

Providing informal care by the older people and the effect of poor health: causality problems

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Structure of the presentation

- About the research problem
- Short literature review and overview of main concepts
- Data, variables and hypotheses
- Results
- Robustness checks
- Discussion and conclusion

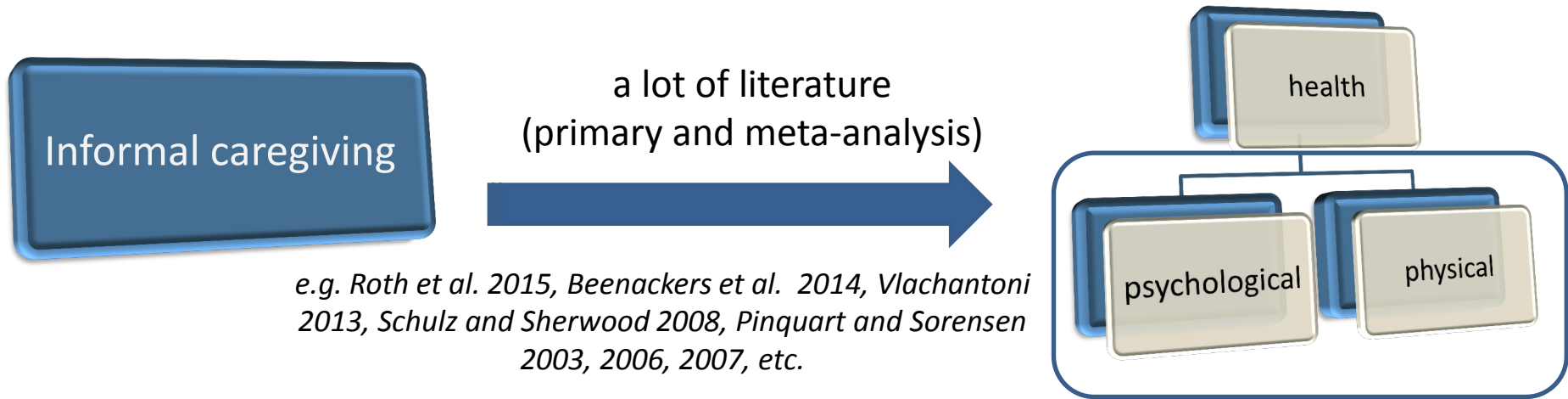
Research problem

- Causal relationship between informal caregiving and (poor) health has been established in several studies (e.g. Schulz & Sherwood, 2008; Schulz & Beach, 1999; Pinquart & Sörensen, 2003; Roth et al., 2009; Vitaliano, Zhang, & Scanlon, 2003)
- Still under-researched: the effect of health on informal caregiving
- The results of basic correlations using SHARE data often confirm the adverse sign of the relationship: particularly for caregivers within household, the ones with *worse* health tend to help *more* often
- What is driving this relationship?

Short literature review and overview of main concepts

- There is a lot of literature (primary and meta-analysis) on impacts of informal caregiving on caregivers health (e.g. Roth et al. 2015, Beenackers et al. 2014, Vlachantoni 2013, Schulz and Sherwood 2008, Pinquart and Sorensen 2003, 2006, 2007, etc.)
- Interdisciplinary research - research designs, sampling procedures, statistical methods are heterogenous
- Health – psychological health and physical health (separately or simultaneously)
- Meta analyses and other systematic reviews typically conclude that caregivers are more likely to experience depressive symptoms and have poorer physical health outcomes when compared with various samples of noncaregivers (Pinquart & Sörensen, 2003; Schulz & Sherwood, 2008; Vitaliano, Zhang, & Scanlon, 2003).

Short literature review and overview of main concepts



- Latest review (Bauer and Sousa-Poza, 2015) points out that caregiving tends to lower the quality of the caregiver's psychological health, which also has a negative impact on physical health outcomes.
- Some studies (Schenmakers; Pinquart and Sorensen; Baurer and Sousa Poza, 2015) noted that:
 - Literature reviewed is very heterogenous – minimally comparable
 - Most studies are cross-sectional and thus do not account for endogeneity
 - Research often omits important controls (e.g. preexisting illness)

Main hypotheses and methodology

- H1: „Older people in *better health* tend to provide more help to others“ (not so obvious...)
- H2: „Relationship between informal caregiving and health is endogenous“
- H3: „There are significant differences in the relationship of health and informal caregiving between helpgiving *within* and *outside* household“
- Methodology: probit / instrumental variables probit (to complement the results: treatment models with endogenous treatment)

