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***Thinking of Incentivizing Care?
The Effect of Demand Subsidies on
Informal Caregiving and
Intergenerational Transfers***

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Preview

GOALS To estimate the effects of universal caregiving allowance expansion and contraction on informal care (incentivizing caregivers) and examine the effects on inter-vivos transfers ('monetary effects' from modifying pre-existing arrangements)

METHODS **DiD** using exogenous variation of two natural experiments from a European country (**Spain**) universalized LTC in 2007 captured on SHARE 2004-2013 on the extensive margin $Pr(IC)$, $Pr(Ti)$ $i=r,p$, controlling for fixed effects and macroeconomic conditions reform, affected severely disabled, and uneven regional implementation (we control for **endogenous implementation** using IV)

RESULTS We find a shift in both the balance of care towards more informal caregiving, and an expansion (reduction) of transfers of income to (from) other family members or outflow (inflow). These effects are concentrated in lower income and wealth quintiles. **Expansion of 'paid' IC 32%** and non-neutral effect on transfers (**reduction on inflow intergenerational transfers 10% and expansion of outflow transfers 29%**) and **13.6 more days of informal care**

Reforming Long Term Care in Europe

- **Public subsidization of long-term care services and supports (LTCSS) is partial**
 - Often means tested, in most industrialized countries.
- **Informal care is the main source of LTCSS in Europe and is not independent of incentives – causal evidence!**
 - Informal caregiving is not independent of the accessibility and affordability of different forms of care
 - **US:** Carcagno and Kemper (1988); Golberstein et al. (2009)
 - **Germany:** Arntz and Thomsen (2011)
 - **Scotland:** Kalsberg-Schaffer (2015)
- Caregiving allowances gives rise to **income effects** - transfers of money and time between family members (Sloan *et al*, 2002)
 - **It strengthens the relative financial position of people in need of care**
 - One way of discriminating between different motivations is by examining *an exogenous change in income support to caregiving* (McGarry, 2000).

Two Experiments from Spain

Experiment 1: most prominent expansion of public funding of LTCSS in Europe - 2007 Spanish 'Promotion of Personal Autonomy and Care of Dependent People'

(**S**istema de **A**utonomía y **A**tención a la **D**ependencia → **SAAD**)

- Unexpected minority socialist government resulting from Madrid bombings
- A lot of uncertain parliamentary debate around the law
- Unlike in the **pre-reform period**, where **care was means-tested** and provided by local authorities and by the Social Security system (e.g. non-contributory disability allowance), **SAAD was a universal entitlement** to receive long-term care upon meeting the established needs test.
- Three dependency degrees:
 - **Official Ranking Scale** ⇒ evaluates 47 tasks grouped into 10 activities
 - **Moderate dependency**: when the person needs help in order to perform various basic activities of daily living, **at least once a day**.
 - **Severe dependency**: when the person needs help in order to perform various basic activities of daily living **two or three times a day**.
 - **Major dependency**: when the person needs help in order to perform various basic activities of daily living **several times a day** or needs the indispensable and **continuous support** of another person.

Two Experiments from Spain (II)

- **‘Individual Care Plan’** is carried out to determine the services and/or benefits that best match the applicant’s needs. This program is established with the participation of the beneficiary after the family is consulted. (services somehow restricted during the first few years)

- **Catalogue of benefits of the Dependency System:** included in-kind services and cash benefits.
 - **In-kind services** grouped home care, day and night centers and residential services.
 - **Cash benefits for informal caregivers (caregiving allowances).**
 - Attempt to acknowledge the effort of informal caregivers who provided long-term care to people in dependency situations.
 - Are incompatible with public home care and day centres
 - **Requirements:**
 - 1) older than 18 years old and being legally resident in Spain
 - 2) kinship within the third degree of consanguinity
 - 3) co-residence with the person in need of care
 - 4) housing conditions that make it possible to provide the required caregiving

Two Experiments from Spain (III)

- **Cash benefits for informal caregivers (caregiving allowances).**
 - Informal caregivers were covered by Social Security System.
 - Caregiving allowances are less than what the caregiver would be paid if he/she were working, even at the minimum wage.
 - Caregivers receive the caregiver allowance in his/her bank account and do not need to provide receipts about how the allowance has been spent.
- Implementation was undertaken by **region states (autonomous communities)**, and typically it **was faster in some regions** (run by the party in the central government) **than others** (Costa-Font, 2010).

Table 1. Working of SAAD according to the main political affiliation of the regional government (%)

	<i>Assessments</i> <i>Applications</i>	%	<i>Caregiving allow.</i> <i>Total LTC benefits</i>	%
2008				
Socialist	91.35		35.14	
Non- socialist	68.95		63.06	
Total	81.05		46.27	

Note: Socialist regional government: 2007 (Andalusia, Aragón, Asturias, Castilla La Mancha, Catalonia, Extremadura); 2011 (Andalusia, Aragón, Asturias, Castilla La Mancha, Extremadura).

Applications: total number of applications received.

Assessments: official valuation of applicant's long-term care needs using the Ranking Scale of the SAAD (it includes positives and negatives valuations).

Awardees: favourable evaluations that recognize the entitlement to publicly funding long-term care (but does not imply the reception of any benefit). Receiving: awardees that in addition are receiving some type of long-term care public benefit (economic or in-kind).

Source: own work using data from http://www.dependencia.imsero.gob.es/dependencia_01/index.htm

Two Experiments from Spain (IV)

