



ANCIEN PROJECT WP3: AVAILABILITY AND CHOICE OF CARE

Sergi Jiménez Martín
(UPF, BARCELONA GSE, AND FEDEA)

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WP3: RESEARCH QUESTIONS

To document forces driving the choice of formal and informal care across European countries

To characterize the linkages between the type of care used by dependent people and country's institutional settings

T1: Analysis of informal care provision across Europe: regulation and profile of providers

T2: Formal Care across Europe. Description and perspectives

T3: What are the determinants across European countries of the choice of the type of care: formal, informal or both types

T4: What are the effects of caring for caregivers

T5: What are the labor market implications of caring for caregivers

✓ **TASK1 & 2 CONTRIBUTORS**

✓ **HIS** – Description FC & IC across European countries

✓ **FPB** – Projection: Demographic trends and its effect in LTC provision

✓ **CASE** - Patterns of use of formal and informal LTC in a set of countries that represent each cluster

✓ **ETLA** –LTC system in Finland and analysis of the impact of being institutionalized in the quality of life

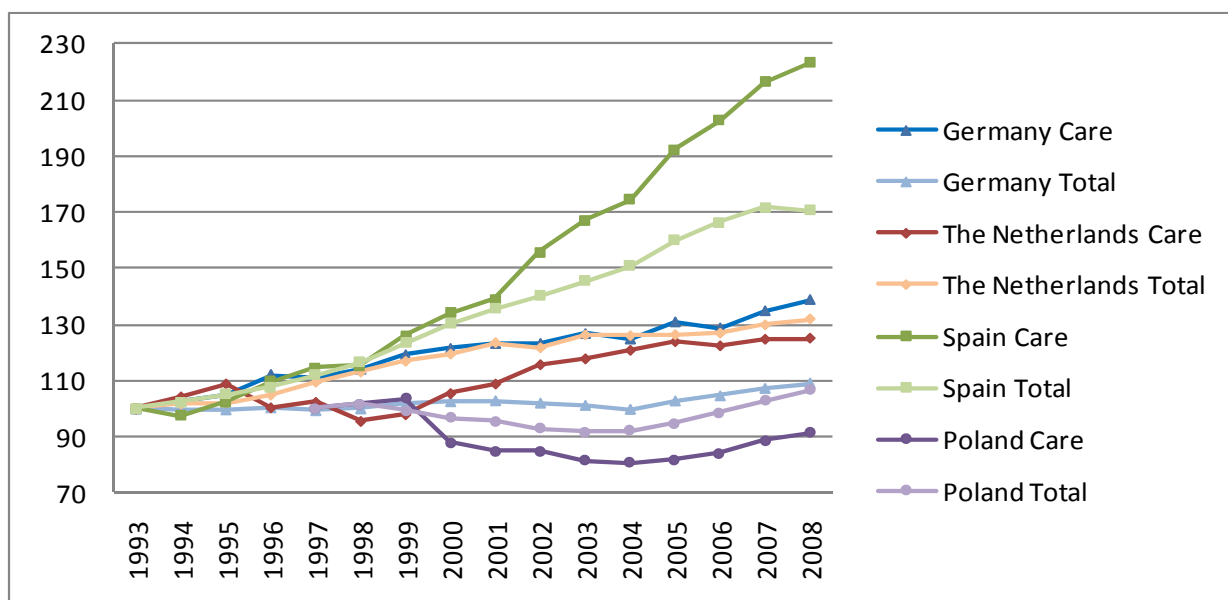
✓ **LSE** - provides a detailed analysis of the probability of providing informal care depending on individual and family circumstances

✓ **TASK3, 4, 5 CONTRIBUTORS**

✓ **FEDEA** - Choice of care and hours of care. Unmet needs and labor market implications.

