

# Challenges in long-term care

Modelling and quantifying future care needs, arrangements and gaps in ageing, low-fertility societies. a novel comparative approach applied in microsimulation projections for Austria and Italy.

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# Population ageing and long-term care

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- ▶ Increased longevity is raising the demand for long-term care just as fertility decline is reducing the supply of informal care
  - ▶ But by how much exactly will demand most likely increase?
  - ▶ What care gaps may we face in the future?
  - ▶ What can we do about it? And how do challenges and solutions differ across countries?
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- ▶ To address these questions, we extend the comparative dynamic microsimulation model microWELT.



# Overview

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- ▶ Measurement paper with (simple) baseline simulation results (this paper)
- ▶ Applications and extensions, e.g. spousal caregiving

# Literature

Table 1: *Microsimulation studies on LTC.*

REFERENCE	COUNTRY	MODEL	AGE	CARE MIX	LTC NEEDS
Kennell (1992)	USA	PRISM+LTCF	65+	NH, FH	ADL counting
Hancock (2007)	UK	PSSRU+CARESIM	65+	NH, FH, IH	ADL and IADL counting
Wittenberg (2007)	ENGLAND	PSSRU+CARESIM	65+	NH, FH, IH	ADL and IADL counting
Baldini (2008)	ITALY	CAPP-DYN	0+	X	ADL and IADL counting
Zissimopoulos (2015)	USA	FEM	65+	NH, FH, IH	ADL and IADL counting, Hours (IH)
Favreault (2015)	USA	DYNASIM3	65+	NH, FH	ADL counting
Chen (2016)	JAPAN	FEM	50+	X	ADL and IADL
Atella (2017)	10 EU countries	EU-FEM	50+	X	Regulation-based index
Gonzalez (2017)	MEXICO	FEM-Mexico	50+	X	X
Kingston (2018)	ENGLAND	PACSim	65+	X	Interval of Needs (IONs)
Zissimopoulos (2018)	USA	FEM	65+	X	X
Genevois (2019)	LUXEMBOURG	DYMH_LU	51+	X	Multidimensional Index
Archer (2021)	ENGLAND	FEM	50+	X	ADL and IADL counting
Atella (2021)	12 OECD countries	EU-FEM	50+	X	X
Goldman (2021)	USA	FAM	25+	X	X
Kasajima (2021)	JAPAN	FEM	60+	X	ADL and IADL counting
Marois (2021)	14 EU countries	ATHLOS-MIC	55+	X	Health Metric
Chen (2022)	SINGAPORE, SOUTH KOREA	FEM	50+	X	ADL and IADL counting
Kasajima (2022)	JAPAN	FEM	60+	NH, FH, IH	ADL and IADL counting
Kingston (2022)	ENGLAND	PACSim - CPEC	65+	NH, FH	IoN (PACSIM), ADL and IADL counting (CPEC)
May (2022)	IRELAND	FEM-IFOAM	50+	X	ADL and IADL counting
Spijker (2022)	SPAIN	DEMOCARE	50+	FH, IH, Gap	Hours
Belmonte (2023)	19 EU countries	CEPAM-Mic	50+	X	ADL and IADL counting
Chen (2024)	TAIWAN	FEM	50+	X	ADL and IADL counting
Jiang (2024)	CHINA	CHARISMA	50+	X	ADL and IADL counting
Van den Ven (2024)	UK	SIMPATHS	18+	FH, IH	Hours
<b>This work</b>	<b>2 EU countries (AT, IT)</b>	<b>microWELT</b>	<b>0+</b>	<b>NH, FH, IH, Gap</b>	<b>Austrian Care Need Assessment Scheme</b>

# Method

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- ▶ We develop a comparative approach to quantify
  - ▶ care needs in hours
  - ▶ the full care mix (institutions, formal, informal)
  - ▶ care gaps
- ▶ Integrating LTC in microWELT ([www.microWELT.eu](http://www.microWELT.eu))
  - ▶ Cross-compatible implementation for Modgen and OpenM++
  - ▶ Comparative platform that supports interacting population modelling in continuous time
  - ▶ Cross sectional imputation model with monthly updates
  - ▶ Consistency with Eurostat population projections but adding further detail

# Core model dimensions

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- ▶ Education
- ▶ Family
- ▶ Fertility
- ▶ Long-term care
- ▶ Migration
- ▶ Mortality
- ▶ Partnerships

# Data and Parametrisation of LTC

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- ▶ Data source: SHARE (Survey of Health and Retirement in Europe)
- ▶ Pooled sample of waves 1, 2, 4-9 (cross-section) focusing on 65+ population
  - ▶ Imputations, proxy variables
- ▶ Underrepresentation of nursing home residents: recalibration of survey weights (Banks et al., 2023; Brugiavini et al., 2023)
- ▶ Austrian care need assessment scheme, applying the same algorithm to respondents in all countries (validation)
- ▶ 5 Parametrisation steps covering care needed, received and given

Table 2: Austrian care need assessment scheme.