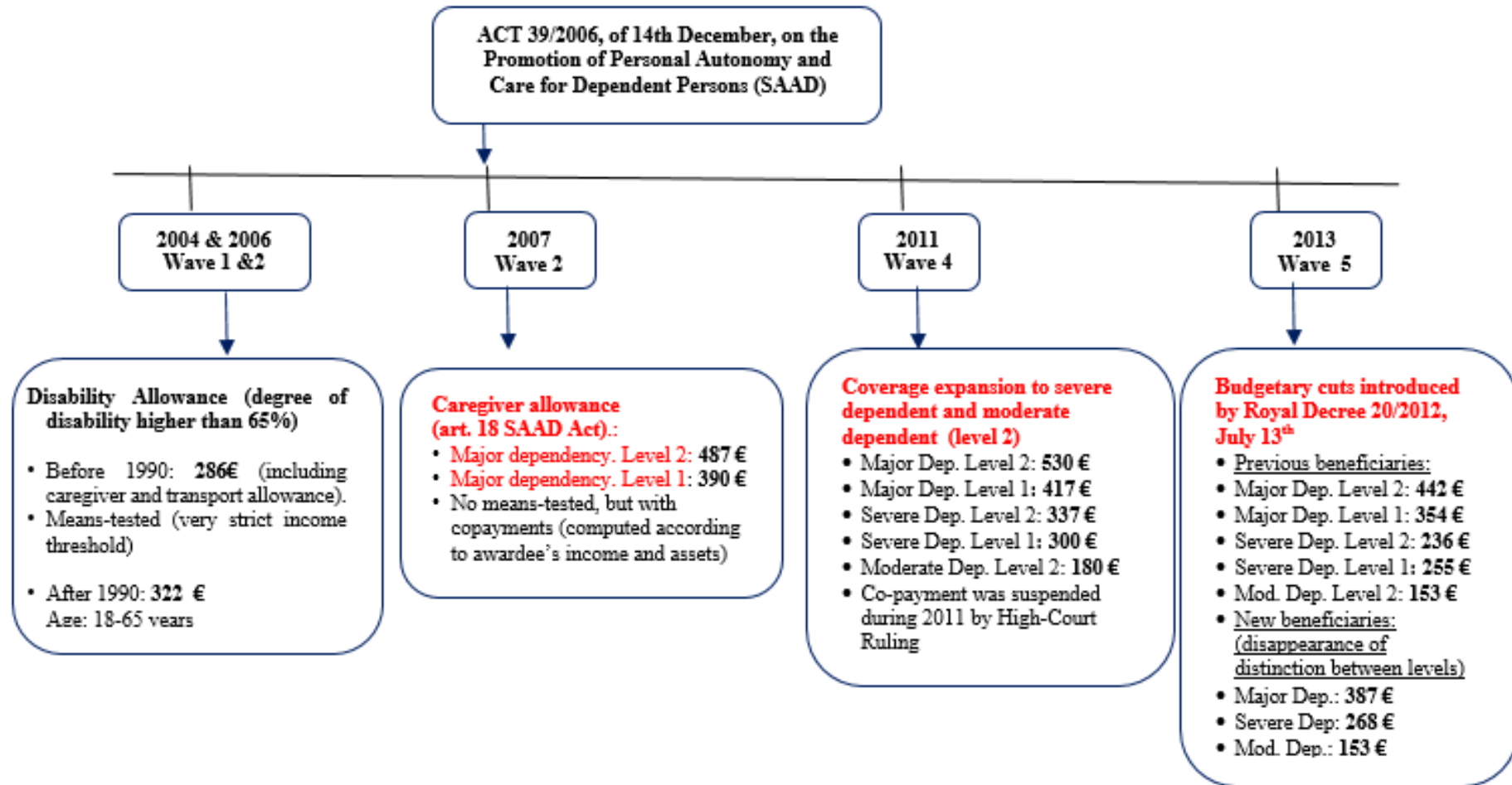
■ Experiment 2:

- Large public deficit (8.9 per cent at the beginning of 2012), implicit bailout in June/July 2012 ⇒ **Royal Decree 20/2012, 13 July 2012**
- Amount of caregiving allowances for informal caregivers was **reduced between 15 and 25 per cent** conditional on dependency degree
- Social Security **stopped paying social contributions** for informal caregivers.
- The entry in the SAAD of 'moderate dependency' people was delayed until 2015.
- Home care support declined:
 - From 70–90 hours/month to 56–70 hours/month for 'major dependency' individuals
 - From 40–55 hours/month to 31–45 hours/month for 'severe dependency' individuals

Policy Implication: to avoid cost escalation more attention to the design

Implementation of the SAAD & DATA

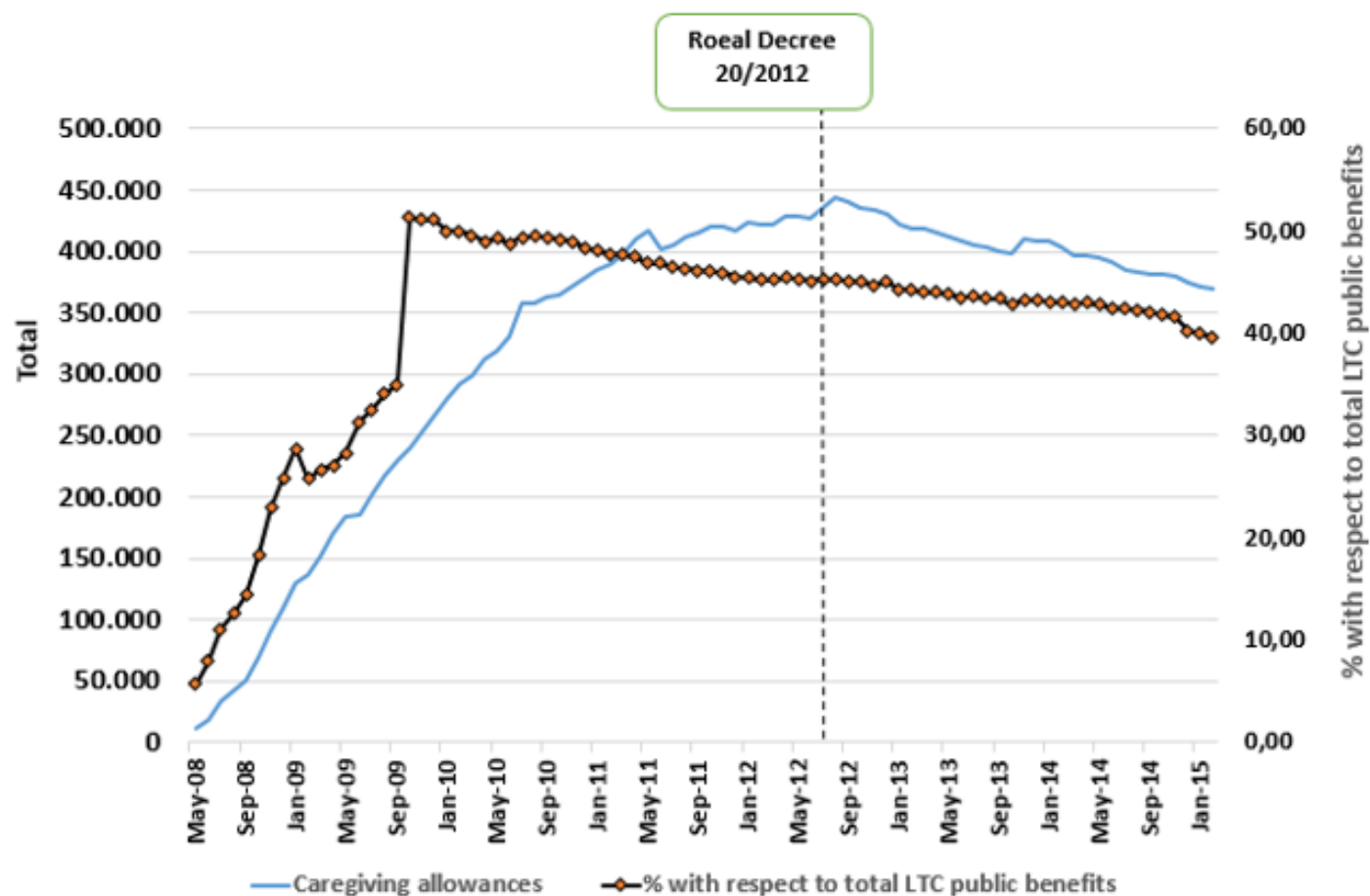
Figure 1. Disability and caregiver allowance entitlements by Spain per SHARE wave



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).