✓ **ISAE**–Labor market implications of caring for caregivers

EXAMPLE OF TASK 1 & 2: SUPPLY OF FORMAL CARE

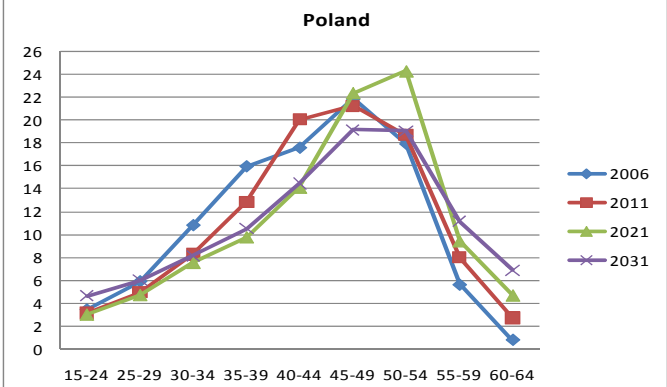
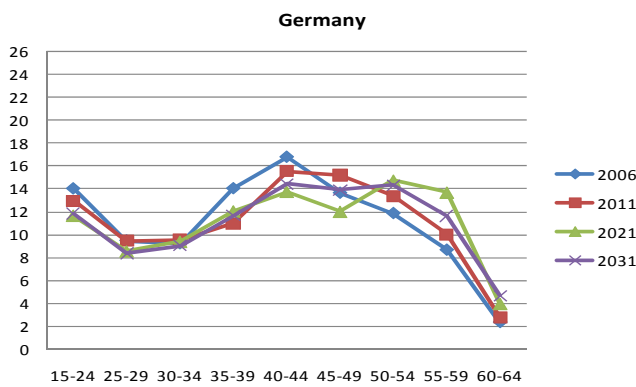
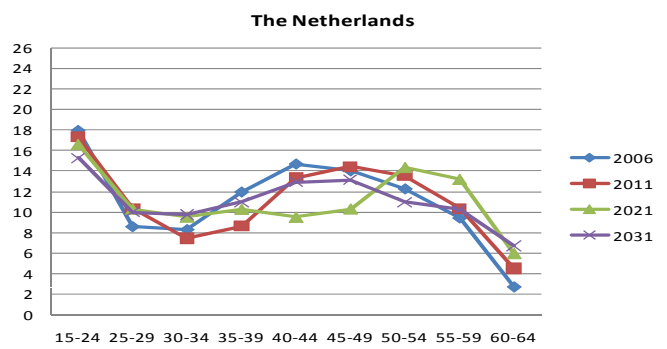
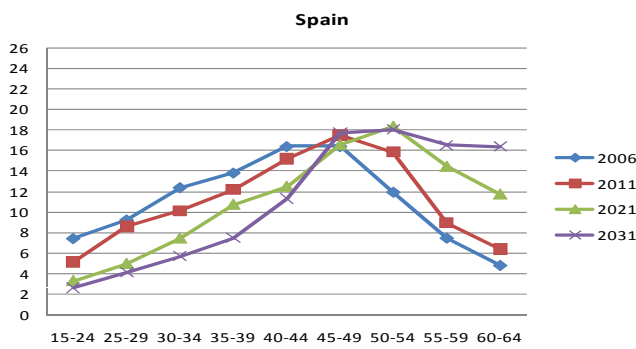


