Disability and Social Exclusion Dynamics in Italian Households

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This paper investigates the dynamics of social exclusion comparing Italian households with and without disabled people, adopting the EU definition of social exclusion and the social model approach to the disability. The analysis applies a dynamic probit model accounting for true state dependence, unobserved heterogeneity and endogenous initial conditions to the 2004-2007 IT-SILC data. Our findings indicate that the incidence of social exclusion for households with disable people is about double with respect to other households, and this disadvantage is especially due to exclusion in the work intensity and material deprivation dimensions. This suggests that analysis based just on income perspective could be insufficient to provide a proper picture of reality. Second, households with disabled people are more likely to persist in social exclusion than other households. Third, persistence in social exclusion for households with disabled people is more likely to be explained by unobserved (and observed) heterogeneity, than by true state dependence. Fourth, households with disabled members experience a stronger severity of social exclusion, explained more in terms of structural factors than in terms of state dependence. Our findings suggest that households with disabled people could benefit more than other households from long-term policies aimed at removing structural factors determining a social exclusion history. The severity of social exclusion, that is stronger for households with disabled members, conforms to the same pattern.

Keywords: social exclusion, persistence, disability, dynamic probit model, initial conditions.

JEL codes: J14, I32, C23.

INTRODUCTION

In the last decade the interest for social exclusion has strongly increased in Europe. The European Union 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, about 20% of EU citizens have such limited resources that they cannot afford the basics.

Various definitions of the notion of social exclusion have emerged, and all share a multidimensional approach that proxies the individual or household well-being extending the standard approach based on income poverty.

However, while some definitions of social exclusion (see the paragraph below), include dimensions as civic and political participation, social interactions, health, and education[1], the EU has been developing models for measuring social exclusion over the years mainly based on economic factors.

As United Nations (2007) underlined, disability, as a factor of vulnerability, is likely to be associated to social exclusion. This is probably true whatever definition of or approach to social exclusion is considered and whatever is the unit of analysis, strictly disabled persons or, in a wider view, households with disabled persons.

Approaching disability in a household rather than individual perspective is recent in the literature of the economics of disability. Disability has an impact on the household through multiple channels of interaction, and is mainly likely to affect the attachment to the labour market of the household members, and the household consumption and income. If the disabled person receives a subsidy, this increases the household income,

[1] For example, the United Nations suggest to investigate social exclusion in terms of three basic categories, i.e. Livelihood, Social provisioning, and Citizenship and rights, respectively organized in terms of subcategories: for Livelihood, Employment (include skills and education), Income, and Purchasing power and consumption; for Social provisioning Education, and Health care; for Citizenship and rights Social participation, Right to organization, Political representation, and Civil rights.

and therefore indirectly the household consumption. From another angle, on the consumption side, the disabled person is likely to have additional/special consumption requirements (She and Livermore, 2007 and 2009, Fremstad, 2009 for the USA, Solipaca et al. 2010[2] for Italy, Tibble, 2005); unless these extra needs are publicly met, the extra costs of disability affect household income, and create substitution effects on other types of consumption. On the labour market side, the disabled person may not work, therefore reducing the number of household members attached to the labour market. Also, according to the severity of disability a disabled person may need care, which can be provided by services outside the household, or within the household. Unless care services are publicly provided, the acquisition of services draws on the household income. Alternatively, care is provided by household members, and this affects their attachment to the labour market (Parodi and Sciulli, 2008). Therefore it is of interest to investigate the systemic effect that disability has on the household.

This paper focuses on the persistence in social exclusion of household which have at least one disabled member, comparing households without disabled people (HHND) with household with disabled people temporary limited (HHTL) and household with disabled people permanently limited (HHD).

Jenkins (2000) describes different approaches to study the dynamics of poverty (or social exclusion), and one of them provides for modeling the process underlying the dynamics of poverty, paying attention to the persistence of poverty and its causes (observable and unobservable heterogeneity and true state dependence). Literature approaching poverty persistence using this methodology include Stevens (1999), Nolan

[2] Using the Italian SILC data at regional level, they find that, standardizing by HH size, a HH with at least one disabled person needs 1,67 income units in order to achieve the spending capacity which a HH without disabled persons achieves with only one income unit. This exercise quantifies the intuition for instance of Fremstad (2009) about the extra consumption needs of HH with disabled persons.

et al. (2001), Whelan, Layte and Maitre (2001), Cappellari and Jenkins (2002), Trivellato, Giraldo and Rettore (2002), and Poggi (2007) for social exclusion.

Most recently the literature on the economics of disability has been enriched by studies focusing on the dynamics of poverty. This includes Meyer and Mok (2006) that study the dynamics of individual income, consumption and earnings after a disability shock in the US, and Shahtamaseb et al. (2011) who find that households with disabled children in UK are not exposed to a different dynamic into and out of poverty with respect to other households. Moreover, both 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 explain it more in terms of persistence (initial conditions and structural characteristics) than state dependence. It follows that this paper adds to the existing literature introducing a multidimensional perspective to analyzing the well-being dynamics of households with and without disabled people.

