Disability and social exclusion in Italian households

Giuliana Parodi
Department of Economic Studies, Università "G. d'Annunzio" di Chieti-Pescara

Dario Sciulli
Department of Economic Studies, Università "G. d'Annunzio" di Chieti-Pescara

Accepted version
Licence: Publisher's Bespoke License
Please cite as:
Parodi G. and Sciulli D. (2019) "Disability and social exclusion in Italian households". Social Indicators Research, Vol. 144: 767-784. DOI: https://doi.org/10.1007/s11205-019-02068-1

Social Indicators Research

Disability and social exclusion in Italian households

--Manuscript Draft--

Manuscript Number:	SOCI-D-18-00988R1
Full Title:	Disability and social exclusion in Italian households
Article Type:	Original Research
Keywords:	disability, social exclusion, household, genuine state dependence, feedback effects, correlated random effects
Corresponding Author:	Dario Sciulli, Ph.D. University of Chieti-Pescara Pescara, ITALY
Corresponding Author's Institution:	University of Chieti-Pescara
Order of Authors:	Giuliana Parodi
	Dario Sciulli, Ph.D.
Funding Information:	Ministero dell'Istruzione, dell'Università e della Ricerca (PRIN prot. 2009NM89S5_004) — Prof- Giuliana Parodi

Abstract:

This paper investigates how the presence of disabled member(s) affects the household risk of being socially excluded in Italy. By using a dynamic probit model with correlated random effects and accounting for endogenous initial conditions, we find that the presence of severely disabled member(s) increases the probability of being socially excluded by 2.5%. Importantly, we find that genuine state dependence is greater, by about 20% in relative terms, for households with disabled member(s) than their counterparts, indicating that the former experience greater difficulties in escaping from social exclusion. This suggests that policies aimed at preventing social exclusion would be particularly effective for households with disabled member(s). All these findings hold when accounting for endogeneity of disability and social exclusion because of possible feedback effects. Finally, our estimates confirm that in Italy low education, living in the South and the presence of children increase the probability of a household being socially excluded.

DISABILITY AND SOCIAL EXCLUSION IN ITALIAN HOUSEHOLDS

Authors

Giuliana Parodi, Dario Sciulli

Addresses

Giuliana Parodi

Università di Chieti-Pescara

Viale Pindaro 42, 65127 Pescara (Italy)

e-mail: parodi@unich.it

Dario Sciulli (corresponding author)

Università di Chieti-Pescara

Viale Pindaro 42, 65127 Pescara (Italy)

e-mail: dario.sciulli@unich.it

Tel. (+39) 085.4537977

1. Introduction

In the last decade, the interest for social exclusion has strongly increased in Europe. The European Union (EU) designed the 2010 as the European year for combating poverty and social exclusion, as, even if EU is one of the richest areas in the world, in 2010 23.7% of EU citizens were at risk of poverty or social exclusion (Eurostat, 2012)[1]. Despite the Europe 2020 sets as a target to reduce by 20 million the number of people at risk of poverty or social exclusion, in 2016 they persisted at 23.5% for the whole EU and substantially increased in Southern Europe (Eurostat 2018), possibly because of lasting effects of the economic crisis.

As the United Nations (2007) underlined, disability, as a factor of vulnerability, is likely to be associated with social exclusion. This takes place through several mechanisms. First, disability reduces the employment probabilities of working-age persons (e.g. Gannon 2005, Oguzoglu 2010, Agovino et al. 2014), with detrimental effects for household income formation and work intensity. Second, recent studies, (e.g. Parodi and Sciulli 2008, Mussida and Sciulli 2018) have demonstrated that the presence of persons with disabilities in the household may be associated with lower employment rates of working-age cohabitant women, because of informal caregiving activities provided in favor of household members with disabilities. This may also negatively affect both household income and work intensity. Third, persons with disabilities need special/additional consumption requirements (She and Livermore, 2007 and 2009 for the US, Fremstad, 2009 for the USA, Solipaca et al. 2010[2] for Italy). This would involve a specific expenditure allocation, which would be detrimental for basic consumption, determining a higher risk of material deprivation.

Additionally, when investigating social exclusion, understanding its dynamic aspects would be relevant. A greater propensity to remain socially excluded from year to year, in fact, would be preparatory to experience a persistent, long term condition in that status (e.g. Jenkins and van Kerm 2014). Persistence in social exclusion would be associated to several negative outcomes, including lower household welfare, stigmatization, long-term effects on children development, when compared to a household experiencing transitory conditions, (Biewen 2014). Thus, uncovering circumstances and mechanisms guiding the transitions into and out of social exclusion would be helpful to provide policy makers with instruments of knowledge and contrast to socio-economic disadvantage.

Given these premises, it is essential to understand both the relationship between disability and social exclusion, and the way social exclusion dynamics is affected by disability.

While the literature has documented that disability increases the risk of being socially excluded, emphasizing the role of educational achievement, occupation and health (e.g. Gannon and Nolan 2007, Kim et al. 2016, Tobias and Mukhopadhyay 2017), little is known about the way disability affects social exclusion dynamics.

[1] In the context of the 2020 European strategy, the EU provided a definition of social exclusion based on three economic dimensions, i.e. income poverty, work intensity and material deprivation.

[2] Using the Italian SILC data at regional level, they find that, standardizing by household size, a household with at least one person with disabilities needs 1.67 income units to achieve the spending capacity which a household without persons with disabilities achieves with only one income unit. This exercise quantifies the intuition for instance of Fremstad (2009) about the extra consumption needs of a household with persons with disabilities.

The literature on the dynamics of social exclusion and/or income poverty is relatively wide; a few approaches have been introduced to investigate these issues, including that concentrating on the persistence of poverty and social exclusion and its causes, such as observable and unobservable heterogeneity and state dependence (e.g. Stevens 1999, Whelan, Layte and Maitre 2003, Cappellari and Jenkins 2002, Devicienti and Poggi 2011, Ayllon 2013 for income poverty, Poggi 2007, Ayllon and Gabos 2017 for social exclusion).

Studies focusing on the role of disability, however, are scarce and essentially focused on the dynamics of income poverty. Shahtamaseb et al. (2011) find that households with children with disabilities in the UK are not exposed to a different dynamic into and out of poverty with respect to other households. Parodi and Sciulli (2012) for Italian households, and Davila-Quintana and Malo (2012) for Spanish individuals, find that disability determines a higher risk of income poverty and that it is affected by a considerable degree of genuine state dependence.

