Living Arrangements in Europe: Whether and Why Paternal Retirement Matters

Luca Stella

University of Padua

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Motivation

Why nest-leaving?

- Key for $\downarrow$ negative effects of delayed coresidence on children's outcomes (Billari and Tabellini 2008).
- Prolonged coresidence $\downarrow$ fertility $\Longrightarrow$ further threat to pension systems.

Research Questions

- Does children's cohabitation change with paternal retirement?
- If so, by how much?
- Mechanism?

Literature on Paternal Retirement & Moving-Out Decisions

- Father's retirement and children's nest-leaving are related:
  - Manacorda & Moretti (JEEA 2006); Battistin et al. (AER 2009).
- Both studies:
  - Focus on Italy & use exogenous variation provided by pension reforms.
  - Find that paternal retirement $\uparrow$ children's nest-leaving.
- But, **two competing mechanisms**:
  1. Manacorda & Moretti (2006): income effect matters.
  2. Battistin et al. (2009): retirement severance payment matters.

My Contribution

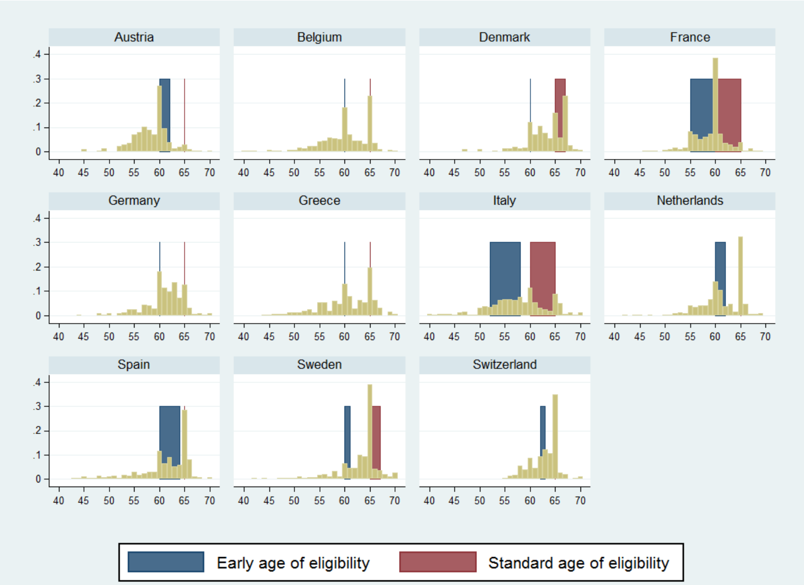
The intended contribution of the paper:

1. Use multi-country data and pension reforms in Europe to estimate the causal effect of paternal retirement on children's nest-leaving.
2. Shed some light on the mechanism.
3. Use hazard estimation methods to model the **timing** of children's nest-leaving.

Data

- SHARE: wave 2 (2006). Fig. A1
- Focus on the following two questions:
  1. In what year did you retire?
  2. In what year did the child move from parental home?
- Reshape data to create a **retrospective panel**, s.t. each child-father pair enters the panel when child is 18 and exits upon children's nest-leaving or in the year of survey.
- Group countries into Southern (IT, ES, GR), Northern (SE, DK, NL) and Central (AT, DE, CH, FR, BE) Europe. Fig. A2

Institutional Context: Pension Reforms in Europe, 1961-2007



Notes: Source: Angelini et al. (2009), Mazzonna et al. (2012), Gruber et al. (2004), and Duval (2003).

