)	(0.035)	(0.037)	(0.030)
Constant	0.807***	0.783***	1.334***	1.158***	0.990***
	(0.209)	(0.215)	(0.258)	(0.273)	(0.288)
N	796	796	796	796	796
R^2	0.382	0.387	0.413	0.438	0.463
F	4.466	3.041	2.911	2.617	2.531
p	0.002	0.005	0.005	0.005	0.003

Short-term: 2004–2011.

Note: M1 includes age and gender of caregiver, regional unemployment rate, year fixed effects and region fixed effects. M2 includes the same explanatory variables than M1 and also professional situation (blue collar/white collar), activity sector (public/private) and number of consultations with doctor/nurse in the last year. M3 also includes household characteristics (having sons/daughters, sons/daughters living at home, sons/daughters living outside home, household size higher than 2). M4 also includes characteristics of the partner/spouse (age, gender, Katz's index, mental illness). M5 also includes size of municipality, household wealth, respondent's income from employment, percentage of respondent's employment income with respect to total household income, having a retirement plan, having a mortgage. As CA and HC are mutually exclusive, in regressions measuring the effect of CA we include a dummy variable for those receiving HC and in regressions measuring the effect of HC we include a dummy variable for those receiving CA. Standard errors clustered by autonomous communities. ***, ** and * denotes statistical significance at the 1%, 5% and 10% level.

Next, we distinguish between employees working full-time and part-time.[33] The results are shown in the upper panel of Table 2 and suggest that before SAAD, caregivers working part-time exhibit a stronger early retirement intentions (34.8pp) compared to those working full-time (20.8pp). Similarly, caregivers working part-time who receive a caregiving subsidy show a higher early retirement intention (30.5pp). Indeed, the introduction of SAAD absorbs most of the early retirement intention effect among caregivers

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[33]Workers with reduced workday are those who work less than 40 hours/week if they are private sector workers (Article 34 of the Workers' Statute) and less than 37.5 hours/week if they are civil servants (Resolution of February 28, 2019, of the Secretary of State for Public Function, by which instructions are issued on the working hours and hours of the personnel at the service of the General Administration of the State and its public bodies).

Table 2. Effects of SAAD on early retirement in the short term (2004–2011) and long term (2004–2017) distinguishing between part-time and full-time workers

	LTC benefits		Caregiving subsidy		Home care	
	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time
Short term: 2004–2011						
Informal care (IC)	0.348***	0.208**	0.400***	0.186***	0.320***	0.252**
	(0.145)	(0.108)	(0.145)	(0.012)	(0.094)	(0.091)
IC × LTC benefit	0.305***	0.117	0.386***	0.117	0.112	0.034
	(0.149)	(0.189)	(0.189)	(0.160)	(0.174)	(0.269)
IC × LTC benefit × post SAAD	−0.228***	−0.105***	−0.227***	−0.002	0.013	−0.140***
	(0.050)	(0.026)	(0.050)	(0.068)	(0.067)	(0.028)
Constant	1.427***	0.633**	1.427***	0.612**	1.235***	0.591*
	(0.487)	(0.339)	(0.487)	(0.337)	(0.503)	(0.337)
N	276	520	276	520	276	520
R^2	0.060	0.046	0.060	0.048	0.040	0.047
F	3.018	4.815	3.018	5.019	4.903	4.850
p	0.020	0.001	0.020	0.001	0.000	0.001
Test coef(IC; part-time) = coef(IC; full-time)	Chi21 = 5.39		Chi21 = 7.14		Chi21 = 6.09	
p	0.000		0.000		0.000	
Test coef(IC × LTC benefit; part-time) = coef (IC × LTC benefit; full-time)	Chi21 = 6.95		Chi21 = 78.85		Chi21 = 8.01	
p	0.000		0.000		0.000	
Test coef(IC × LTC benefit × post; part-time) = coef(IC × LTC benefit × post; full-time)	Chi21 = 5.22		Chi21 = 4.67		Chi21 = 9.51	
p	0.000		0.000		0.000	

	LTC benefits		Caregiving subsidy		Home care	
	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time
Long-term: 2004–2017						
Informal care (IC)	0.284***	0.199***	0.283***	0.169***	0.256***	0.133***
	(0.036)	(0.052)	(0.037)	(0.053)	(0.089)	(0.059)
Private sector	−0.188***	0.329***	−0.184***	0.270***	−0.187	0.291***
	(0.028)	(0.055)	(0.023)	(0.049)	(0.103)	(0.030)
Private sector × post (2013–17)	−0.059***	−0.025***	−0.066***	−0.023***	−0.051***	−0.029***
	(0.019)	(0.009)	(0.012)	(0.014)	(0.010)	(0.014)
IC × LTC benefit × post (2013–17)	−0.216***	−0.134***	−0.320***	−0.184***	−0.143***	−0.175***
	(0.064)	(0.046)	(0.075)	(0.047)	(0.034)	(0.040)
IC × LTC × private sector × post (2013–17)	−0.140***	−0.219***	−0.143***	−0.219***	−0.153***	−0.220***
	(0.064)	(0.083)	(0.064)	(0.083)	(0.064)	(0.083)
Constant	0.851	0.448	0.841	0.433	0.799	0.427
	(0.291)	(0.208)	(0.293)	(0.208)	(0.291)	(0.207)
N	685	1.449	685	1.449	685	1.449
R^2	0.017	0.022	0.015	0.020	0.013	0.021
F	6.194	4.874	5.836	4.346	5.582	4.776
p	0.000	0.000	0.000	0.001	0.000	0.000
Test coef(IC; part-time) = coef(IC; full-time)	Chi21 = 4.78		Chi21 = 4.98		Chi21 = 4.93	
p	0.000		0.000		0.000	
Test coef(private; part-time) = coef(private; full-time)	Chi21 = 6.01		Chi21 = 6.51		Chi21 = 6.65	
p	0.000		0.000		0.000	
Test coef(private × post; part-time) = coef (private × post; full-time)	Chi21 = 4.77		Chi21 = 4.84		Chi21 = 4.80	
p	0.000		0.000		0.000	
Test coef(IC × LTC benefit × post; part-time) = coef(IC × LTC benefit × post; full-time)	Chi21 = 6.30		Chi21 = 665		Chi21 = 5.99	
p	0.000		0.000		0.000	
Test coef(IC × LTC benefit × private × post; part-time) = coef(IC × LTC benefit × private × post; full-time)	Chi21 = 6.91		Chi21 = 8.04		Chi21 = 6.93	
p	0.000		0.000		0.000	

Note: All regressions have been performed using M5 specification. As CA and HC are mutually exclusive benefits, in order for the control group to include only those individuals who do not receive any benefits, a binary variable for HC is entered in the regressions to analyse the effect of CA and a binary variable for CA is entered in the regressions for HC. Standard errors clustered by autonomous communities. ***, ** and * denote statistical significance at the 1%, 5% and 10% level.

working part-time (−22.8pp), given that the caregiving subsidy alongside the social security contributions compensates the employment income effect. In contrast, caregivers who work full-time exhibit a reduction in the early retirement intention upon benefiting from home care (−14pp).

5.3 Intensive margin (short-term)

Given that the effect of SAAD on early retirement intentions may depend on the amount of caregiving subsidy received (€1,000 per year; 2012), we have re-estimated the effect of SAAD considering the caregiving subsidy amount and the share of the caregiving subsidy on caregivers' labour income. The amount of the subsidy is expressed in net terms, e.g., net of the co-payment. More specifically, the upper panel of Table 3 reveals that, before SAAD, a higher subsidy amount and a higher income share of the subsidy led to an increase in the intention to retire early, but the implementation of the SAAD (2007–2011) switched the effect of the caregiving subsidy and turned it negative (−0.352 for the amount subsidy and −0.085 for the ratio of subsidy and caregiver's income).

For a better visualisation of these results, Figure 5 plots the predicted probability for the early retirement intention in the pre- and post-reform period (2004–2011) by gender. The figure depicts the amount of the caregiving subsidy (up to €4,000/year) and the probability in the pre-reform period. Consistently, for both men and women, the early retirement intention decreased in the post-reform period.

Compared to the average caregiving subsidy for the period 2004–2011 (€3,665/year; 2012), we find a 33% reduction in early retirement intentions among men (from 0.76 to 0.51) and a 13.7% reduction among women (from 0.9189 to 0.7925). Similarly, compared to the employment income share of the caregiving subsidy (0.4174 for the period 2004–2011), we find a 29% reducton in early retirement intentions among men (from 0.7512 to 0.5323) and a 14.8% reduction among women (from 0.9077 to 0.7735). Hence, our estimates suggest that men exhibit an extra reduction in the early retirement intentions after SAAD.

5.4 Extensive margin (long-term)

Table 4 displays the long-term effects from the introduction of SAAD (2004–2017). Compared to civil servants, *private sector employees are more likely to intent to retire early* (12.6pp, a mean 18.8% increase). However, such a higher intention is moderated by the restrictions on the access to early retirement (−5.7pp or a decrease by 45.24% with respect to the positive effect of being private sector employee). In the short term, we find that being a caregiver increases early retirement intentions by 20pp (29.6% average increase). Consistently, the austerity cuts in SAAD around 2012 are found to reduce early retirement intentions (17.6pp or an average 26% reduction), and specifically, retirement intentions among private sector workers compare to those employed in the public sector by 12.4pp (compared to an average 18.5% increase).

Consistently, retirement intentions among those receiving a caregiving subsidy decline by 22.1pp (−32.73% with respect to the mean value), which almost offsets the positive effect of being a caregiver. These results suggest that austerity cuts led to powerful added worker effect. In contrast, we find an increase in early retirement intentions of 15.6pp (an average 23.2% increase) among caregivers whose disabled partners/spouses received home care support. Hence, we conclude that a reduction in hours of home care support subsidy increase the early retirement intentions. In contrast, the reduction in the amount of the caregiving subsidies and the suppression of the contributions paid by social security gave rise to an extension of caregivers working life.