Official data: Caregiving allowances

Figure 2. Evolution of caregiving allowances (total and percentage with respect to total long-term care benefits). (2008-2013)

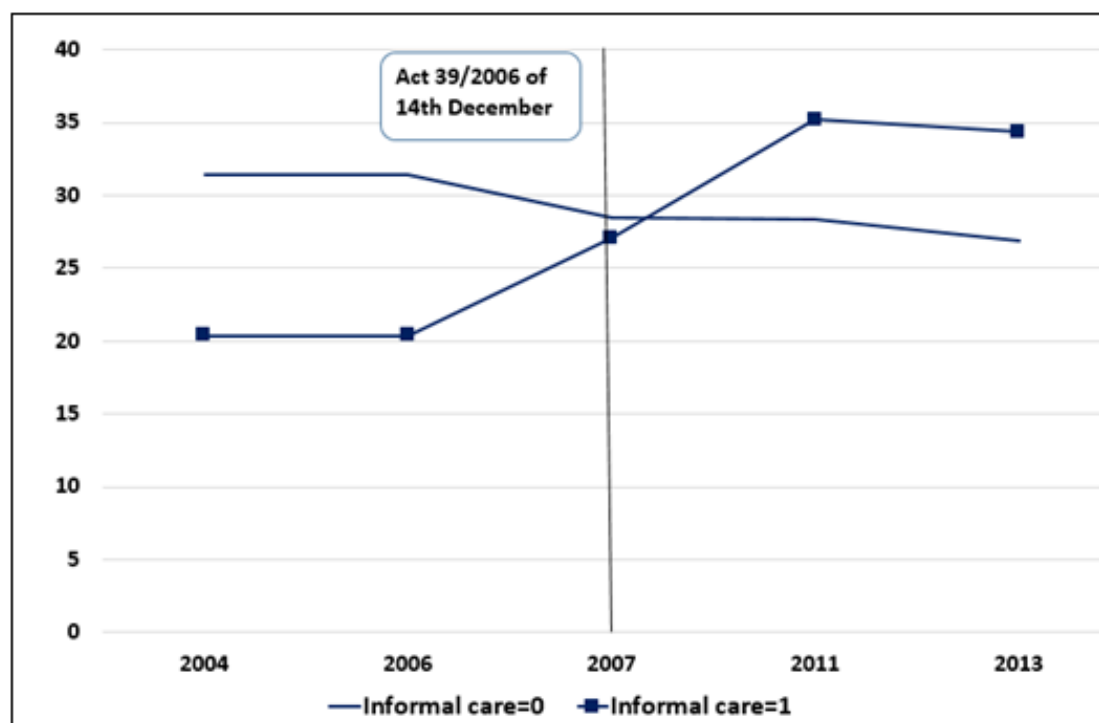


Data sources

- **SHARE (Survey of Health, Ageing and Retirement in Europe)**
 - Wave 1 (2004): 2,396 obs.
 - Wave 2 (2007): 2,228 obs.
 - ~~Wave 3 SHARE Life: not comparable with other waves~~
 - Wave 4 (2011): 3,690 obs.
 - Wave 5 (2013): 8,283 obs.
 - ~~Wave 6 (2015): XXXX obs. (not used yet)~~
- **Caregiver's characteristics**
 - Age, gender, marital status, level of education
 - **Disabilities:**
 - Seven categories: 0 (not dep), 1, 2, 3, 4, 5, 6 (very dep).
 - 1 & 2 $\Rightarrow$ equivalent to **moderate dependent**
 - 3 & 4 $\Rightarrow$ equivalent to **severe dependent**
 - 5 & 6 $\Rightarrow$ equivalent to **great dependent**
 - **Income and wealth**
- **Regional variables:** GDP per capita, unemployment rate, other

PTA: Pre & post-reform differences (I)

Figure 3. Percentage of respondents who receive caregiving subsidy (allowance) conditioned on receiving or not informal care

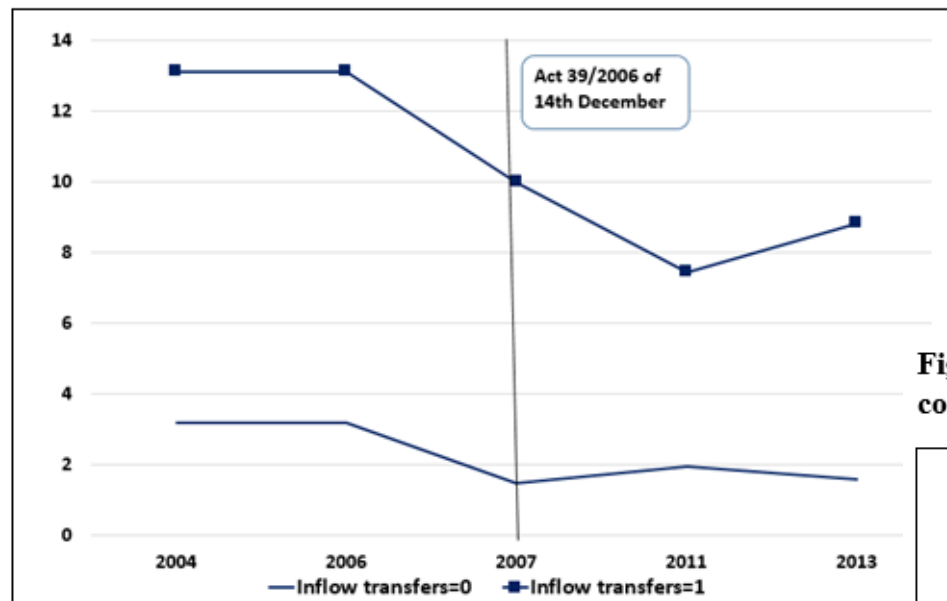


Source: Own work using SHARE (waves 1, 2, 4 ad 5)

Informal care: care provided by family members, friends or neighbours (i.e., excluding profesional caregivers and household employees)

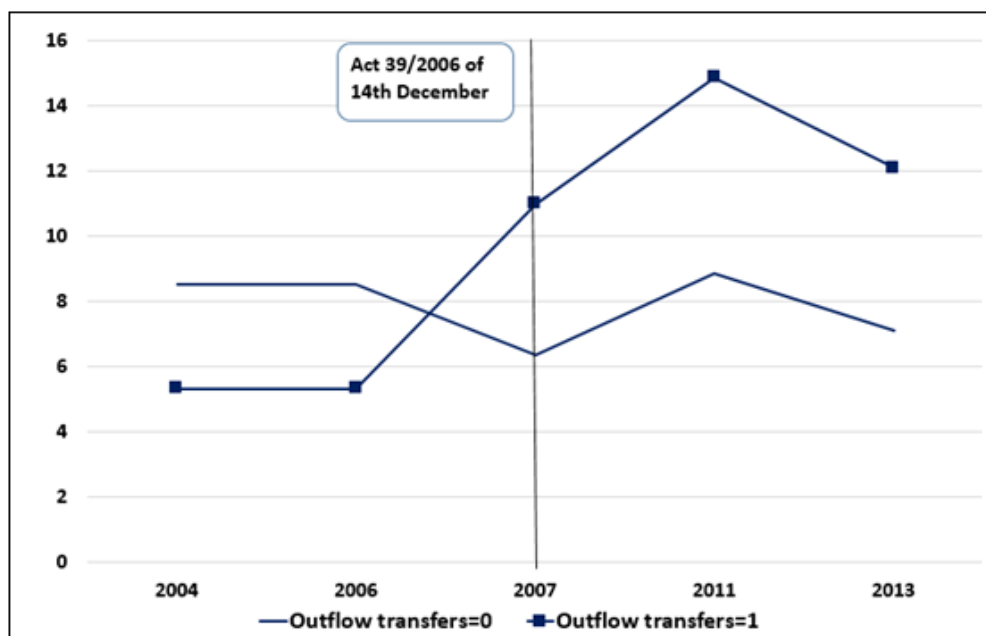
PTA: Pre & post-reform differences (II)