Methodology: Stock-flow projection model

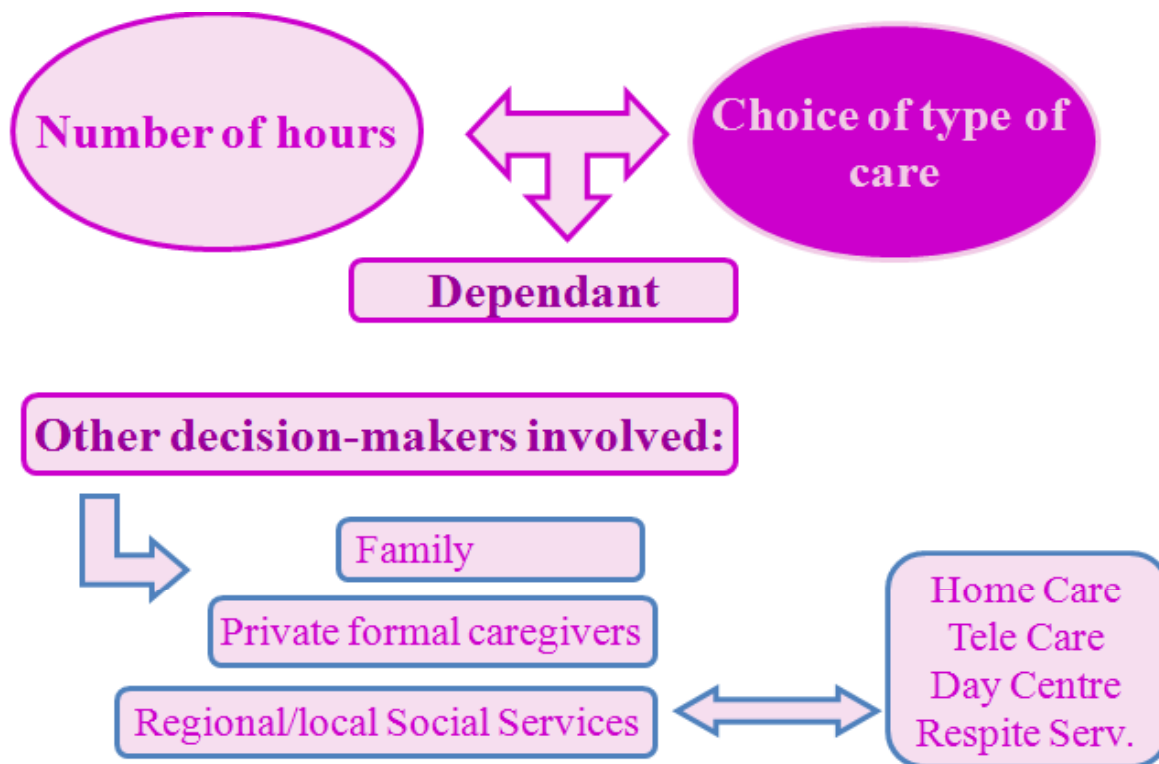
Data: ELFS

Representative countries: Germany, Netherlands, Spain, Poland

Example of results from Task 1 & 2: Projected age profile of the care workforce, 2011-2031



TASK 3: CHOICE OF CARE FOR SELECTED COUNTRIES



Choice of care: basic econometric model (BFG, 2007)

$$H_j^* = X\beta_j + \varepsilon_j \quad j = 1, 2, 3$$

Outcome equation

$$C_j = Z\alpha_j + u_j \quad j = 0, 1, 2, 3$$

Selection equation

$$E[\varepsilon_j | X, Z] = 0; V[\varepsilon_j | X, Z] = \sigma^2$$

Assume that we observe H_1 if and only if the category 1 has been chosen $\rightarrow C_1 > \max_{j \neq 1} (C_j)$

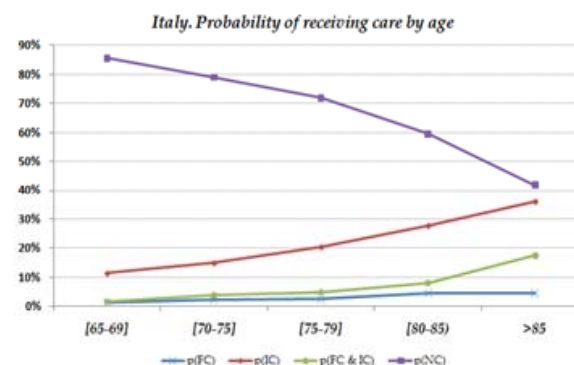
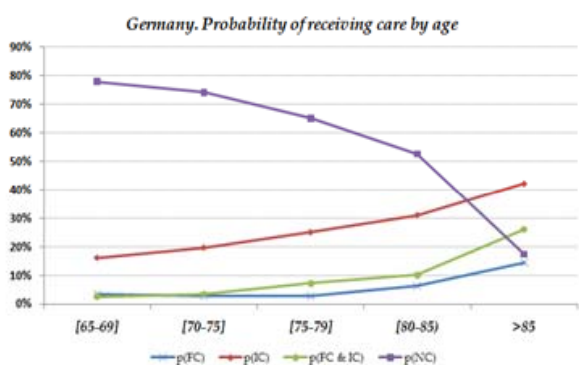
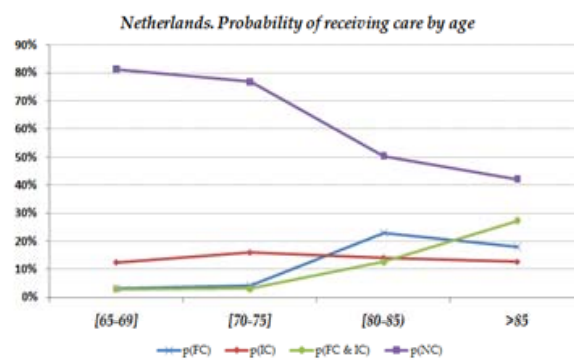
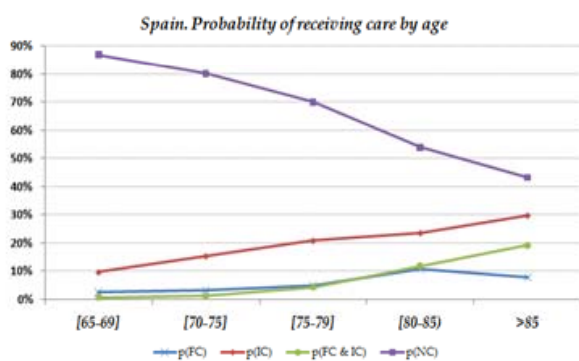