Main hypotheses and methodology

$$y_{1i}^* = y_{2i}\beta + x_{1i}\gamma + u_i$$

$$y_{2i} = x_{1i}\Pi_1 + x_{2i}\Pi_2 + v_i$$

We do not observe y_{1i}^* ; instead, we observe

$$y_{1i} = \begin{cases} 0 & y_{1i}^* < 0 \\ 1 & y_{1i}^* \geq 0 \end{cases}$$

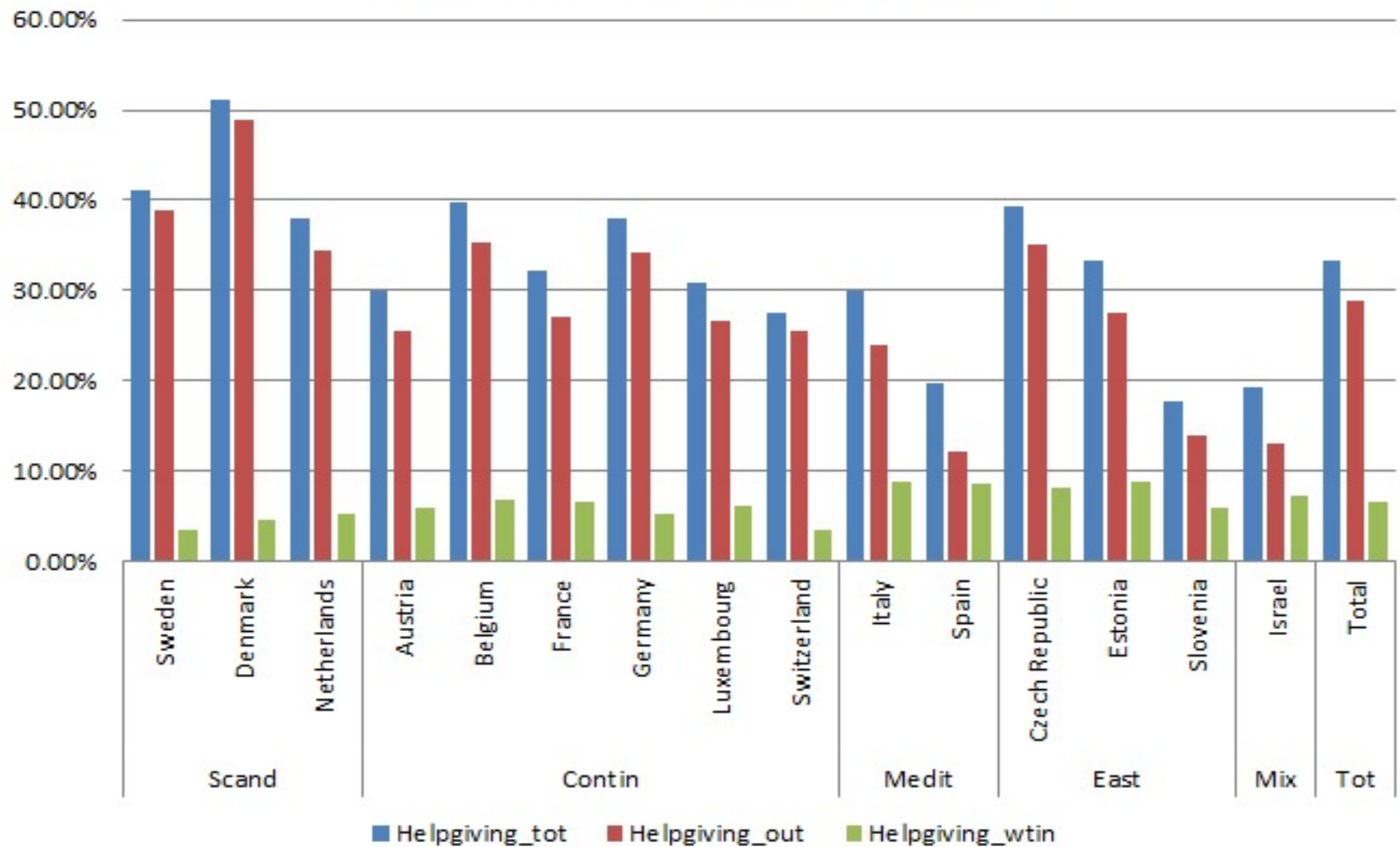
- IV estimation faces three main perils (Murray, 2006; 2010):
 - 1) IV estimation is inconsistent if the instruments are correlated with the disturbance term. This is **the problem of “bad” or “invalid” instruments**.
 - 2) IV estimation suffers persistent biases and size-of-test biases in even very large samples if the instruments used are only weakly correlated with explanatory variables responsible for bias in an OLS estimation. This is **the problem of “weak” instruments**.
 - 3) Interpreting the economic meaning of IV estimates can become problematic if the slope coefficients in the model are heterogeneous across observations. This is **the problem of “ugly” instruments**.

Data

- Data: SHARE Wave 5, data for 15 countries (Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Switzerland, Belgium, Israel, Czech Republic, Luxembourg, Slovenia, Estonia), final analytic sample: 65,281 respondents
- When including instruments from SHARE Wave 3: 14,564 respondents, 11 countries (Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Switzerland, Belgium, Czech Republic)
- Three helpgiving variables:
- **Helpgiving_out:** SP002_HelpFrom: Thinking about the last twelve months has any family member from outside the household, any friend or neighbour given you [or/or/or/or][your/your/your/your][husband/wife/partner/partner] personal care or practical household help?
- **Helpgiving_wtin:** SP020_RechHelpPersCareInHH: And is there someone living in this household who has helped you regularly during the last twelve months with personal care, such as washing, getting out of bed, or dressing?
- **Helpgiving_tot**