Figure 4. Percentage of respondents who **receive caregiving allowance** conditioned on **receiving or not inflow intergenerational transfers**



Source: Own work using SHARE (waves 1, 2, 4 ad 5)

Figure 5. Percentage of respondents who **receive caregiving allowance** conditioned on **providing or not outflow intergenerational transfers**



Source: Own work using SHARE (waves 1, 2, 4 ad 5)

Econometric Strategy

- We estimate a **difference-in-difference** fixed effect model for the probability of receiving informal care and the probabilities of receiving (giving) economic support to (from) informal caregivers, giving in the linear case

$$Y_{ict} = X_{ict}\beta_0 + \beta_1 E_{ct} + \beta_2 SAAD_{ict} + \beta_3 POST_t + \beta_4 POST_t * SAAD_{ict} + C_c + T_t + \varepsilon_{ict} \quad (1)$$

$$Y_{ict} = \{IC_{ict}, TR^R_{ict}, TR^G_{ict}\}$$

- **$SAAD_{ict}$** : 1 if the individual is receiving a cash subsidy (caregiving allowance).
 - **Before 2007**: major disability benefit, third-party benefits, non-contributory invalidity pensions or family benefits for dependent children.
 - **After 2007**: (i) individuals who were not receiving any type of benefit previously, were evaluated according to the Official Ranking Scale of the SAAD, and (ii) individuals who were already receiving any of the benefits mentioned in the previous point were re-evaluated according to the Ranking Scale and re-classified as moderate, severe or major dependent.
- **$POST_t$** : 1 if the observation relates to the after reform period
- **C_c** and **T_t** denote Autonomous Communities fixed effects and year fixed effects, respectively, and **ε_{ict}** is an individual-specific error term.

Instrumental variables strategy (2SLS)

- Given that the reform was the 'star social program' of a newly elected socialist government, and that the regions were co-financing and implementing the reform, we employ **regional political information to instrument the reform**

$$SAAD_{ict} = \gamma_0 + \gamma_1 Soc_{ict} + \gamma_2 POST_t * Soc_{ict} + \gamma_3 Z_{ct} + E_{ct} + C_c + T_t + \vartheta_{ict} \quad (2)$$

$$POSTSAAD_{ict} = \delta_0 + \delta_1 Soc_{ict} + \delta_2 POST_t * Soc_{ict} + \delta_3 Z_{ct} + E_{ct} + C_c + T_t + \theta_{ict} \quad (3)$$

- Soc_{ict}*** is a dummy variable equal to 1 if the socialist party won the last regional elections and zero otherwise (or the percentage of vote to the socialist party)
- Z** : coverage index for public home care in 2000 and 2002, before the onset of the SAAD $\Rightarrow$ to capture the effect of regional differences in the provision of formal care.
 - Additional robustness checks using as instrument the **presence of daughters in the family**

Extensions: model for the frequency of informal care

Definition of the interval variable for the frequency of informal care

SHARE answers to frequency of informal care	Interpretation	Interval proposed in terms of days per year (ICH_{ict})	
		Lower bound	Upper bound
IC: less frequently than monthly	4-6 times/year	4	6
IC: almost every monthly	11-12 times/year	11	12
IC: almost every weekly	4-5 times/month	48	52
IC: almost daily	6-7 days/week	313	365

More than one informal caregiver $\Rightarrow$ new interval whose lower bound is the sum of the lower bounds of all informal caregiving days, and whose upper bound is the sum of all the upper bounds of informal caregiving days.

- Estimate the following **interval regression**:

$$ICH_{ict} = X_{ict}\lambda_0 + \lambda_1 E_{ct} + \lambda_3 W_{ict} + C_c + T_t + \varpi_{ict} \quad (4)$$

- As exclusion restrictions (W_{ict}): the number of bedrooms in the house and birth order and gender of adult children.

- OLS regression** for the predicted number of informal caregiving days ($\widehat{ICH}_{ict}$)

$$\widehat{ICH}_{ict} = X_{ict}\kappa_0 + \kappa_1 E_{ct} + \kappa_2 \widehat{SAAD}_{ict} + \kappa_3 POST_t + \kappa_4 \widehat{POSTSAAD}_{ict} + C_c + T_t + \xi_{ict} \quad (5)$$

- Instrument SAAD and POSTSAAD** following equations (2) and (3) and introduce the predicted variables ($\widehat{SAAD}_{ict}$ and $\widehat{POSTSAAD}_{ict}$) in (5).

Endogeneity of the reform: First stage of IV

Table B1. First Stage Estimates

	Using 4 instruments		Using 5 instruments	
	SAAD	SAAD interacted with year=2007, 2011	SAAD	SAAD interacted with year=2007, 2011
Support socialist party	0.021* (0.01)	0.015 (0.01)	0.026* (0.01)	0.002 (0.05)
Interaction year=2007, 2011	-0.089*** (0.01)	-0.044** (0.02)	-0.092*** (0.02)	-0.046 (0.02)
Home care coverage index (2000)	-0.045*** (0.01)	-0.028** (0.01)	-0.048 ** (0.02)	-0.033* (0.01)
Home care coverage index (2002)	-0.078*** (0.02)	-0.046*** (0.00)	-0.082** (0.03)	-0.050*** (0.01)
Proportion of daughters (% household members)	-	-	0.015** (0.007)	0.019*** (0.006)
N (*)	6,672	6,672	6,641	6,641
F (p-value)	18.02 (p = 0.0000)	55.43 (p = 0.0000)	27.13 (p = 0.0000)	81.24 (p = 0.0000)
F-test of excluded instruments	7.79 (p = 0.0004)		6.57(p = 0.0002)	
Endogeneity				
Durbin (score) chi2	31.5691 (p = 0.0000)		62.453 (p = 0.0000)	
Wu-Hausman	15.8073 (p = 0.0000)		35.8025 (p = 0.0000)	
Underidentification				
Kleibergen-Paap rk LM statistic	6.09 (p = 0.0136)		15.210 (p=0.0000)	
Weak identification				
Kleibergen-Paap rk Wald F statistic	7.930		8.912	
Cragg-Donald	10.662		13.005	
Stock and Yogo test critical values(**)	10% maximal IV size: 7.03 15% maximal IV size: 4.58 20% maximal IV size: 3.95 25% maximal IV size: 3.63		10% maximal IV size: 8.43 15% maximal IV size: 6.18 20% maximal IV size: 5.40 15% maximal IV size: 4.45	
Overidentification				
Hansen's J-statistic	Chi ² (2)=0.874 (p=0.6459)		Chi ² (3)=0.675 (p=0.8791)	

(*): standard error of the estimated coefficients are not directly comparable because sample size is slightly smaller in the estimation with 5 instruments. The reason is that some respondents refuse to answer the question "number of children".

