Demographic Change in the EU

EIB Institute Seminar
December 6, 2018

Demographic Change in the EU

- EIBURS-funded research project
- Launched in spring 2015
- Focus: Investigating various dimensions of long-term care (LTC) in Europe

Work Packages

- WP1: Assessment of Future LTC Needs (UDE/CINCH)
- WP2: Evaluating Policy Reforms in the LTC Sector (UDE/CINCH)
- WP3: Care Provision in a Changing Society (RWI)

WP1: Assessment of Future LTC Needs

WP1: Assessment of Future LTC Needs

- Core Research Team:
    - Martin Karlsson
    - Norman Bannenberg
- Associated Partners:
    - Ben Rickayzen (Cass Business School, City University London)
    - David Smith (Cass Business School, City University London)

Methodology

- Datasets: SHARE and ELSA (England)
- Calculated **mortality rates** for all the countries.
- Validated rates with **government tables**
  - Mortality rates in all countries were substantially **lower** than expected
- After further analysis by **deprivation**, retained the following countries:
  - Denmark, England, Israel, Italy, Poland, Spain and Sweden
- Producing **transition rate models** by care status.

Figure 1. Male Mortality by Wealth Quintile – England.
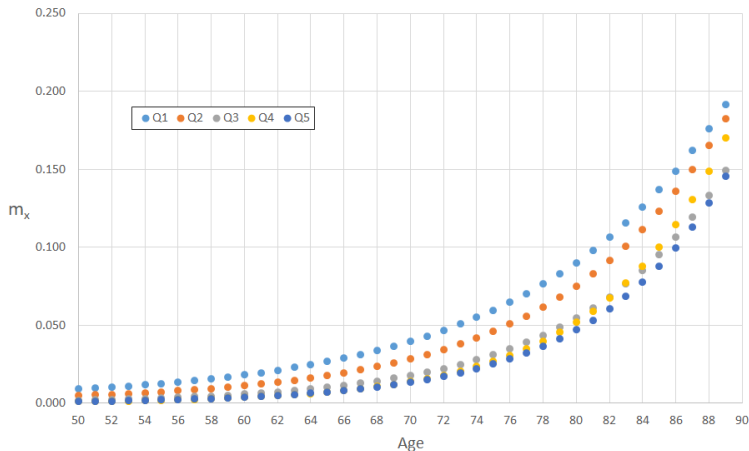
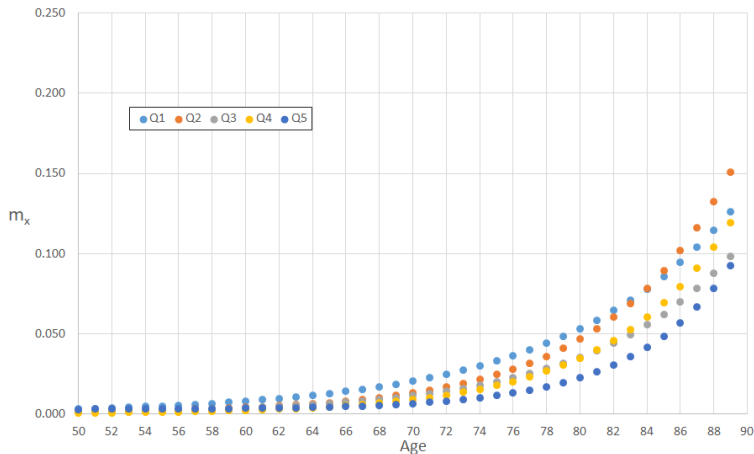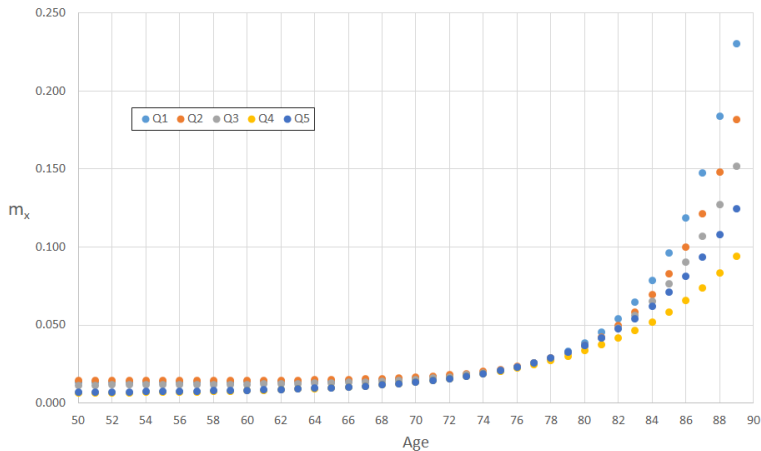Figure 2. Female Mortality by Wealth Quintile – England.