Problem: to estimate the parameter vector β_1 while taking into account that the disturbance term ε_1 might be not independent of all (u_j) 's
 \rightarrow 2nd stage "LS" are not consistent

Methodology (cont)

- **Solution:**
 - Selection bias model (Heckman, 1979)
 - In this case the selection criteria is a multinomial logit: Bourguignon et al., (2007)
 - Where the selection correction terms help deciding which model of care is more likely to hold in data.
 - **Applied to:**
 - representative countries (Germany, Netherlands, Spain, Italy)
 - Pooled sample of countries
- + with **SHARE DATA** for individuals **65+ having a health limitation.**
- **With the objectives:**
 - Studying the relationship between types of care
 - The influence of the choice of care in the # hours of care

TASK 3: CHOICE OF CARE FOR SELECTED COUNTRIES



TASK 3: CHOICE OF CARE, BASIC RESULTS (I)

	Germany			Netherlands		
	FC	IC	FC & IC	FC	IC	FC & IC
Male	-0.168 (-0.454)	-0.201 (-1.067)	-0.270 (-0.828)	-0.252 (-0.791)	0.016 (0.066)	-0.226 (-0.690)
Married	-0.714 (-1.494)	-0.629*** (-2.732)	-0.392 (-0.922)	0.652 (1.630)	-0.354 (-1.117)	-0.288 (-0.570)
Widow	0.029 (0.052)	0.393 (1.268)	0.790* (1.874)	0.222 (0.369)	0.070 (0.137)	0.876 (1.638)
At least a women descendant	-0.144 (-0.412)	0.818*** (4.425)	0.288 (0.954)	0.625** (2.007)	0.988*** (4.136)	0.004 (0.012)
Household size	-0.394 (-1.245)	-0.155 (-1.026)	-0.813** (-2.477)	-1.060*** (-2.961)	-0.702*** (-2.690)	-1.340*** (-3.666)
Secondary	-0.361 (-0.938)	0.183 (0.842)	1.240*** (3.466)	-0.164 (-0.518)	0.145 (0.610)	-0.011 (-0.033)
University	0.343 (0.600)	0.384 (1.145)	-14.178 (-0.018)	-0.231 (-0.394)	0.358 (0.906)	-0.579 (-0.800)
Age: 65-69	0.190 (0.414)	-0.055 (-0.241)	-0.128 (-0.267)	-0.303 (-0.570)	-0.222 (-0.772)	-0.062 (-0.120)
Age: 70-74	-0.594 (-0.811)	0.124 (0.481)	0.560 (1.263)	1.020** (2.149)	0.143 (0.446)	0.680 (1.357)
Age: 80-85	0.899* (1.756)	0.640** (2.315)	1.084** (2.384)	1.777*** (3.628)	-0.366 (-0.851)	1.426*** (2.777)
Age: Older than 85	2.773*** (4.431)	1.897*** (4.251)	2.953*** (5.231)	1.527*** (2.818)	0.191 (0.415)	2.115*** (4.069)
Basic DLA	-0.644 (-0.603)	0.414 (1.116)	-0.457 (-0.551)	0.879 (1.644)	0.090 (0.158)	-0.315 (-0.433)
Instrumental DLA	1.340*** (2.964)	0.871*** (3.030)	1.642*** (4.379)	0.458 (1.180)	0.281 (0.863)	1.161*** (3.213)
Mobility limitations	0.413 (0.942)	1.206*** (4.930)	1.210** (2.384)	1.571*** (3.946)	0.656*** (2.741)	2.401*** (4.343)
Depression	0.719* (1.893)	-0.058 (-0.323)	1.077*** (3.036)	0.538* (1.779)	0.439* (1.925)	0.735** (2.296)
Income: 1001-2000 €/month	0.046 (0.114)	0.211 (1.034)	-0.392 (-1.157)	0.249 (0.744)	0.428* (1.672)	0.321 (0.946)
Income: 2001-3000 €/month	-0.028 (-0.048)	0.052 (0.192)	-0.049 (-0.098)	-0.140 (-0.259)	0.272 (0.848)	-0.151 (-0.244)
Income: 3000-5000 €/month	-0.023 (-0.028)	0.098 (0.257)	-0.818 (-0.758)	0.421 (0.629)	0.790** (1.996)	-0.599 (-0.537)
Income: More than 5000 €/month	-0.215 (-0.321)	-0.017 (-0.051)	-0.384 (-0.664)	1.230* (1.856)	0.716 (1.396)	1.903*** (2.881)
Constant	-2.641*** (-3.034)	-2.300*** (-5.004)	-3.858*** (-4.235)	-2.779*** (-3.269)	-1.564*** (-2.616)	-2.973*** (-3.179)
Observations	46	225	74	67	118	73
Observations Total	Total: 913 (NC=568)			Total: 704 (NC=446)		