(**): As there are two or three endogenous variables, the comparison of Stock-Yogo critical values is done with respect to Kleibergen-Paap rk statistic. Wild cluster by autonomous community and bootstrap with 1,000 replications (Cameron et al., 2008).
Four instruments: Support socialist party, support socialist party*post-reform dummy, home care coverage index in 2000 and 2002
Five instruments: Support socialist party, support socialist party*post-reform dummy, home care coverage index in 2000 and 2002, proportion of daughters in the household.

Experiment 1: Endogeneity of reform implementation

Table 2. Comparison OLS and IV estimates. (2004-2011)

	Informal care		Outflow transfers		Inflow transfers	
	OLS	IV	OLS	IV	OLS	IV
Receives SAAD	-0.036** (0.01)	-0.024*** (0.01)	0.027* (0.01)	0.043*** (0.01)	0.044*** (0.01)	0.032*** (0.01)
Interaction Year=2007 or 2011	0.173*** (0.03)	0.317*** (0.03)	0.145*** (0.03)	0.293*** (0.03)	-0.073*** (0.01)	-0.103*** (0.01)
Year=2006	0.043** (0.01)	0.044*** (0.01)	-0.009 (0.01)	-0.0011 (0.01)	-0.016** (0.01)	-0.018** (0.01)
Year=2007	0.008 (0.01)	0.008 (0.01)	0.050*** (0.01)	0.053*** (0.01)	-0.021*** (0.00)	-0.023*** (0.00)
Year=2011	-0.070*** (0.01)	-0.073*** (0.01)	-0.123*** (0.03)	-0.127*** (0.03)	0.016** (0.00)	0.015** (0.00)
Real income (million € 2011)	-0.021*** (0.00)	-0.022*** (0.00)	0.102*** (0.03)	0.100*** (0.03)	-0.045** (0.01)	-0.043** (0.01)
Real wealth (million € 2011)	-0.009*** (0.00)	-0.0010*** (0.00)	0.021** (0.01)	0.023** (0.01)	-0.012** (0.00)	-0.011** (0.00)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Katz Index	Yes	Yes	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes	Yes
Unemployment rate	Yes	Yes	Yes	Yes	Yes	Yes
Regional GDP	Yes	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.051** (0.03)	-0.079*** (0.02)	0.195*** (0.04)	0.151*** (0.03)	0.071*** (0.02)	0.041*** (0.01)
N	6,672	6,672	6,672	6,672	6,672	6,672
R ²	0.288	0.297	0.111	0.120	0.125	0.131
F-statistic	284.57	122.80	71.58	55.23	60.74	44.65
p-value	0.000	0.000	0.000	0.000	0.000	0.000

Note: Omitted variables: Year=2004, women, no elementary education, widow, Katz index equal to zero. Standard errors between parenthesis. Wild cluster by autonomous community and bootstrap with 1,000 replications (Cameron et al., 2008).

IV regressions employ 'support for PSOE (Spanish socialist party), home care coverage index (2000, 2002) as an instrument.

Diagnosis test are reported in Table D4 in the appendix.

Experiment 1: Main results with 4 vs 5 instruments

Table B3. Estimates of the effects using an additional instrument (as stated below)

	Informal care		Outflow transfers		Inflow transfers	
	IV-4 instruments	IV-5 instruments	IV-4 instruments	IV-5 instruments	IV-4 instruments	IV-5 instruments
Receives SAAD	-0.024*** (0.01)	-0.026*** (0.01)	0.043*** (0.01)	0.057*** (0.01)	0.032*** (0.01)	0.024** (0.01)
Interaction Year=2007 or 2011	0.317*** (0.04)	0.325** (0.05)	0.293*** (0.05)	0.308*** (0.06)	-0.103*** (0.02)	-0.117*** (0.03)
Year=2006	0.044** (0.01)	0.071* (0.02)	-0.0011 (0.01)	-0.002** (0.01)	-0.018** (0.01)	-0.013** (0.00)
Year=2007	0.008 (0.01)	0.011** (0.14)	0.053*** (0.01)	0.076*** (0.02)	-0.023*** (0.00)	-0.023 (0.04)
Year=2011	-0.073*** (0.01)	-0.097** (0.04)	-0.127*** (0.03)	-0.134** (0.05)	0.015** (0.00)	0.027** (0.01)
Real income (million € 2011)	-0.022*** (0.00)	-0.025*** (0.00)	0.100*** (0.03)	0.090*** (0.03)	-0.043** (0.01)	-0.049** (0.01)
Real wealth (million € 2011)	-0.0010*** (0.00)	-0.0013*** (0.00)	0.023** (0.01)	0.018** (0.00)	-0.011** (0.00)	0.013** (0.00)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Katz Index	Yes	Yes	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes	Yes
Unemployment rate	Yes	Yes	Yes	Yes	Yes	Yes
Regional GDP	Yes	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.079*** (0.02)	-0.067*** (0.02)	0.151*** (0.03)	0.114* (0.06)	0.041*** (0.01)	0.031** (0.01)
N	6,672	6,641	6,672	6,641	6,672	6,641
R ²	0.297	0.225	0.120	0.117	0.131	0.126
F-statistic	122.80	139.67	55.23	62.24	44.65	46.85
p-value	0.000	0.000	0.000	0.000	0.000	0.000

Sample size is different for the IV estimation with 3 instruments because there were missing values or refusal answers for the number of children. Using clusters at autonomous community level.

Four instrument (IV4): Support socialist party, support socialist party*post-reform dummy, home care coverage index in 2000 and 2002

Five instruments (IV5): Support socialist party, support socialist party*post-reform dummy, home care coverage index in 2000 and 2002, proportion of daughters in the household.