As for the period 2004–2017, we estimate the effect of full- and part-time work as a mediator in the impact of both reforms. The lower panel of Table 2 reports the results of the the long-term model differentiating between full-time and part-time employment. We find the following results: (i) early retirement intentions are 18.8pp lower among private part-time workers, but 32.9pp higher among private full-time workers; (ii) the effect of a reduction in the early retirement intentions that resulted from the early retirement reform was twice as large among part-time workers than full-time workers (−5.9pp vs. −2.5pp); (iii) the impact of the austerity cuts in SAAD also affected more intensively part-time workers (−21.6pp. vs. −13.4pp), especially if they received a caregiving subsidy, due to the suppression of the payment of complementary contributions to social security (−32pp vs. −18.4pp); (iv)

Table 3. Effects of SAAD on early retirement in the short term (2004–2011) and long term (2004–2017) using as explanatory variables the 'amount of caregiving subsidy (CA)' and the 'ratio between caregiving subsidy with respect to caregiver's income'

	M1	M2	M3	M4	M5
Amount of caregiving subsidy. 2004–2011					
Informal care (IC)	0.319***	0.322***	0.278***	0.252***	0.255***
	(0.055)	(0.055)	(0.056)	(0.053)	(0.049)
IC × amount CA	0.210***	0.212***	0.216***	0.212***	0.213***
	(0.048)	(0.048)	(0.047)	(0.043)	(0.039)
IC × amount CA × post SAAD	−0.378***	−0.367***	−0.370***	−0.379***	−0.352***
	(0.037)	(0.038)	(0.044)	(0.046)	(0.048)
Constant	0.848***	0.820***	1.235***	0.751***	0.667***
	(0.209)	(0.214)	(0.284)	(0.300)	(0.313)
N	796	796	796	796	796
R^2	0.034	0.038	0.061	0.080	0.094
F	5.555	3.620	3.274	2.817	2.548
p	0.000	0.001	0.001	0.002	0.002
Test for coef(IC) – coef(IC × amount CA × post SAAD) = 0	5.952	6.175	6.265	6.416	6.598
p	0.000	0.000	0.000	0.000	0.000
Ratio CA and caregiver's income. 2004–2011					
Informal care (IC)	0.318***	0.317***	0.274***	0.241***	0.238***
	(0.027)	(0.027)	(0.028)	(0.023)	(0.025)
IC × amount CA	0.199***	0.197***	0.218***	0.220***	0.230***
	(0.028)	(0.028)	(0.056)	(0.023)	(0.097)
IC × amount CA × post SAAD	−0.114***	−0.113***	−0.104***	−0.098**	−0.085*
	(0.049)	(0.049)	(0.043)	(0.047)	(0.048)
Constant	0.820***	0.191	0.124	−0.258	−0.345
	(0.136)	(0.170)	(0.251)	(0.281)	(0.287)
N	796	796	796	796	796
R^2	0.014	0.025	0.034	0.044	0.048
F	4.090	4.601	3.023	2.671	2.336
p	0.001	0.000	0.001	0.001	0.003
Test for coef(IC) – coef(IC × amount CA × post SAAD) = 0	5.139	6.431	6.628	7.450	7.498
p	0.000	0.000	0.000	0.000	0.000
Amount of caregiving subsidy. 2004–2017					
Informal care (IC)	0.200***	0.204***	0.210***	0.200***	0.196***
	(0.035)	(0.035)	(0.037)	(0.030)	(0.033)
IC × amount of CA × post (2013–17)	0.128***	0.124***	0.203**	0.206**	0.119
	(0.058)	(0.058)	(0.106)	(0.108)	(0.111)
IC × amount of CA × private sector × post (2013–17)	−0.141***	−0.128***	−0.128***	−0.129***	−0.127***
	(0.039)	(0.040)	(0.046)	(0.046)	(0.048)
Constant	0.833	0.840	0.891	0.751	0.661
	(0.224)	(0.231)	(0.298)	(0.300)	(0.313)
N	2,134	2,134	2,134	2,134	2,134
R^2	0.036	0.040	0.063	0.079	0.094
F	4.903	3.244	2.849	2.775	2.532
p	0.001	0.003	0.004	0.002	0.002
Test for coef(IC) – coef(IC × amount CA × post SAAD) = 0	4.842	5.153	5.775	6.115	6.280
p	0.000	0.000	0.000	0.000	0.000
Ratio CA and caregiver's income. 2004–2017					
Informal care (IC)	0.199***	0.199***	0.199***	0.189***	0.190***
	(0.034)	(0.034)	(0.036)	(0.038)	(0.039)
IC × amount of CA × post (2013–17)	−0.124***	−0.125***	−0.122***	−0.119***	−0.117***
	(0.042)	(0.043)	(0.046)	(0.047)	(0.048)
IC × amount of CA × private sector × post (2013–17)	−0.213***	−0.212***	−0.212***	−0.193***	−0.182***
	(0.036)	(0.036)	(0.037)	(0.030)	(0.031)
Constant	0.827***	0.215	−0.149	−0.261	−0.350
	(0.149)	(0.186)	(0.280)	(0.281)	(0.287)
N	2,134	2,134	2,134	2,134	2,134
R^2	0.015	0.024	0.037	0.043	0.048
F	3.600	3.586	2.791	2.657	2.326
p	0.002	0.000	0.002	0.001	0.003

Table 3. (*Continued.*)

	M1	M2	M3	M4	M5
Test for coef(IC) – coef(IC × amount CA × post SAAD) = 0	4.955	5.282	5.455	5.673	5.967
p	0.000	0.000	0.000	0.000	0.000

Note: M1 includes age and gender of caregiver, year fixed effects and region fixed effects. M2 includes the same explanatory variables than M1 and also professional situation, activity sector and doctor consultations. M3 also includes household characteristics (having sons/daughters, sons/daughters living at home, sons/daughters living outside home, household size higher than 2). M4 also includes age and gender of the care receiver, Katz's index and having mental illness. M5 also includes size of municipality, household wealth, income from employment, retirement plan, income from other household members and having mortgage. As CA and HC are mutually exclusive, in regressions for CA we include a dummy variable for those receiving HC. Standard errors clustered by autonomous communities.
***p < 0.01, **p < 0.05, *p < 0.1.
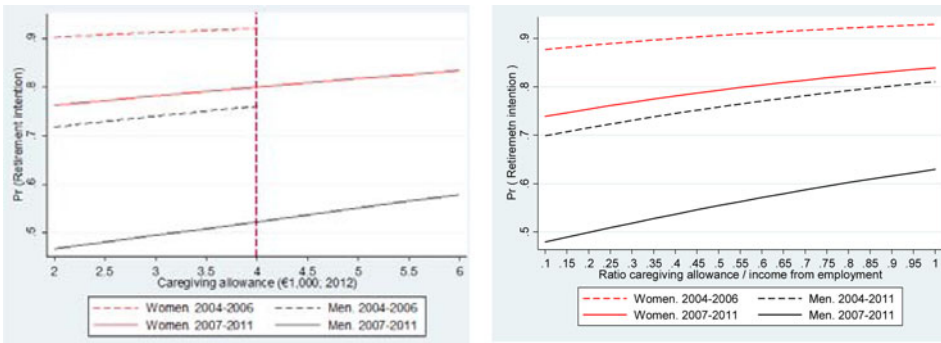
Figure 5. Effect of the implementation of the SAAD: 2004–2011. Effect of the amount of caregiving subsidy (left) and the ratio between caregiving subsidy and caregiver's employment income (right). Note: Predicted probability of early retirement obtained after estimating the short-term model (2004–2011) using the specification M5. The caregiving subsidy in the pre-reform period was lower than €4,000/year. This explains why predicted probabilities have not been computed for higher amounts of the caregiving subsidy in the pre-reform period. The red dashed line depicts the predicted probability of retirement intention for women before the implementation of the SAAD (2004–2006). The red straight line depicts the predicted probability of retirement intention for women after the implementation of the SAAD (2007–2011). The black dashed line depicts the predicted probability of retirement intention for men before the implementation of the SAAD (2004–2006). The black straight line represents the predicted probability of retirement intention for men after the implementation of the SAAD (2007–2011). In the left figure, the *x*-axis depicts the amount of the caregiving subsidy (€1,000, 2012). In the right figure, the *x*-axis represents the share of the caregiving subsidy with respect to caregiver's income from employment.

in contrast, the impact of the cuts in SAAD among private sector workers was more intense among full-time workers (−21.1pp) than part-time workers (−14pp).

Thus, the SAAD austerity cuts had a much stronger effect on retirement intention than the 2013 reform that changed the conditions for early retirement. The effect was 67% and 50% for caregivers with caregiving subsidy or home care, respectively; 54% and 63% higher for part-time or full-time workers, respectively.

5.5 Intensive margin (long-term)

Next, we have re-estimated the effects of the caregiving subsidy and the share of the caregiving subsidy on the caregiver's employment income (lower part of Table 3). Unlike our previous results, we find that the amount of the caregiving subsidy did not modify the probability of early retirement for the entire sample, although specifically, for private workers alone, it decreased the probability of early retirement by 12.7pp.