TASK 3: HOURS OF CARE, BASIC SELECTION RESULTS WITH COUNTRY DATA (I)

Germany				Netherlands			
	P(FC)	P(IC)	P(FIC)		P(FC)	P(IC)	P(FIC)
M(FC)	14.976 (0.246)	-3.204 (-0.185)	-1.129 (-0.033)	M(FC)	3.622 (1.166)	2.366 (0.272)	2.291 (0.037)
M(IC)	-52.029 (-0.410)	-1.162 (-0.127)	19.718 (0.144)	M(IC)	-4.941 (-0.311)	5.202 (0.878)	44.900 (0.472)
M(FIC)	-37.636 (-0.312)	-4.567 (-0.375)	24.211 (0.592)	M(FIC)	2.355 (0.239)	5.053 (0.625)	-10.898 (-0.189)
M(NC)	-60.928 (-0.571)	3.727 (0.251)	-21.099 (-0.387)	M(NC)	-13.348 (-0.859)	-1.475 (-0.163)	-7.607 (-0.069)
Spain				Italy			
M(FC)	-6.176 (-0.234)	-7.972 (-0.437)	n.d.	M(FC)	19.672 (0.652)	-3.204 (-0.185)	-1.129 (-0.033)
M(IC)	-8.023 (-0.150)	-0.490 (-0.029)	n.d.	M(IC)	35.431 (1.243)	-1.162 (-0.127)	19.718 (0.144)
M(FIC)	-0.198 (-0.007)	1.660 (0.069)	n.d.	M(FIC)	35.860** (2.368)	-4.567 (-0.375)	24.211 (0.592)
M(NC)	9.419 (0.194)	7.946 (0.526)	n.d.	M(NC)	-18.205 (-0.361)	3.727 (0.251)	-21.099 (-0.387)

Little evidence in favour of the BFG model, mainly because insufficient data

TASK 3: HOURS OF CARE, BASIC SELECTION RESULTS WITH POOLED DATA

Countries clustered by characteristics of their LTC

	P(IC)	P(FC)	P(FIC)
M(FC)	1.702 (0.816)	-0.150 (-0.203)	0.817 (0.293)
M(IC)	-2.753* (-1.773)	-3.988 (-1.312)	1.756 (0.435)
M(FIC)	-4.671* (-1.749)	-5.101 (-1.559)	1.428 (0.806)
M(NC)	-0.556 (-0.571)	-2.354 (-1.560)	1.465 (0.806)

-the task-specific/complementarity model fits well to these results

-the sign and significance of the selectivity term M(IC) in the IC equation indicates family care increases in the case of dependent people with worse unobservable characteristics.

EXAMPLE OF TASKS 4 & 5: INFORMAL CARE CHARACTERISTICS, EMERGENCE OF LABOUR PROBLEMS AND THE PROBABILITY OF BECOMING A CAREGIVER

Objectives:

- Incorporate the unmet needs dimension to the study of labours problems suffered by informal caregivers.
- Exploring similarities and differences of informal caregiving behaviour and its consequences across the EU
- Analysis of the implications of varying (FC) resources on the probability of having UN, LP & being IC.