Experiment 1: Caregiver Heterogeneity

Table 3. OLS and IV regressions for the probability of receiving informal care according to different profiles of caregivers. (2004-2011)

	Co-resident		Not co-resident		Partner		Co-resident child		Not co-resident child	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Receives SAAD	-0.037*** (0.01)	-0.025** (0.01)	-0.031*** (0.01)	-0.021** (0.01)	-0.028** (0.01)	-0.017* (0.01)	-0.030*** (0.01)	-0.020** (0.01)	-0.021** (0.01)	-0.015* (0.01)
Interaction with Year=2007 or 2011	0.165*** (0.02)	0.302*** (0.01)	0.218*** (0.01)	0.403*** (0.01)	0.142*** (0.01)	0.240*** (0.01)	0.197** (0.00)	0.304*** (0.01)	0.220** (0.00)	0.405*** (0.01)
Year=2006	0.040*** (0.01)	0.041*** (0.01)	0.041*** (0.01)	0.041*** (0.01)	0.043*** (0.01)	0.045*** (0.01)	0.038** (0.01)	0.039** (0.01)	0.039*** (0.01)	0.040*** (0.01)
Year=2007	0.008 (0.00)	0.009 (0.00)	0.009 (0.01)	0.008 (0.01)	0.008 (0.00)	0.008 (0.00)	0.009 (0.00)	0.009 (0.00)	0.010 (0.00)	0.011 (0.00)
Year=2011	-0.058** (0.00)	-0.059** (0.00)	-0.068** (0.00)	-0.068** (0.00)	-0.071** (0.00)	-0.073** (0.00)	-0.068** (0.00)	-0.069** (0.00)	-0.063** (0.00)	-0.065** (0.00)
Real income (million € 2011)	-0.022*** (0.01)	-0.020*** (0.01)	-0.033*** (0.02)	-0.035*** (0.02)	-0.015*** (0.01)	-0.017*** (0.01)	-0.028*** (0.01)	-0.027*** (0.01)	-0.035*** (0.01)	-0.034*** (0.01)
Real wealth (million € 2011)	-0.010** (0.00)	-0.011** (0.00)	-0.014** (0.00)	-0.014** (0.00)	-0.005** (0.00)	-0.006** (0.00)	-0.013** (0.00)	-0.014** (0.00)	-0.017** (0.00)	-0.018** (0.00)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Katz index	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Unemployment rate	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional GDP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.112*** (0.01)	-0.173*** (0.02)	0.052*** (0.02)	0.081*** (0.02)	-0.051*** (0.01)	-0.080*** (0.02)	-0.011 (0.01)	-0.017* (0.01)	0.027*** (0.01)	0.042*** (0.01)
N	6,672	6,672	6,672	6,672	6,672	6,672	6,672	6,672	6,672	6,672
R ²	0.312	0.330	0.322	0.328	0.370	0.375	0.350	0.359	0.352	0.361
F-statistic	520.12	418.23	785.23	689.23	312.56	289.26	358.89	345.70	201.58	185.71
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Note: Omitted variables: Year=2004, women, no elementary education, widow, Katz index equal to zero. Standard errors between parenthesis. Wild cluster by autonomous community and bootstrap with 1,000 replications (Cameron et al., 2008). IV regressions employ 'support for PSOE (Spanish socialist party) and home care coverage index (2000, 2002) as an instrument. Diagnosis test are reported in Table D4 in the appendix.

Experiment 1: Income and Wealth heterogeneity

Table 4. OLS and IV regressions for the probability of receiving informal care and intervivos transfers by income quintile and wealth quintile (2004-2011)

INCOME QUINTILES	Informal care		Outflow transfers		Inflow transfers	
	OLS	IV	OLS	IV	OLS	IV
Interaction SAAD & YEAR==2007 or YEAR=2011	0.175** (0.03)	0.320*** (0.03)	0.140*** (0.02)	0.282*** (0.02)	-0.070** (0.02)	-0.098*** (0.02)
Interactions SAAD & YEAR=2007 or 2011						
1st quintile income	0.112*** (0.04)	0.201*** (0.04)	-0.002* (0.00)	-0.005** (0.00)	0.087** (0.03)	0.118*** (0.03)
2nd quintile income	0.078*** (0.01)	0.132*** (0.01)	0.015*** (0.01)	0.032*** (0.01)	0.046*** (0.01)	0.065*** (0.01)
3rd quintile income	-0.035** (0.01)	-0.054*** (0.01)	0.075*** (0.01)	0.154*** (0.01)	-0.097** (0.03)	-0.130*** (0.03)
4th quintile income	-0.085*** (0.01)	-0.151*** (0.01)	0.086*** (0.01)	0.170*** (0.01)	-0.112*** (0.01)	-0.158*** (0.013)
WEALTH QUINTILES	Informal care		Outflow transfers		Inflow transfers	
	OLS	IV	OLS	IV	OLS	IV
Interaction SAAD & YEAR==2007 or YEAR=2011	0.174*** (0.04)	0.301*** (0.05)	0.141*** (0.02)	0.272*** (0.04)	-0.071** (0.02)	-0.093** (0.03)
Interactions SAAD & YEAR=2007 or 2011						
1st quintile wealth	0.084*** (0.02)	0.147*** (0.02)	-0.023* (0.01)	-0.039** (0.00)	0.018*** (0.03)	0.030*** (0.01)
2nd quintile wealth	0.023*** (0.00)	0.044*** (0.00)	-0.015** (0.00)	-0.031*** (0.00)	0.011** (0.00)	0.015** (0.00)
3rd quintile wealth	-0.014*** (0.00)	-0.027** (0.00)	0.023** (0.00)	0.041*** (0.00)	-0.023*** (0.01)	-0.032*** (0.01)
4th quintile wealth	-0.078*** (0.01)	-0.150*** (0.01)	0.044** (0.01)	0.091** (0.01)	-0.030*** (0.01)	-0.047*** (0.01)

Note: 5th quintile of income or wealth rate is the omitted category. Other explanatory variables included in the regressions: age, gender, Katz index, marital status, level of education, year and regional dummies, real income (in the regression for wealth quintiles) and real wealth (in the regression for income quintiles).

Omitted variables: Year=2004, women, no elementary education, widow, Katz index equal to zero. Standard errors between parenthesis. Using clusters at autonomous community level.

IV regressions employ 'support for PSOE (Spanish socialist party) and home care coverage index (2000, 2002) as an instrument.

Experiment 2: effect of the 2012/13 Austerity budget cuts

Table 5. Effect of austerity reforms. (2004-2013).

	Informal care	Outflow intervivos transfers	Inflow intervivos transfers	IC Co-resident	IC Not co-resident	IC Partner	IC Co-resident child	IC Not co-resident child
OLS Estimates								
Receives SAAD	-0.040** (0.01)	0.029* (0.01)	0.046*** (0.01)	-0.039*** (0.01)	-0.032*** (0.01)	-0.027** (0.01)	-0.029*** (0.01)	-0.024** (0.01)
Interaction 2007	0.132*** (0.04)	0.088** (0.03)	-0.072* (0.01)	0.098*** (0.02)	0.113*** (0.01)	0.072*** (0.01)	0.123** (0.00)	0.140** (0.00)
Interaction 2011	0.201*** (0.03)	0.190*** (0.02)	-0.122* (0.01)	0.215*** (0.03)	0.275*** (0.03)	0.163*** (0.03)	0.247** (0.03)	0.298** (0.03)
Interaction 2013	-0.098*** (0.02)	-0.046*** (0.03)	0.043*** (0.01)	-0.077*** (0.02)	-0.158*** (0.01)	-0.023*** (0.01)	-0.125** (0.00)	-0.179** (0.00)
IV Estimates								
Receives SAAD	-0.025*** (0.01)	0.043*** (0.01)	0.033*** (0.01)	-0.027** (0.01)	-0.022** (0.01)	-0.017* (0.01)	-0.021** (0.01)	-0.014* (0.01)
Interaction 2007	0.100*** (0.04)	0.082** (0.03)	-0.067* (0.01)	0.061*** (0.02)	0.088*** (0.01)	0.071*** (0.01)	0.077*** (0.01)	0.090*** (0.01)
Interaction 2011	0.220*** (0.03)	0.213*** (0.02)	-0.170* (0.01)	0.255*** (0.03)	0.320*** (0.05)	0.195*** (0.03)	0.291*** (0.05)	0.342*** (0.03)
Interaction 2013	-0.057*** (0.02)	-0.093*** (0.03)	0.061*** (0.01)	-0.044** (0.02)	-0.091*** (0.02)	-0.012 (0.01)	-0.074*** (0.01)	-0.107*** (0.01)
Income and wealth	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dependency	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Unemployment	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional GDP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Omitted variables: Year=2004, women, no elementary education, widow, Katz index equal to zero. Standard errors between parenthesis. Using clusters at autonomous community level.