This paper provides two main contributions to the existing literature. First, to the best of our knowledge, this is the first to investigate the relationship between disability and the dynamics of social exclusion. In doing so, we disentangle the impact of past social exclusion on current social exclusion according to the presence or not of household member(s) with disabilities, by interacting lagged social exclusion and disability variables and accounting for different severity of disability. This allows us to identify differences in state dependence between households with and without persons with disabilities, which is interesting from a policy point of view. Should state dependence be greater for households with persons with disabilities, this would indicate that they experience greater difficulties in escaping from social exclusion, and specific contrasting policies would be required. Second, we consider possible feedback effects (e.g. Ayllon and Gabos 2017), as social exclusion may endogenously affect future disability and, therefore, the estimated impact of disability on the probability of being socially excluded would be potentially biased.

The empirical analysis is based on data gathered from the 2007-2010 longitudinal component of the Italian version of the EU-SILC database. Italy is interesting to be analyzed, since it is the European country having experienced the greatest increase of people at risk of poverty or social exclusion since the beginning of the economic crisis (3 million more from 2008 to 2016). The definition of social exclusion follows the EU approach, which has developed a model measuring social exclusion on economic factors, such as income poverty, low work intensity and material deprivation[3].

Our econometric strategy is based on a dynamic probit model with correlated random effects (Mundlak 1978) and accounting for endogenous initial conditions (Heckman 1981), which allows us to disentangle the contribution of past social exclusion and unobserved (and observed) characteristics on the current status of social exclusion. This would be helpful to obtain genuine state dependence and contribute to improving the

[3] Alternative measures of social exclusion share a multidimensional approach that proxies the individual or household well-being, extending the standard approach based on the unidimensional monetary measure of income poverty. Usually, the multidimensional approach includes civic and political participation, social interaction, health, and education

measured impact of explanatory variables on social exclusion, and also account for the mediating role of past social exclusion. We address the initial conditions problem following Wooldridge (2005), who proposed the implementation of a conditional maximum likelihood estimator[4].

When accounting for feedback effects, we extend the Wooldridge's approach by running a joint estimation of the dynamic probit model with correlated random effects accounting for endogenous initial conditions and an ordinal response equation to model the (suspected) endogenous disability outcome (no disability, disability, severe disability). This allows us to relax the strict exogeneity assumption and, therefore, to explicitly account for the endogeneity of the disability status.

Main descriptive findings reveal that the incidence of social exclusion is higher for households with persons with disabilities compared with those without persons with disabilities (37.7% in case of severe disability, 33.4% in case of disability and 23.3%, respectively, see Table 1). The econometric analysis clarifies that the probability of a household being socially excluded increases by 1.3% (but not statistically significant) in case of the presence of a person with disabilities and by 2.5% in case of severe disability.

Being socially excluded in the previous period increases by 15.3% the probability of being currently socially excluded (genuine state dependence) for households without persons with disabilities. Genuine state dependence, however, is greater by 3.3% in case a person with disabilities lives in the household, and by 0.8% in case of a person with severe disabilities, but the estimated coefficient is not significant in the latter case. This suggests, first, that social exclusion is a dynamic process and, second, that policies aimed at preventing social exclusion would be particularly effective for households with persons with disabilities. These findings hold when accounting for endogeneity of disability and social exclusion because of feedback effects.

The remainder of this paper is organized as follows. Section 2 provides definitions; Section 3 illustrates the dataset and presents descriptive statistics; Section 4 reports the empirical specification, while Section 5 presents the results of the econometric analysis. Finally, Section 6 concludes.

2. Social exclusion and disability

2.1 Definition of social exclusion

Social exclusion is a process that prevents individuals or groups from full participation in social, economic and political life or as an accumulation of confluent processes leading to marginalization with respect to the prevailing values of a community (United Nations, 2007). A similar concept of social exclusion emerges in Lee and Murie (1999), while Atkinson (1999) suggests three key elements to identify social exclusion: relativity, agency and dynamics. Other studies focus on capabilities and functioning to identify excluded

[4] In principle, when accounting for the initial conditions problem, the Heckman estimator would be preferable when using short panel data. The Wooldridge approach, however, is more flexible, because it allows for an easy extension to the model accounting for feedback effects.

individuals, as in the work by Sen and by the "Scandinavian approach to welfare" proposed by Brandolini and D'Alessio (1998) and reinforced by Poggi (2007).

The longitudinal component of our dataset does not collect information on participation and social variables useful to construct a wider indicator of social exclusion, thus we rely on an economic-oriented definition as formally proposed by the EU[5].

The EU has been developing models for defining and measuring social exclusion over the years, paralleling the debate especially lively in the UK on the inadequacy of income as a measure of social unease (e.g. Burchardt et al. 2002). The Laeken European Council (December 2001) endorsed 23 common statistical indicators (the so-called Laeken Indicators) of social exclusion and poverty. In June 2010, the European Council opted for a more complex Headline Target for promoting social inclusion at EU level, defined on the basis of three indicators, which have been adopted by the European Strategy 2020 as dimensions of social exclusion. They are the number of people at risk of poverty[6], the number of materially deprived people[7], and the number of people aged 0–59 living in 'jobless' households[8]; according to EU definition, social exclusion occurs if a person is socially excluded in at least one of the three dimensions mentioned above. Therefore, it focuses on the economic conditions of the household using a multidimensional indicator rather than the standard unidimensional one based on income (e.g. Davila-Quintana and Malo 2012, Parodi and Sciulli 2012).

Our paper adopts a definition of social exclusion very close to the European Strategy one, deviating from it just for the number of people living in 'jobless' households, that in our definition includes also people over 59. In addition, it would be noted that because the dimensions considered in our definition of social exclusion are all household-based, social exclusion at household and at individual (of the same household) levels tend to overlap. This means that investigating social exclusion at household level or focusing on a reference- individual would not change the essence of our empirical analysis.

[5] Here we concentrate on EU measurements of social exclusion. For a UN approach, see the United Nations development program, 2012, which develops a multidimensional social exclusion index, developed over 24 indicators, that reflect the ways in which people are denied access to labour markets, education and health systems, as well as to civic and social networks.

[6] In terms of income, persons are socially excluded if their equivalized disposable income, calculated using the modified OECD equivalent scale, is below the risk-of-poverty threshold, which is set at 60% of the national median equivalised disposable income (after social transfers).