When we examine the effect of the share of the caregiving subsidy as a proportion caregiver's employment income, we find that the impact of austerity cuts led to a higher reduction among private employees (−18.2pp) as compared to all employees (−11.7pp). This result suggests

Table 4. Effect of austerity cuts in SAAD and early retirement reform for private workers

	M1	M2	M3	M4	M5
Any LTC benefit					
Informal care (IC)	0.225***	0.227***	0.212**	0.204**	0.200***
	(0.079)	(0.079)	(0.090)	(0.088)	(0.086)
Private sector	0.108***	0.112***	0.136***	0.124***	0.126***
	(0.025)	(0.025)	(0.027)	(0.031)	(0.031)
Private sector × post (2013–17)	−0.050***	−0.049***	−0.051***	−0.053***	−0.057***
	(0.016)	(0.017)	(0.015)	(0.019)	(0.019)
IC × LTC benefit × post (2013–17)	0.195***	0.187***	0.176***	0.176***	0.176***
	(0.056)	(0.055)	(0.057)	(0.048)	(0.049)
IC × LTC × private sector × post (2013–17)	−0.136***	−0.134***	−0.116***	−0.119***	−0.124***
	(0.035)	(0.035)	(0.042)	(0.044)	(0.045)
Constant	0.833	0.197	0.252	−0.013	−0.091
	(0.135)	(0.169)	(0.239)	(0.271)	(0.277)
N	2,134	2,134	2,134	2,134	2,134
R^2	0.355	0.370	0.378	0.391	0.400
F	3.125	4.255	2.632	2.446	2.283
p	0.015	0.000	0.006	0.006	0.005
Caregiving subsidy					
Informal care (IC)	0.243******	0.245	0.253***	0.252***	0.248***
	(0.082)	(0.082)	(0.092)	(0.082)	(0.083)
Private sector	0.109***	0.113***	0.136***	0.124***	0.127***
	(0.033)	(0.025)	(0.027)	(0.031)	(0.031)
Private sector × post (2013–17)	−0.051***	−0.050***	−0.051***	−0.053***	−0.057***
	(0.016)	(0.017)	(0.015)	(0.019)	(0.019)
IC × LTC benefit × post (2013–17)	−0.243***	−0.247***	−0.253***	−0.226***	−0.221***
	(0.090)	(0.090)	(0.080)	(0.079)	(0.080)
IC × LTC × private sector × post (2013–17)	−0.133***	−0.131***	−0.122***	−0.126***	−0.132***
	(0.035)	(0.035)	(0.041)	(0.044)	(0.044)
Constant	0.224	0.190	0.259	−0.006	−0.080
	(0.135)	(0.168)	(0.239)	(0.271)	(0.277)
N	2,134	2,134	2,134	2,134	2,134
R^2	0.354	0.369	0.379	0.392	0.400
F	3.474	4.543	2.967	2.668	2.443
p	0.012	0.000	0.003	0.003	0.003
Home care					
Informal care (IC)	0.128***	0.133***	0.141***	0.138***	0.141
	(0.057)	(0.056)	(0.052)	(0.050)	(0.050)
Private sector	0.107***	0.111***	0.116***	0.116***	0.119***
	(0.025)	(0.025)	(0.027)	(0.031)	(0.031)
Private sector × post (2013–17)	−0.049***	−0.048***	−0.052***	−0.057***	−0.059***
	(0.016)	(0.017)	(0.015)	(0.019)	(0.019)
IC × LTC benefit × post (2013–17)	0.170***	0.170***	0.156***	0.159***	0.156***
	(0.047)	(0.047)	(0.039)	(0.035)	(0.036)
IC × LTC × private sector × post (2013–17)	−0.128***	−0.125***	−0.114***	−0.104***	−0.104***
	(0.034)	(0.034)	(0.041)	(0.043)	(0.044)
Constant	0.296**	0.272**	0.235	−0.231	−0.216
	(0.134)	(0.138)	(0.139)	(0.131)	(0.138)
N	2,134	2,134	2,134	2,134	2,134
R^2	0.354	0.369	0.374	0.388	0.396
F	3.296	4.427	2.427	2.431	2.220
p	0.016	0.000	0.014	0.007	0.008

Long-term: 2004–2017.

Note: M1 includes age and gender of caregiver, year fixed effects and region fixed effects. M2 includes the same explanatory variables than M1 and also professional situation, activity sector and doctor consultations. M3 also includes household characteristics (having sons/daughters, sons/daughters living at home, sons/daughters living outside home, household size higher than 2). M4 also includes age and gender of the care receiver, Katz's index and having mental illness. M5 also includes size of municipality, household wealth, income from employment, retirement plan, income from other household members and having mortgage. As CA and HC are mutually exclusive, in regressions for CA we include a dummy variable for those receiving HC and in regressions for HC we include a dummy variable for those receiving CA. Standard errors clustered by autonomous communities.
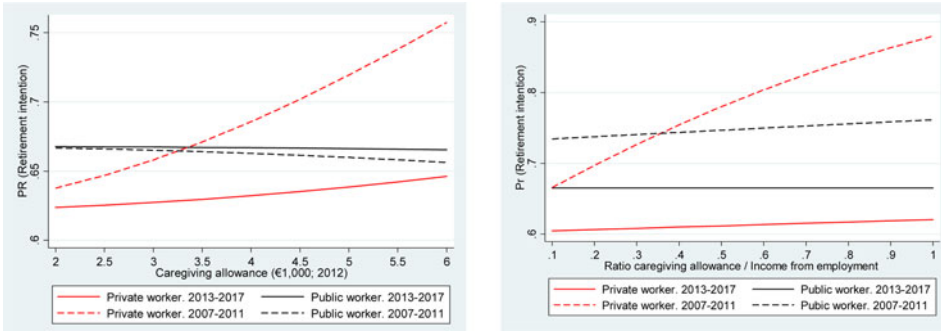
***p < 0.01, **p < 0.05, *p < 0.1.

Figure 6. Effect of budgetary cuts in SAAD and early retirement reforms for private workers: 2007–2017. Effect of the amount of caregiving subsidy (left) and the ratio between caregiving subsidy and caregiver's employment income (right) distinguishing between private and public workers. Note: Predicted probability of early retirement obtained after estimating the short-term model (2007–2017) using the specification M5. In the left figure, the *x*-axis represents the amount of the caregiving subsidy (€1,000, 2012). In the right figure, the *x*-axis represents the ratio of the caregiving subsidy with respect to caregiver's income from employment. The red dashed line depicts the predicted probability of early retirement intention for caregivers who are private workers in the period 2007–2011 (after the implementation of the SAAD, but before the budgetary cuts and the early retirement reform). The red straight line depicts the predicted probability of early retirement intention for caregivers who are private workers in the period 2013–2017 (after budgetary cuts and early retirement reform). The black dashed line depicts the predicted probability of early retirement intention for caregivers who are public workers in the period 2007–2011 (after the implementation of the SAAD, but before the budgetary cuts and the early retirement reform). The black straight line depicts the predicted probability of early retirement intention for caregivers who are public workers in the period 2013–2017 (after budgetary cuts and early retirement reform).

evidence of a larger impact of the austerity cuts among private sector workers, and specifically, suggests that rather than the benefit amount, it is the share of the benefits as a proportion of caregivers budget what affects retirement intentions.

Finally, Figure 6 displays the predicted probability for early retirement in the post-reform period conditioned on the amount of the caregiving subsidy (left figure) and the share of caregiving subsidy on caregiver's income from employment (right figure). It is worth noting that in the period 2007–2011 the predicted probabilities for private workers reveal a marked positive slope, while it is almost flat among civil servants. This suggests that private sector workers are much more sensitive to the impact of the caregiving subsidies, and adjust their early retirement intentions accordingly.

However, in the period 2011–2017, the predicted probabilities for private sector employees changed significantly. Compared to the amount of the caregiving subsidy for the period 2007–2017 (€4,279/year, 2012), we find a 9.7% reduction in the predicted probabilities of early retirement (from 0.7075 to 0.6387), whereas we document no significant effects among civil servants (+0.95%; from 0.6608 to 0.6671). When we look at the share of the caregiving subsidy on caregivers' income, we find that compared to the average value for the period 2007–2017 (0.4036), the early retirement intention decreased by 18.19% for private workers (from 0.7559 to 0.6184), compared to a more moderate reduction of 13.79% for civil servants (from 0.7637 to 0.6590).

6. Heterogeneity

6.1 Short-term heterogeneity effects

Table B1 reports a re-estimation of the short-term model conditioned on different socio-demographic characteristics. Consistently, we find that the receipt of SAAD subsidies and supports in the post-reform period (2007–2011) reduces caregivers early retirement intentions, especially among women (−30.1pp for subsidies (CA); −24.9pp for supports (HC). We estimate the reduction in early

retirement intention to be 121% higher for women than men when receiving CA and 74% higher when receiving HC.[34]

When we carry out a subsample analysis by employment sector, we find that our estimates are driven by blue-collar workers. That is, blue-collar workers exhibit a stronger early retirement intention once they become caregivers, but this intention decreases if they benefit from SAAD in the post-reform period (−14.7pp for subsidies (CA); −13.8pp for supports (HC)). In contrast, we find no significant effect for white-collar workers.

When we examine the heterogeneous effect by partner's mental health or disability, we document that being an informal caregiver increases early retirement intentins in 10–12pp among those with mental disorders and by 61pp when the Katz's index exceeds the value of 4. However, receiving a LTC benefit in the post-reform period reduces early retirement intention by 10pp in case of mental disorder or by 16–17pp in case of Katz's index exceeding the value of 4.

Next, we examine the heterogeneity of our estimates by household wealth. Estimates suggest that early retirement intention increases among households in the first (lowest) and second quartile, but such effect is smaller among households in the fourth quartile (highest).[35] In contrast, being informal caregiver increases the probability of holding a retirement plan by around 25–26pp but receiving a LTC benefit in the post-reform period reduces such probability by approximately 60%. Having no mortgage increases the early retirement intention (22–23pp), although after SAAD, such intention is reduced by half.

Finally, when we examine the heterogeneity effects conditioned on the presence of children in the household we find that: (i) having no children increases the early retirement intention by 37.6pp among caregivers, but this intention declines in the post-reform period (by 40% among those receiving CA and by 36% among those with HC); (ii) having a co-resident daughter and co-resident son does not have any significant effect on the early retirement intention of the partner/spouse; (iii) the retirement intention decreases by 34.7pp if the caregiver receives CA and there is a co-resident daughter, or by 18.7pp if the caregiver receives HC and there is a co-resident son.

6.2 Long-term heterogeneity effects

Table B2 shows the results after re-estimating the long-term model considering some relevant socio-demographic characteristics. The austerity cuts in caregiving subsidies (CA) only reduced retirement intentions among women (−28.9pp), although the reduction in home supports (HC) increased retirement intentions among both genders (20.2pp for men and 10.6pp for women). For private sector workers, we find a reduction in early retirement intentions among those receiving CA (−12.1pp for men, −14.4 for women) or HC (−9pp for men and −13.6pp for women). These results imply that among private sector workers, the reduction in early retirement was higher among women (19% for CA and 51% for HC).[36]

When we compare the effect by income groups, we find that austerity cuts have discouraged early retirement among households in the lowest quartiles (−56.6pp for the 1st; −53.4pp for the 2nd) but increased early retirement among the most affluent households who received home care (+51.7pp). Similar effects are found among those individuals that have a retirement plan (−25.1pp for CA and +25.9pp for HC) or a mortgage (−20.9pp for CA and +25.1pp for HC). In contrast when we examine

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[34]We have tested the equality of the estimated coefficient 'I×LTC benefit×Post SAAD' between men and women. For CA: $\chi^2(1)$=0.01, p-value: 0.9322. For HC: $\chi^2(1)$=1.02, p-value: 0.3019.