The study of persistence in social exclusion is important for its policy implications. If social exclusion is explained by true state dependence this could suggest that short-term policies may be effective for reducing the risk of social exclusion in the future, while if social exclusion mainly depends on unobserved (and observable) heterogeneity, long-term policies affecting structural variables would be effective.

Our econometric analysis is based on a dynamic probit model accounting for unobserved heterogeneity, true state dependence and endogenous initial conditions (Wooldridge 2005), applied to the longitudinal component of the 2004-2007 IT-SILC database. The main findings are the following ones. First, the probability of being socially excluded for HHD is about doubled with respect to HHTL and HHND, and this disadvantage depends especially by material deprivation and, overall, work intensity dimensions. This suggests that analysis based just on income perspective could be insufficient to provide a proper picture of reality. Second, HHD are more likely to persists in social exclusion than other household types. Third, social exclusion for HHD is more likely to be explained by unobserved (and observed) heterogeneity, affecting initial conditions and persistence than by true state dependence. This is suggestive that HHD could benefit more than other households from long-term policies aimed at removing structural factors determining a social exclusion history.

We provide a further analysis concerning the severity of social exclusion. With this aim we proxy the severity of social exclusion (that we interpret as a latent phenomenon) with the number of dimensions for which an individual is socially excluded. Descriptive findings make clear that HHD experience stronger severity of social exclusion when compared with other household groups. Empirically, with the aim of uncovering the determinants of the severity of social exclusion, we estimate a dynamic ordered probit model, accounting for state dependence, unobserved heterogeneity and initial conditions, approximating the Wooldridge's approach provided before. The estimation results show that for HHND and HHTL higher severity of social exclusion in the past increases the risk of higher severity in the current period, implying the existence of relevant state dependence. Conversely HHD experience a different pattern with respect to the severity of social exclusion: state dependence is relatively negligible, while we find a strong positive gradient correlation between the observations referring to the initial period and the unobserved latent severity of social exclusion. This correlation is weaker for the other household groups. It follows that interventions aimed at reducing the severity of social exclusion for HHD should be focused on structural factors rather than simply rely on monetary transfers, that prevalently produce short-term effects.

The remainder of this paper is organized as follows. Section 2 provides definitions and describes the data. Section 3 reports the empirical specification, while Section 4 presents the results of the econometric analysis. Finally, conclusions and policy implications follow in Section 5.

DEFINITIONS AND DATA

We provide two basic definitions for our analysis: social exclusion and disability. The we focus on the description of data and of the sample used in the paper.

Definition of social exclusion

Social exclusion can be seen as a process and a state 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 emerged by in Lee and Murie (1999), while Atkinson (1999) suggested three key elements to identify social exclusion: relativity, agency and dynamics. Other studies discuss how to determine and to select functionings used to identify excluded individuals, and they include 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). Finally, Burchardt (2000) and Burchardt, Le Grand and Piachaud (2002), include further discussions about the way to approach social exclusion. Nolan and Whelan (2010) provide ample reference to the literature trying to identify non-monetary deprivation in individual countries; they also analyze non-monetary deprivation in Europe comparing results using ECHP and EU-SILC data, with special emphasis on consumption, in order to identify specific forms of poverty, and possible cumulative poverty.

The EU has been developing models for defining and measuring social exclusion over the years, paralleling the debate developed especially in the UK on the inadequacies of income as a measure of social unease (see for instance, Burchardt et al. 1999, Burchardt et al. 2002). The Laeken European Council (December 2001) endorsed 23 common statistical indicators of social exclusion and poverty that serve as key elements in monitoring progress in the fight against poverty and social exclusion (the so called Laeken Indicators). In June 2010 the European Council finally opted for a more complex Headline Target for promoting social inclusion at EU level. The target is defined on the basis of three indicators: the number of people at risk of poverty, the number of materially deprived people, and the number of people aged 0–59 living in 'jobless' households (defined, for the purpose of the EU target, as households where none of the members aged 18–59 are working or where members aged 18–59 have, on average, very limited work attachment). More recently, the European Strategy 2020 adopted the same three indicators as dimensions of social exclusion[3]. This definition is adopted in this article.

Specifically, social exclusion occurs if a person is socially excluded in at least one of the three dimensions considered In terms of income, persons are socially excluded if their equivalized disposable income is below the risk-of-poverty threshold, which is set

[3] Here we concentrate on EU measurements of SE. 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.

at 60% of the national median equivalised disposable income (after social transfers)[4]. In terms of work, people are socially excluded if they are living in HH with very low work intensity, i.e. they are people aged 0-59 living in HH where the adults worked less than 20%of their total work potential during the past year. Finally, severe material deprivation occurs for people whose living conditions are severely constrained by a lack of resources, and experience at least 4 out of 9 of the following deprivation items: cannot afford to pay for 1) (arrears on) 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 and 9) heating to keep the home adequately warm[5].