[7] Severe material deprivation occurs for people whose living conditions are severely constrained by lack of resources, and experience at least 4 out of 9 of the following deprivation items: cannot afford to pay for (or are in arrears with) 1) mortgage or rent payments, utility bills, hire purchase instalments or other loan payments; 2) one week's annual holiday away from home; 3) a meal with meat, chicken, fish (or protein equivalent) every second day; 4) unexpected financial expenses; 5) a telephone (including mobile phone); 6) a colour TV; 7) a washing machine; 8) a car; 9) heating to keep the house adequately warm.

[8] In terms of work, people are socially excluded if they live in households with very low work intensity, i.e. where working age adults worked less than 20% of their total work potential during the past year.

2.2. Definition of disability

The definition of disability can be tackled from several angles. The first one is based on the International Classification of Functioning, Disability and Health (ICF, WHO, 2001), which identifies the social or inclusive model of disability, based on the capability approach. In this respect, a person with disabilities is one whose autonomy is limited because of the characteristics of the context where she lives and operates (this is the approach advocated by the European Disability Forum). An alternative approach is the strictly institutional one, according to which people are defined as persons with disabilities if they have been certified as such by the system. A third approach, quite close to the first one, is the self-reported one, according to which disability is defined in terms of how people perceive their own limitations with respect to daily activities[9].

IT-SILC data provides yearly information on the person's self-assessment of limitation (and its seriousness) in daily activities because of health problems, including ongoing physical and mental health problems, illness or disability.

Based on data definition, a person is considered to experience an activity limitation if he/she is currently limited and has been limited for at least the last six months. The period of at least the last six months, therefore, is relating to the duration of the activity limitation and not of the health problem. If a person is diagnosed having a longstanding illness is not automatically identified as a person with limitations in daily activities; the definition of limitations in daily activities, indeed, requires that a long-standing illness has disabling consequences for the individual for at least a six months period.

It follows that the identification of persons with disabilities with IT-SILC data is in the spirit of the social model (Mitra, 2008), for which disability, may be seen as a reduced form of the interrelations among impairment, technical help and environment, leading to activity limitations.

The criterion based on limitations in daily activities allows to identify persons with disabilities and households characterized by the presence of persons with disabilities.

3. Data and descriptive statistics

3.1. The sample of analysis

Our analysis is based on the longitudinal section of the IT-SILC dataset for the period 2007-2010. IT-SILC data is the Italian component of the EU-SILC (the European Union Statistics on Income and Living Conditions), which provide cross-sectional and longitudinal information. As the EU-SILC, the IT-SILC is a

[9] The three definitions have all pros and cons: the second one is open to bias determined by fraud, or by governmental choice of using disability benefits as an instrument of financial support to poor people (for Italy see Agovino and Parodi, 2012); the third is contingent on the possible bias linked to self-assessment, but also is flexible enough to accommodate for different individual perceptions of given limitations. Consequently, the choice of using data collected according to each system introduces some bias in the investigation.

multi-purpose instrument mainly focusing on income and devoting specific attention to detailed income components at both household and personal level, to social exclusion, housing condition, labour, education and health.

The longitudinal component of the IT-SILC dataset includes about 100000 individuals and about 47360 households for the whole period 2007-2010[10]. However, we only use information from households present in each and all of the four waves of the longitudinal section in the period under analysis. This is required for the application of our econometric model, and it allows us to exclude households characterized by a too short data collection period. In addition, we eliminate households with missing values in the variables of interest, including disability status. This selection leaves 14068 households (the original balanced panel consisted of 15948 households), corresponding to 3517 households per year (the original balanced sample consisted of 3987 households per year).

In our empirical analysis, we control for observable heterogeneity by including several covariates. These include characteristics defined at household level: the presence of persons with disabilities in the current year, the presence of persons with disabilities in the previous year, area of residence, household size, the number of children aged 0-3, the presence of self-sufficient elderly member, and being resident in a city. In addition, we control for a set of covariates referred to the reference person[11]: age, gender, educational level and marital status. This allows us to approximate different household behaviors because of heterogeneous characteristics. Finally, we include time dummy variables, and an indicator of changes in the local unemployment rate to be used for identification purpose in the benchmark model.

3.2. Descriptive analysis

Descriptive statistics are reported in Table 1. We report both information for the full sample and for sub-samples that have been split according to the presence or not of persons with disabilities. According to our sample, it results that 40.6% of households are characterized by the presence of (at least) one person with disabilities for at least one year, and disability is severe for 1/3 of them. This high measured rate would be explainable by a few facts. Among others, it is worth mentioning that about 37.1% of heads of the households are aged 64 years or more, and limitations in daily activities tend to increase with age. Also, we have defined as households with a person with disabilities those where at least one household member has experienced a limitation in daily activities in the reference period, so transitory disabilities are included in our definition[12].

[10] The 2007-2010 IT-SILC dataset includes, respectively, 6115 households in 2007, 11474 in 2008, 16044 in 2009 and 13707 in 2010.

[11] The reference person is identified according to the *relpar* variable included in the L10r file of the longitudinal component of the IT-SILC data. According to this information the digit one identifies the reference person.

[12] Disability seems to be prevalently a transitory phenomenon, as about 20% of analyzed households experience persistence of disability over the 2007-2010, as we found in an analysis here not shown.

Table 1 also reveals that social exclusion is higher for households with (at least) a person with disabilities than for those without (at least) a person with disabilities. The latter presents and incidence of social exclusion equal to 23.3%. The incidence raises to 33.4% for households with persons with disabilities and up to 37.7% for households with persons with severe disabilities. Finally, some relevant differences emerge with respect to characteristics of households with and without persons with disabilities. For example, households with and without persons with disabilities are more likely to be characterized by the presence of a female head of the household and lower educational level. They are also more likely located in Southern regions, of a smaller household size, with lower incidence of married household heads, a smaller number of children aged 0-3 and a greater number of self-sufficient elderly household members.

[Table 1 about here]

Table 2 provides a preliminary analysis of social exclusion dynamics and disability. The transition matrix shows the incidence of social exclusion, conditioned on the previous social exclusion status, accounting for disability status. Social exclusion appears to be a phenomenon affected by a relevant degree of persistence. Disability, however, affects in some way the dynamic aspects of social exclusion. Considering households experiencing social exclusion at time t-1, the incidence of households persisting in the social exclusion status one year later increases with the severity of disability. It corresponds to 72.85% for households without persons with disabilities, to 77.81% for households with persons with disabilities and to 80.44% for households with persons with severe disabilities. The risk of entering social exclusion, starting from a non-social exclusion condition, however, is relatively homogenous, ranging from 8.9% for households without persons with disabilities to 12.28% for households with persons with disabilities.