Data Sources:

**Eurobarometer EB67.3: "Health and long-term care in Europe"
Including also potential countries for the European enlargement
European Commission (2007)**

MODEL: Joint (trivariate) analysis of IC, LP, and UN.

We define a three equations conditional simultaneous model.

$$IC = 1(IC^* > 0), LP = 1(LP^* > 0), UN = 1(UN^* > 0)$$

$$IC^* = \alpha_1 X_1 + \beta LP^* + \gamma UN^* + \varepsilon_1$$

$$LP^* = \alpha_2 X_2 + \delta UN^* + \varepsilon_2$$

$$UN^* = \alpha_3 X_3 + \varepsilon_3$$

$$\text{Cov}(\varepsilon_1, \varepsilon_2, \varepsilon_3) = \begin{bmatrix} 1 & \rho_{12} & \rho_{13} \\ \rho_{12} & 1 & \rho_{23} \\ \rho_{13} & \rho_{23} & 1 \end{bmatrix}$$

Maddala, 1983
Blundell y Smith, 1994

Triangular form

Coherence condition

x1 =

Age, sex, marital status, kinship dependent individual-caregiver

x2 =

X₁+
Working before becoming caregiver
Professional situation

- > Single business proprietor
- > Business proprietor with wage-earners
- > White collar
- > Qualified worker
- > Non-qualified worker

x3 =

X₂+
Community size

- > Rural
- > Small/midle city
- > Big city

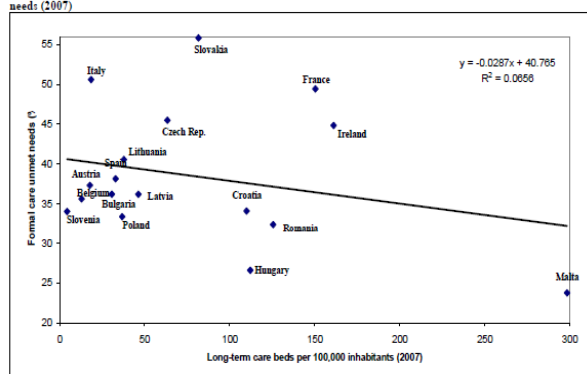
Durable goods

- > Car
- > PC
- > Fixed telephone

RELATIONSHIP BETWEEN REGIONAL INDICATORS AND UNMET NEEDS:

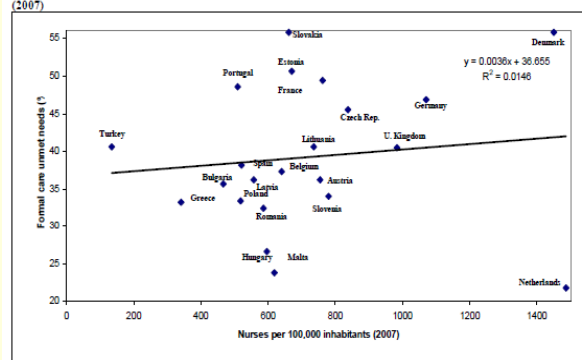
HIGHER FORMAL CARE PROVISION → LESS UNMET NEEDS

Figure 9. Relationship between long-term care beds per 100,000 inhabitants and formal care unmet needs (2007)



Source: Own elaboration using Eurobarometer 67.3 and Eurostat Database

Figure 11. Relationship between nurses per 100,000 inhabitants and formal care unmet needs (2007)



Source: Own elaboration using Eurobarometer 67.3 and Eurostat Database

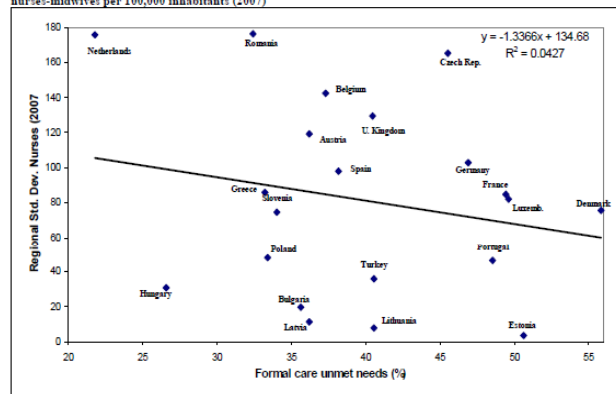
For long-term care beds and psychiatric beds it seems that there exists a negative relationship between the number of beds per 100,000 inhabitants and the percentage of formal care unmet needs.