Data

Distribution of helpgiving variables



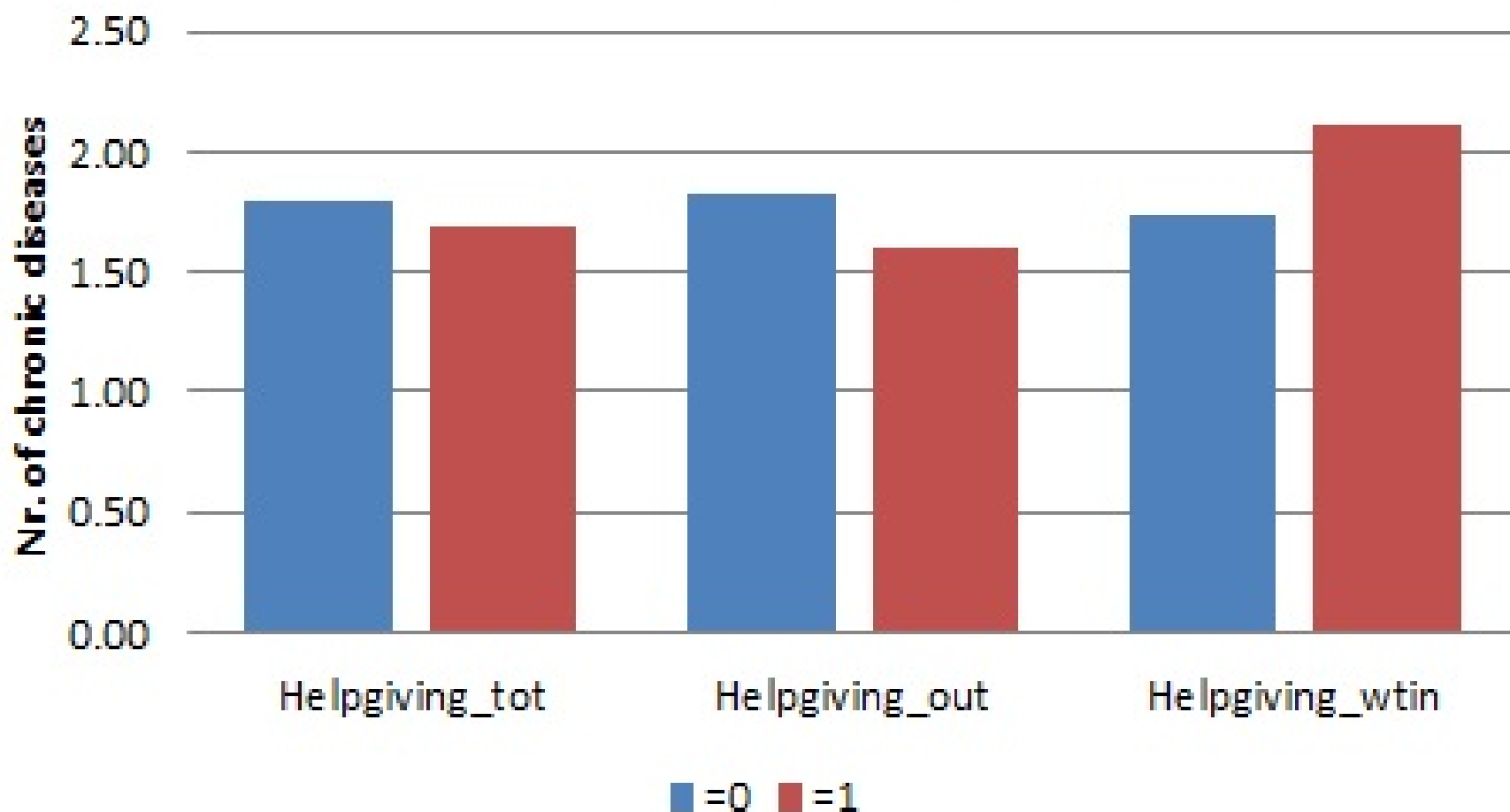
Data

- Estimation of total people providing helpgiving, Deville-Särndal's procedure (calibrated weights)

	country	Helpgiving_tot	Helpgiving_out	Helpgiving_wtin
Scand	Sweden	1,527,567	1,460,927	113,159
	Denmark	1,048,569	1,005,553	92,927
	Netherlands	2,376,857	2,163,370	315,709
Contin	Austria	953,164	833,773	177,566
	Belgium	1,637,570	1,426,540	331,931
	France	8,371,773	7,252,966	1,507,020
	Germany	12,648,003	11,455,470	1,745,328
	Luxembourg	52,710	45,376	10,395
	Switzerland	839,445	790,900	90,097
Medit	Italy	7,153,458	6,053,197	1,691,223
	Spain	3,572,164	2,512,323	1,268,977
East	Czech Republic	1,483,696	1,341,115	298,467
	Estonia	172,302	150,356	36,329
	Slovenia	131,627	106,774	39,095
Mix	Israel	306,143	198,250	119,050
Tot	Total	42,275,048	36,796,889	7,837,273