Figure 3. Male Mortality by Wealth Quintile – Sweden.

Results: Mortality – Swedish Females

Figure 4. Female Mortality by Wealth Quintile – Sweden.
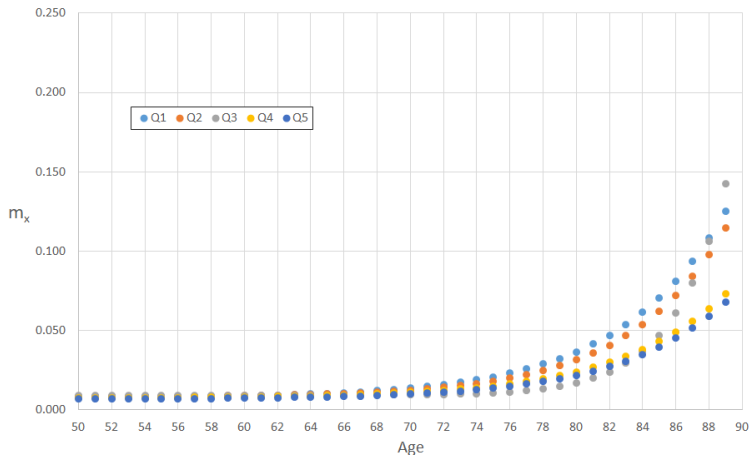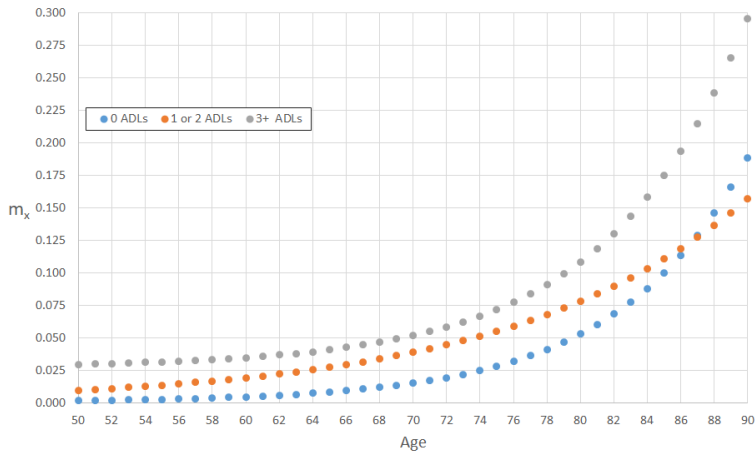
Figure 5. Male Mortality by ADLs – England.
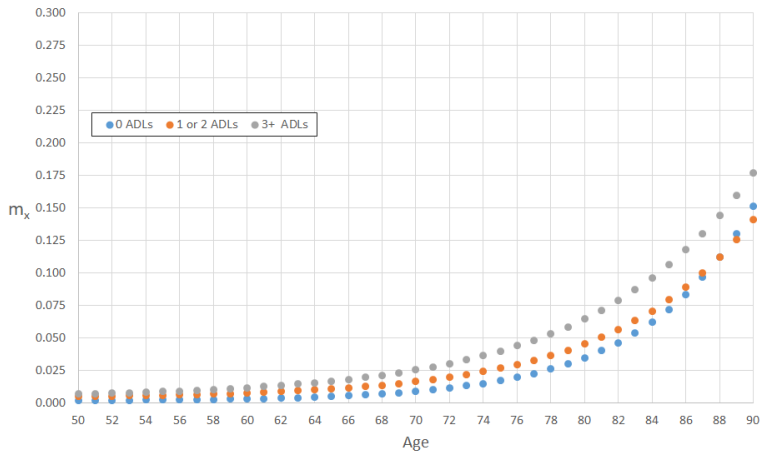
Figure 6. Female Mortality by ADLs – England.
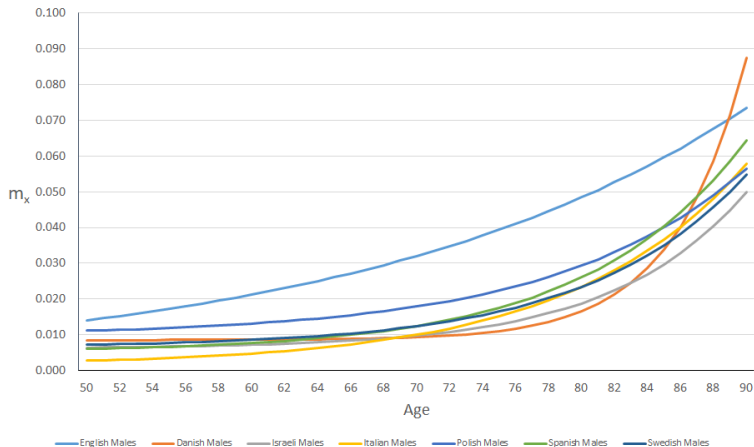
Figure 7. Transitions from 0 to 1-2 ADLs by Country.