[Table 2 about here]

4. The econometric analysis

The impact of disability on social exclusion is estimated by using a binary response model. The dependent variable takes value one if the household is socially excluded and zero otherwise. Because of the hypothesis that social exclusion is driven by past social exclusion status and, therefore, that state dependence is at work, we include the lagged social exclusion indicator in the right-hand side of the social exclusion equation. The impact of disability is identified by including two dummy variables, which allow to measure the impact of the presence of persons with disabilities and/or persons with severe disabilities in the household and taking value one if at least one person with disabilities lives in the household for at least one period, and zero otherwise. In addition, because disability may determine a lasting impact on social exclusion, we also include two lagged disability dummy variables.

A crucial point that our analysis addresses is the potential heterogeneity of state dependence in presence of disability. With the aim of disentangling it, we also include two interaction dummy variables, which are obtained interacting the past social exclusion indicator with the past disability status indicators. Finally, we control for several head of the household and household factors potentially driving social exclusion.

The econometric model controls for unobserved heterogeneity by introducing an individual-specific random effect that is assumed to be normally distributed and independent of other covariates. The independence assumption, however, may be relaxed by adopting the Mundlak's approach (Mundlak 1978), for which the unobserved heterogeneity term is decomposed into two parts: one correlated with (time-variant) explanatory variables and one uncorrelated.

Finally, the estimation of state dependence parameters could be biased (spurious state dependence) because of endogeneity between initial conditions and unobserved heterogeneity, i.e., the first social exclusion status observed in the data could be affected by underlying unobservable factors conditioning the distribution of social exclusion at initial time (Heckman 1981). We address the initial conditions problem following Wooldridge (2005), who proposed an alternative conditional maximum likelihood (CML) estimator that considers the distribution conditional on the value in the initial period. The Wooldridge approach presents some advantages with respect to the Heckman estimator. First, it allows an easy inclusion of Mundlak's specification and, thus, we estimate a correlated random effects probit model with endogenous initial conditions. Second, it allows to account for feedback effects by running a joint estimation between the mentioned Wooldridge probit dynamic model and a dynamic ordinal response equation that models the (suspected) endogenous disability outcome. This allows us to relax the strict exogeneity assumption and, therefore, to explicitly account for the endogeneity of disability status in the social exclusion equation (e.g. Biewen, 2009).

Wooldridge's model reads as follows:

$$se_{it}^{*} = \gamma se_{it-1} + \varphi(se_{it-1} \times DM_{it-1}) + \delta DM_{it} + \tau DM_{it-1} + x'_{it}\beta + z'_{i}\pi + \alpha_i + u_{it} \quad (1)$$

with $i = 1, \ldots, N$ indicating the household and $t = 2 \ldots T$ the time period. *se** is the latent social exclusion dependent variable, while *se* is the observed binary response variable, which is defined as follows:

$$se_{it} = \begin{cases} 1 \text{ if } se_{it}^{*} \geq 0 \\ 0 \text{ otherwise} \end{cases} \quad (2)$$

Specifically, *se* takes value one if the household is socially excluded at time *t* and value 0 if the household is not socially excluded at time *t*.

In equation (1), *DM* is a vector including two dummy variables indicating, in turn, the presence of persons with disabilities and severe disabilities in the household, x_{it} is a vector of control variables, whereas z_i is a

vector of time invariant control variables and x is a vector of time variant control variables. γ is the (true) state dependence parameter, φ is a vector of two unknown parameters indicating the change in the state dependence parameter for households with persons with disabilities and severe disabilities. δ and τ are two vectors of unknown parameters identifying, respectively, the impact of current and past disability and severe disability on the probability of being socially excluded. β and π are the vectors of the unknown parameters to be estimated.

Finally, α_i is the individual-specific unobserved heterogeneity and u_{it} is the idiosyncratic error term. We assume that both α_i and u_{it} are normally distributed and that there is no serial correlation in the u_{it}. The individual-specific unobserved effect in Wooldridge's approach is written as follows:

$$\alpha_i = \theta_0 + \theta_1 se_{i1} + x'_i\omega + \varepsilon_i \quad (3)$$

where ε is another unobservable individual-specific heterogeneity term that is uncorrelated with the initial social exclusion status se_{i1} or the time-variant explanatory variables. Conversely, correlation between α_i and the time-variant explanatory variables and the initial employment status is captured by parameters θ_1 and ω, where the latter is the vector of parameters of time-averaged time-variant explanatory variables calculated for periods 2 to T, as proposed by Mundlak (1978).

In summary, according to Wooldridge's specification, the probability of employment for cohort-member i at time t is specified as follows:

$$\Pr[se_{it} = 1|.] = \Phi[\gamma se_{it-1} + \varphi(se_{it-1} \times DM_{it-1}) + \delta DM_{it} + \tau DM_{it-1} + x'_{it}\beta + z'_i\pi + \theta_1 se_{i1} + x'_i\omega + \varepsilon_i] \quad (4)$$

where Φ is the cumulative distribution function of a standard normal.

As noted, a potential source of bias would derive by the violation of the strict exogeneity assumption for which, conditional on past social exclusion and unobservable individual-specific factors, the current social exclusion status should not be related to past or future values of the explanatory variables. This requires that there are no feedback effects from current social exclusion to future disability status (e.g. Biewen, 2009). In case of feedback effects, current disability status would be endogenously determined based on a circular relation between disability and social exclusion, and an estimation bias problem would exist.

This potential source of bias has so far not been considered by the literature on the economics of disability. We test this potential source of bias by running a joint estimation between social exclusion and disability equations. The social exclusion equation is modeled according to the Wooldridge's approach, while the disability equation is modeled as follows:

$$dm^*_{it} = \rho dm_{it-1} + \sigma se_{it-1} + h'_{it}\vartheta + v_i + \epsilon_{it} \quad (5)$$

where *dm** is the latent disability dependent variable, while *dm* is the observed ordinal response variable, which is defined as follows:

$$dm_{it} = \begin{cases} 0 & \text{if } dm_{it}^* \leq c_1 \\ 1 & \text{if } c_1 < dm_{it}^* \leq c_2 \\ 2 & \text{if } dm_{it}^* > c_2 \end{cases} \quad (6)$$

h is a vector of control variables, which includes an instrumental variable introduced for identification purposes. In particular, we rely on the 2007-2010 yearly variation in road accidents rate in Italy (Eurostat 2017), which is likely to be associated with variation in disability incidence but nor with social exclusion. c_1 and c_2 are a set of threshold parameters to be estimated, v_i is the individual-specific unobserved heterogeneity and ϵ_{it} is the idiosyncratic error term. Under the normality assumption of the residual ϵ the model corresponds to an ordered probit random effects specification. That model can be consistently and efficiently estimated by limited information maximum likelihood[13].