Less clear relation for nurses/psychiatrist per 100,000 inhabitants and unmet needs

RELATIONSHIP BETWEEN REGIONAL DISPERSION AND UNMET NEEDS:

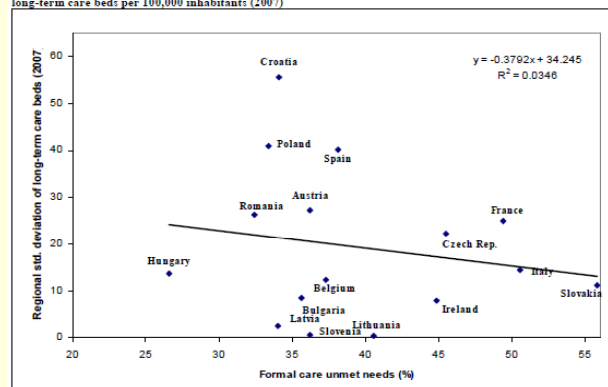
- REGIONAL DISPERSION AND UNMET NEEDS ARE NOT POSITIVELY RELATED

Figure 15. Relationship between formal care unmet needs (2007) and regional standard deviation of nurse-midwives per 100,000 inhabitants (2007)



Source: Own elaboration using Eurobarometer 67.3 and Eurostat Database

Figure 13. Relationship between formal care unmet needs (2007) and regional standard deviation of long-term care beds per 100,000 inhabitants (2007)



Source: Own elaboration using Eurobarometer 67.3 and Eurostat Database

- For any pair of variables we do not observe a positive relationship between higher degree of unmet needs and more regional dispersion

□ SIM 1: NUMBER OF LONG-TERM CARE BEDS PER 100,000 INHABITANTS INCREASE BY 10%.

	Pr[being informal caregiver]			Pr[having labour problems]			Pr[formal care unmet needs]		
	Initial	Simulated	Change (%)	Initial	Simulated	Change (%)	Initial	Simulated	Change (%)
Belgium	0.2814	0.2652	-5.75	0.3684	0.3341	-9.32	0.2327	0.2281	-1.97
Denmark	0.2870			0.3662			0.3430		
Germany	0.2573			0.3778			0.2427		
Greece	0.2339			0.3756			0.0419		
Spain	0.2449	0.2372	-3.15	0.3780	0.3522	-6.82	0.1879	0.1871	-0.44
Finland	0.2902			0.4022			0.0409		
France	0.2726	0.2557	-6.19	0.3539	0.3119	-11.87	0.2410	0.2356	-2.23
Ireland	0.2376	0.2321	-2.34	0.3529	0.3241	-8.16	0.0808	0.0692	-14.42
Italy	0.2482	0.2389	-3.73	0.3403	0.2995	-11.98	0.1116	0.0873	-21.82
Luxemb.	0.2449			0.3634			0.2420		
Netherlands	0.2872			0.3788			0.8368		
Austria	0.2265	0.2124	-6.21	0.3396	0.3212	-5.41	0.1686	0.1632	-3.20
Portugal	0.2467			0.3879			0.1317		
Sweden	0.2701	0.2672	-1.28	0.3936	0.3624	-8.11	0.1629	0.1026	-32.93
U. Kingdom	0.2651	0.2540	-4.18	0.3830	0.3432	-10.38	0.3363	0.3125	-7.09
Cyprus	0.2816			0.4252			0.0581		
Czech Rep.	0.2388	0.2262	-5.27	0.3973	0.3740	-5.86	0.1771	0.1108	-37.42
Estonia	0.2815			0.4127			0.3257		
Hungary	0.2391	0.2122	-11.25	0.4249	0.4120	-3.05	0.1469	0.1122	-23.59
Latvia	0.2286	0.2049	-10.37	0.3629	0.3513	-3.21	0.1297	0.0969	-25.31
Lithuania	0.2506	0.2390	-4.63	0.3767	0.3545	-5.89	0.2133	0.1830	-14.18
Malta	0.2353	0.1961	-16.67	0.4276	0.4225	-1.21	0.1511	0.1242	-17.81
Poland	0.2573	0.2514	-2.28	0.4001	0.3766	-5.88	0.1690	0.1653	-2.21
Slovakia	0.2641	0.2551	-3.38	0.3970	0.3590	-9.57	0.0468	0.0465	-0.62
Slovenia	0.2393	0.2184	-8.70	0.4001	0.3838	-4.06	0.1290	0.1256	-2.67
Bulgaria	0.2409	0.2175	-9.72	0.4020	0.3838	-4.53	0.0856	0.0845	-1.31
Romania	0.2285	0.2118	-7.28	0.3643	0.3477	-4.56	0.5413	0.4112	-24.05
Turkey	0.2354			0.3688			0.1844		
Croatia	0.2438	0.2343	-3.92	0.3916	0.3504	-10.50	0.1040	0.0918	-11.66