Table 1. Example of Cohort Life Table

Year	Age	0 ADLs	1-2 ADLs	3+ ADLs	Dead
2018	60	86,400	9,500	4,100	0
2019	61	84,672	9,975	4,551	802
2020	62	82,132	10,574	5,097	2,197
2021	63	78,847	11,314	5,811	4,028
2022	64	75,693	12,219	6,683	5,405
2023	65	71,908	13,319	7,752	7,021
2024	66	67,234	14,784	9,147	8,835

WP2: Evaluating Policy Reforms in the LTC Sector

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- Core Research Team:
  - Martin Karlsson
  - Norman Bannenberg
- Associated Partners:
  - Tor Iversen (University of Oslo)
  - Henning Øien (University of Oslo)
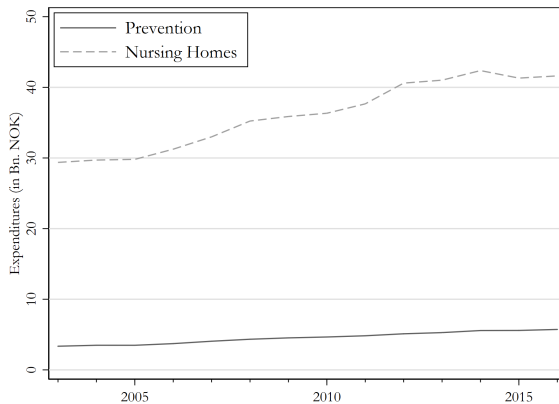
Figure 8. Spending on Nursing Homes and Prevention, Norway 2003–16.
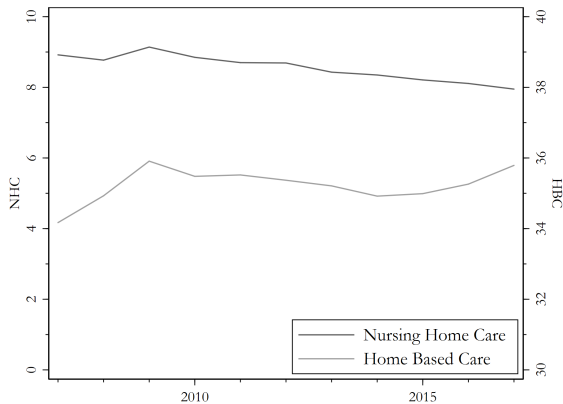
Figure 9. LTC Utilisation, Norway 2003–16.
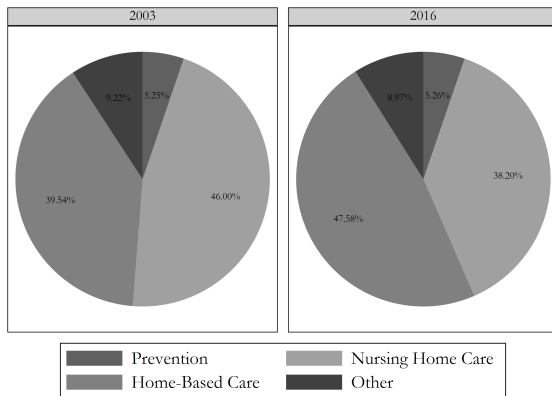
Figure 10. LTC Expenditure by Type, Norway 2003–16.