Finally, because we are using non-linear models, the interpretation of the estimated coefficients is not straightforward. Thus, we compute average marginal effects (AMEs), which allow us to quantify the impact of the explanatory variables on the dependent variable in percentage terms.

5. Results

Estimation results are presented in Tables 3 and 4. Table 3 reports estimates from our benchmark specification, a dynamic probit model with correlated random effects accounting for endogenous initial conditions estimated following the Wooldridge's approach.

Even accounting for unobserved heterogeneity and endogenous initial conditions, our results confirm that genuine state dependence exists, i.e. being in a status causally increases the probability of being in the same status one year later. Our estimates reveal that being socially excluded in the past increases by 15.3% the probability of being currently socially excluded. This finding is in line with Davila-Quintana and Malo (2012) when they investigate income poverty, who find evidence of genuine state dependence in Spain, ranging between 0.111 and 0.162,

Multiple causes may explain state dependence in the social exclusion process. Among others, deprivation conditions may demotivate individuals, lowering their labor supply or negatively affecting actions aimed at increasing their income (e.g. application for disability benefits). In addition, experiencing unemployment may affect future employment (e.g. Biewen 2014) and, therefore, social exclusion, by altering preferences for leisure and/or by determining human capital deterioration; similar considerations may apply to full time caregivers within the household.

[13] This model is estimated in STATA by using the *cmp* routine (Roodman, 2011).

A contribution of our study to the existing literature concerns the way state dependence is affected by a disability condition in the household. Uncovering differences in state dependence among households with and without persons with disabilities would be indicative of different social exclusion dynamics between the two groups, and, therefore, of a different propensity to experience persistence in social exclusion. Our results suggest that the state dependence of households with persons with disabilities is by 3.3% (in absolute terms) greater than the estimated state dependence for households without persons with disabilities. This means that once a household with persons with disabilities is socially excluded, the probability of experiencing social exclusion one year later is (in relative terms) about 20% greater when compared to a household without persons with disabilities. The state dependence of households with persons with severe disabilities, however, is just 0.8% greater than that of households without persons with disabilities (5% in relative terms); additionally, the estimated coefficient is not statistically significant. This indicates that the contribution of genuine state dependence to social exclusion is not significantly different from that we found for households without persons with disabilities. This, however, would not indicate that households with persons with severe disabilities are exposed to the same risk of persistent social exclusion as households without persons with disabilities. The greater persistence for households with persons with disabilities which we detected in the descriptive analysis, instead, is explained by structural factors, such as lower educational levels (see Kim et al 2016), rather than state dependence.

Whatever the origin of social exclusion, however, our results are relevant for several reasons. First, they suggest that social exclusion is a dynamic rather than a static phenomenon. In that case, policy measures should be addressed to prevent the risk of incurring social exclusion, with the aim of avoiding the beginning of a self-sustaining process. Second, because state dependence is significantly greater for households with persons with disabilities, preventing policies would be particularly relevant for them. In addition, once social exclusion has occurred, policies aimed at lifting households with persons with disabilities out of social exclusion would be relatively costly in comparison with households without persons with disabilities.

While severe disability appears not to affect the dynamics of social exclusion, we find it has a significant impact on the probability of being currently socially excluded, which increases by 2.5% when a person with severe disabilities lives in the household. The impact is smaller (+1.3%) and not significant when looking at non-severe disability. This would be possibly explained by the greater involvement in informal caring activities of members of households with persons with severe disabilities, especially in those areas where formal care is inadequate. Parodi and Sciulli (2008) and, more recently, (Mussida and Sciulli 2018), have proved that female employment probabilities in Italy are negatively affected by the presence of household members with severe disabilities. This is because of the scarce accessibility of formal care services and the predominance of the male breadwinner model which assigns to women the informal care and homework duties. Therefore, households with persons with severe disabilities are more likely to experience lower work intensity because the lower employment probabilities of both person with disabilities and his/her carer, and a higher risk of income poverty and material deprivation because of the household's lower income from work

Thus, an improvement of formal care services for persons with severe disabilities , alleviating the homework responsibilities of women, would be helpful to reduce the risk of social exclusion associated to disability.

Our model controls for several idiosyncratic variables, i.e. age, gender, educational attainments and marital status, all referred to the head of the household. First, we find no relevant differences in the probability that a household is socially excluded with reference to the age of the head of the household (head of the household aged 17-34 is the base-category). Similarly, social exclusion is not significantly affected by having a woman as household head, and by the household's head marital status. Finally, in line with expectations, the educational level of the household head is an important predictor of social exclusion. For medium education, the probability of being socially excluded decreases by 4.1% with respect to the base-category (low educational level), while in case of highly educated heads of the household the probability of being socially excluded decreases by 8.3%.

Other controls directly refer to household characteristics. First, we account for the role of area of residence, and we find a disadvantage for Southern regions. Households living in the South have a probability of being socially excluded 5.9% higher than the base-category (the Centre), while those living in the North do not display a different performance with respect to the base-category. The presence of children aged 0-3 increases by 6.1% the probability that a household is socially excluded, while the presence of self-sufficient elderly persons in the household reduce by 19.7% the probability of being socially excluded; once more it appears that elderly persons in good health can be a valuable asset in the household, perhaps here taking over the role of carer for the person with disabilities, and therefore allowing other family members to work outside the family. Finally, controlling for the time trend, it emerges that in 2009 the probability of being socially excluded is 2.2% higher than in 2008. This is possibly connected to the consequences of the economic downturn.

[Table 3 about here]

As mentioned above, if the strict exogeneity assumption is violated, feedback effects would be present, and disability would be endogenous in the social exclusion equation. In that case, estimation results from the benchmark model would be potentially biased. We explicitly test this circumstance by running a supplementary analysis based on an extension of the Wooldridge's approach, for which a dynamic probit model estimating the probability of being socially excluded is run jointly with a dynamic ordered probit model estimating the probability that persons with disabilities or severe disabilities live in the household.