BIGGEST REDUCTIONS

□ SIM 2: NUMBER OF NURSES/MIDWIVES PER 100,000 INHABITANTS INCREASE BY 10%.

	Pr[being informal caregiver]			Pr[having labour problems]			Pr[formal care unmet needs]		
	Initial	Simulated	Change (%)	Initial	Simulated	Change (%)	Initial	Simulated	Change (%)
Belgium	0.2814	0.2655	-5.65	0.3684	0.3639	-1.24	0.2327	0.2279	-2.08
Denmark	0.2870	0.2691	-6.21	0.3662	0.3568	-2.59	0.3430	0.3237	-5.61
Germany	0.2573			0.3778			0.2427		
Greece	0.2339	0.2082	-10.99	0.3756	0.3506	-6.66	0.0419	0.0389	-7.39
Spain	0.2449	0.2370	-3.26	0.3780	0.3731	-1.29	0.1879	0.1868	-0.55
Finland	0.2902			0.4022			0.0409		
France	0.2726	0.2560	-6.09	0.3539	0.3405	-3.81	0.2410	0.2359	-2.12
Ireland	0.2376	0.2318	-2.45	0.3529	0.3527	-0.06	0.0808	0.0692	-14.33
Italy	0.2482			0.3403			0.1116		
Luxemb.	0.2449			0.3634			0.2420		
Netherlands	0.2872	0.2701	-5.96	0.3788	0.3709	-2.07	0.8368	0.7424	-11.28
Austria	0.2265	0.2122	-6.33	0.3396	0.3304	-2.71	0.1686	0.1630	-3.31
Portugal	0.2467	0.2357	-4.43	0.3879	0.3836	-1.12	0.1317	0.1235	-6.25
Sweden	0.2791			0.3835			0.1528		
U. Kingdom	0.2651	0.2543	-4.08	0.3830	0.3742	-2.30	0.3363	0.3128	-6.99
Cyprus	0.2816			0.4252			0.0581		
Czech Rep.	0.2388	0.2259	-5.38	0.3973	0.3883	-2.25	0.1771	0.1106	-37.57
Estonia	0.2815	0.2746	-2.45	0.4127	0.4067	-1.46	0.3257	0.2658	-18.39
Hungary	0.2391	0.2119	-11.38	0.4249	0.4033	-5.09	0.1469	0.1120	-23.72
Latvia	0.2286	0.2046	-10.49	0.3629	0.3450	-4.93	0.1297	0.0970	-25.23
Lithuania	0.2506	0.2387	-4.75	0.3767	0.3683	-2.23	0.2133	0.1832	-14.08
Malta	0.2353	0.1958	-16.79	0.4276	0.3875	-9.38	0.1511	0.1244	-17.72
Poland	0.2573	0.2511	-2.40	0.4001	0.3911	-2.24	0.1690	0.1654	-2.10
Slovakia	0.2641			0.3970			0.0468		
Slovenia	0.2393	0.2182	-8.82	0.4001	0.3838	-4.07	0.1290	0.1257	-2.57
Bulgaria	0.2409	0.2172	-9.84	0.4020	0.3876	-3.59	0.0856	0.0844	-1.42
Romania	0.2285	0.2116	-7.40	0.3643	0.3513	-3.56	0.5413	0.4116	-23.96
Turkey	0.2354	0.2304	-2.12	0.3688	0.3688	0.00	0.1844	0.1394	-24.40
Croatia	0.2438			0.3916			0.1040		

Concluding remarks

- In this project we have studied the availability, choice of care and the implications of caring for caregivers in the EU
 - The analysis of representative countries reveals strong dispersion in the configuration of the LTC system and its implications for caregivers
 - Initial conditions (dispersion) matters a lot.
 - Informal and formal care seem to be complements rather than substitutes.