[35]The effect of receiving a caregiving subsidy in the post-reform period decreases this intention by approximately 50% (−33.4pp for CA and −31.6pp for HC) for the first quartile and by 33% for the highest quartile (−16.7pp for CA and −13.3pp for HC).

[36]We have tested the equality of the estimated coefficient 'I×LTC benefit×Post SAAD' between men and women. For CA: $\chi^2(1)$=1.58, p-value: 0.2083. For HC: $\chi^2(1)$=0.43, p-value: 0.5117. Consistently with previous estimates, we find similar effects for blue-collar workers (−24.2pp for CA and +26.7pp for HC) and caregivers of highly disabled individuals (+59.9pp for CA and +57.3pp for HC).

the effects by family composition, we find that the 2012 SAAD austerity cuts reduced retirement intentions among caregivers with no children receiving CA (−13.3pp), or HC with at least one co-resident daughter and son (−93.8pp). However, early retirement intentions increased for those receiving CA with no co-resident daughters (+81pp) or HC without children (+31.8pp).

Next, we compare the relative magnitude of the impact of the reform of the retirement for private sector workers compared to the SAAD cuts. This relative effect is 38% for men (−0.121 with respect to 0.313), and twice as large among women, (−0.144 with respect to −0.189). This result points to a long term effect among a specific household profile facing more difficulties to make ends meet, and where the caregiving subsidy was 'welcomed' as a supplementary household income (potentially shared with adult children) as discussed in Costa-Font and Vilaplana (2017).

7. Robustness checks

7.1 Treatment effect heterogeneity

De Chaisemartin and d'Haultfoeuille (2020) show that in a two-way fixed-effects design, the estimated effect is a weighted average of treatment effects in each group and time period, with weights that depend on group size and treatment variance. When the treatment effect is not constant over time and across groups, the estimated effect is biased. To overcome this issue, they propose a new estimator corresponding to the average treatment effect of all group-time cells whose treatment status changes between two consecutive time periods.

The estimator by De Chaisemartin and d'Haultfoeuille relies on two assumptions. The first one, which is a generalisation of the traditional common trend, requires that the mean outcome of groups having the same treatment status in wave $t-1$ would have the same trend between wave $t-1$ and wave t, in the absence of treatment. In our case, it implies that if no benefit had been awarded in a given year, early retirement intentions would have been similar in the treatment and control observations which were not treated in the preceding wave. The second assumption requires that, for each year, if one individual enters the treatment, then at least there is one observation that remains untreated. The first assumption is not testable, but it is weaker than the traditional common trend assumption. The second assumption is easy to check and holds as long as there is a sufficient number of benefits awarded each year. As a robustness check, we have used the De Chaisemartin and d'Haultfoeuille's estimator and the number of estimates with a negative weight. We find that only 0.61% of our estimates display a negative weight (the sum of the weights is −0.00019), which implies a very limited importance to the overall weighted average.

7.2 Stable household composition

As an additional robustness check, we have re-estimated the short and long-term models for the sub-sample of households whose composition has not changed. In the previous estimates, the set of explanatory variables included whether more than two people lived in the household, as well as the number of co-resident and non-co-resident sons and daughters. Now, we attempt to disentangle the effect of SAAD from other confounding effects related to living arrangements.[37] Estimates are retrieved from a reduced sample size, given that households must have been interviewed several times and must not exhibit changes in its composition across different waves. The final sample for the short-term model consists of 230 observations (28.9% compared to the initial sample) and 837 observations for the long-term model (39.2% compared to the initial sample). Nevertheless, the results reported in the Table B3 are in line with those of Tables 1 and 4, both in magnitude and significance, consistent with prior estimates.

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[37]For example, the fact that one child stops living with the parents, and, at the same time, the mother/father is granted a LTC benefit, or conversely, the fact that a child moves to the parents' coinciding with a reduction in the amount of home care hours received due to budgetary cuts.

7.3 Endogeneity of informal caregiving

Testing whether the exclusion condition is satisfied is not possible, since the error term is unobservable, and must be conducted in a purely conjectural way (Roberts and Whited, 2013). However, to assess the effect of violations of the exclusion restriction, we use the approach of van Kippersluis and Rietveld (2018), who extend the 'plausibly exogenous' method developed by Conley et al. (2012) and provides guidance on which prior to use in sensitivity checks. As van Kippersluis and Rietveld (2018) note, if there exists a sub-group of the sample for whom the first stage is zero, then the reduced form for this group can be used to back out a plausible estimate for the estimated coefficients of the instruments, instead of choosing arbitrary prior values. In our case, the sub-sample of individuals without children qualifies to estimate the direct effect of the instrumental variables on the dependent variable. Running the regression of the instrument, on the dependent variable, we find no significant effect, which increases our trust in our assumptions (results available upon request).

Table B4 shows the results of the first-stage regression for the probability of being informal caregiver using as instrument the number of non-co-resident informal caregivers. For the five different specifications, we find a positive association between supply of care and the probability of receiving help from other non-co-resident caregivers. We estimate that each additional non-co-resident informal caregiver increases the probability of spouse/partner providing informal by 4.4pp. In our specifications, the errors are also clustered by region. We use the traditional Hausman or Durbin–Wu–Hausman to test for endogeneity, and a variation of the Durbin–Wu–Hausman test that is robust to heteroskedastic and clustered errors (Cameron and Trivedi (2010) discuss the robust test (p. 190) as the 'robustified' Durbin–Wu–Hausman test).[38]

Similarly, we use the Kleibergen Paap's F-statistic to test for weak instruments, since we cannot formally test for weak instruments when errors are heteroskedastic, serially correlated or clustered (Pflueger and Wang, 2015). Given that F-statistics may be high even under weak instruments, setting the confidence level to 5%, we compare the effective F test to the critical values under different values of τ (e.g., fraction of a 'worst-case scenario' situation in which the instruments are completely uninformative and first- and second-stage errors are perfectly correlated).[39] The test rejects the null hypothesis of a weak instrument threshold of $\tau = 5\%$. These results show that the instrument is reasonably strong under all specifications.

7.4 Domestic care employment

Finally, in this section, we propose an additional mechanism which could drive our estimates: the effect of SAAD in the hire of domestic caregivers. If caregivers allocate part of the caregiving subsidies to hire a domestic carer (although this would be a misuse of the benefit), it might allow them to continue to participate in the labour force and delay their retirement. To test this effect, the short and long-term models are re-estimated using a binary variable that takes the value 1 if the household has hired a housekeeper, and 0 otherwise. The results are shown in Table B5.

Our results suggest that in the short-term, the probability of employment of a domestic carer increases by 11.7pp when the caregiver receives a caregiving subsidy, but we find no significant effect when home care supports are received. In the long-term, the 2012 budgetary cuts in the SAAD have led to a decrease in the probability of employing a domestic carer upon receiving a caregiving subsidy but suggest an increase after receiving home care supports (−6.0pp for CA; +6.1pp for home supports). Hence, these results provide suggestive evidence of some substitution between informal and formal caregiving, which might be offset by the role of domestic care employment.

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[38]The robustified Durbin–Wu–Hausman tests indicate that the exogeneity hypothesis cannot be rejected. This result is in line with other studies (Ciani, 2012; Meng, 2013; Van Houtven et al., 2013; Nguyen and Connelly, 2014) that have also found no significant evidence of endogeneity in the decision to be an informal caregiver.

[39]The Nagar bias is the approximate asymptotic bias under weak instruments. The Montiel–Pflueger F-statistics allow us to test whether the Nagar bias exceeds a certain fraction of the 'worst case' benchmark (Olea and Pflueger, 2013; Pflueger and Wang, 2015).

8. Conclusion

In this paper, we study the effect of changes in the costs of caregiving, resulting from the introduction of a new set of subsidies and supports, on early retirement intentions of caregiving spouses. We draw on quasi-experimental evidence from the introduction of a new LTC legislation (SAAD) that reduced the costs of caregiving in 2007, its subsequent reduction amidst austerity cuts in 2012, and we compare it to a reform that changed the requirements for accessing early retirement among private sector workers in 2013.

Our estimates suggest that caregivers are likely to intend to stay in the labour force after the introduction of either a caregiving subsidy which in addition pays the social insurance contributions of informal caregivers, or subsidizes a network of home care supports. That is, we find that caregiving subsidies and supports ameliorate the time and income restrictions common of caregiving duties (Coile, 2004), and decrease retirement intentions by 32.73%. In contrast, Geyer and Korfhage (2015) found that cash subsidies in Germany decreased labour market participation, because unlike in Spain, part-time workers benefited from supplemental social insurance contributions. However, these results are consistent with Fu *et al.* (2017) who found that a similar LTC reform in Japan expanded labour supply among men, but it contracted it among women (Fu *et al.*, 2017). Against such backdrop, we find evidence of a reduction in retirement intentions (after the introduction of a system of caregiving subsidies and supports), for both men and women even though the effect size is larger among women, especially after the introduction of caregiving subsidies.

Consistently, we find that the reduction of SAAD subsidies and the early retirement reform reduced early retirement intentions, by 17.6pp (an average 26%) and 12.4pp (or an average 18.5%) respectively. Thus, our estimates indicate that the extension of caregiving subsidies and supports can exert a stronger effect on retirement intentions than an early retirement reform. These results are explained by either the introduction (contraction) of a caregiving subsidy alongside the inception of publicly funded social insurance contributions, as well as the expanded number of hours of home support. Both influence the caregiver's financial status and affect their balance of work and care.