Related estimates (see Table 4) reveal that feedback effects are quite irrelevant. Estimates of the state dependence parameters remain unaltered after accounting for feedback effects, confirming that households with persons with disabilities experience a greater probability of remaining socially excluded if they are in that status in the previous year. The presence of persons with severe disabilities in the household increase by

2.9% the probability of being socially excluded, which is greater than the impact that we found when using the model specification not accounting for feedback effects.

The impact of educational level is confirmed in sign and significance and presents a slightly greater magnitude when compared to the previous empirical specification. On the contrary, the impact associated to the presence of children aged 0-3 and self-sufficient elderly persons is slightly smaller. The impact of territorial variables remains unchanged.

[Table 4 about here]

Table A1 reports the estimation results of the dynamic ordered probit model. It indicates that past social exclusion significantly increases the probability that a household has (at least) a person with disabilities, but the coefficient is relatively smaller. Past disability status, instead, is a relevant predictor of current disability, suggesting that there is a persistence component in the disability phenomenon. The probability that a household includes a person with disabilities increases with the presence of elderly household members, indicating that aging is associated with disability. Disability is less frequent in Northern regions and it is negatively associated with educational attainments. Finally, the instrumental variable introduced for identification purposes, i.e. the road accidents rate yearly variation, displays an unexpected negative sign.

Tables A2 and A3 report the estimation results of the Mundlak's specification that we included in our benchmark model and the model accounting for feedback effects. The most important finding concerns the relevance of the initial social exclusion status, which confirms the relevance of accounting for initial conditions problem. We find that being socially excluded in the first observed year increases by 22.4% the probability of being currently socially excluded, confirming that persistence is implicit in the social exclusion phenomenon.

6. Conclusions

This paper has investigated how the presence of persons with disabilities affects the probability that a household is socially excluded, and its dynamics. Following the EU approach, social exclusion is defined along three economic dimensions, i.e. income poverty, low work intensity and material deprivation. The study focuses on Italy, a country having experienced one of the greatest increase of people at risk of poverty or social exclusion since the beginning of the economic crisis.

Disability, as a factor of vulnerability, is likely to be associated with disadvantaged socio-economic conditions. Persons with disabilities show a lower propensity to being employed and this may affect both work intensity and household income formation. Additionally, persons with disabilities have special/additional consumption requirements conditioning the allocation of household financial resources; also, sometimes they need informal care within the household, with consequences for the employment

probabilities of their relatives. This may affect household work intensity, material deprivation and household income formation.

Our findings support the hypothesis that the presence of a persons with severe disabilities in the household increases the probability of being socially excluded by 2.5%-2.9%, suggesting the necessity of specific policies to support households with persons with severe disabilities.

When uncovering the determinants of social exclusion, we find that genuine state dependence is greater for households with persons with disabilities (by about 20% in relative terms with respect to households without persons with disabilities); in other words, a household with persons with disabilities experiencing social exclusion is more likely to remain still socially excluded in the following year, when compared to other households in a similar situation of exclusion. In the medium/long-term this may involve persistence in social exclusion, which is associated with several negative socio-economic outcomes. These findings suggest that social exclusion is a dynamic process and, importantly, that policies aimed at preventing social exclusion would be particularly effective for households with persons with disabilities.

Importantly, all these findings hold even accounting for feedback effects, according to which disability and social exclusion would be endogenously determined.

Our results also reveal that in Italy social exclusion is affected by several structural factors, such as low education, the presence of children, and living in southern regions. This suggests that effective measures to contrast social exclusion should combine policies supporting persons with disabilities and their households with policies aimed at improving educational achievements, providing formal care services and developing disadvantaged areas.

References

Agovino M., Parodi G. (2012). Civilian disability pensions as an antipoverty policy instrument? A spatial analysis of Italian Provinces, 2003-2005. In: Parodi G., Sciulli D. (eds.), Social Exclusion. Short and long term causes and consequences, AIEL Series in Labour Economics, Verlag Springer, Heidelberg.

Agovino M., Parodi G., Sciulli D. (2014) The dynamics of disability and labour force participation in Italy. In: Malo MÁ, Sciulli D (eds.) Disadvantaged Workers, AIEL Series in Labour Economics, Verlag Springer, Heidelberg.

Atkinson, A.B. (1999). On the poverty measurement. Econometrica, 55: 749-64.

Ayllón, S. (2013). Understanding poverty persistence in Spain. SERIES Journal of the Spanish Economic Association, 42(2): 201–233.

Ayllón S., Gabos A. (2017). The Interrelationships between the Europe 2020 Poverty and Social Exclusion Indicators. Social Indicators Research, 130: 1025-1049.

Biewen M. (2009). Measuring state dependence in individual poverty status: are there feedback effects to employment decisions and household composition? Journal of Applied Econometrics, 24(7): 1095-1116.

Biewen M. (2014). Poverty persistence and poverty dynamics. IZA World of Labor, 103: 1-10

Brandolini, A., D'Alessio, G. (1998). Measuring well-being in the functioning space. Mimeo, Bank of Italy, Rome.

Burchardt, T., LeGrande, J., Piachaud, D. (2002). Degrees of exclusion: Developing a dynamic multidimensional measure. In: Hills, J., Le Grand, J., Pichaud, D. (eds.) Understanding Social Exclusion, Ch. 3, Oxford University Press.

Cappellari L., Jenkins S. (2002). Who stays poor? Who becomes poor? Evidence from the British household panel survey. Economic Journal, 112: 60-67.

Davila-Quintana C.D., Malo M.A. (2012). Poverty dynamics and disability: An empirical exercise using the European Community Household Panel, Journal of Socio-Economics, 41: 350-359.

Devicienti F., Poggi A., (2011) Poverty and social exclusion: two sides of the same coin or dynamically interrelated processes? Applied Economics, 43(25): 3549-3571.

Eurostat (2012). Population and Social Conditions. Statistics in Focus, 9/2012.

Eurostat (2017). Accidents and injuries statistics. https://ec.europa.eu/eurostat/statistics-explained/index.php/Accidents_and_injuries_statistics.

Eurostat (2018). People at risk of poverty and social exclusion. http://ec.europa.eu/eurostat/statistics-explained/index.php/People_at_risk_of_poverty_or_social_exclusion.

