Disability and Labour Force Participation in Greece

A microeconometric analysis

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Outline

Motivation

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- Labour market integration promotes social cohesion, improves aggregate labour market indices & reduces national budget expenditure.
- All these issues are rather relevant for Greece (relatively low participation & employment rates, perennial public deficits).
- Change of policy: instead of providing services & benefits; the provision of equality & full participation is promoted.
- Helpful for goverment officials to know the exact impact of disability upon LFP.

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Research Questions

- Explore the determinants of LFP & correctly measure the effect of disability.
- Distinguish between (un)observed heterogeneity and true state dependence.
- True state dependence: causal relation between previous and current LFP $\Rightarrow$ an individual who is participating now will behave differently in the future than an individual out of the labour market.

Data

European Community Household Panel (ECHP)

- Harmonised cross-national longitudinal survey focussing on income and living conditions.
- Run from 1994 to 2001.
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Sample:

- Working age males & females aged 16 to 65.
- After sampling criteria are applied we have 44,755 person-year observations for 8,959 individuals.

Definitions

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Four health groups:

1. No chronic health problems - Reference category.
2. Chronic health problems but no limitations.
3. Chronic health problems with some limitations.
4. Chronic health problems with severe limitations.

Labour Force Participation and Health Status

Table 1: Labour force participation rates

	$\mathbf{Pr}(LFP_t{=}1)$	$\mathbf{Pr}(LFP_t{=}1 \mid LFP_{t-1}{=}1)$	**Entry**	**Exit**
All	**64.98**	**92.22**	**12.18**	**7.78**
No health problems	69.17	93.27	14.10	6.73
No limitations	59.20	93.20	11.01	6.80
Some limitaions	44.43	85.63	6.80	14.37
Severe limitations	21.58	67.11	3.52	32.89
Men	**82.55**	**95.69**	**15.12**	**4.31**
No health problems	88.16	96.94	20.99	3.06
No limitations	74.66	96.33	14.10	3.67
Some limitaions	63.38	89.91	7.59	10.09
Severe limitations	27.66	67.61	2.98	32.39
Women	**48.85**	**86.81**	**11.33**	**13.19**
No health problems	51.84	87.61	12.57	12.39
No limitations	39.39	85.71	9.29	14.29
Some limitaions	30.88	79.42	6.52	20.58
Severe limitations	15.62	66.10	3.93	33.90

Health Status Dynamics

Table 2: Health Status Transition Probabilities, *t-1* to *t*

	Destination (t) probabilities (%)			
Initial (*t-1*) status	(1)	(2)	(3)	(4)
1.No health problems	95.12	0.63	2.95	1.31
	(70.29)	(64.14)	(49.09)	(32.61)
2.No limitations	55.40	17.84	19.95	6.81
	(63.56)	(65.79)	(51.76)	(41.38)
3.Some limitations	37.57	3.81	44.37	14.24
	(49.51)	(57.83)	(43.79)	(20.00)
4.Severe limitations	23.48	1.56	21.22	53.75
	(38.86)	(40.91)	(25.33)	(14.21)

Number in parentheses is the probability of participating given present and past health status

Dynamic Random Effects Probit - Overview

We estimate a dynamic random effects probit model:

$$LFP^{*}_{it} = x^{'}_{it}\beta + \psi h_{it} + \gamma LFP_{it-1} + \epsilon_i + u_{it} \tag{1}$$

for $i=1,\ldots,N$ and $t=2,\ldots,T$

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if we now plug (2) in (1) we get:

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Dynamic Random Effects Probit - Initial conditions

Initial conditions problem

$$LFP^*_{i1} = Z_i\delta + \eta_i + e_{it} \text{ for } t{=}1$$

If η_i and α_i are correlated then LFP_{i1} is correlated with α_i in $LFP^*_{i,2} = \gamma LFP^*_{i1} + x_{i2}\beta + \epsilon_i + u_{i2}$ thus we cannot estimate consistently γ and β.

General Solution: Estimate jointly equation (3) and the initial conditions allowing for correlation between α_i and η_i.

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2. **Orme(1996):** Two-step estimation method; in the first step estimate a probit for LFP_{i1} & in the second estimate (3) adding $E[\eta_i|LFP_{i1}]$ from the first step. ▸ Details

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3. **Wooldridge(2002):**Parametric method; models the unobserved heterogeneity conditional on the value of the initial period and the other exogenous variables. Details

Dynamic Random Effects Probit - Interpretation

- Unlike linear models the coefficients are not equal to the change in the conditional mean of the dependent variable when regressors change by one unit. Thus, we need to estimate the partial effect of $LFP_{it\text{-}1}$ on the $\Pr(LFP_{it} = 1)$.

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- We estimate predicted probabilities using the coefficients & taking the lagged dependent variable fixed at 1 and 0 while the rest of the regressors are kept in their sample mean value. Their difference is the marginal effect.

$$\text{Marginal Effect of LFP}_{it\text{-}1} =$$

$$\widehat{Pr}(LFP_{it} = 1|LFP_{it\text{-}1} = 1, \overline{x}_{it}, \overline{h}_{it}) - \widehat{Pr}(LFP_{it} = 1|LFP_{it\text{-}1} = 0, \overline{x}_{it}, \overline{h}_{it})$$

$$\equiv$$

$$\Phi\left\{\left(\gamma + \overline{x}_{it}\hat{\beta} + \overline{h}_{it}\hat{\psi}\right)(1-\hat{\rho})^{0.5}\right\} - \Phi\left\{\left(\overline{x}_{it}\hat{\beta} + \overline{h}_{it}\hat{\psi}\right)(1-\hat{\rho})^{0.5}\right\}$$

Standard errors were estimated using the delta method.