Our estimates carry important policy implications for the international evaluation of caregiving supports and subsidies. More specifically, they suggest that although the original purpose of caregiving subsidies and supports is typically to offer respite to informal caregivers, they exert important spillover effects on the labour market decisions of caregivers, and more specifically in reducing their early retirement intentions, which are likely to influence actual retirement. These effect sizes are economically significant, and large in magnitude.

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Appendix A

Table A0. Comparison of caregiving subsidy and economic value of home care

	Caregiving subsidy (€/month)	Home care	
		Hours per month	Economic value (€/month)
2007			
Major dependency. Level 2	487	70–90	889.70–1,143.90
Major dependency. Level 1	390	55–70	699.05–889.70
2011			
Major dependency. Level 2	530	70–90	956.20–1,229.40
Major dependency. Level 1	417	55–70	751.30–956.20
Severe dependency. Level 2	337	40–55	546.40–751.30
Severe dependency. Level 1	300	30–40	409.80–546.40
Moderate dependency. Level 2	180	21–30	286.86–409.80
2013			
Major dependency	387	46–70	653.20–994
Severe dependency	268	21–45	298.20–639
Moderate dependency	153	Max. 20	284
2015			
Major dependency	387	46–70	628.36–956.20
Severe dependency	268	21–45	286.86–614.70
Moderate dependency	153	Max. 20	273.20
2017			
Major dependency	387	46–70	689.54–1,049,30
Severe dependency	268	21–45	314.79–674.55
Moderate dependency	153	Max. 20	Max. 299.80

For a better understanding of the amount of caregiving subsidy and disability subsidy, they can be compared with minimum wage: €460.50/month (2004), €540.90/month (2006), €570.60/month (2007), €641.40/month (2011), €645.30/month (2013) (nominal euros). Home care public price: €12.71/hour (2007); €13.66/hour (2011); €14.20/hour (2013); €13.66/hour (2015); €14.99/hour (2017).
Source: Own work using 'Las personas mayores en España' (2008, 2012, 2014, 2016) and 'Servicios sociales para personas mayores en España 2018'. Wave field time overview: Wave 1: April–December 2004; Wave 2: October–December 2006 and January–October 2007; Wave 4: January–November 2011; Wave 5: February–October 2013.

Table A1. Description of the sample (Spanish respondents who are married or cohabiting at the time of the survey and working in the public or private sector)

	Total sample	Working in			Dependent spouse/partner receives public LTC benefits			Spouse/partner is caregiver	
		Public sector	Private sector	% workers in private sector	Caregiving subsidy (CA)	Home care	% receiving CA	Total	% with respect sample size
Wave 1	235	40	195	82.98	23	20	53.49	44	18.72
Wave 2	221	48	173	78.28	42	32	56.76	80	36.20
Wave 4	340	58	282	82.94	49	28	63.64	73	21.47
Wave 5	794	179	615	77.46	33	24	57.89	95	11.96
Wave 6	285	56	229	80.35	36	21	63.16	73	25.61
Wave 7	259	54	205	79.15	30	20	60.00	68	26.25
Total	2,134	435	1,699	79.62	213	145	59.50	433	20.29

Source: Own work using SHARE (waves, 1, 2, 4, 5, 6 and 7).

Table A2. Descriptive statistics (2004–2017)

		Non-caregivers			
	Total	Total	Private sector	Public sector	Caregivers
Respondent characteristics					
Early retirement intention	66.82	66.70	67.04	65.45	67.52
Man	54.82	57.06	60.36	44.99	42.06
Woman	45.18	42.94	39.64	55.01	57.94
Age	58.36	58.33	58.36	58.22	58.56
	(4.65)	(4.65)	(4.70)	(4.46)	(4.65)
Working in					
Private sector	79.62	79.37	100.00	0.00	80.57
Public sector	20.38	20.63	0.00	100.00	19.43
Working hours per week	37.70	37.95	38.41	36.27	33.03
Reduced workday	23.34	22.69	24.57	15.57	42.25
Professional situation					
Blue collar	79.76	79.57	85.59	57.54	80.85
White collar	20.24	20.43	14.41	42.46	19.15
Consultation with doctor last year	82.61	82.66	81.02	88.66	82.27
Number of consultations	5.04	4.81	4.65	5.35	6.36
	(7.35)	(7.15)	(6.93)	(7.84)	(8.29)
Care receiver characteristics					
Man	58.67	–	–	–	58.67
Women	41.33	–	–	–	41.33
Age	59.50	–	–	–	59.50
	(5.19)	–	–	–	(5.19)
Receives LTC benefit		–	–	–	
Caregiving subsidy	16.78	–	–	–	82.68
Public home care	9.98	–	–	–	49.19
Mental illness	6.79	–	–	–	33.49
Katz's index					
0	79.71	100.00	100.00	100.00	0.00
1	10.97	0.00	0.00	0.00	54.08
2	2.32	0.00	0.00	0.00	11.43
3	1.73	0.00	0.00	0.00	8.54
4	1.15	0.00	0.00	0.00	5.68
5	1.73	0.00	0.00	0.00	8.54
6	2.38	0.00	0.00	0.00	11.73
Caregivers outside home	45.01	–	–	–	45.01
Number of caregivers outside home	2.04	–	–	–	2.04
	(0.41)	–	–	–	(0.41)
Caregiving subsidy €/year	4,279.21	–	–	–	4,279.21
	(1,227.44)	–	–	–	(1,227.44)
Ratio between caregiving subsidy and caregiver's income from employment	40.36	–	–	–	40.36
	(3.23)	–	–	–	(3.23)

(*Continued*)

Table A2. (*Continued.*)

		Non-caregivers			
	Total	Total	Private sector	Public sector	Caregivers
Household characteristics					
Size of municipality					
Big city	21.65	22.43	21.60	25.50	17.24
Outskirts of big city	8.57	8.83	8.83	8.84	7.11
Large city	23.50	22.79	23.04	21.89	27.56
Small town	36.79	36.17	36.99	33.19	40.30
Rural area or village	9.49	9.78	9.55	10.58	7.79
Has household employee/housekeeper	4.19	2.38	4.18	1.84	29.48
Has children	93.79	93.24	93.43	92.55	96.97
Number of children	2.23	2.22	2.23	2.18	2.30
	(0.95)	(0.94)	(0.98)	(0.81)	(0.98)
Has sons	33.94	33.95	33.73	34.77	33.84
Number of sons	1.59	1.62	1.65	1.49	1.51
	(0.87)	(0.87)	(0.91)	(0.69)	(0.84)
Has daughters	30.80	30.43	30.58	29.87	32.94
Number of daughters	1.62	1.59	1.62	1.53	1.68
	(0.84)	(0.83)	(0.83)	(0.85)	(0.88)
Has co-resident sons	17.07	17.81	18.52	15.20	12.87
Number of co-residents sons	(1.42)	(1.41)	(1.42)	(1.37)	(1.47)
	(0.63)	(0.59)	(0.60)	(0.56)	(0.90)
Has co-resident daughters	12.89	12.82	13.30	11.07	13.30
Number of co-resident daughters	1.40	1.38	1.39	1.35	1.54
	(0.68)	(0.64)	(0.66)	(0.59)	(0.86)
Has non-co-resident sons	23.53	23.18	22.96	24.02	25.48
Number of non-co-resident sons	1.51	1.52	1.53	1.46	1.44
	(0.82)	(0.83)	(0.86)	(0.72)	(0.76)
Has non-co-resident daughters	22.64	22.20	22.33	21.71	25.20
Number of non-co-resident daughters	1.55	1.54	1.55	1.53	1.59
	(0.82)	(0.81)	(0.80)	(0.85)	(0.87)
Other co-resident members not children	71.05	69.59	66.71	80.12	79.43
Number of other co-resident members	1.59	1.58	1.57	1.64	1.66
	(0.77)	(0.72)	(0.73)	(0.68)	(0.98)
Mortgage	9.18	8.75	9.41	6.41	11.63
Retirement plan	3.69	3.57	2.67	6.90	4.33
Adjusted wealth €1000 (2012)	211.71	212.25	203.85	243.59	208.62
	(272.21)	(275.87)	(262.14)	(320.59)	(250.43)
Adjusted wealth quartile					
First lowest	26.03	24.80	27.25	16.04	33.16
Second	25.33	25.91	26.62	23.34	21.99
Third	25.61	26.46	25.98	28.26	20.75
Fourth highest	23.03	22.83	20.15	32.37	24.10
Income from employment caregiver €1000 (2012)	14.85	15.07	14.12	18.46	13.61
	(10.65)	(10.67)	(10.22)	(11.54)	(10.48)
Income from employment caregiver quartile					
First lowest	18.41	17.89	19.29	12.83	21.37
Second	19.00	17.72	18.60	14.55	26.41
Third	25.23	25.35	26.54	21.06	24.50
Fourth highest	37.37	39.04	35.57	51.56	27.72
Income from other household members €1000 (2012)	15.03	14.58	13.25	19.25	17.51
	(15.56)	(15.57)	(14.63)	(17.76)	(15.30)
Ratio income from employment caregiver with respect to total household income	58.11	58.09	58.95	55.03	46.76
	(30.14)	(29.76)	(30.73)	(25.86)	(27.16)
N	2,134	1,701	1.350	351	433

Adjusted wealth: real wealth (€1000; 2012) divided by the square root of the number of household members.
Income from employment (caregiver): includes only income from paid work (€1000; 2012).
Income from other household members: difference between total household income and income from employment of the caregiver.
The dependency degree is approximated using Katz's index (Katz, 1983). The Katz's index determines functional status as a measurement of the ability to perform six daily living activities independently. We have computed this index using the information on daily living activities provided by SHARE. The Katz's index considers six different activities of daily living. The value 0 indicates that the individual performs all activities independently, whereas the value 6 indicates that the individual needs help for all activities.