IV regressions employ 'support for PSOE (Spanish socialist party) and home care coverage index (2000, 2002) as an instrument.

Ext Experiment 1 &2: Effect on the frequency of informal care?

Table 7. OLS regression for the predicted number of informal caregiving days (after first-stage regression for SAAD and POST*SAAD)

	OLS-1	OLS -2	OLS -3	OLS -4	OLS -5
Panel A: 2004-2011					
Receives SAAD	15.569*** (5.09)	15.432*** (5.05)	15.432*** (5.05)	15.432*** (5.05)	15.432*** (5.05)
Interaction Year=2007 or 2011	13.318*** (2.62)	13.117*** (2.61)	13.117*** (2.61)	13.117*** (2.61)	13.117*** (2.61)
N	1,321	1,321	1,321	1,321	1,321
F	484.98	485.23	485.27	485.77	485.90
p-value	0.000	0.000	0.000	0.000	0.000
R ²	0.569	0.572	0.574	0.580	0.583
Panel B: 2004-2013					
Receives SAAD	16.231*** (5.32)	13.220*** (5.30)	13.220*** (5.30)	13.220*** (5.30)	13.220*** (5.30)
Interaction Year=2007	3.782*** (1.25)	3.763*** (1.21)	3.763*** (1.21)	3.763*** (1.21)	3.763*** (1.21)
Interaction Year= 2011	9.743*** (2.65)	9.737*** (2.64)	9.737*** (2.64)	9.737*** (2.64)	9.737*** (2.64)
Interaction Year=2013	-6.243*** (2.73)	-6.212** (2.72)	-6.212** (2.72)	-6.212*** (2.72)	-6.212** (2.72)
N	2,302	2,302	2,302	2,302	2,302
F	510.08	510.25	510.27	510.28	510.28
p-value	0.000	0.000	0.000	0.000	0.000
R ²	0.692	0.693	0.695	0.698	0.699
Real income (million € 2011)	No	Yes	Yes	Yes	Yes
Real wealth (million € 2011)	No	Yes	Yes	Yes	Yes
Demographics	Yes	Yes	Yes	Yes	Yes
Dependency	Yes	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes
Unemployment	No	No	Yes	No	Yes
Regional GDP	No	No	No	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes

Using score bootstrap-t to obtain robust standard errors within clusters (autonomous communities). First-stage regressions using four instruments: Support socialist party, support socialist party*post-reform dummy, home care coverage index in 2000 and 2002

Robustness: Exchange motivation for inter vivos-transfers?

Table 6. Exchange motivations for transfers

	Outflow inter vivos transfers		Inflow inter vivos transfers	
	2004-2011	2004-2013	2004-2011	2004-2013
Receives SAAD	0.017* (0.01)	0.018* (0.01)	0.001 (0.01)	0.001 (0.01)
Receives informal care	0.031 (0.02)	0.03 (0.02)	0.031*** (0.01)	0.030*** (0.01)
SAAD *Post-reform	-0.013 (0.03)	-0.013 (0.03)	0.016 (0.02)	0.016 (0.02)
SAAD *Informal care	-0.019 (0.04)	-0.017 (0.04)	0.101*** (0.02)	0.102*** (0.02)
Informal care * Post-reform	-0.016 (0.02)	-0.015 (0.02)	-0.01 (0.01)	-0.009 (0.01)
SAAD * Informal care * Post-reform	0.305*** (0.05)	0.233*** (0.05)	-0.189*** (0.03)	-0.140*** (0.03)
Demographics	Yes	Yes	Yes	Yes
Katz index	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Unemployment rate	Yes	Yes	Yes	Yes
Regional GDP	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes
Constant	0.296*** -0.03	0.285*** -0.03	0.087*** -0.02	0.086*** -0.02
N	6,672	14,955	6,672	14,955
R ²	0.125	0.133	0.128	0.133
F-statistic	8.835	9.0250	12.035	10.975
p-value	0.000	0.000	0.000	0.000

Omitted variables: Year=2004, women, no elementary education, widow, Katz index equal to zero. Standard errors between parenthesis. Using clusters at autonomous community level.

IV regressions employ 'support for PSOE (Spanish socialist party) and home care coverage index (2000, 2002) as an instrument.

Robustness: Effect of informal care at the baseline

	Without wave 5			With wave 5		
	Informal care	Outflow intervivos transfers	Inflow intervivos transfers	Informal care	Outflow intervivos transfers	Inflow intervivos transfers
Receives SAAD	-0.030 (0.02)	-0.003 (0.02)	0.001 (0.01)	-0.015 (0.02)	-0.013 (0.02)	0.000 (0.01)
Informal care (2004/06)	0.790*** (0.02)	-0.002 (0.02)	0.108*** (0.01)	0.769*** (0.02)	0.000 (0.02)	0.106*** (0.01)
SAAD * IC(2004/06)	-0.013 (0.05)	-0.013 (0.04)	-0.019 (0.02)	0.041 (0.04)	-0.025 (0.03)	-0.007 (0.02)
IC(2004/06)*Post-reform	-0.674*** (0.03)	-0.002 (0.02)	-0.111*** (0.01)	-0.660*** (0.03)	-0.004 (0.02)	-0.109*** (0.01)
SAAD * IC(2004/06)*Post-reform	0.061* (0.07)	-0.037 (0.06)	0.034 (0.03)	0.059 (0.04)	0.008 (0.03)	0.012 (0.02)
Constant	-0.211*** (0.02)	0.153*** (0.02)	0.045*** (0.01)	-0.219*** (0.04)	0.187*** (0.03)	0.051** (0.01)
N	3,396	3,396	3,396	5,094	5,094	5,094
R2	0.387	0.097	0.086	0.366	0.110	0.105
F-statistic	200.447	9.404	10.821	203.362	9.945	10.415
p-value	0.000	0.000	0.000	0.000	0.000	0.000

Including: demographics, dependency, marital status, education, unemployment, regional GDP and regional dummies.