Study I: Preventive Home Visits

- Background:
  - Preventive home visiting programs to older people (PHV) implemented in several countries.
  - Conducted by trained **community care workers/nurses**.
  - Programs aim at supporting **autonomy**, **independence**, and **preventing disabilities**
  - ⇒ Decreasing need for (intensive forms of) public LTC.
- Research Questions
  - Do PHV attain their goals?
  - Do they **reduce spending**?
  - Do they improve **health outcomes**?

Empirical Approach

- PHV in Norway:
    - Norwegian municipalities **not obliged** to offer PHV programs.
    - Between 2000 and 2013 about **20%** of Norwegian municipalities introduced PHV programs.
- Empirical Strategy:
    - Variation between municipalities in **adoption** of programs.
    - Variation in **timing** of adoption.
    - ⇒ Difference-in-differences analysis.
- Data:
    - Municipality-level data on nursing home/home-based **care utilization**, **hospital admissions**, and **mortality** among population aged 80+.
    - Individual-level data on **hospital care utilization** and **diagnoses**.
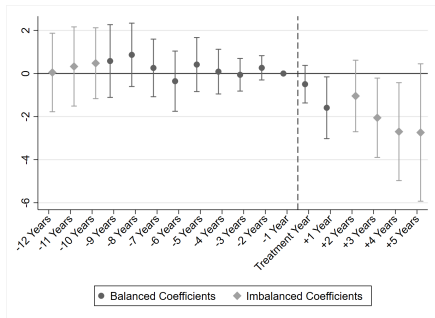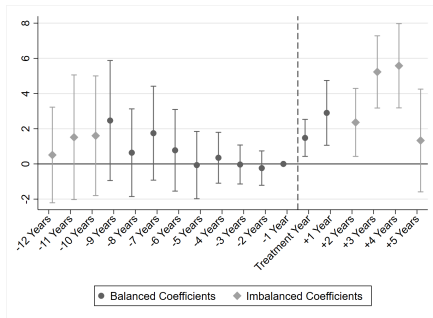
(a) Nursing Homes

(b) Home-Based Care

Figure 11. Effects of PHV on Utilisation

Main Results
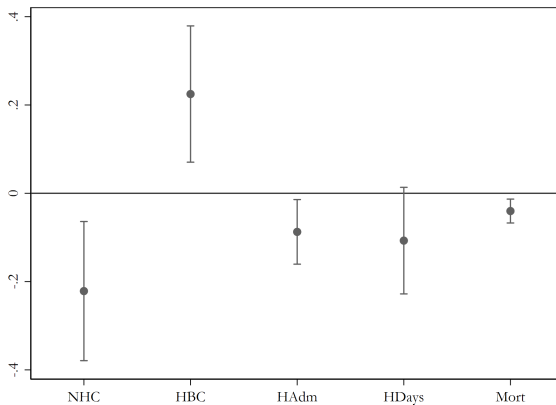
Figure 12. Summary of Results

Conclusions

- Home-based and nursing home care found to be **substitutes**.
- **Beneficial impacts on health**.