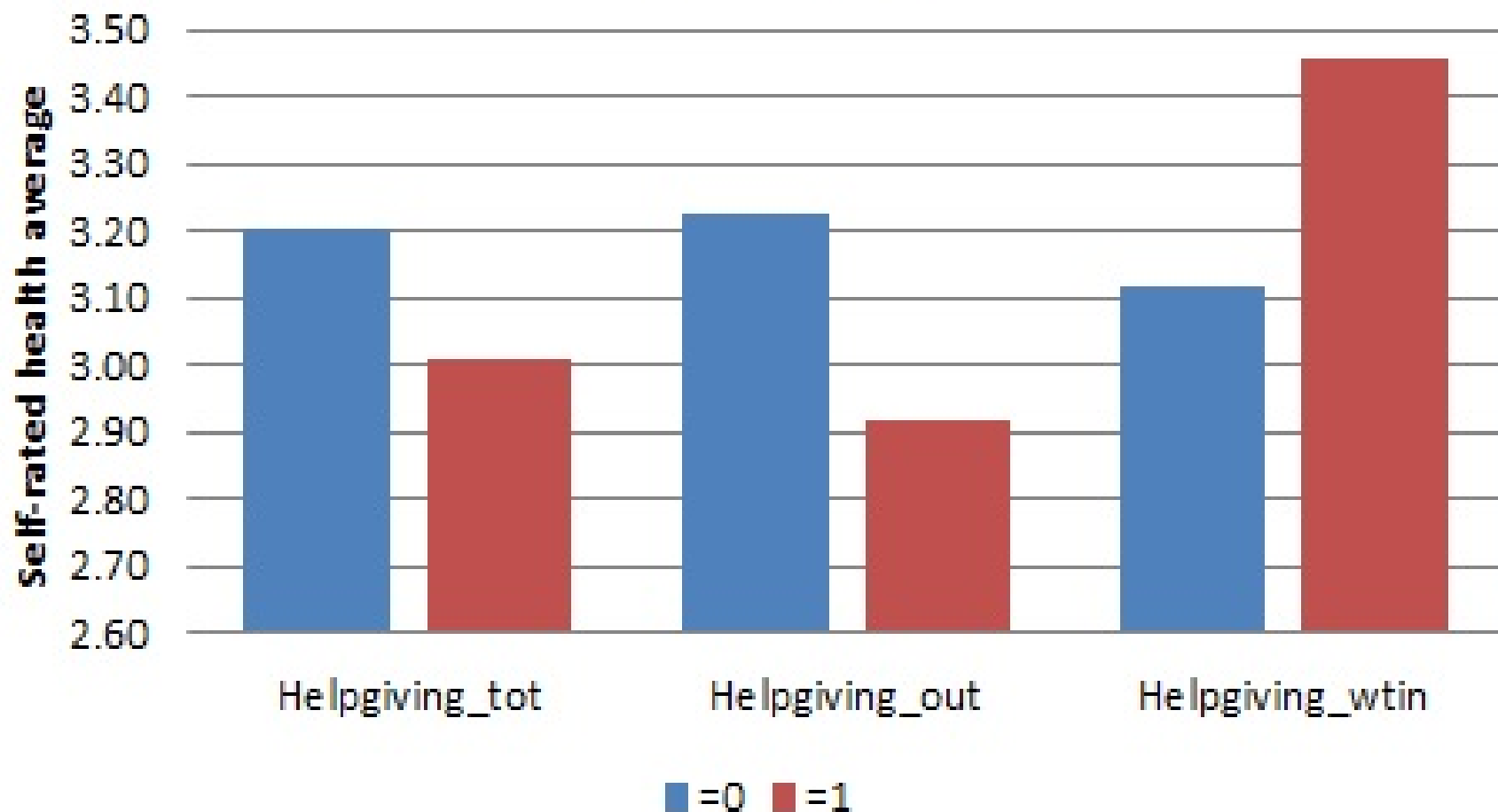
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Chronic diseases



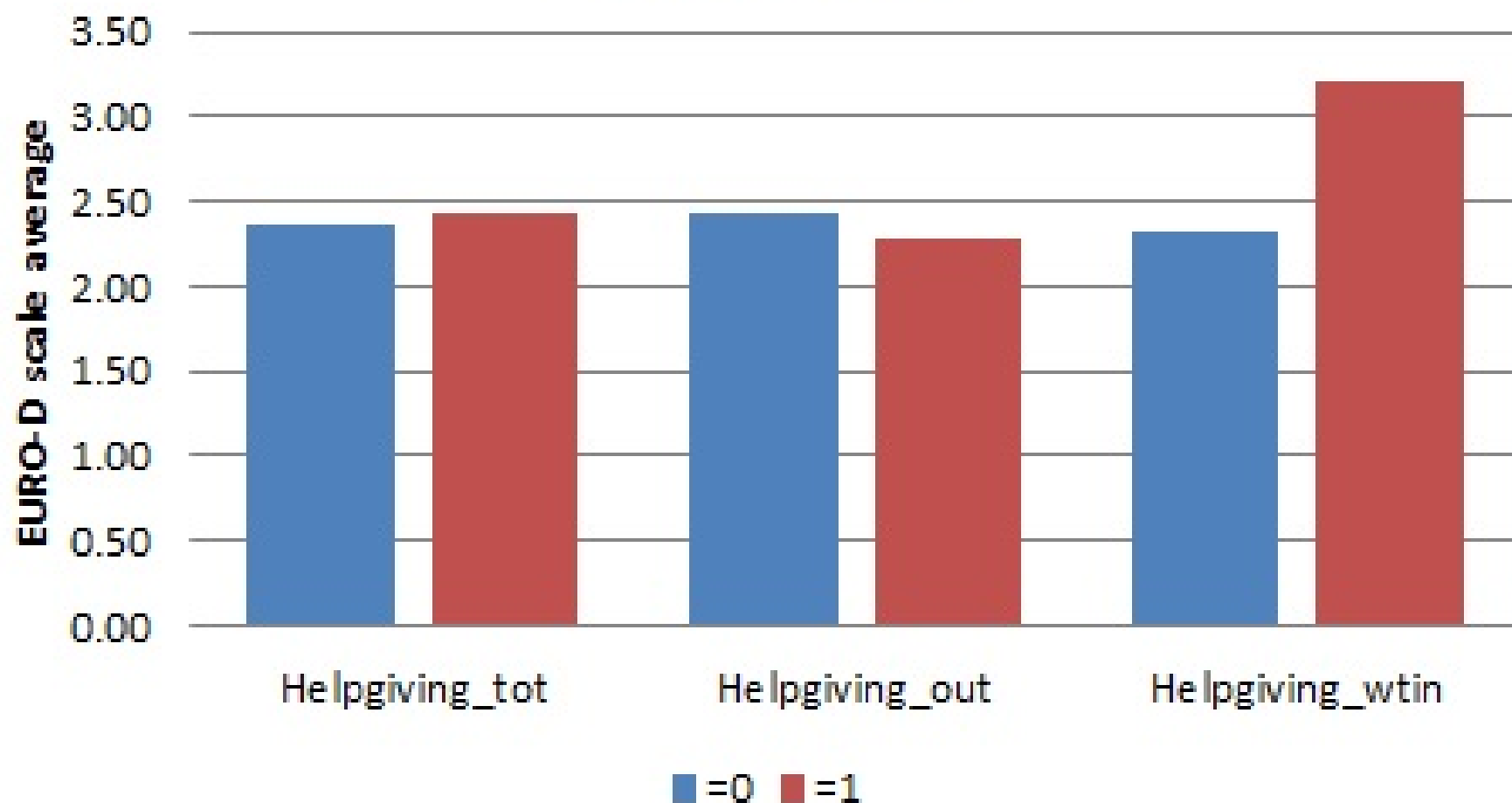
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Self-rated health