Model

I estimate the following bivariate discrete-time hazard model with shared frailty:

$$\begin{cases} \theta_{1,it} = & \lambda_1(t)\phi_1(X_i\beta_1 + \delta Retired_{it} + u_{1,i}) \\ \\ \theta_{2,it} = & \lambda_2(t)\phi_2(X_i\beta_2 + \gamma Eligible_{it} + u_{2,i}) \end{cases}$$

where:

- i : child-father pair.
- θ_1: hazard that child i leaves the nest at age t.
- θ_2: hazard that father i retires age t.
- ϕ: logistic function
- $Retired$: dummy 0/1 if father i is retired at age t.
- $Eligible$: dummy 0/1 if father i is eligible for early retirement at age t.
- X : socio-demographic controls, country f.e. & cohort f.e. for fathers.
- λ : baseline hazard functions (piecewise constant function).
- u : unobserved heterogeneity terms. IV

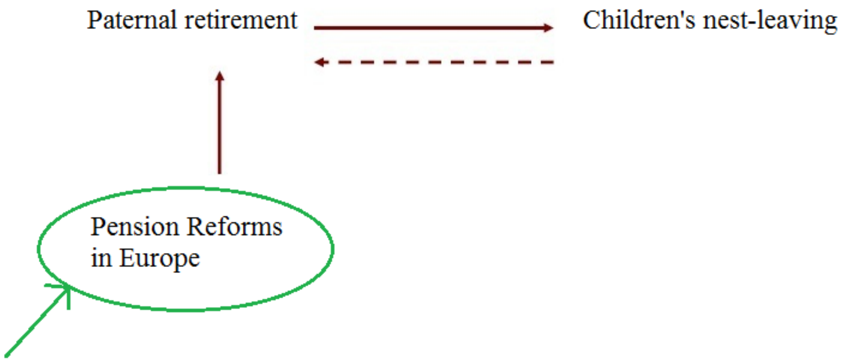
Model (2)

- Follow Melberg et al. (2010) and adopt a **latent class approach** that assigns a bernoulli distribution to u.
- Intuitively, individuals are clustered into two sub-groups:
  1. Group 1: "late" nest-leaving types.
  2. Group 2: "early" nest-leaving types.

Identification

- Need exogenous variation in paternal retirement.
- Abbring and van den Berg (EMA 2003): conditional on frailty, the treatment effect is identified w/o exclusion restrictions iff:
    1. Timing of the treatment is random.
    2. Unaffected by the anticipation of the subsequent outcome.
- Potential problem: **Timing of the treatment is not random**.

Identification (2)



Model with Shared Frailty - Hazard of Nest-leaving

Sample	**Southern Europe**		**Northern Europe**		**Central Europe**		**Full sample**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Latent Class	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
Father is retired	0.055***	0.014***	0.023	-0.097	0.009	-0.026	0.026***	0.002
	(0.007)	(0.005)	(0.025)	(0.067)	(0.009)	(0.021)	(0.007)	(0.005)
$\hat{\pi}_1$	0.334		0.065		0.210		0.319	
	(0.325)		(0.196)		(0.290)		(0.336)	
N	24,530	24,530	13,197	10,623	28,698	22,114	66,425	57,267
Controls	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Average marginal effects reported. Standard errors are clustered at the household level.

Model with Shared Frailty - Hazard of Nest-leaving

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	(0.325)		(0.196)		(0.290)		(0.336)	
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Controls	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Average marginal effects reported. Standard errors are clustered at the household level.

Mechanism?

Question: Can I use the data to learn something about **why** nest-leaving $\uparrow$ upon paternal retirement?

1. INCOME EFFECT (Manacorda & Moretti 2006):

   Retirement makes fathers' income $\downarrow \Longrightarrow$ can no longer bribe children to stay at home.

2. SEVERANCE PAYMENT EFFECT (Battistin et al. 2009):

   Positive shock to liquidity $\Longrightarrow$ use it to help children leave home.

Mechanism? (2)

To test income effect vs retirement severance payment effect, I do the following:

- Focus on Southern Europe.
- Use a **differences-in-differences** strategy:
  - IT & GR: large retirement allowance $\Longrightarrow$ Treatment group.
  - ES: no retirement allowance $\Longrightarrow$ Control group.
- **Key identification assumption:** ES represents a valid counterfactual since:
  - Cross-country dataset & cross-region analysis.
  - ES has similar welfare state and family structure to IT & GR.