Study II: Norwegian Care Plan Programs

- Background:
  - Norwegian central government established two similar programs in 1998 and 2008 aimed at **increasing LTC quality and quantity**.
  - Financing of **new nursing home** and **sheltered housing spaces** as main instrument.
  - Municipalities were able to apply for grants and **most actually did** (420/429).
- Research questions:
  - How did exogenous changes in nursing home care **supply affect utilization**?
  - How did changes in **nursing home care** utilization **affect home-based care** utilization?

Empirical Approach

- Empirical strategy:
  - **Variation** in **amount of grants between municipalities**.
  - Variation in grants **over time within municipalities**.
  - ⇒ **Fixed effects instrumental variables** technique applied.
- Data:
  - Municipality-level data on **nursing home** and **home-based care utilization**.
  - Information on **amount of grants** by municipality, year, and type (nursing home or sheltered housing).
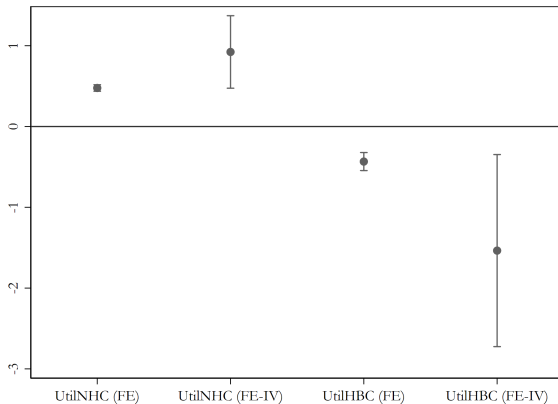
Figure 13. **Summary of Results**

Conclusion

- Results:
  - **Increase** in **nursing home spaces** leads to an **increase** in **nursing home care** utilization of **0.92** percentage points.
  - **Increase** in **nursing home care** utilization causes **decrease** of **1.54** percentage points.
- Conclusions:
  - The large increase in nursing home care utilization indicates a **large excess demand** in the beginning.
  - Increases in nursing home care utilization cause **even larger home-based care reductions**.
  - Possible explanation: **Different care needs** of Couples. One spouse **institutionalized**, the other does **not demand formal care anymore** (informal care receipt?).

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WP3: Care Provision in a Changing Society

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- Core Research Team:
    - Ansgar Wübker
    - Dörte Heger
    - Ingo Kolodziej
    - Thorben Korfhage

- **Life expectancy increases**
  - Older people main beneficiaries of recent gains in life expectancy in the EU
  - Rise of health care costs
  - Change in morbidity
  - Health care use of the elderly is important to predict the additional health care expenditures arising from population ageing

- **Are the life years gained spent in good or bad health?**
  - Morbidity status rather than age per se determines an individual's need for health care services

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Research questions

- Are the additional life-years gained lived in bad health or does morbidity decline over time?

Aim

- Analyze changes in disability of the elderly over time
- Decompose this change to identify possible drivers of the observed change

Our strategy in a nutshell

1. Exploit the longitudinal aspect of a large European dataset (SHARE)
2. Use additional information provided by exit interviews
   - Proxy answered questions about a former SHARE respondent's last year of life.
   - Include individuals that died between 2004 and 2013: last two years of live are the most expensive.
3. Combination of commonly used measures for morbidity:
   ADL, iADL as a meaningful measure of disability
4. Predictors
   - Demography
   - Medical events
   - Behavioural factors

Estimation strategy

Oaxaca-Blinder decomposition

- decomposes drivers of the change in morbidity
  - ... into the change in demographic, clinical and behavioural factors
  - ... and the change of their impact on morbidity status (e.g., Cutler et al. 2013; Oaxaca, 1973; Blinder, 1973; Jann, 2008).