Table B1. Heterogeneity results

	LTC benefit = caregiving subsidy				LTC benefit = home care			
	Caregiver: man	Caregiver: women	Caregiver: blue-collar	Caregiver: white-collar	Caregiver: man	Caregiver: women	Caregiver: blue-collar	Caregiver: white-collar
Informal care (IC)	−0.103	0.354***	0.231***	−0.614**	−0.213	0.310***	0.223***	−0.614***
	(0.138)	(0.103)	(0.086)	(0.295)	(0.128)	(0.133)	(0.098)	(0.293)
IC × LTC benefit	0.087	0.354***	0.256***	0.387	0.137	0.317*	0.252***	0.199
	(0.172)	(0.134)	(0.111)	(0.334)	(0.174)	(0.169)	(0.129)	(0.341)
IC × LTC benefit × post SAAD	−0.136***	−0.301***	−0.147***	−0.030	−0.143***	−0.249***	−0.138***	−0.024
	(0.049)	(0.042)	(0.041)	(0.105)	(0.049)	(0.050)	(0.041)	(0.104)
Constant	0.935***	0.603***	0.603***	1.943***	0.910***	0.417	0.524***	1.876***
	(0.273)	(0.297)	(0.226)	(0.422)	(0.273)	(0.296)	(0.226)	(0.421)
N	436	360	634	162	436	360	634	162
R^2	0.349	0.377	0.360	0.414	0.354	0.361	0.356	0.424
F	1.071	13.558	5.708	12.857	3.437	0.952	5.084	13.604
p	0.000	0.000	0.003	0.000	0.041	0.000	0.005	0.000
	Care receiver				Care receiver			
	Mental illness	No mental illness	Katz's index > 4	Katz's index ≤ 4	Mental illness	No mental illness	Katz's index > 4	Katz's index ≤ 4
Informal care (IC)	0.120***	0.543***	0.617***	−0.185	0.096***	0.368	0.612***	−0.248**
	(0.033)	(0.207)	(0.131)	(0.120)	(0.014)	(0.276)	(0.149)	(0.124)
IC × LTC benefit	0.114	−0.060	0.957***	0.159	0.078	0.229	0.936***	0.136
	(0.092)	(0.089)	(0.259)	(0.174)	(0.105)	(0.192)	(0.266)	(0.196)
IC × LTC benefit × post SAAD	−0.108***	0.268	−0.174***	−0.071	−0.103***	−0.092	−0.164***	−0.074
	(0.033)	(0.184)	(0.062)	(0.066)	(0.033)	(0.066)	(0.062)	(0.066)
Constant	0.888***	−5.708***	1.370***	0.627**	0.860***	−5.205***	1.349***	0.566
	(0.173)	(0.462)	(0.313)	(0.320)	(0.173)	(0.287)	(0.313)	(0.316)
N	199	597	505	291	199	597	505	291
R^2	0.457	0.558	0.501	0.475	0.456	0.781	0.495	0.481
F	16.502	15.876	15.863	12.094	11.960	13.784	19.102	16.880
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Household wealth quartile				Household wealth quartile			
	1st lowest	2nd	3rd	4th highest	1st lowest	2nd	3rd	4th highest
Informal care (IC)	0.733***	0.316***	−0.270	−0.503***	−0.593***	−0.016	−0.270	−0.390***
	(0.178)	(0.102)	(0.214)	(0.146)	(0.220)	(0.153)	(0.214)	(0.100)

(Continued)

Table B1. (*Continued.*)

	LTC benefit = caregiving subsidy				LTC benefit = home care			
	Caregiver: man	Caregiver: women	Caregiver: blue-collar	Caregiver: white-collar	Caregiver: man	Caregiver: women	Caregiver: blue-collar	Caregiver: white-collar
IC × LTC benefit	0.003	0.801***	0.167	0.488***	0.216	0.700***	0.053	0.274
	(0.192)	(0.211)	(0.251)	(0.183)	(0.224)	(0.251)	(0.280)	(0.215)
IC × LTC benefit × post SAAD	−0.334***	−0.157	−0.060	−0.167***	−0.316***	−0.066	−0.060	−0.133***
	(0.072)	(0.075)	(0.080)	(0.078)	(0.072)	(0.073)	(0.080)	(0.059)
Constant	0.789**	0.978***	−0.456	1.329***	0.909***	0.852***	−0.438	1.219***
	(0.360)	(0.334)	(0.413)	(0.357)	(0.358)	(0.337)	(0.412)	(0.360)
N	218	185	189	204	218	185	189	204
R^2	0.341	0.146	0.365	0.404	0.342	0.117	0.368	0.383
F	13.417	8.753	11.275	3.335	13.531	6.068	15.293	17.383
p	0.000	0.000	0.000	0.039	0.000	0.002	0.000	0.000

	Retirement plan		Mortgage over main house		Retirement plan		Mortgage over main house	
	Yes	No	Yes	No	Yes	No	Yes	No
Informal care (IC)	0.265***	−0.041	−0.877***	0.238***	0.253***	−0.091	−0.877***	0.221***
	(0.085)	(0.325)	(0.292)	(0.087)	(0.095)	(0.198)	(0.292)	(0.099)
IC × LTC benefit	0.284***	−0.036	0.816***	0.241***	0.238**	0.228**	0.816***	0.196
	(0.111)	(0.352)	(0.332)	(0.112)	(0.128)	(0.118)	(0.332)	(0.133)
IC × LTC benefit × post SAAD	−0.159***	−0.300***	−0.101***	−0.145***	−0.147***	−0.298***	−0.101	−0.134***
	(0.041)	(0.118)	(0.031)	(0.040)	(0.040)	(0.123)	(0.123)	(0.040)
Constant	0.869***	3.018***	−0.217	0.891***	0.786***	3.052***	−0.217***	0.809***
	(0.219)	(0.480)	(0.478)	(0.219)	(0.219)	(0.476)	(0.478)	(0.219)
N	714	82	78	718	714	82	78	718
R^2	0.362	0.284	0.421	0.357	0.358	0.283	0.421	0.354
F	7.051	8.734	1.159	5.854	6.164	17.088	1.159	5.074
p	0.001	0.000	0.540	0.002	0.002	0.000	0.540	0.005

	Children				Children			
	No children	At least one daughter co-resident no son co-resident	At least one son co-resident no daughter co-resident	At least one daughter and one son co-resident	No children	At least one daughter co-resident no son co-resident	At least one son co-resident no daughter co-resident	At least one daughter and one son co-resident
Informal care (IC)	0.376***	−0.351	−0.867***	−0.208	0.378**	−0.361	0.265	−0.069
	(0.106)	(0.234)	(0.390)	(0.216)	(0.115)	(0.230)	(0.184)	(0.453)
IC × LTC benefit	0.448***	0.191	0.985***	−0.502	0.399**	−0.254	−0.112	−0.695
	(0.136)	(0.296)	(0.405)	(0.410)	(0.151)	(0.345)	(0.123)	(0.489)
IC × LTC benefit × post SAAD	−0.151***	−0.347**	−0.165	−0.141	−0.137***	−0.212	−0.187***	−0.118
	(0.053)	(0.143)	(0.098)	(0.132)	(0.053)	(0.138)	(0.070)	(0.130)
Constant	0.785***	1.014**	1.087***	0.659	0.689***	1.143***	1.277***	0.422
	(0.268)	(0.500)	(0.438)	(0.491)	(0.269)	(0.500)	(0.436)	(0.494)
N	346	108	106	70	346	108	106	70
R^2	0.251	0.120	0.277	0.124	0.247	0.158	0.271	0.114
F	3.993	14.932	15.342	15.979	3.416	16.356	11.816	15.561
p	0.000	0.000	0.000	0.000	0.033	0.000	0.000	0.000

Estimation of the difference-in-difference model for the implementation of the SAAD Short term: 2004–2011.

All regressions have been performed using M5 specification. As CA and HC are mutually exclusive benefits, in order for the control group to include only those individuals who do not receive any benefits, a binary variable for HC is entered in the regressions to analyse the effect of CA and a binary variable for CA is entered in the regressions for HC. Robust standard errors. ***, ** and * denote statistical significance at the 1%, 5% and 10% level.

Table B2. Heterogeneity results

	LTC benefit = caregiving subsidy				LTC benefit = home care			
	Caregiver: man	Caregiver: women	Caregiver: blue-collar	Caregiver: white-collar	Caregiver: man	Caregiver: women	Caregiver: blue-collar	Caregiver: white-collar
Informal care (IC)	0.080	0.314***	0.736***	0.202***	0.194	0.268***	0.789***	0.195***
	(0.137)	(0.103)	(0.223)	(0.085)	(0.128)	(0.089)	(0.193)	(0.060)
IC × LTC benefit × post 2013–17	−0.013	−0.289***	−0.242***	0.612***	0.202***	0.106***	0.267***	0.640***
	(0.060)	(0.093)	(0.094)	(0.298)	(0.050)	(0.045)	(0.108)	(0.300)
IC × LTC × priv. sector × post 2013–17	−0.121***	−0.144***	−0.136***	−0.061	−0.090***	−0.136***	−0.129***	−0.063
	(0.044)	(0.057)	(0.037)	(0.098)	(0.044)	(0.055)	(0.037)	(0.098)
Constant	1.132***	0.362**	0.694***	0.839***	1.132***	0.305	0.665***	0.866***
	(0.188)	(0.188)	(0.152)	(0.266)	(0.188)	(0.186)	(0.151)	(0.265)
N	1,143	991	1,647	487	1,143	991	1,647	487
R^2	0.448	0.458	0.451	0.458	0.451	0.454	0.451	0.457
F	12.642	9.621	8.508	11.397	13.811	11.145	8.281	8.030
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	Care receiver				Care receiver			
	Mental illness	No mental illness	Katz's index>4	Katz's index<=4	Mental illness	No mental illness	Katz's index>4	Katz's index<=4
Informal care (IC)	0.107***	0.053	0.469***	−0.106	0.086***	0.081	0.444***	−0.205
	(0.042)	(0.207)	(0.164)	(0.113)	(0.032)	(0.223)	(0.164)	(0.120)
IC × LTC benefit × post 2013–17	0.099	−0.116	−0.599***	0.064	0.099	−0.159	0.573***	0.247
	(0.078)	(0.117)	(0.172)	(0.124)	(0.088)	(0.134)	(0.174)	(0.133)
IC × LTC × priv. sector × post 2013–17	−0.085	0.121	−0.129***	−0.087	−0.082***	0.111	−0.125***	−0.104**
	(0.031)	(0.114)	(0.055)	(0.060)	(0.030)	(0.148)	(0.055)	(0.059)
Constant	1.042***	−2.443***	0.635***	0.600***	1.032***	−2.544***	0.621***	0.631***
	(0.110)	(0.422)	(0.231)	(0.204)	(0.110)	(0.416)	(0.231)	(0.201)
N	534	1,600	629	1,505	534	1,600	629	1,505
R^2	0.327	0.311	0.342	0.334	0.327	0.309	0.340	0.337
F	18.585	16.770	13.236	12.539	14.378	9.285	9.294	10.253
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	Household wealth quartile				Household wealth quartile			
	1st lowest	2nd	3rd	4th highest	1st lowest	2nd	3rd	4th highest
Informal care (IC)	0.569***	0.113***	−0.269	−0.459***	−0.023	−0.353	−0.268	−0.382***
	(0.178)	(0.040)	(0.215)	(0.147)	(0.149)	(0.211)	(0.215)	(0.145)
IC × LTC benefit × post 2013–17	−0.566***	−0.534***	0.219	−0.144	0.075	0.365	0.203	0.517***
	(0.159)	(0.191)	(0.227)	(0.148)	(0.166)	(0.223)	(0.231)	(0.183)