Channel: Income Effect?

- Could income effect be a channel?

  Retirement $\rightarrow$ Income $\downarrow$ $\rightarrow$ Nest-leaving $\uparrow$

- One would expect the following:
  - No evidence of positive causal effect on hazard of children's nest-leaving in Italy & Greece.
  - Evidence of such positive causal effect in Spain.

- Empirical implementation:
  - Conduct analysis separately for Treatment (IT & GR) and Control Group (ES).

Income Effect: does not appear to be the channel

Sample	Treatment Group (Italy and Greece)			Control Group (Spain)		
	(1)	(2)	(3)	(4)	(5)	(6)
Latent class	No Het.	Group 1	Group 2	No Het.	Group 1	Group 2
Father is retired	**0.024****	**0.061*****	**0.015*****	0.025***	0.047***	0.015
	(0.006)	**(0.009)**	**(0.006)**	(0.010)	(0.015)	(0.011)
$\hat{\pi}_1$	0.334			0.334		
	(0.325)			(0.325)		
N	16,960	16,960	16,960	7,570	7,570	7,570
Controls	YES	YES	YES	YES	YES	YES

Notes: Average marginal effects reported. Standard errors are clustered at the household level.

Channel: Severance Payment Effect?

- Could severance payment be a channel?

  Retirement $\rightarrow$ Liquidity $\uparrow$ $\rightarrow$ Nest-leaving $\uparrow$

- Would need the following:
  - No evidence of positive causal effect on hazard of children's nest-leaving in Spain.
  - Evidence of positive causal effect in Italy and Greece.

- Empirical implementation:
  - Conduct analysis separately for Treatment (IT & GR) and Control group (ES).

Severance Payment: does not appear to be the channel

Sample	**Treatment Group (Italy and Greece)**			**Control Group (Spain)**		
	(1)	(2)	(3)	(4)	(5)	(6)
Latent class	No Het.	Group 1	Group 2	No Het.	Group 1	Group 2
Father is retired	0.024**	0.061***	0.015***	**0.025*** **	**0.047*** **	**0.015**
	(0.006)	(0.009)	(0.006)	**(0.010)**	**(0.015)**	**(0.011)**
$\hat{\pi}_1$	0.334			0.334		
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N	16,960	16,960	16,960	7,570	7,570	7,570
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Notes: Average marginal effects reported. Standard errors are clustered at the household level.

Channel: Role of Grandparents?

- Unintended effects of pension reforms on children's fertility (Battistin et al. 2013):

  Pension reforms $\rightarrow$ Informal child care by GP $\downarrow$ $\rightarrow$ Fertility $\downarrow$

- Grandmothers contribute more to child care than grandfathers (e.g. Richter et al. 1994).

- But, I focus only on grandfathers. Moreover, female LFP was very low.

$\Longrightarrow$ **Informal care provided by GP is probably not an important channel.**

What probably matters is...

Conclusion

- Explore the effect of paternal retirement on the hazard of children's nest-leaving, using European data.
- Main Finding:
  - Paternal retirement **causally increases** children's nest-leaving between 1.5% and 5% in Southern Europe.
  - No evidence of causal effects in Northern and Central Europe.
- Mechanism: negative externalities in preferences likely because:
  - Rule out channel through income, or severance payment.
  - Informal child care provided by GP is unlikely to be a major determinant.

Policy Implications

Potential unintended consequences of pension reforms on children's moving-out decisions in southern Europe.

THANK YOU FOR YOUR ATTENTION !