Decomposition Results
Changes over Time, 2004/5 vs. 2011

	overall		explained		unexplained
Wave 1	0.611***				
Wave 4	0.700***				
Difference	-0.088***	-0.053***	[60.23%]	-0.047*	[53.41%]
Difference	[100.00%]				
Decomposition by variable groups					
Age structure		-0.036***	[41.08%]	0.009	[-9.61%]
Soc. econ.		0.019***	[-21.91%]	0.076*	[-85.62%]
Prox. to death		-0.002	[2.11%]	0.083	[-93.46%]
Conditions		-0.035***	[40.02%]	0.025	[-27.85%]
Countries		0.001	[-1.03%]	-0.025*	[28.24%]
Constant				-0.213	[241.21%]
Observations	57,690	57,690		57,690	

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Interaction effect not shown

Conclusion

- Disability levels significantly increase over time: a 14.48% increase in AL over a relatively short period of time (2004 - 2011).
- The main contributing factors are population ageing and an increase in the prevalence of diseases.
    - The effect of health conditions on disability remained constant over time.
    - Country differences suggest a relatively higher impact on increase of disability originating from Southern European countries, i.e. Spain and Italy.
    - Health care systems need to prepare for an increase in multi-morbidity and an increase in health care costs (e.g. preventive efforts and improved health education).

Study II: Care Choice in Europe

- The share of elder people will continue to increase in EU-27 (EC, 2014).
  - The proportion of people **aged 65** and over is expected to increase from **17%** in 2010 to **30%** in 2060.
  - The proportion of people **aged 80** and over is expected to increase from **5%** in 2010 to **12%** in 2060.
- The risk of long term care dependency increases with age.
- Organization of long-term care is one of the major challenges of demographic aging.
- Today, average spending on LTC accounts **1.5% of GDP** across OECD countries. This share is projected to double or even triple until 2050 (Colombo et al., 2011).

Research questions

- How do people choose between no care, informal care, and formal care?
- What are the reasons for cross-country differences?

Aim

- Learn whether cross-country differences are based on differences in need or institutions and preferences.
- Learn how demographic trends will affect LTC choices within different institutional settings.

Our strategy in a nutshell

1. Exploit rich data from the Survey of Health, Ageing and Retirement in Europe (SHARE)

2. Estimate determinants of care use in four countries:
   - Germany (mixed system, both formal and informal care support)
   - Spain (Southern-European economy, strong focus on family care)
   - France (somewhat more generous eligibility rules than Germany)
   - the Czech Republic (Eastern-European country, relatively low LTC benefits)

3. Decompose country differences into coefficient and endowment effect
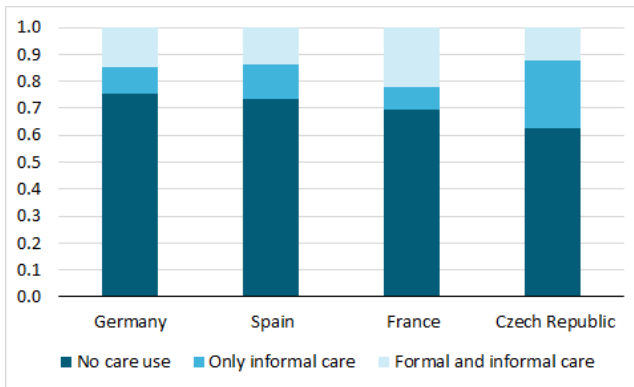
Note: Individual weights are used for calculation.

Source: Share w5, own calculation.

Decomposition of informal care

Germany acts as reference country.

	Spain		France		Czech Republic	
	PP	%	PP	%	PP	%
Endowment effect	0.070***	231	0.002	-12	0.020**	13
Coefficient effect	-0.040***	-131	-0.018	112	0.132***	87
Total difference	0.030***	100	-0.016*	100	0.152***	100
Observations	6,110		4,900		5,503	

Standard errors are calculated with the delta-method.

Significance levels: ∗ p <0.10, ∗∗ p <0.05, ∗ ∗ ∗ p <0.01

Decomposition of formal & informal care

Germany acts as reference country.

	Spain		France		Czech Republic	
	PP	%	PP	%	PP	%
Endowment effect	-0.049***	452	0.057***	78	0.012**	-46
Coefficient effect	0.038**	-352	0.016	22	-0.039***	146
Total difference	-0.011	100	0.073***	100	-0.027***	100
Observations	6,110		4,900		5,503	

Standard errors are calculated with the delta-method.