Data

Depression



Variables used

Variables:

- Main health variables:
- **Physical health: *number of chronic diseases*** (dummy: 1 if a respondent has two or more chronic diseases; and 0 otherwise)
- **Mental health: *depression*** (dummy: 1 if a respondent has a score of 4 or more on the Euro-D Depression scale; and 0 otherwise);
- **Subjective assesment of health: *self-rated health status*** (dummy: 1 if less than very good; and 0 otherwise)
- Additional health variables: ***physical inactivity; memory capabilities***
- Controls: ***gender; age*** (nominal); ***education*** (years); ***income*** (nominal, winsorised); ***settlement*** (dummy: 1 if urban; 0 if rural); ***household size*** (nominal)
- ***Welfare regimes***, 4 types: 1 – continental (Austria, Germany, Netherlands, France, Switzerland, Belgium, Luxembourg); 2 – social democratic (Sweden, Denmark); 3 – Mediterranean (Spain, Italy); 4 – *eastern European (Czech Republic, Slovenia, Estonia)*;
- **Receiving help:** 1 if receiving informal care *within household*; 0 otherwise

Variables used

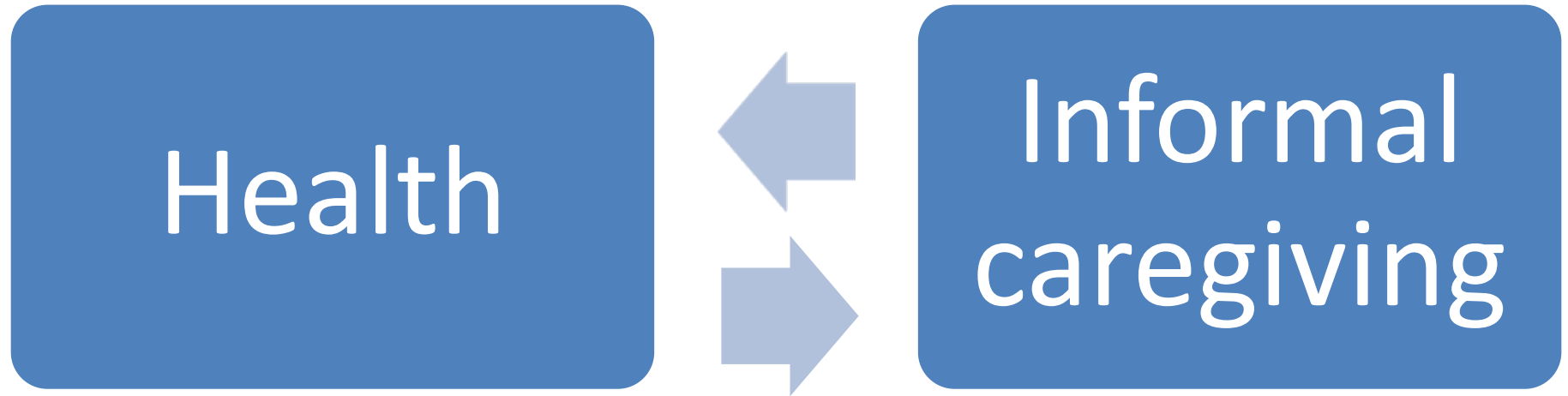
Instruments:

- All taken from Wave 3 of SHARE – „Life Histories“
- For number of chronic diseases: **sl_hs006**:
„childhood health: in hospital for 1 month+“
- For mental health (depression): **sl_hs009d3**:
„childhood illness 2: emotional, nervous, or psychiatric problem“
- For self-rated health: **sl_hs003_**: *childhood health status*
- All instruments are valid, the second and the third are also very strong