Figure A1: Eleven European countries

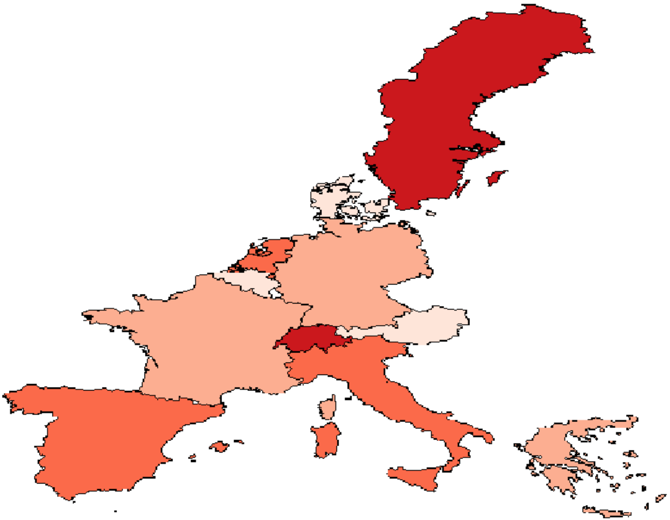


Table A1: Sample of Fathers and Children, by Country

Sample	Fathers	Sons	Daughters	Total
Austria	242	278	255	533
Belgium	664	704	686	1,390
Denmark	407	478	421	899
France	543	588	606	1,194
Germany	568	585	546	1,131
Greece	300	339	298	637
Italy	629	655	673	1,328
Netherlands	518	593	590	1,183
Spain	361	442	385	827
Sweden	455	573	464	1,037
Switzerland	248	290	271	561
Total	4,935	5,525	5,195	10,720

Table A2: Summary statistics

Variable	Observations	Mean	Std. Dev.
Sons			
Age	5,525	38.15	8.22
Nest leaving age	5,525	24.92	4.83
High school	5,525	0.46	0.50
College or more	5,525	0.37	0.48
Married	5,525	0.72	0.45
Daughters			
Age	5,195	37.77	8.42
Nest leaving age	5,195	23.61	4.30
High school	5,195	0.46	0.50
College or more	5,195	0.40	0.49
Married	5,195	0.77	0.42

Table A2: Summary statistics (cont.ed)

Variable	Observations	Mean	Std. Dev.
Fathers			
Age	4,935	66.89	8.60
Retired	4,935	0.72	0.45
Working	4,935	0.28	0.45
Retirement age (retired)	3,553	60.34	4.73
High school	4,935	0.34	0.47
College or more	4,935	0.23	0.42
Bad health	4,935	0.29	0.45
Household size	4,935	2.23	0.57