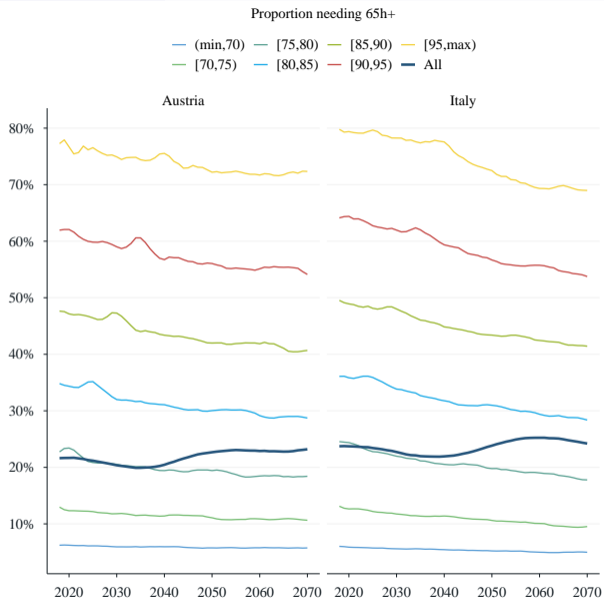
LIMITATION	SHARE VARIABLE	MONTHLY HOURS
<b>Basic Assessment Scheme</b>		
Activities of Daily Living (ADLs)		
Dressing	ph049d1	20
Walking AND getting up	ph049d2, ph049d5	30
Walking AND NOT getting up	ph049d2, ph049d5	15
NOT Walking AND getting up	ph049d2, ph049d5	22.5
Daily hygiene and bathing	ph049d3	35
Eating	ph049d4	30
Using the toilet	ph049d6	30
Instrumental Activities of Daily Living (IADLs)		
Preparing a hot meal	ph049d8	30
Shopping	ph049d9	10
Taking medication	ph049d11	3
House or garden work	ph049d12	10
Leaving home independently	ph049d14	10
Laundry	ph049d15	10
Motivational talk (Using a map OR Telephone calls OR Managing money)	ph049d7, ph049d10, ph049d13	10
Severe mental health limitations		
Dementia	ph006d16 (imputed)	45
Psychiatric problem	ph006d18, mh022 (proxied)	45
<b>Supplementary Items</b>		
Extra hours 1		
(Climbing several flights of stairs without resting OR Stooping, kneeling, or crouching OR Reaching or extending your arms above shoulder level OR Pulling or pushing large objects like a living room chair OR Lifting or carrying weights over 5 kilos)	ph048d4, ph048d6, ph048d7, ph048d8, ph048d9	5
Extra hours 2		
(Walking 100 metres OR Sitting for about two hours OR Getting up from a chair after sitting for long periods OR Climbing one flight of stairs without resting OR Picking up a small coin from a table)	ph048d1, ph048d2, ph048d3, ph048d5, ph048d10	10
<b>Conditional Age Trend</b>		
IF any limitation OR Global Activity Limitation Indicator (GALI)	gali, age	$(age - 65) + 0.73 + (age - 65)^2 * 0.042$