Fremstad S. (2009). Half in ten: Why taking disability into account is essential to reducing income poverty and expanding economic inclusion. CEPR Reports and Issue Briefs, n. 30.

Gannon B. (2005). A dynamic analysis of disability and labour force participation in Ireland 1995-2000. Health Economics, 14(9): 925-938.

Gannon B., Nolan T.N. (2007). The impact of disability transitions on social inclusion. Social Science and Medicine, 64(7): 1425-1437.

Heckman, J.J. (1981). The incidental parameters problem and the problem of initial conditions in estimating a discrete time-discrete data stochastic process. In: C.F. Manski and D. McFadden (eds.), Structural Analysis of Discrete Data with Econometric Applications, 179-195. MIT Press: Cambridge, MA.

Jenkins, S.P. (2000). Modeling household income dynamics. Journal of Population Economics, 13(4): 529-567.

Jenkins, S. P., Van Kerm, P. (2014). The relationship between EU indicators of persistent and current poverty. Social Indicators Research, 116 (2): 611–638

Kim K.M. et al. (2016). Social Exclusion of People with Disabilities in Korea. Social Indicators Research, 129: 761-773

Lee, P., Murie, A. (1999). Literature review of social exclusion. Scottish Office Central Research Unit, Stationery Office, Edinburgh.

Mitra S. (2008). The recent decline in the employment of person with disabilities in South Africa 1998-2006. South African Journal of Economics, 76(3): 480-492.

Mundlak, Y. (1978). On the pooling of time-series and cross-section data. Econometrica, 46(1): 69–85.

Mussida C., Sciulli D. (2018). Does the presence of a disabled person in the household affect the employment probabilities of cohabiting women? Evidence from Italy, France and the UK. Unpublished manuscript.

Oguzoglu U. (2010). Dynamics of work limitation and work in Australia. Health Economics, 19(6): 656–669.

Parodi G., Sciulli D. (2008). Disability in Italian households: Income, poverty and labour market participation. Applied Economics, 40(20): 2615-2630.

Parodi G., Sciulli D. (2012). Disability and low income persistence in Italian households. International Journal of Manpower, 33(1): 9-26.

Poggi A. (2007). Does persistence of social exclusion exist in Spain? Journal of Economic Inequality, 5(1): 53-72.

Roodman D. (2011). Fitting fully observed recursive mixed-process models with cmp. Stata Journal, 11(2): 159-206.

Shahtamaseb S., Emerson E., Berridge D., Lancaster G. (2011). Child disability and the dynamics of family poverty, hardship and financial strain: Evidence from the UK. Journal of Social Policy, 40: 653-673.

She P., Livermore G.A. (2007). Material hardship, poverty, and disability among working-age adults. Social Science Quarterly, 88(4): 970-981.

She P., Livermore G.A. (2009). Long-term poverty and disability among working-age adults. Journal of Disability Policy Studies, 19(4): 244-268.

Sloane P. J. Jones M. K. (2012). Disability and social exclusion. In: Parodi G., Sciulli D. (Eds.), Social Exclusion. Short and long term causes and consequences, AIEL Series in Labour Economics, Verlag Springer, Heidelberg.

Solipaca A., Di Nicola F., Mancini F., Rosano A. (2010). Il gap di reddito delle persone con disabilità: un'analisi regionale. Rapporto Osservasalute, Stato di Salute e Qualità dell'Assistenza nelle Regioni italiane.
Stevens A.H. (1999). Climbing out of poverty, falling back. Journal of Human Resources, 34(3): 557-588.

Tobias E.I., Mukhopadhyay S. (2017) Disability and social exclusion: Experiences of individuals with visual impairments in the Oshikoto and Oshana regions of Namibia. Psychology and Developing Societies, 29(1): 22–43.

United Nations (2007). Literature review on social exclusion in the ESCWA Region. Economic and Social Commission for Western ASIA (ESCWA), New York, 07-0346.

Whelan C.T., Layte R., Maitre B. (2003). Persistent income poverty and deprivation in the European Union: An analysis of the first three waves of the ECHP. Journal of Social Policy, 32(1): 1-18.

WHO (2001). International Classification of Impairments, Disabilities, and Handicaps. World Health Organization, Geneva.

Wooldridge J. (2005). The initial condition problem in dynamic, non-linear panel data models with unobserved heterogeneity. Journal of Applied Econometrics, 20: 39-54;

Appendix

[Table A1 about here]

[Table A2 about here]

[Table A3 about here]

Tables

Table 1. Descriptive statistics

	Whole sample		No disability		Disability		Severe disability	
	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Social exclusion	0.280	0.449	0.233	0.423	0.334	0.472	0.377	0.485
No disability	0.594	0.491						
Disability	0.271	0.444						
Severe disability	0.135	0.342						
Household head age [17-34]	0.076	0.266	0.115	0.319	0.020	0.139	0.019	0.136
Household head age [35-44]	0.182	0.386	0.257	0.437	0.087	0.282	0.039	0.195
Household head age [45-54]	0.210	0.408	0.261	0.439	0.153	0.360	0.106	0.308
Household head age [55-64]	0.185	0.389	0.185	0.389	0.182	0.386	0.192	0.394
Household head age [65 and more]	0.371	0.483	0.218	0.413	0.569	0.495	0.650	0.477
Female household head	0.283	0.451	0.249	0.433	0.341	0.474	0.318	0.466
Household head education [low]	0.612	0.487	0.516	0.500	0.730	0.444	0.796	0.403
Household head education [medium]	0.260	0.439	0.314	0.464	0.203	0.402	0.137	0.344
Household head education [high]	0.128	0.334	0.170	0.376	0.067	0.250	0.067	0.251
North	0.458	0.498	0.478	0.500	0.450	0.498	0.387	0.487
Centre	0.228	0.419	0.229	0.420	0.208	0.406	0.261	0.439
South	0.314	0.464	0.293	0.455	0.342	0.474	0.352	0.478
Household size	2.568	1.288	2.684	1.307	2.395	1.247	2.399	1.224
Household head married	0.637	0.481	0.665	0.472	0.591	0.492	0.609	0.488
Number of children aged 0-3	0.058	0.245	0.079	0.283	0.032	0.182	0.019	0.149
Number of self-sufficient elderly people	0.538	0.735	0.302	0.597	0.809	0.762	1.031	0.796
Living in a city	0.342	0.474	0.350	0.477	0.338	0.473	0.314	0.464