Back

Figure A2: Children's nest-leaving mean age

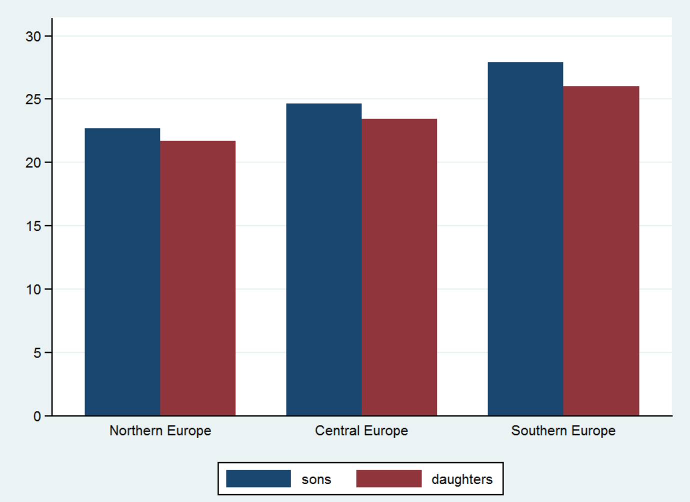


Figure A3: Fraction of adult children who are married

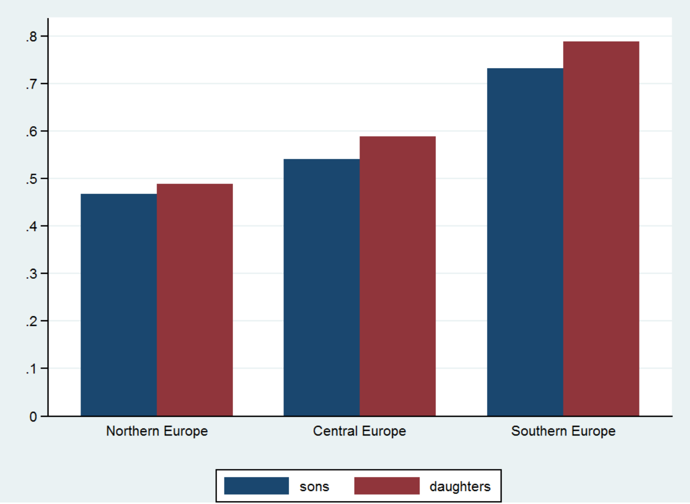
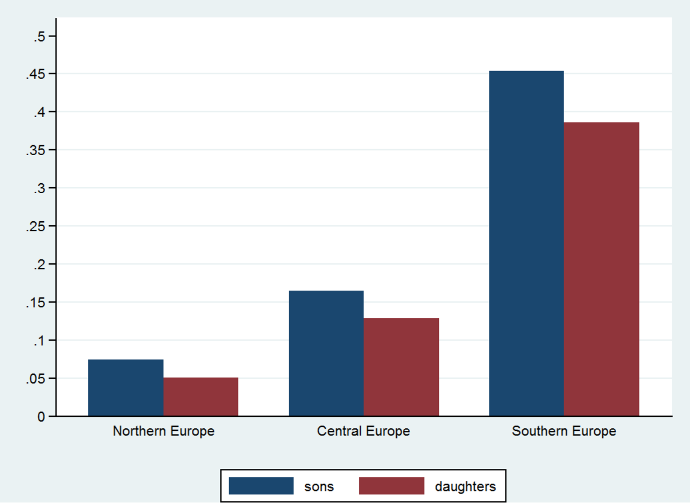
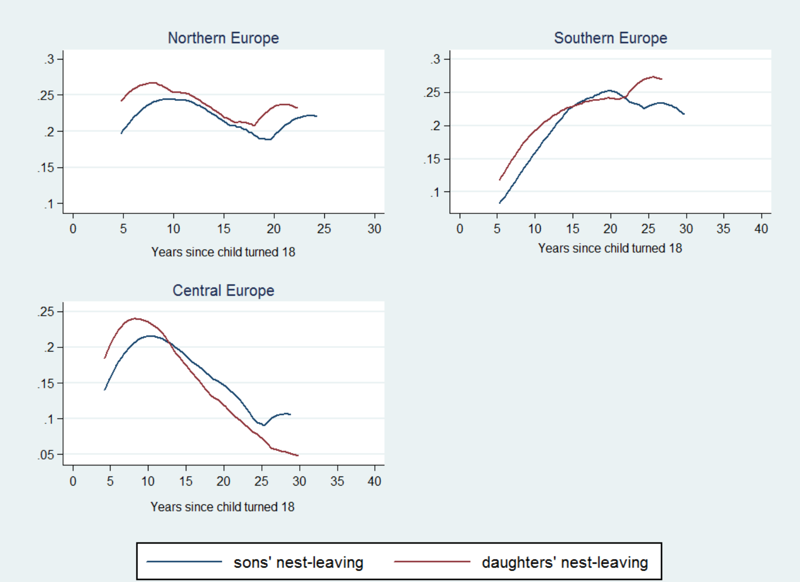