Table 3: Marginal effects of labour force participation

	Probit	D.Probit	D.R.E.P.	Orme	Wooldridge	Heckman
LFP_{t-1}		0.733	0.659	0.417	0.365	0.411
I.C.				0.235	0.366	

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I.C.				0.235	0.366	
Severe lim.	-0.474	-0.341	-0.201	-0.205	-0.208	-0.179
Some lim.	-0.150	-0.095	-0.062	-0.061	-0.062	-0.058
No lim.	-0.094	0.013	0.028	0.030	0.028	0.025

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No lim.	-0.094	0.013	0.028	0.030	0.028	0.025
Female	-0.386	-0.210	-0.234	-0.305	-0.225	-0.232
University	0.196	0.098	0.114	0.157	0.116	0.167
High school	0.025	0.009	0.016	0.032	0.025	0.027
Age 17-25	0.196	0.173	0.183	0.213	0.201	0.152
Age 26-35	0.311	0.211	0.236	0.281	0.247	0.193
Age 36-45	0.334	0.225	0.248	0.302	0.256	0.204
Age 46-55	0.267	0.174	0.193	0.241	0.201	0.163
Married	-0.061	-0.050	-0.107	-0.105	-0.100	-0.111
Attica	-0.064	-0.031	-0.034	-0.051	-0.037	-0.041
Child<12	-0.034	0.008	0.021	0.010	0.007	0.008
Income	-0.002	-0.001	0.000	0.000	0.000	0.000

Red indicates insignificant M.E.

Results for Unob. Heterogeneity

Conclusions

- Health problems have a significant adverse effect on the probability of participating;
  This is overestimated when unobserved characteristics are ignored.
- The negative health effect is higher for more severe health problems.
- Health problems influence LFP directly (incidence of a health problem) & indirectly (unobserved heterogeneity).
- There is true state dependence in LFP, between 36.5% to 41.7%; but is heavily overestimated when (un)observed characteristics and I.C are ignored.
- I.C. are always positive and significant; can't reject endogenous I.C.
- Being a woman, being married, living in Attica $\Rightarrow$ significant negative effect on LFP.
- Higher education increases the probability of participating;
  Age has an inverse U-shape.
- Children & unearned income affect unobserved heterogeneity in a way that decreases LFP.

Thank you for your attention!!! ☺

Here's a link to the paper
`http://www.kepe.gr/pdf/D.P/D.P.%20121b.pdf`

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Heckman (1981) method

Heckman suggests to approximate the initial observation with a simple probit model and to allow free correlation between LFP_{i1} *and* LFP_{it}.

$$LFP^*_{i1} = Z_i\lambda + \eta_i \tag{4}$$

$$\eta_i = \theta\alpha_i + u_{i1} \tag{5}$$

Substitute (5) in to (4) and estimate jointly with (3) :

$$LFP^*_{i1} = Z_i\lambda + \theta\alpha_i + u_{i1} \tag{6}$$

$$LFP^*_{it} = x_{it}^{'}\beta + \gamma LFP_{it-1} + \delta_1^{'}\bar{x}_i + \alpha_i + u_{it} \tag{7}$$

Back to I.C.

Orme (1996) method

Orme suggests a two-step estimation method that provides adequate inferences for the parameters of interest.
Following Heckman (1979) he suggests a reduced form equation for the initial observation:

$$LFP_{i1}^{*} = Z_i\lambda + \eta_i \tag{8}$$

Correlation between α_i and $L_{i,1}$ can be removed by:

$$\alpha_i = \kappa\eta_i + w_i \tag{9}$$

Substitute (9) in to (3) and get:

$$LFP_{it}^{*} = x_{it}^{'}\beta + \gamma LFP_{it-1} + \delta_1^{'}\bar{x}_i + \kappa E[\eta_i|LFP_{i1}] + w_i + u_{it} \tag{10}$$

Back to I.C.

Wooldridge (2002) method

Wooldridge proposes a parametric method of estimation which models the unobserved heterogeneity conditional on the value of the initial period and the other exodenous variables.

$$\epsilon_i | LFP_{i1}, x_i \sim Normal\left(\alpha_0 + \alpha_1 LFP_{i1} + \bar{x_i}\alpha_2, \sigma_\alpha^2\right)$$

$$LFP_{it}^* = \acute{x_{it}}\beta + \gamma LFP_{it-1} + \alpha_0 + \alpha_1 LFP_{i1} + \bar{x_i}\alpha_2 + \alpha_i + u_{it} \quad (11)$$

Back to I.C.

Unobserved Heterogeneity

Table 4: Marginal effects of labour force participation; Time-Avereged Characteristics

	D.R.E.Pr.	Orme	Wooldridge	Heckman
Severe lim.	-0.319	-0.405	-0.443	-0.306
Some lim.	-0.028	-0.025	-0.028	-0.013
No lim.	-0.189	-0.203	-0.227	-0.100
Married	0.085	0.100	0.089	0.072
Child<12	-0.051	-0.038	-0.039	-0.028
Income	-0.002	-0.003	-0.002	-0.002

Red indicates insignificant M.E.

Back to Results