# Steps

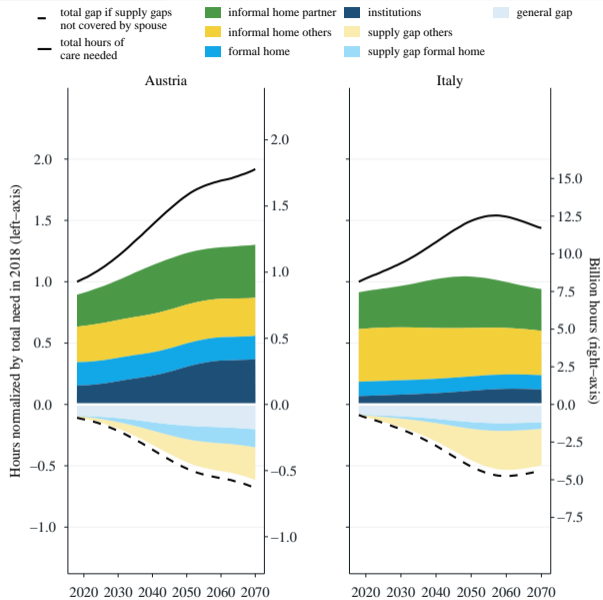
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- ▶ Step 1: Any hours of care needed (by age, sex, edu)
- ▶ Step 2: Decile means of hours of care needed (by age, sex, edu)
- ▶ Step 3: Nursing home prevalences (by age, sex, need category, having a partner, number of children)
- ▶ Step 4.1: Prevalence of receiving home care (by hours of care need and having children)
- ▶ Step 4.2: Home care mix (by need category, care type, having a caring partner, children)
- ▶ Step 5: Average hours of care given (by age and sex)

► Results



► Results



# Conclusion

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- ▶ Hours of care needed may almost double in Austria until 2070
- ▶ This increase is about twice as large as in Italy
- ▶ However, the care gap in Italy may still be substantially larger than in Austria under current informal caregiving patterns
- ▶ Our model supports a large range of scenarios and can be extended to further dimensions and many countries
  - ▶ Scenario illustration (Famira-Mühlberger et al., 2025)

## Next steps

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- ▶ 1 working paper becomes 2 working papers
  - ▶ The comparative measurement of care needs and care gaps in hours
  - ▶ The effect of increased longevity on spousal caregiving and care gaps
- ▶ model extensions, also in SUSTAINWELL project
  - ▶ longitudinal consistency
  - ▶ reductions in labour force participation (potentially)
- ▶ Developing a detailed Austrian model version based on administrative care allowance data

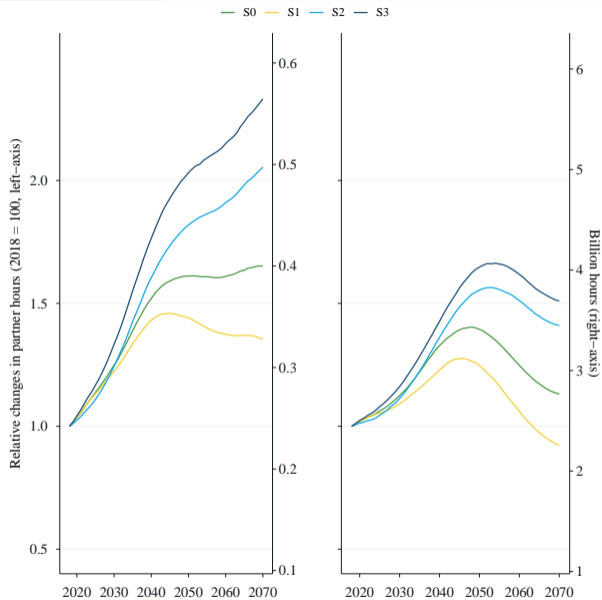
# References

# References I

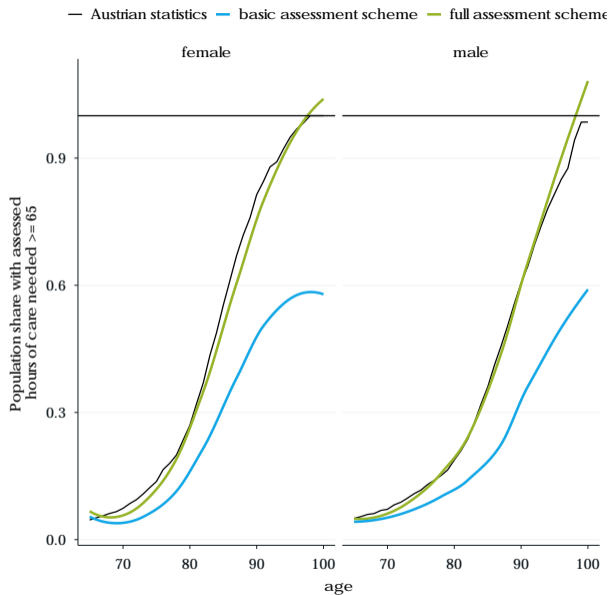
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- Brugiavini, A., Carrino, L., & Pasini, G. (2023). *Long-term care in italy* (Tech. Rep.). National Bureau of Economic Research.
- Famira-Mühlberger, U., Horvath, T., Leoni, T., Spielauer, M., & Warum, P. (2025). *How do rising care needs impact the formal and informal care sectors and existing inequalities? comparing austria and spain* (Tech. Rep.). WIFO Working Papers.