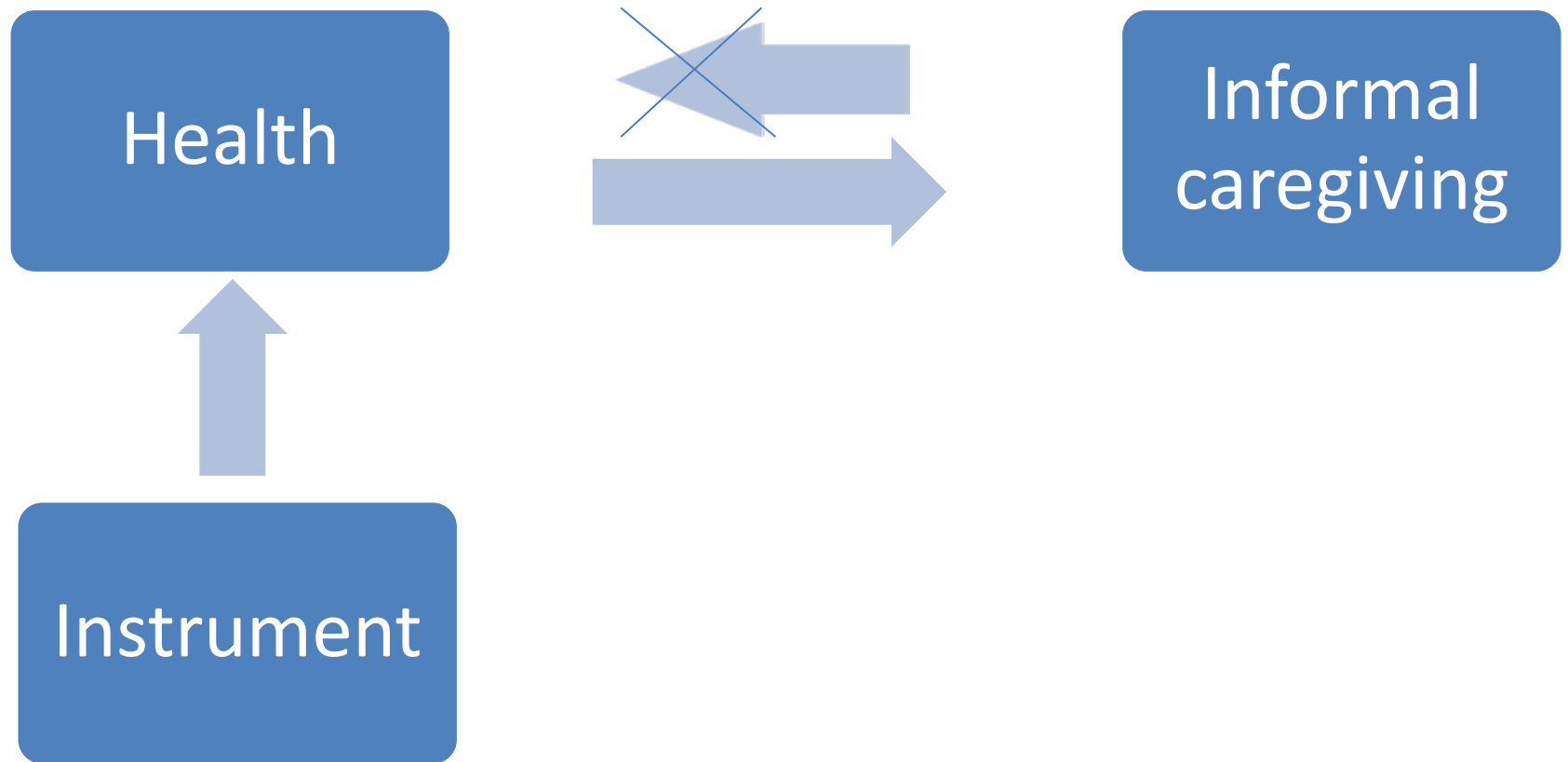
What is actually the problem in the „ordinary“ models?

Probit: <i>Help_outside</i>	Coeff.	z	P>z	Coeff.	z	P>z	Coeff.	z	P>z
Gender	0.0095	0.84		0.0104	0.91		-0.0016	-0.14	
Age	-0.0239	-28.51	***	-0.0234	-28.12	***	-0.0233	-27.80	***
Edu_Years	0.0190	13.59	***	0.0190	13.61	***	0.0191	13.63	***
Income_Middle	0.0371	2.67	***	0.0373	2.69	***	0.0392	2.81	***
Income_Upper	0.1028	7.19	***	0.1026	7.16	***	0.1077	7.48	***
Retired vs. Employed	0.0789	4.76	***	0.0818	4.94	***	0.0789	4.75	***
Other vs. Employed	-0.0225	-1.20		-0.0162	-0.87		-0.0260	-1.38	
Hh_Size	-0.0514	-8.12	***	-0.0513	-8.11	***	-0.0510	-8.02	***
Physical_Inactivity	-0.3691	-16.73	***	-0.3638	-16.52	***	-0.3883	-17.27	***
Memory	0.0377	13.23	***	0.0369	12.91	***	0.0384	13.33	***
Continental	0.1064	7.68	***	0.1045	7.51	***	0.1037	7.43	***
Socialdemocratic	0.4534	25.15	***	0.4553	24.65	***	0.4624	25.46	***
Mediterranean	-0.1866	-9.79	***	-0.1893	-9.93	***	-0.1897	-9.90	***
Chronic diseases	0.0404	3.50	***						
Self-rated Health				0.0077	0.60				
Depression							0.1052	7.93	***
Constant	0.5855	8.89	***	0.5676	8.53	***	0.5541	8.35	***
Observations	62257			62330			61547		
LR Chi2	5073.81	***		5032.93	***		5001.36	***	
Pseudo R2	0.0673			0.0667			0.0670		
Log Likelihood	-35168.70			-35221.55			-34847.12		