Figure A4: Fraction of children who left home after paternal retirement

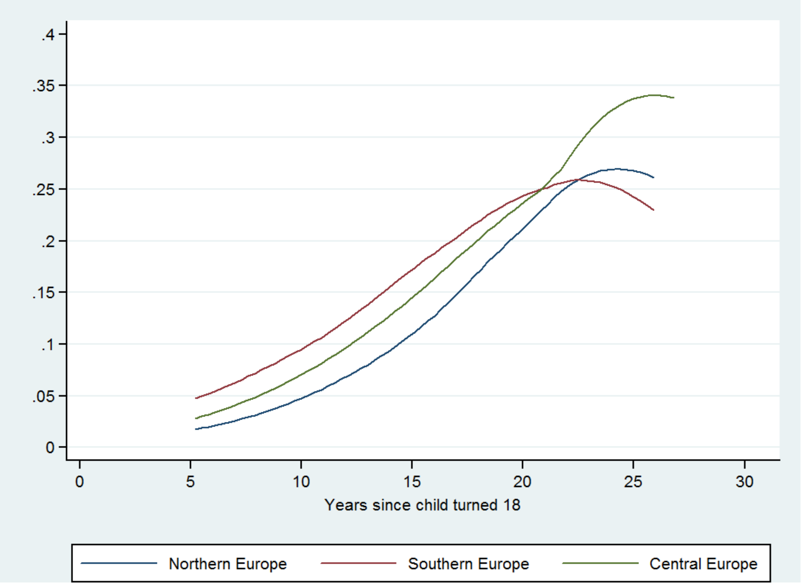


Hazard of Children's Nest-leaving

Back



Hazard of Paternal Retirement



Hazard Model vs Linear Analysis: Pros & Cons

Back

The hazard model is the most appropriate representation since:

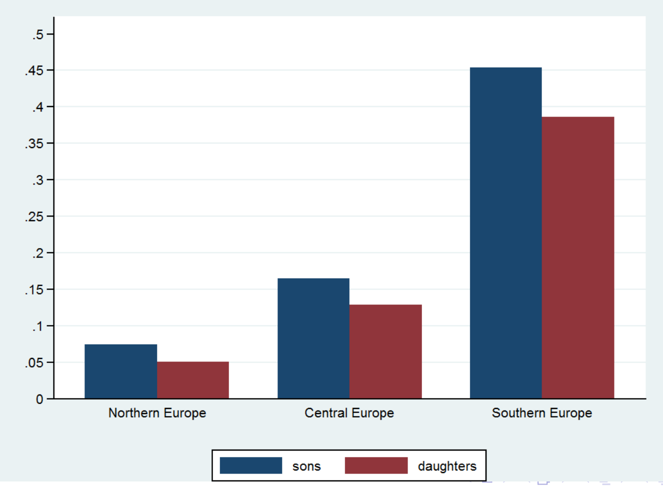
- Natural statistical framework for modeling time-to-event/survival outcomes.
- Accounts for *right-censoring*.
- Flexibility to handle nonlinear baseline hazards and nonlinear effects of covariates. Baseline
- Novel approach to identify treatment effects.

However, the hazard model has some disadvantages:

- Computationally demanding and convergence may be problematic.
- Estimates may be sensitive to parametric assumptions in the estimation.

What explains cross-region differences?

Figure 1: Fraction of children that left home after paternal retirement



What explains cross-region differences? (2)

Potential explanations for large disparities across European regions:

- Housing markets
  - Higher transaction costs in IT vs NL $\downarrow$ home leaving (Alessie et al. 2006).
- Family ties
  - "Strong" in South vs "weak" in North and Central (Reher 1998; Alesina and Giuliano 2011).
- Credit markets
- Other?

Likelihood

Following Melberg et al. (2010), the log-likelihood can be written as:

$$L = \sum_{i=1}^{n} \left\{ \sum_{k=1}^{2} \pi_k \left\{ \sum_{j=1}^{2} \left\{ \sum_{t=1}^{T_{ij}-d_{ij}} log\left[1-\theta_{jit}\right] + d_{ij} log\left[\theta_{jit}\right] \right\} \right\} \right\} \tag{1}$$

where:

- π_k : prob. that individual i belongs to group k.
- d_{ij}: dummy 0/1 if individual i is right-censored.
- T: last time period individual i is observed in the panel:
  - For nest-leaving children, T is the year of nest-leaving;
  - For non-nest-leaving children, T is the survey year (2006).