The first three regressions have been performed over the subsample of individuals who have answered waves 1, 2 and 4, whereas the last three regressions have been performed over the subsample of individuals who have answered waves 1, 2, 4 and 5. Using clusters at autonomous community level.

Table 11. Effect of the SAAD over informal caregiving behaviour

	Supply of co-resident informal caregivers				
	OLS-1	OLS -2	OLS -3	OLS -4	OLS -5
Panel A: 2004-2011					
Care recipient receives SAAD	0.027 (0.02)	0.028 (0.02)	0.028 (0.02)	0.028 (0.02)	0.028 (0.02)
Interaction Year=2007 or 2011	0.287*** (0.01)	0.290*** (0.01)	0.290*** (0.01)	0.290*** (0.01)	0.290*** (0.01)
N	6,672	6,672	6,672	6,672	6,672
F	7.780	7.925	7.985	8.025	8.065
p-value	0.000	0.000	0.000	0.000	0.000
R ²	0.206	0.207	0.210	0.212	0.215
Panel B: 2004-2013					
Care recipient receives SAAD	0.114*** (0.02)	0.117*** (0.02)	0.118*** (0.02)	0.118*** (0.02)	0.118*** (0.02)
Interaction Year 2007-2013	0.150*** (0.01)	0.152*** (0.01)	0.153*** (0.01)	0.153*** (0.01)	0.153*** (0.01)
Interaction Year 2007-2011	0.289*** (0.02)	0.289*** (0.02)	0.289*** (0.02)	0.289*** (0.02)	0.289*** (0.02)
N	14,955	14,955	14,955	14,955	14,955
F	27.463	27.485	27.493	27.512	27.525
p-value	0.000	0.000	0.000	0.000	0.000
R ²	0.221	0.225	0.230	0.232	0.234
Real income (million € 2011)	No	Yes	Yes	Yes	Yes
Real wealth (million € 2011)	No	Yes	Yes	Yes	Yes
Demographics	Yes	Yes	Yes	Yes	Yes
Dependency	Yes	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes
Unemployment	No	No	Yes	No	Yes
Regional GDP	No	No	No	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes

Note: Omitted variables: Year=2004, women, no elementary education, widow, Katz index equal to zero. Standard errors between parentheses. Wild cluster at the regional level and wild bootstrap with 1,000 replications (Cameron et al., 2008). IV regressions employ ‘support for PSOE (Spanish socialist party), home care coverage index (2000, 2002) as an instrument.

Table 12. Effect of caregiving subsidies on formal care employment (employees in social services to non-institutionalized dependent people)

	OLS-1	OLS-2	OLS-3	OLS-4
SAAD	-87.89*** (12.58)	-88.02*** (12.50)	-88.23*** (12.49)	-88.56*** (12.48)
Interaction Year 2011	-2,392.57*** (523.58)	-2,390.81*** (523.14)	-2,389.67*** (522.96)	-2,388.54*** (521.87)
Interaction Year 2013	-125.68*** (33.21)	-125.47*** (32.15)	-125.12*** (32.17)	-124.74*** (31.78)
Year=2011	8,269.13*** (1,126.22)	8,269.01*** (1,126.18)	8,269.02*** (1,126.17)	8,268.96*** (1,126.15)
Year=2013	842.45*** (223.15)	842.34*** (223.07)	841.32*** (223.08)	841.11*** (222.15)
Constant	7,392.81*** (1,058.11)	7,391.14*** (1,057.16)	7,391.25*** (1,057.24)	7,390.87*** (1,057.01)
Unemployment	No	Yes	No	Yes
Regional GDP	No	No	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes
N	12,508	12,508	12,508	12,508
F	460.73	462.25	468.71	478.92
p-value	0.000	0.000	0.000	0.000
R ²	0.391	0.410	0.411	0.423

Regressions performed only over wave 2 (2007), wave 4 and 5. Standard errors between parenthesis. Clustered estimates at regional level and wild bootstrap with 1,000 replications (Cameron et al., 2008).

Simulation

Monthly estimate of the economic impact of SAAD

A. Monthly Estimate of SAAD	Coef	Beneficiaries	Average caregiving allowance	(4) Product (1)*(2)*(3) (€/month)	(5) % with respect to SAAD expenditure	(6) Per capita expenditure (€/year)
2007	0.100	6,612	476,31	327,538	1.296%	0.086
2011	0.220	400,086	357,34	31,881,548	21.216%	8.09
2013	-0.057	408,296	299,78	-7,466,456	-7.416%	1.92

B. Economic Value	Beneficiaries (1)	Predicted number of caregiving days ^b (2)	Wage ^c (€/year)	Wage (€/day) (3)	Economic value of informal care (€) (1)*(2)*(3)	GDP ^d (10 ⁶ €)	% with respect to GDP
2007	6,612	215.47	15,150.36	41.51	59,138,784	1,080,807	0.01
2011	400,086	239.18	15,230.32	41.73	3,993,250,924	1,070,413	0.37
2013	408,296	206.32	14,439.92	39.56	3,332,519,791	1,025,634	0.32

(1) Coefficient of the interaction SAAD & year dummy (Table 7)

(2) Population beneficiaries using calibrated weights

(3) Average Caregiving Allowance (multiplying average monthly benefit for each dependency degree by the distribution of beneficiaries by dependency degree: Table B4)

(4) To obtain the percentage with respect to total expenditure of SAAD, we have multiplied the monthly estimation by 12 and divided by annual expenditure corresponding to that year.

(5) Total expenditure in the SAAD: 302,563,029€ (2007); 1,802,975,359€ (2011); 1,206,789,133€ (2013)

(6) Per capita expenditure is obtained multiplying monthly estimation (4) by 12 and dividing by total population. Total population: 45,668,938 (2007), 47,265,312 (2011), 46,771,341 (2013). Source: National Institute of Statistics. <http://www.ine.es/>

^aPopulation beneficiaries using calibrated weights.

^bPredictions obtained with the results of the interval regression.

^cAnnual Survey of Labour Costs (National Institute of Statistics). Wage corresponding to employees in social services without lodging.

^dNational Accounts (National Institute of Statistics). Nominal Gross Domestic Product.

Number of registered beneficiaries in the SAAD was: 11,385 (May 2008), 401,176 (June 2011), 409,435 (June 2013). Supply of co-resident informal caregivers

■ **Experiment 1** (Expansion of caregiving allowance):

Expansion of LTC insurance had non-neutral effects on informal care and on intra-household transfers.

- We find evidence of an expansion of 32% in the probability of an elderly person receiving informal care after the reform, 10% reduction in inflow transfer and 29 % increase in outflow transfers and increase in 13.6 days of informal care
- The effects were largely concentrated among bottom wealth distribution and is heterogenous by caregiver type

■ **Experiment 2** (Spending Cuts reducing caregiving allowance):

- Cut down on IC by 10% and an increase (decrease) in 5% of inflow (outflow) transfers
- **Implications: caregiving allowances are not neutral and incentivize care**
 - At least partly driven by 'caregiving' moral hazard and exchange relationship

Thanks!!