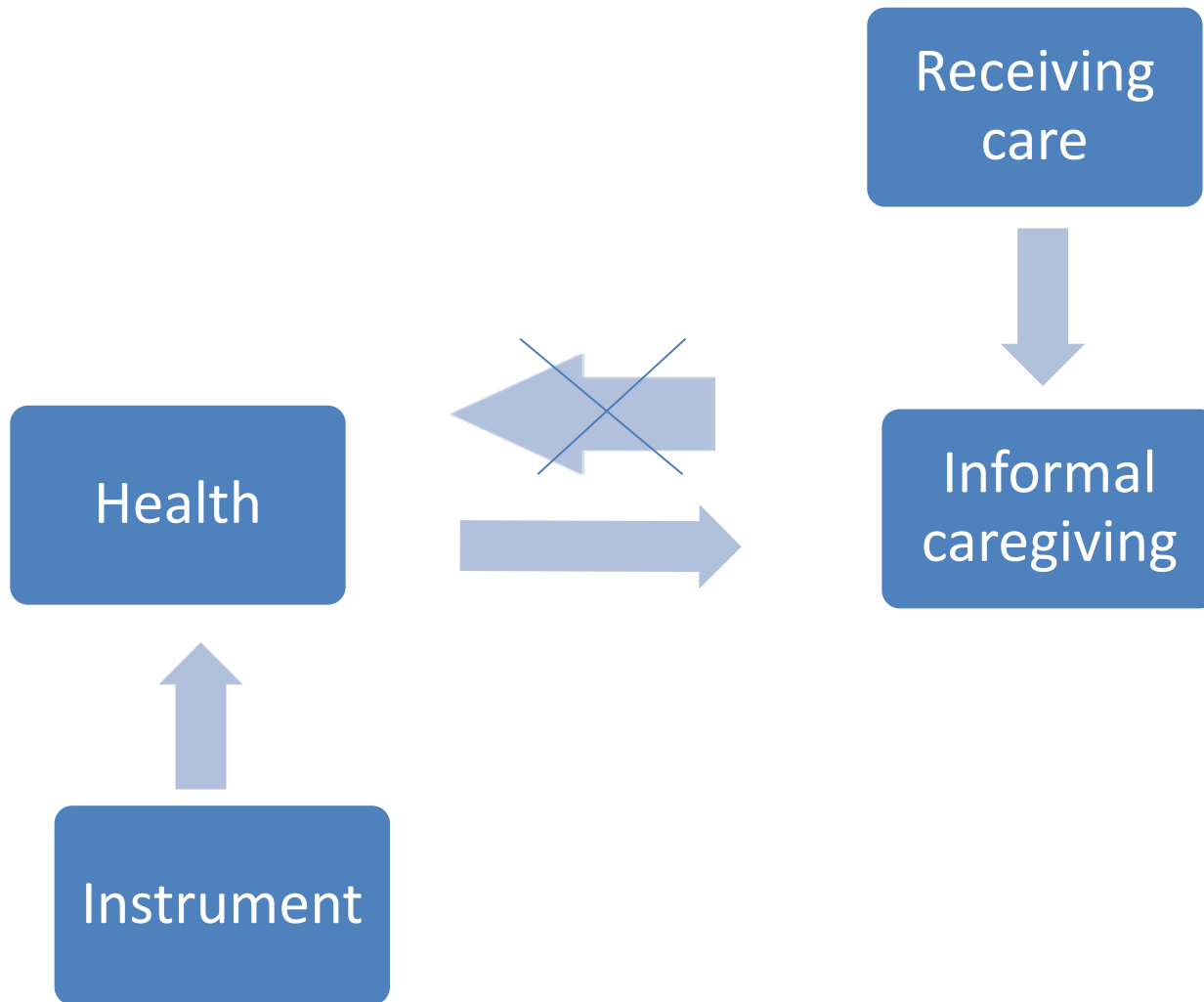
What is the problem in „ordinary“ models?



What is the problem in „ordinary“ models?



Causality problems – „within household“



Main results – summary

<i>Help_total</i>	Coeff.	z	P>z	Coeff.	z	P>z	Coeff.	z	P>z
Gender	0.0246	2.72	***	0.0183	2.11	**	0.0282	2.82	***
Age	-0.0071	-10.03	***	-0.0078	-12.34	***	-0.0079	-12.62	***
Edu_Years	0.0030	2.86	***	0.0028	2.64	***	0.0032	3.07	***
Income_Middle	0.0133	1.33		0.0108	1.09		0.0132	1.33	
Income_Upper	0.0161	1.45		0.0124	1.10		0.0174	1.57	
Retired vs. Employed	0.0258	1.69	*	0.0159	1.16		0.0068	0.52	
Other vs. Employed	0.0112	0.60		-0.0013	-0.08		-0.0088	-0.56	
Hh_Size	0.0026	0.48		0.0022	0.40		0.0021	0.37	
Physical_Inactivity	-0.0391	-2.30	**	-0.0504	-3.29	***	-0.0439	-2.62	***
Memory	0.0061	2.69	***	0.0060	2.60	***	0.0065	2.86	***
Continental	-0.0140	-0.77		-0.0042	-0.25		0.0037	0.22	
Socialdemocratic	0.0652	3.42	***	0.0512	2.40	**	0.0784	4.36	***
Mediterranean	-0.0669	-3.41	***	-0.0553	-3.00	***	-0.0471	-2.53	**
Chronic diseases	-0.1309	-2.49	**						
Self-rated Health				-0.0936	-2.46	**			
Depression							-0.0739	-1.97	**
Constant	0.7908	14.58	***	0.8617	14.07	***	0.7942	14.63	***
Observations	13232			13179			13149		
Wald Chi2	650.65	***		660.09	***		654.60	***	
Log Likelihood	-17116.06			-15074.79			-14999.20		
Test of endogeneity	7.04	***		4.87	**		8.52	***	