IC × LTC × priv. sector × post 2013–17	−0.268***	−0.182***	−0.083	−0.065	−0.249***	−0.150***	−0.084	−0.089
	(0.068)	(0.072)	(0.074)	(0.067)	(0.068)	(0.070)	(0.074)	(0.066)
Constant	0.219	0.543**	0.922***	1.438***	0.249	0.525**	0.931***	1.312***
	(0.247)	(0.252)	(0.272)	(0.241)	(0.244)	(0.252)	(0.272)	(0.240)
N	524	509	521	579	524	509	521	579
R^2	0.344	0.364	0.328	0.346	0.343	0.358	0.328	0.341
F	12.846	13.969	12.561	13.719	12.720	9.122	9.116	9.087
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	Retirement plan		Mortgage over main house		Retirement plan		Mortgage over main house	
	Yes	No	Yes	No	Yes	No	Yes	No
Informal care (IC)	0.232***	0.051	0.213***	−0.454	0.220***	−0.043	0.207***	−0.456
	(0.084)	(0.330)	(0.087)	(0.239)	(0.095)	(0.165)	(0.081)	(0.240)
IC × LTC benefit × post 2013–17	−0.251***	−0.123	−0.209***	0.495**	0.259***	−0.279*	0.251***	0.409
	(0.093)	(0.342)	(0.095)	(0.260)	(0.104)	(0.144)	(0.108)	(0.261)
IC × LTC × priv. sector × post 2013–17	−0.135***	0.199	−0.142***	−0.082	−0.128***	0.189	−0.130***	−0.075
	(0.037)	(0.146)	(0.030)	(0.108)	(0.036)	(0.140)	(0.030)	(0.108)
Constant	0.740***	3.514***	0.728***	0.280	0.710***	3.586	0.703***	0.241
	(0.142)	(0.467)	(0.142)	(0.370)	(0.142)	(0.465)	(0.141)	(0.371)
N	1,888	246	1,941	193	1,888	246	1,941	193
R^2	0.450	0.182	0.450	0.474	0.450	0.178	0.450	0.474
F	3.556	4.431	3.372	7.387	3.374	5.724	3.358	7.343
p	0.027	0.021	0.033	0.000	0.033	0.011	0.034	0.000

	Children				Children			
	No children	At least one daughter co-resident no son co-resident	At least one son co-resident no daughter co-resident	At least one daughter and one son co-resident	No children	At least one daughter co-resident no son co-resident	At least one son co-resident no daughter co-resident	At least one daughter and one son co-resident
Informal care (IC)	0.363***	−0.407	−0.748**	−0.160	−0.369***	−0.409	0.283	0.274
	(0.106)	(0.228)	(0.372)	(0.207)	(0.115)	(0.226)	(0.174)	(0.373)
IC × LTC benefit × post 2013–17	−0.354***	0.162	0.810***	−0.395	0.381***	−0.065	0.170	−0.938**
	(0.116)	(0.267)	(0.386)	(0.401)	(0.126)	(0.280)	(0.172)	(0.454)
IC × LTC × priv. sector × post 2013–17	−0.133***	−0.326***	−0.071	−0.257***	−0.126***	−0.336***	−0.082	−0.228***
	(0.049)	(0.126)	(0.086)	(0.112)	(0.048)	(0.123)	(0.085)	(0.109)
Constant	0.703***	2.393***	1.148***	1.186***	0.671***	2.410***	1.285***	0.874*
	(0.173)	(0.470)	(0.375)	(0.486)	(0.172)	(0.468)	(0.374)	(0.485)
N	1,231	105	221	99	1,231	105	221	99
R2	0.222	0.103	0.229	0.300	0.221	0.116	0.232	0.275
F	7.874	6.748	9.709	8.483	10.700	10.591	7.280	7.913

(*Continued*)

Table B2. (*Continued.*)

	LTC benefit = caregiving subsidy				LTC benefit = home care			
	Caregiver: man	Caregiver: women	Caregiver: blue-collar	Caregiver: white-collar	Caregiver: man	Caregiver: women	Caregiver: blue-collar	Caregiver: white-collar
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Estimation of the difference-in-difference model for budgetary cuts and early retirement reform for private workers long-term: 2004–2017.

All regressions have been performed using M5 specification. As CA and HC are mutually exclusive benefits, in order for the control group to include only those individuals who do not receive any benefits, a binary variable for HC is entered in the regressions to analyse the effect of CA and a binary variable for CA is entered in the regressions for HC. Standard errors clustered by autonomous communities. ***, ** and * denote statistical significance at the 1%, 5% and 10% level.

Table B3. Estimation of the difference-in-difference model for the implementation of the SAAD (2004–2011) and the difference-in-difference model for budgetary cuts and early retirement reform for private workers (2004–2017)

	Effect of the implementation of SAAD, 2004–2011				Effect of budgetary cuts in SAAD and early retirement reform for private workers, 2004–2107		
	M3	M4	M5		M3	M4	M5
Any LTC benefit				Any LTC benefit			
Informal care (IC)	0.275***	0.285***	0.286***	Informal care (IC)	0.202	0.190	0.199
	(0.110)	(0.111)	(0.131)		(0.057)	(0.049)	(0.050)
IC × LTC benefit	0.103	0.092	0.078	IC × LTC benefit × post 2013–17	−0.193	−0.191	−0.180
	(0.092)	(0.093)	(0.052)		(0.057)	(0.058)	(0.056)
IC × LTC benefit × post SAAD	−0.118**	−0.120	−0.118**	IC × LTC × priv. sector × post 2013–17	−0.127	−0.122	−0.125
	(0.055)	(0.057)	(0.057)		(0.033)	(0.034)	(0.038)
Constant	1.003***	0.884***	2.040***	Constant	0.607	0.470	1.318
	(0.360)	(0.367)	(0.431)		(0.231)	(0.252)	(0.329)
N	230	230	230	N	837	837	837
R^2	0.271	0.281	0.317	R^2	0.233	0.237	0.269
F	10.235	11.809	9.547	F	7.829	9.283	10.174
p	0.000	0.000	0.000	p	0.000	0.000	0.000
Caregiving subsidy				Caregiving subsidy			
Informal care (IC)	0.323***	0.329***	0.341***	Informal care (IC)	0.234	0.243	0.248
	(0.116)	(0.117)	(0.135)		(0.100)	(0.100)	(0.100)
IC × LTC benefit	0.215	0.201	0.173	IC × LTC benefit × post 2013–17	−0.224	−0.219	−0.215
	(0.181)	(0.182)	(0.222)		(0.106)	(0.107)	(0.106)
IC × LTC benefit × post SAAD	−0.117**	−0.113**	−0.106**	IC × LTC × priv. sector × post 2013–17	−0.122	−0.124	−0.126
	(0.053)	(0.055)	(0.056)		(0.032)	(0.033)	(0.033)
Constant	0.981***	0.863***	2.025***	Constant	0.606	0.463	1.307
	(0.361)	(0.368)	(0.430)		(0.231)	(0.252)	(0.329)
N	230	230	230	N	837	837	837
R^2	0.396	0.407	0.456	R^2	0.358	0.363	0.398
F	5.971	7.305	7.598	F	8.041	11.632	10.346
p	0.000	0.000	0.000	p	0.000	0.000	0.000
Home care				Home care			
Informal care (IC)	0.269***	0.264***	0.254***	Informal care (IC)	0.151***	0.151***	0.149***
	(0.108)	(0.109)	(0.108)		(0.047)	(0.048)	(0.044)
IC × LTC benefit	0.101	0.101	0.089	IC × LTC benefit × post 2013–17	0.154***	0.150***	0.145***
	(0.061)	(0.064)	(0.053)		(0.048)	(0.048)	(0.047)
IC × LTC benefit × post SAAD	−0.115**	−0.114**	−0.111**	IC × LTC × priv. sector × post 2013–17	−0.115***	−0.111***	−0.100***
	(0.046)	(0.048)	(0.048)		(0.031)	(0.032)	(0.035)
Constant	0.775**	0.672**	1.818***	Constant	0.550**	0.403	1.237***
	(0.360)	(0.367)	(0.434)		(0.231)	(0.251)	(0.329)
N	230	230	230	N	837	837	837
R^2	0.273	0.281	0.300	R^2	0.232	0.237	0.260
F	8.165	9.525	9.181	F	6.192	7.339	7.725
p	0.000	0.000	0.000	p	0.000	0.000	0.000

Restricted to households in which composition has not changed throughout the period of analysis.
M3 includes respondent's characteristics (age, gender, professional situation, activity sector, consultations with doctor/nurse), household characteristics (having sons/daughters, sons/daughters living at home, sons/daughters living outside home, household size higher than 2), regional unemployment rate, year fixed effects and region fixed effects. M4 also includes characteristics of the partner/spouse (age, gender, Katz's index, mental illness). M5 also includes size of municipality, household wealth, respondent's income from employment, percentage of respondent's employment income with respect to total household income, having a retirement plan, having a mortgage. As CA and HC are mutually exclusive benefits, in order for the control group to include only those individuals who do not receive any benefits, a binary variable for HC is entered in the regressions to analyse the effect of CA and a binary variable for CA is entered in the regressions for HC. Standard errors clustered by autonomous communities. ***, ** and * denote statistical significance at the 1%, 5% and 10% level.