Significance levels: $*$ p $<$0.10, $**$ p $<$0.05, $***$ p $<$0.01

Conclusion

- Age and disability are strong predictors of receiving informal or (even more so) formal care.
- Formal and informal care utilization rates differ by country.
- These differences are caused by different population compositions but also by differences in how certain characteristics affect the care choice.
- This is likely due to different institutional settings.
  - More generous in-kind benefits tend to increase the demand for professional formal care services (e.g. Czech Republic vs Germany/France).
  - However, an increase in formal care use can only occur if such care options are available (e.g. Germany vs Spain).

Study III: Informal Care to Parents and Labor Market Outcomes

When a parent's health declines, adult children are often faced with the decision whether to provide informal care or not.

$+$ Caregiving can be rewarding, as it conveys a **feeling of purpose** and **strengthens family ties**.

$-$ However, caregiving is **physically and emotionally demanding** and presents a **considerable time commitment**.

Hence, things to consider are

- the parent's need for informal care
- is one physically/mentally capable to provide care?
- does one have the time to provide care (opportunity cost of caregiving)?

Contribution

This paper contributes to the scarce literature on the persistence of caregiving effects on labor market outcomes by

- looking at **short and medium-term effects** of parental caregiving on employment and hours worked
- looking at both **male and female caregivers**
- focusing on **individuals close to retirement**
- using a large sample of **15 European countries and Israel**
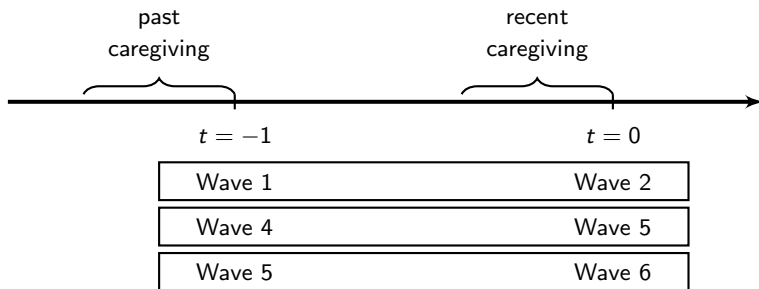
Descriptive statistics by caregiver status and sex

| | Women | | | | Men | | | |
| | Recent carers | | Non-carers | | Recent carers | | Non-carers | |
	mean	obs	mean	obs	mean	obs	mean	obs
Outcome								
Employed	0.47	1,141	0.60	9,440	0.50	423	0.69	6,846
Working-hours[a]	32.52	461	33.40	5,144	41.81	181	40.72	4,328
Explanatory variables								
Past carers	0.52	1,141	0.05	9,440	0.40	423	0.03	6,846

Note: [a] Conditional on employment; [b] Zeros also include some cases were no parent is alive.
Source: SHARE, own calculation.

Further control variables: information on socio-demographics, health, indicators for whether an individual has reached/is within two years of the countries' specific effective retirement age, and country dummies.

Identifying the effects of caregiving

Two-step model:

First, we estimate the effects of **recent**, **past**, and **recent and past caregiving** (CG_r, CG_p, and $CG_{r\&p}$, respectively) on **employment** (E) using a linear probability model.

Next, we look at the **number of hours an individuals works** per week (H) conditional on employment:

$$E = \alpha^L + \beta^L CG_r + \gamma^L CG_p + \delta^L CG_{r\&p} + \lambda^L X + u^L, \tag{1}$$

$$log(H) = \alpha^H + \beta^H CG_r + \gamma^H CG_p + \delta^H CG_{r\&p} + \lambda^H X + u^H, \ \forall \ E = 1 \tag{2}$$

Effects of caregiving on labor force participation

	Women		Men	
	employed	log(hours)	employed	log(hours)
Recent caregiver	-0.048***	0.009	-0.070***	0.036
Past caregiver	-0.017	-0.042	-0.061**	-0.004
Recent & past caregiver	0.038	-0.080	0.006	0.012
Continuous caregiver[a]	*-0.027*	*-0.132****	*-0.125****	*0.044*
Obs.	10,581	5,605	7269	4509
R^2	0.33	0.14	0.35	0.08

$* \ p < 0.10, ** \ p < 0.05, *** \ p < 0.01$

[a]Continuous caregiver = Recent caregiver + Past caregiver + Recent & Past caregiver

Source: SHARE, own calculation.