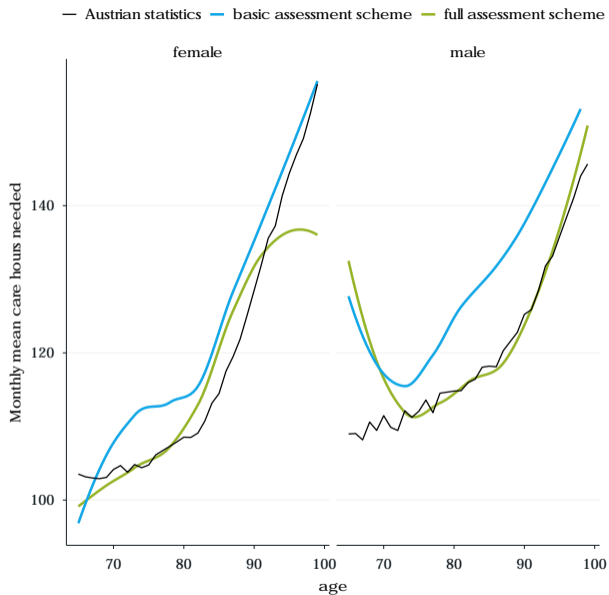
► Results



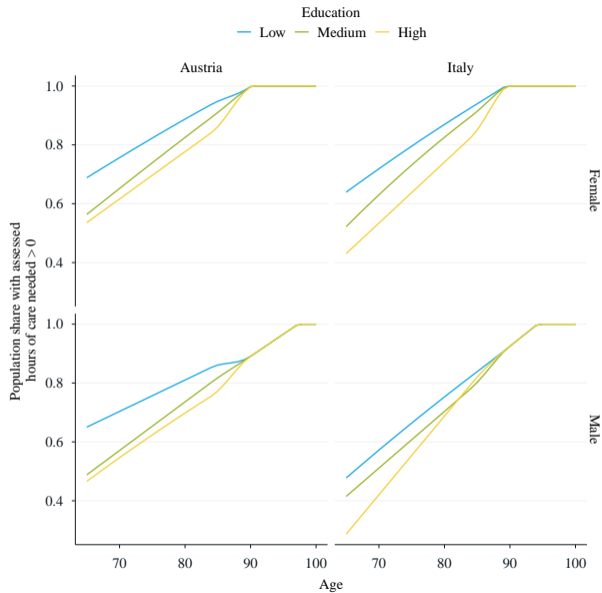
► Calibration



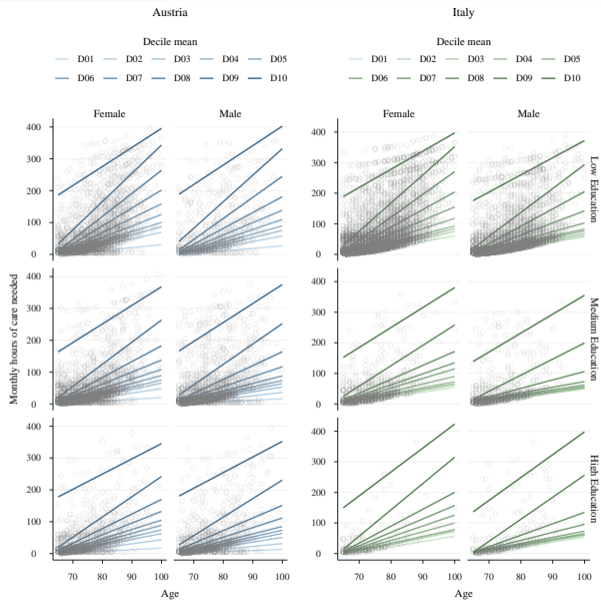
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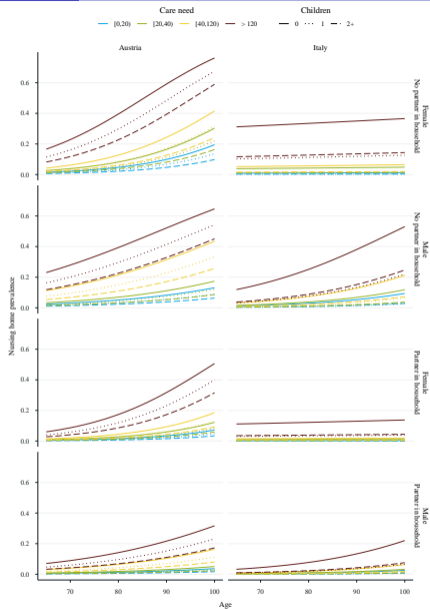