To maximize (1), I use the EM algorithm. EM

EM Algorithm

Back

- EM algorithm is a method to compute MLE when data is incomplete or missing.
- It consists of two processes:
  - **E-step:** compute the conditional expected value $Q(\theta; \theta_{k-1})$
  - **M-step:** find θ that maximizes $Q(\theta; \theta_{k-1})$
- Repeat E-step & M-step until convergence.

EM Algorithm (2)

- Start with a vector of parameters ϕ_0 that includes $\beta_1, \beta_2, \delta, \gamma$, $u = (u^{low}, u^{high})$ and $p = (p_1, p_2)$.
- **E-step:** Construct a set of weights for each observation as follows:

$$\pi^0_{k,i} = \frac{p^0_k L^0_{ki}}{\sum_{k=1}^{2} p^0_k L^0_{ki}}$$

  - Use these weights to construct an expected log-likelihood.
- **M-step:** Maximize this expected log-likelihood over ϕ to obtain ϕ_1.
- Based on ϕ_1, I construct a new set of weights π^1 and repeat the process to converge.

Hazard Model w/o Shared Frailty

Sample	Southern Europe		Northern Europe		Central Europe		Full sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Outcome	Nest	Ret.	Nest	Ret.	Nest	Ret.	Nest	Ret.
Father is retired	**0.023***** **(0.005)**		0.017 (0.030)		0.003 (0.009)		0.021*** (0.005)	
Father is eligible		0.089*** (0.005)		0.032*** (0.003)		0.043*** (0.004)		0.055*** (0.002)
N	24,530	18,806	13,197	12,597	28,698	23,682	66,425	55,085
Covariates	YES	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Cohort FE	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Average marginal effects reported. Standard errors are clustered at the household level.

Model with Shared Frailty - Hazard of Nest-leaving

Sample	**Southern Europe**		**Northern Europe**		**Central Europe**		**Full sample**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Latent Class	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
Father is retired	0.055***	0.014***	0.023	-0.097	0.009	-0.026	0.026***	0.002
	(0.007)	(0.005)	(0.025)	(0.067)	(0.009)	(0.021)	(0.007)	(0.005)
$\hat{\pi}_1$	0.334		0.065		0.210		0.319	
	(0.325)		(0.196)		(0.290)		(0.336)	
N	24,530	24,530	13,197	10,623	28,698	22,114	66,425	57,267
Controls	YES	YES	YES	YES	YES	YES	YES	YES

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Latent Class	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
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Model with Shared Frailty - Hazard of Nest-leaving

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N	24,530	24,530	13,197	10,623	28,698	22,114	66,425	57,267
Controls	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Average marginal effects reported. Standard errors are clustered at the household level.

Hazard of Nest-leaving - Sons & Daughters

Sample	**Sons**			**Daughters**		
	(1)	(2)	(3)	(4)	(5)	(6)
Latent Class	No Het.	Group 1	Group 2	No Het.	Group 1	Group 2
Father is retired	0.024***	0.055***	0.013**	0.017**	0.049***	0.011
	(0.006)	(0.009)	(0.007)	(0.008)	(0.011)	(0.008)
$\hat{\pi}_1$	0.334			0.334		
	(0.325)			(0.325)		
N	14,076	14,076	14,076	10,454	10,454	10,454
Controls	YES	YES	YES	YES	YES	YES

Notes: Average marginal effects reported. Standard errors are clustered at the household level.

Model with Shared Frailty - Hazard of Retirement

Sample	**Southern Europe**		**Northern Europe**		**Central Europe**		**Full sample**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Latent Class	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
Father is eligible	0.100***	0.087***	0.039***	0.023***	0.047***	0.037***	0.065***	0.061***
	(0.000)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)
$\hat{\pi}_1$	0.334		0.065		0.210		0.319	
	(0.325)		(0.196)		(0.290)		(0.336)	
N	18,806	18,806	12,597	12,597	23,682	18,419	55,085	49,822
Controls	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Average marginal effects reported. Standard errors are clustered at the household level.