Summary of main findings

Looking at **recent caregiving only**, we find

- negative effects on employment for both men and women.
- a reduction of working hours for women.

When we also consider **past and continuous caregiving**, we find

- severe and persistent effects on employment for men.
- only short term effects on employment for women.
- a reduction in working hours for continuously caregiving women.

Study IV: Effects of the Double Burden of Long-Term Care and Work on the Mental Health of Caregivers

> • What effect does the double burden of work and informal care have on the mental health of caregivers and on their regular intake of medication?

Aim

- Expand the knowledge of the double burden of care and gainful employment
- Consider the majority of European countries on the basis of uniform data

Our strategy in a nutshell

1. Exploit rich data from the Survey of Health, Ageing and Retirement in Europe (SHARE)
2. Restriction to children caring for their parents
   - At least weekly
   - Age from 50 to 65
   - At least one parent alive
3. Consideration of endogeneity problems resulting from simultaneity and unobserved heterogeneity
4. Separate regressions for working and non-working individuals

Estimation strategy

Explain probability to provide care in a first step

- Using Instrumental variable approach
  - Number of siblings still alive
  - Only one parent alive
  - Validity
    - the greater the number of siblings, the less likely it is for the individual to care for their parents
    - no direct influence on health
    - not correlated with unobserved determinants of health status

Estimate the causal effects of the double burden from providing care and working on

- Number of depressive symptoms
- Drug intake for psychological problems

Effects of caregiving by work status on mental health

	Men		**Women**	
	not employed	employed	not employed	employed
Depression scale EURO-D				
Caregiver	-0.058	0.209***	0.141**	0.111**
Obs.	4,014	10,896	8,850	12,241
Drug intake for psychological problems				
Caregiver	-0.054	0.145	0.127	0.111
Obs.	4,014	10,891	8,574	12,238

$*$ p $<$0.10, $**$ p $<$0.05, $***$ p $<$0.01

Source: SHARE, own calculation.

Conclusion

- We find evidence of a double burden of working and providing care at the same time for men but not for women.
- Traditional gender roles may be at place.
    - Women have a lower attachment to the labor force and their labor force participation is more flexible.
    - Men often are the sole breadwinner and work full-time, which makes adapting their labor supply more difficult.
    - Hence more men than women might combine work and care even though this double burden leads to increased stress.

Conclusions and Impacts

Conclusions

- The project allowed to **identify the predictors of LTC demand** and draw conclusions on the **further development of demand and costs** in the long-term care sector.

- Insights into the **relationship between different forms of long-term care** were gained which is essential to policy makers in order to **keep high-quality care affordable**.

- It was possible to quantify the **adverse effects of caregiving** on the caregivers' employment and identify **gender differences** in the burden due to care provision.

Impacts on LTC Research in Essen: Leibniz Science Campus Ruhr

- Focus: Health care challenges in regions with declining and ageing populations
- Cooperation between RWI, University of Duisburg-Essen, Tilburg University
- Funding period: 2016 - 2020 (currently: application for second funding period)
- Research areas: Regional variation, sustainable supply, prevention

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Impacts on LTC Research in Essen: Research Unit "The LTC Economy"

- Application for a research unit in the area of LTC
- Funding: up to 8 years (by German Research Fund)
- Applicants: Leading health economists in Germany and Austria
- Methods: Laboratory experiments, reduced form analysis, structural econometrics, life cycle modelling
- Research areas: determinants of LTC demand, LTC supply side policies, integrated life cycle view of LTC