Source: our elaboration of 2007-2010 IT-SILC data

Table 2. Social exclusion transitions by disability status

		Social exclusion time t					
		No disability		Disability		Severe disability	
		No	Yes	No	Yes	No	Yes
Social exclusion time t-1	No	91.10	8.90	87.72	12.28	89.15	10.85
	Yes	27.15	72.85	22.19	77.81	19.56	80.44

Source: our elaboration of 2007-2010 IT-SILC data

Table 3. Dynamic probit model with correlated random effects and endogenous initial conditions: Social exclusion equation

	Coeff.	s.e.		AME
SE t-1	0.954	0.080	***	0.153
SE t-1*Disability	0.207	0.110	*	0.033
SE t-1*Severe disability	0.049	0.135		0.008
No disability		base-category		
Disability	0.079	0.064		0.013
Severe disability	0.158	0.093	*	0.025
No disability t-1		base-category		
Disability t-1	0.003	0.075		0.001
Severe disability t-1	0.046	0.108		0.007
Household head age [17-34]		base-category		
Household head age [35-44]	-0.382	0.302		-0.062
Household head age [45-54]	-0.330	0.388		-0.053
Household head age [55-64]	-0.705	0.461		-0.113
Household head age [65 and more]	0.800	0.576		0.129
Female household head	0.079	0.065		0.013
Household head married	-0.563	0.365		-0.091
Household head education [low]		base-category		
Household head education [medium]	-0.254	0.059	***	-0.041
Household head education [high]	-0.517	0.083	***	-0.083
North	-0.017	0.062		-0.003
Centre		base-category		
South	0.367	0.064	***	0.059
Household size	0.091	0.095		0.015
Number of children aged 0-3	0.376	0.181	**	0.061
Number of self-sufficient elderly people	-1.225	0.235	***	-0.197
Living in a city	1.471	1.067		0.237
Year 2008		base-category		
Year 2009	0.135	0.057	**	0.022
Year 2010	0.043	0.061		0.007
Constant	-1.818	0.152	***	

Source: our elaboration of 2007-2010 IT-SILC data

Table 4. Dynamic probit model with correlated random effects and endogenous initial conditions accounting for feedback effects: Social exclusion equation

	Coeff.	s.e.		AME
SE t-1	0.952	0.081	***	0.153
SE t-1*Disability	0.208	0.111	*	0.033
SE t-1*Severe disability	0.038	0.136		0.006
No disability		base-category		
Disability	0.094	0.075		0.015
Severe disability	0.181	0.107	*	0.029
No disability t-1		base-category		
Disability t-1	-0.007	0.078		-0.001
Severe disability t-1	0.035	0.115		0.006
Household head age [17-34]		base-category		
Household head age [35-44]	-0.421	0.328		-0.068
Household head age [45-54]	-0.335	0.422		-0.054
Household head age [55-64]	-0.566	0.501		-0.091
Household head age [65 and more]	0.615	0.629		0.099
Female household head	0.051	0.065		0.008
Household head married	-0.387	0.418		-0.062
Household head education [low]		base-category		
Household head education [medium]	-0.259	0.059	***	-0.042
Household head education [high]	-0.520	0.084	***	-0.083
North	-0.025	0.062		-0.004
Centre		base-category		
South	0.367	0.065	***	0.059
Household size	0.136	0.103		0.022
Number of children aged 0-3	0.281	0.200		0.045
Number of self-sufficient elderly people	-1.111	0.255	***	-0.178
Living in a city	1.109	1.274		0.178
Year 2008		base-category		
Year 2009	0.138	0.058	**	0.022
Year 2010	0.046	0.062		0.007
Constant	-1.815	0.156	***	

Source: our elaboration of 2007-2010 IT-SILC data

Appendix

Table A1. Ordered probit model with random effects: Disability equation

	Coeff.	s.e.	
SE t-1	0.053	0.031	*
No disability		base-category	
Disability t-1	1.215	0.033	***
Severe disability t-1	2.449	0.049	***
Household head age [17-34]		base-category	
Household head age [35-44]	0.302	0.119	**
Household head age [45-54]	0.500	0.116	***
Household head age [55-64]	0.784	0.115	***
Household head age [65 and more]	1.156	0.114	***
North	-0.072	0.036	**
Centre		base-category	
South	-0.019	0.039	
Household head education [low]		base-category	
Household head education [medium]	-0.153	0.037	***
Household head education [high]	-0.221	0.052	***
Living in a city	-0.018	0.030	
Yearly variation in road accident rate	-0.058	0.008	***

Source: our elaboration of 2007-2010 IT-SILC data

Table A2. Estimated coefficients of Mundlak's specification: Social exclusion without feedback effects

	Coeff.	s.e.		AME
SE time 1	1.395	0.086	***	0.224
Average no disability		base-category		
Average disability	0.103	0.166		0.017
Average severe disability	0.128	0.232		0.021
Average household head age [17-34]		base-category		
Average household head age [35-44]	0.396	0.325		0.064
Average household head age [45-54]	0.313	0.406		0.050
Average household head age [55-64]	1.219	0.476	***	0.196
Average household head age [65 and more]	-0.499	0.597		-0.080
Average household size	-0.112	0.098		-0.018
Average marital status	0.567	0.374		0.091
Average number of children aged 0-3	-0.168	0.235		-0.027
Average number of self-sufficient elderly members	1.003	0.250	***	0.161
Average living in a city	-1.397	1.069		-0.225

Source: our elaboration of 2007-2010 IT-SILC data

Table A3. Estimated coefficients of Mundlak's specification: Social exclusion with feedback effects

	Coeff.	s.e.		AME
SE time 1	1.393	0.086	***	0.224
Average no disability		base-category		
Average disability	0.168	0.151		0.027
Average severe disability	0.248	0.215		0.040
Average household head age [17-34]		base-category		
Average household head age [35-44]	0.444	0.358		0.071
Average household head age [45-54]	0.347	0.446		0.056
Average household head age [55-64]	1.050	0.521	**	0.169
Average household head age [65 and more]	-0.176	0.651		-0.028
Average household size	-0.164	0.106		-0.026
Average marital status	0.385	0.424		0.062
Average number of children aged 0-3	0.010	0.243		0.002
Average number of self-sufficient elderly members	0.814	0.265	***	0.131
Average living in a city	-1.029	1.275		-0.165

Source: our elaboration of 2007-2010 IT-SILC data