Differences between Latent Classes

Variable	Group 1		Group 2			Full sample - No Het.	
	Mean	Std. Dev.	Mean	Std. Dev.	*p-value*	Mean	Std. Dev.
Panel A: Southern Europe ($\hat{\pi}_1 = 0.334$)							
Father is retired	0.247	0.431	0.195	0.397	0.00	0.221	0.415
College or more (father)	0.084	0.277	0.073	0.259	0.00	0.078	0.268
College or more (child)	0.301	0.459	0.235	0.424	0.00	0.268	0.442
Nest-leaving age	30.078	5.268	29.325	5.262	0.00	29.701	5.278
Panel B: Northern Europe ($\hat{\pi}_1 = 0.065$)							
Father is retired	0.072	0.259	0.018	0.132	0.00	0.045	0.207
College or more (father)	0.213	0.409	0.282	0.450	0.00	0.247	0.431
College or more (child)	0.350	0.477	0.388	0.487	0.00	0.369	0.482
Nest-leaving age	26.308	5.196	23.704	4.104	0.00	25.006	4.858

Differences between Latent Classes (cont.ed)

Variable	Group 1		Group 2			Full sample - No Het.	
	Mean	Std. Dev.	Mean	Std. Dev.	*p-value*	Mean	Std. Dev.
Panel C: Central Europe ($\hat{\pi}_1 = 0.210$)							
Father is retired	0.159	0.366	0.040	0.197	0.00	0.100	0.299
College or more (father)	0.272	0.445	0.253	0.435	0.00	0.263	0.440
College or more (child)	0.430	0.495	0.488	0.500	0.00	0.459	0.498
Nest-leaving age	29.024	7.055	25.326	4.286	0.00	27.175	6.122
Panel D: Full sample ($\hat{\pi}_1 = 0.319$)							
Father is retired	0.172	0.377	0.123	0.328	0.00	0.147	0.354
College or more (father)	0.217	0.412	0.164	0.370	0.00	0.190	0.393
College or more (child)	0.392	0.488	0.351	0.477	0.00	0.371	0.483
Nest-leaving age	28.560	6.299	26.807	5.172	0.00	27.684	5.829

Notes: Obs. with an estimated prob. less than the median are assigned to Group 1, while the remaining are in Group 2.

Robustness Checks

I verify whether my results are robust to:

1. Linear IV analysis. Table A1
2. Narrow window around paternal retirement (3 years). Table A2

IV analysis

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Sample	(1) South	(2) North	(3) Central	(4) Overall
Panel A: 2SLS				
Father is retired	0.159**	-0.253	-0.046	0.042
	(0.075)	(0.235)	(0.066)	(0.066)
N	34,462	37,135	54,976	126,573
First stage F	82.06	9.12	98.99	159.68
Panel B: First stage				
Father is eligible	0.442***	0.132*	0.246***	0.454***
	(0.020)	(0.044)	(0.025)	(0.009)
N	34,462	37,135	54,976	126,573

Notes: Standard errors are clustered at the household level.

Sensitivity of Estimates

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Sample	Southern Europe		Northern Europe		Central Europe		Full sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Latent Class	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
Panel A: Piecewise constant function as baseline hazard								
Father is retired	0.056***	0.014***	0.024	-0.098	0.005	-0.026	0.025***	-0.001
	(0.007)	(0.005)	(0.024)	(0.063)	(0.009)	(0.020)	(0.007)	(0.005)
N	24,530	24,530	13,197	10,623	28,698	22,114	66,425	57,267
Panel B: Gateway Effect - 3 years								
Father is retired	0.038***	0.011*	0.021	-0.055	0.009	-0.011	0.028***	0.001
	(0.009)	(0.007)	(0.020)	(0.114)	(0.011)	(0.031)	(0.009)	(0.007)
N	24,530	24,530	13,197	10,623	28,698	22,114	66,425	57,267

Notes: Average marginal effects reported. Standard errors are clustered at the household level.