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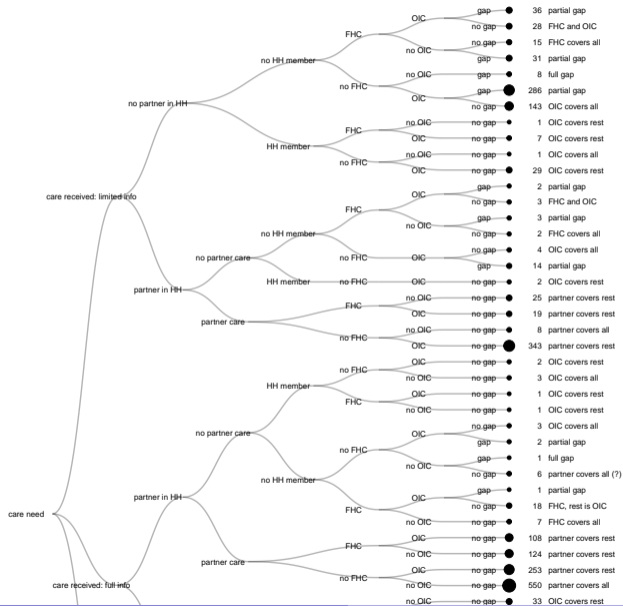
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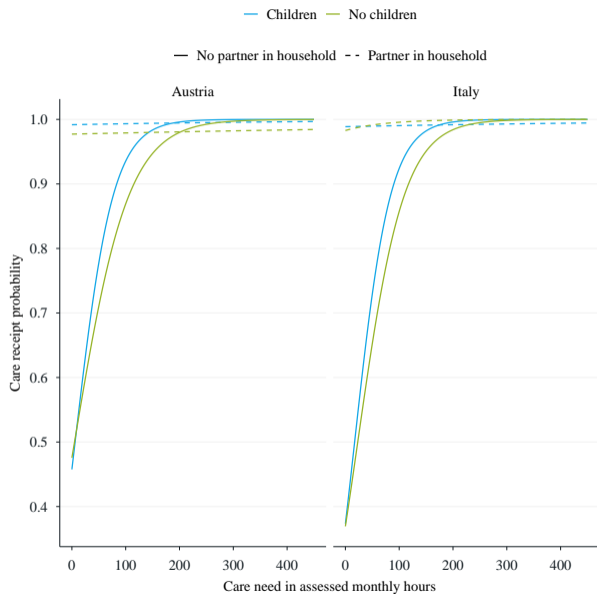
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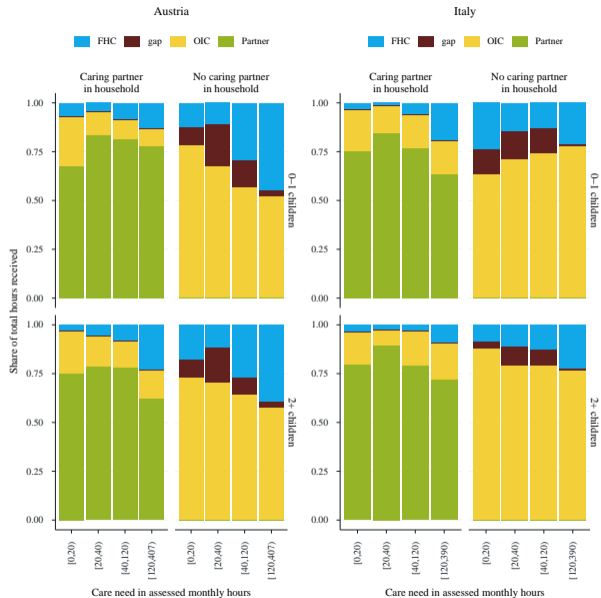
## ► Step 4



► Step 4



► Step 4



► Step 5