Main results – summary

<i>Help_outside</i>	Coeff.	z	P>z	Coeff.	z	P>z	Coeff.	z	P>z
Gender	0.0136	1.57		0.0055	0.66		0.0235	2.5	**
Age	-0.0083	-12.56	***	-0.0093	-15.51	***	-0.0095	-15.75	***
Edu_Years	0.0039	3.92	***	0.0038	3.81	***	0.0041	4.14	***
Income_Middle	0.0096	1.00		0.0070	0.74		0.0077	0.8	
Income_Upper	0.0163	1.53		0.0144	1.35		0.0165	1.55	
Retired vs. Employed	0.0333	2.34	**	0.0156	1.21		0.0086	0.68	
Other vs. Employed	0.0131	0.76		-0.0092	-0.59		-0.0103	-0.68	
Hh_Size	-0.0275	-5.19	***	-0.0277	-5.23	***	-0.0288	-5.39	***
Physical_Inactivity	-0.0488	-3.07	***	-0.0690	-4.78	***	-0.0465	-2.94	***
Memory	0.0086	3.97	***	0.0092	4.28	***	0.0082	3.77	***
Continental	-0.0139	-0.81		0.0033	0.21		0.0131	0.83	
Socialdemocratic	0.0780	4.31	***	0.0727	3.74	***	0.0965	5.6	***
Mediterranean	-0.0799	-4.30	***	-0.0624	-3.56	***	-0.0491	-2.75	***
Chronic diseases	-0.1749	-3.92	***						
Self-rated Health				-0.0839	-2.74	**			
Depression							-0.1404	-4.24	***
Constant	0.9109	17.49	***	0.9716	17.21	***	0.9227	17.71	***
Observations	13236			13183			13153		
Wald Chi2	1036.86	***		1062.89	***		1053.86	***	
Log Likelihood	-16505.67			-14463.15			-14398.63		
Test of endogeneity	14.92	***		5.08	**		18.90	***	

Main results – summary

<i>Help_within</i>	Coeff.	z	P>z	Coeff.	z	P>z	Coeff.	z	P>z
Gender	0.0297	2.63	***	0.0136	1.34		0.0281	2.76	***
Age	0.0018	2.36	**	0.0013	1.86	*	0.0019	2.91	***
Edu_Years	-0.0010	-0.74		-0.0014	-1.12		-0.0004	-0.33	
Income_Middle	0.0042	0.34		-0.0083	-0.73		0.0002	0.02	
Income_Upper	-0.0237	-1.65	*	-0.0407	-3.15	***	-0.0131	-1.09	
Retired vs. Employed	0.0682	3.56	***	0.0382	2.23	**	-0.0008	-0.05	
Other vs. Employed	0.0833	3.96	***	0.0509	2.70	***	0.0030	0.18	
Hh_Size	0.0182	3.01	***	0.0188	3.25	***	0.0273	4.19	***
Physical_Inactivity	0.0518	3.32	***	0.0389	2.77	***	0.0086	0.62	
Memory	-0.0055	-1.97	**	-0.0055	-2.21	**	-0.0011	-0.46	
Receiving_help	0.1061	7.36	***	0.0819	5.88	***	0.0902	5.87	***
Continental	-0.1043	-5.39	***	-0.0729	-4.20	***	-0.0532	-3.32	***
Socialdemocratic	-0.1090	-4.92	***	-0.1615	-8.06	***	-0.0792	-4.32	***
Mediterranean	-0.0548	-2.54	**	-0.0404	-2.09	**	-0.0260	-1.41	
Chronic diseases	-0.4332	-34.91	***						
Self-rated Health				-0.4326	-36.13	***			
Depression							0.0119	0.36	
Constant	0.2021	3.08	***	0.3982	6.60	***	-0.0962	-1.68	*
Observations	4656			4634			4615		
Wald Chi2	1318.33	***		1397.63	***		136.85	***	
Log Likelihood	-3592.05			-2002.05			-3583.52		
Test of endogeneity	299.29	***		525.46	***		0.38		

Robustness checks done

- Exclusion of additional health variables due to additional endogeneity problems

	Help_total		Help_outside		Help_within	
Chronic diseases	-0.1545	***	-0.1837	***	-0.5459	***
Self-rated Health	-0.1095	***	-0.1108	***	-0.5537	***
Depression	-0.0939	**	-0.1559	***	0.0130	

Robustness checks done

- Restricting the age of the respondents: 65+ (also: under 80)

	Help_total		Help_outside		Help_within	
Chronic diseases	-0.1493	***	-0.1924	***	-0.6022	***
Self-rated Health	-0.1264	***	-0.0915	**	-0.5451	***
Depression	-0.0806	*	-0.1685	***	-0.0687	*

Robustness checks done

- Controlling for possible reverse causality between providing and receiving help within household

	Help_total		Help_outside		Help_within	
Chronic diseases	-0.0904	*	-0.0910	*	-0.1170	*
Self-rated Health	-0.0243		-0.0352	*	-0.3504	**
Depression	-0.0569	*	-0.0857	*	0.0025	

- All three health variables jointly instrumented in the model

Discussion of findings

- All three hypotheses are validated
- Some main findings:
 - 1) Effect of health on informal caregiving is indeed positive (as one would expect) but only after taking into account the endogeneity in the model
 - 2) The situation between informal caregiving outside and within household is significantly different: helpers within household tend to *help and receive help*, the health of household members is related to each other; expected sign of the effect can be obtained only after taking this into account
 - 3) Also, caregiving within households appears to be more related to socially and materially deprived and larger households, while caregiving outside households is positively related to education and negatively to age

Some important paths for future work

- Improvement in the **instrumental variables' models** we used: additional variables, including social and material deprivation, relationship to person receiving help, frequency of the help provided (some of this has been tried and the results are very robust)
- **Wave 3** appears to be a rich source for the construction of instrumental variables
- Research of the **causal influence of informal caregiving to health** has also seldom taken into account the endogeneity between the two – would be interesting to see if something changes in the findings, if this was controlled for
- Which is the **more important predictor** of informal caregiving: physical, mental or self-rated health? (Our results: physical health)
- **Policy prescription:** adopting measures to stimulate health of potential and actual caregivers would tend to raise the level of provided help significantly

THANK YOU FOR LISTENING!



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