Table B4. First-stage regression

	FS1	FS2	FS3	FS4	FS5
Number of informal caregivers outside home	0.046***	0.045***	0.045***	0.045***	0.044***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
N	2,134	2,134	2,134	2,134	2,134
R^2	0.109	0.121	0.127	0.137	0.144
Endogeneity tests					
Robustified Durbin–Wu–Hausman	0.5595	0.590	0.590	0.589	0.589
F-statistic	37.642	37.190	37.102	36.893	37.026
Montiel Olea–Pflueger robust weak instrument test	0.000	0.000	0.000	0.000	0.000
Critical values (%worst case base: $\tau = 20\%$)			15.062		
Critical values (%worst case base: $\tau = 10\%$)			23.109		
Critical values (%worst case base: $\tau = 5\%$)			30.612		

Probability of being informal caregiver.
FS1 (first-stage regression) includes year fixed effects and region fixed effects. FS2 includes the same explanatory variables than FS1 and also professional situation, activity sector and doctor consultations. FS3 also includes household characteristics (having sons/daughters, sons/daughters living at home, sons/daughters living outside home, household size higher than 2). FS4 also includes age and gender of the partner/spouse, Katz's index and having mental illness. FS5 also includes size of municipality, household wealth, income from employment, retirement plan, income from other household members and having mortgage. Effective F statistics and critical values shown are for the Montiel Olea–Pflueger robust weak instrument test with confidence level of $\alpha = 5\%$ and obtained with the weakivtest command in Stata (Pflueger and Wang, 2015). Standard errors clustered by autonomous communities.
***p < 0.01, **p < 0.05, *p < 0.1.

Table B5. Effect of the SAAD over the probability of having housekeeper/household employee

	Effect of the implementation of SAAD, 2004–2011				Effect of budgetary cuts in SAAD and early retirement reform for private workers, 2004–2107		
	M3	M4	M5		M3	M4	M5
Any LTC benefit				Any LTC benefit			
Informal care (IC)	0.001	−0.001	0.001	Informal care (IC)	0.005	−0.004	0.003
	(0.011)	(0.013)	(0.013)		(0.015)	(0.021)	(0.025)
IC × LTC benefit	−0.001	−0.003	−0.002	IC × LTC benefit × post 2013–17	−0.031***	−0.031***	−0.032***
	(0.005)	(0.006)	(0.006)		(0.015)	(0.015)	(0.016)
IC × LTC benefit × post SAAD	0.061***	0.076***	0.073***	IC × LTC × priv. sector × post 2013–17	0.277	−0.251	0.302
	(0.014)	(0.017)	(0.017)		(0.351)	(0.343)	(0.331)
Constant	−0.036	−0.046	−0.041	Constant	0.115	0.160	0.163
	(0.039)	(0.046)	(0.049)		(0.325)	(0.371)	(0.307)
N	796	796	796	N	2,134	2,134	2,134
R^2	0.068	0.088	0.090	R^2	0.059	0.044	0.053
F	3.892	3.199	2.436	F	4.346	4.193	5.505
p	0.000	0.000	0.003	p	0.000	0.000	0.000
Caregiving subsidy				Caregiving subsidy			
Informal care (IC)	−0.001	−0.002	−0.001	Informal care (IC)	−0.003	−0.005	−0.007
	(0.013)	(0.016)	(0.017)		(0.015)	(0.020)	(0.028)
IC × LTC benefit	−0.002	−0.002	−0.001	IC × LTC benefit × post 2013–17	−0.054***	−0.058***	−0.060***
	(0.005)	(0.006)	(0.006)		(0.012)	(0.010)	(0.018)
IC × LTC benefit × post SAAD	0.102***	0.121***	0.117***	IC × LTC × priv. sector × post 2013–17	0.225	0.230	0.264
	(0.017)	(0.021)	(0.022)		(0.234)	(0.226)	(0.229)
Constant	−0.038	−0.045	−0.039	Constant	1.131	0.989	0.989
	(0.039)	(0.045)	(0.048)		(0.691)	(0.602)	(0.716)
N	796	796	796	N	2,134	2,134	2,134
R^2	0.108	0.129	0.132	R^2	0.039	0.050	0.051
F	6.956	5.270	3.900	F	3.023	2.817	3.827
p	0.000	0.000	0.000	p	0.000	0.000	0.003

(Continued)

Table B5. (*Continued.*)

	Effect of the implementation of SAAD, 2004–2011				Effect of budgetary cuts in SAAD and early retirement reform for private workers, 2004–2107		
	M3	M4	M5		M3	M4	M5
Home care				Home care			
Informal care (IC)	−0.001	−0.002	0.000	Informal care (IC)	−0.001	−0.002	−0.001
	(0.011)	(0.013)	(0.014)		(0.010)	(0.010)	(0.025)
IC × LTC benefit	−0.005	−0.006	−0.009	IC × LTC benefit × post 2013–17	0.070***	0.064***	0.061***
	(0.015)	(0.018)	(0.019)		(0.018)	(0.017)	(0.017)
IC × LTC benefit × post SAAD	0.005	0.005	0.006	IC × LTC × priv. sector × post 2013–17	−0.116	−0.133	−0.099
	(0.006)	(0.006)	(0.007)		(0.093)	(0.134)	(0.066)
Constant	−0.046	−0.046	−0.047	Constant	−0.237	0.236	0.219
	(0.041)	(0.047)	(0.050)		(0.292)	(0.290)	(0.276)
N	796	796	796	N	2,134	2,134	2,134
R^2	0.011	0.020	0.025	R^2	0.444	0.444	0.454
F	0.495	0.614	0.588	F	3.930	3.953	5.368
p	1.844	1.752	1.864	p	0.000	0.000	0.000

M3 includes respondent's characteristics (age, gender, professional situation, activity sector, consultations with doctor/nurse), household characteristics (having sons/daughters, son/daughters living at home, son/daughters living outside home, household size higher than 2), regional unemployment rate, year fixed effects and region fixed effects. M4 also includes characteristics of the partner/spouse (age, gender, Katz's index, mental illness). M5 also includes size of municipality, household wealth, respondent's income from employment, percentage of respondent's employment income with respect to total household income, having a retirement plan, having a mortgage. As CA and HC are mutually exclusive benefits, in order for the control group to include only those individuals who do not receive any benefits, a binary variable for HC is entered in the regressions to analyse the effect of CA and a binary variable for CA is entered in the regressions for HC. Standard errors clustered by autonomous communities. ***, ** and * denote statistical significance at the 1%, 5% and 10% level.

Appendix C. Early retirement in Spain

In 2011, the real average retirement age of Spaniards was 63.47 years. That is, one in two people who retired did so before legal retirement age. Early retirement has been a mechanism that was implemented to a certain extent in the Spanish Social Security system in 2002,[40] instituting a demanding access system that was nonetheless acceptable for a significant part of workers. Employees are entitled to early retirement at age 60 for public employees and 61 years for private sector employees under the condition that they had a minimum of 30 contributions. The social security system penalised – and still penalises after the 2011–2013 reform, to which we will refer later – access to early retirement with significant discounts. These discounts were based on the principle of reducing the amount of the pension based on the years and/or fractions of the year that the worker anticipated his retirement, so that the consolidated discounts in the amount of the pension could be extended from a minimum of 6% to a maximum of 7.5% of the pension for each year or fraction of the year in advance.

Throughout the two consecutive reforms, between 2011 and 2013, early retirement for private sector workers was restricted, creating a double access route: by company restructuring or by the will of the worker. However, early retirement conditions for public sector workers have not changed.

It was possible to access retirement through company restructuring as long as age was lower, by a maximum of four years, than the age that, in each case, was applicable for the person to legally access retirement. Furthermore, the accreditation of an effective contribution period increased from 30 to 33 years of contribution. The pre-reform discounts were maintained so that for each year in advance, the pension was reduced between 6% and 7.5%.

One of the greatest novelties of the 2011–2013 pension reform is the figure of early retirement by the will of the interested party that allows anticipating the retirement age up to a maximum of two years, taking as reference the ordinary retirement age. This is a burdensome novelty for the worker, considering that, in this case, the discounts per year in advance oscillate between 6.5% and 8%. That is more onerous than those foreseen prior to the reform and those established for the early retirement due to termination of employment contract. In addition, the law requires proof of a contribution of 35 years, two more than those required for early retirement due to restructuring, and five more than those required in the early retirement regime prior to the 2011–2013 reform. Finally, it is required that to access 'voluntary' early retirement, a comfortable amount of retirement pension is achieved. Following the literal wording of the law, it will be necessary that, after calculating the pension, the amount '*must be higher than the amount of the minimum pension that would correspond to the interested party due to his/*

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[40]Law 35/2002, of July 12, on measures to establish a gradual and flexible retirement system.

her family situation at the age of 65'. Otherwise, the worker could not access the early retirement pension and should wait 65 years of age or the age that is in accordance with the applicable transitional rule.

In any case, the reforms of 2011–2013 have served to limit the scope of strictly private early retirement on the social security system. In the regime applicable to early retirement prior to the 2011 reform, access to early retirement from the age of 61 was expressly and exceptionally allowed. Therefore, it was tolerated to anticipate retirement for up to four years.

Although Law 27/2011 was approved in August 2011, we consider that these reforms have not affected the responses provided in Wave 4 (interviews conducted between February and October 2011) for the following reasons. First, because the processing of the law did not have an easy parliamentary process, Congress faced three amendments to the totality and more than 400 to the article, while Senate also presented three other amendments to the totality and 262 amendments to the articles. Second, it was approved that the entry into force of the law was not immediate, but that it was applicable from 1 January 2013.