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 disabled is a person whose autonomy is limited

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[4] The household income with different size are made comparable using the modified OECD equivalent scale, for which the household income is normalized by an equivalent scale number (equivalent adult), where the equivalent adult is: ae=1+0.5*(adults-1)+0.3*(number of components aged less than 14). The equivalent income is $Y_{eq}=Y/ae$. This system of equivalization does not take into account possible extra weights of disabled people, necessary according to the results of the investigation by Solipaca et al. (2010)

[5] Actually the EU definition refers to individuals belonging to HH. Our analysis concentrates on HH, therefore we adapt the EU definition of SE as follows: given that the EU SILC data provide information only on people over 17, we only consider people aged 18-59 included; also, the benchmark definition of national median equivalised disposable income is here the value calculated as the median over the sample we consider; also, for the sake of calculating work intensity we distinguish between HH members aged 18-24 who are students and those who are not, and we do not consider those who are students as potential workers.

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 disabled are considered the people whom the institutional system has certified as such, and who receive some kind of disability benefits. A third approach 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. The three definitions have all pros and cons: in particular 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, 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 to given limitations. Consequently, the choice of using data collected according to each system introduces some bias in the investigation.

The EU-SILC data, which are suitable for our investigation, do not have a specific question to identify disability, but they provide information on daily activity limitations. It follows that the identification of disabled people with EU-SILC data is in the spirit of the social model (Mitra, 2008), for which disability, whatever its origin may be seen as a reduced form of the interrelations among impairment, technical help and environment leading to activity limitations.

In our analysis we identify disabled people on the basis of two criteria, i.e. the daily limitations in activities, and the continuity of activity limitations. We identify three levels of limitation: no limitation, light limitation and severe limitation. The second criterion, based on the continuity of activity limitation is stressed for instance by an ad hoc module of the Labour Force Survey conducted in 2002 (see Dupré and Karjalainen, 2003), where respondents were asked whether they had a longstanding health problem or disability lasting for six months or more or expected to last six months or more (quoted by Sloane and Jones, 2012).

The sample of analysis

Our analysis is based on the longitudinal section of the IT-SILC dataset for the period 2004-2007. The 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. The EU-SILC collects micro-data on income, poverty, social exclusion and living conditions from most of the EU countries in order to make available comparable information across countries. As the EU-SILC, the IT-SILC is a multi-purpose instrument mainly focusing on income, and devoting specific attention to detailed income components both at household and personal level, social exclusion, housing condition, labour, education and health.

The longitudinal component of the IT-SILC dataset includes about 105000 individuals and about 49292 households for the whole period 2004-2007. However, since our dynamic analysis requires a balanced panel, we only use information from households present in each of the four waves of the longitudinal section in the period under analysis. Moreover, because of the work intensity definition, for the sake of homogeneity, we focus just on households where at least a household member is in working age i.e., in our case, where at least one household member is aged 18-59 and, if aged 18-24, is not a student. Finally, we eliminate households for which we register missing values in the variables of interest. This selection excludes from the analysis households composed just by elderly people, leaving us with 2833 households per year.

EU-SILC data provide information on both duration and seriousness of activity limitations; therefore we organize the information collected on all individuals in terms of type of limitation (if any) and its duration.

We acknowledge that temporary limitations, however serious, may lead to considerable disadvantage, and therefore we identify a group of households in which at least one of the members reports some form of limitation in some of, or even all, the years under observation; these are defined as households with members with temporary limitations (HHTL).

However, in this paper we use a more stringent definition of disability, i.e. we define as disabled individuals who have experienced some form of limitation during the whole period of observation, i.e. for the four years for which the data are available (persistence in disability status). On the contrary, non-disabled individuals include people not experiencing any limitation in any year under analysis, while people with temporary limitations include those experiencing an intermediate position.

Given these premises we identify three groups of households:

- Households without disabled members (HHND);
- Households with members with temporary limitations (HHTL);
- Households with disabled members (HHD).

Within the group of HHD we consider various possible situations according to the seriousness of the activity limitation (Table 1a).

Table 1a. Identification of HHD, HHTL and HHND

Number of years of limitation	Light limitation				
	0	1	2	3	4
Severe limitation					
0	1496	438	197	121	61
1	66	60	62	64	-
2	29	23	68	-	-
3	9	66	-	-	-
4	73	-	-	-	-

Source: our elaboration on IT-SILC data

We provide three alternative definitions of HHD according to the seriousness of activity limitations**,** and their duration. Specifically we have:

a) Benchmark definition: HHD is the household in which at least one member reports four years of activity limitations, of which at least two of severe limitation.
b) Weak definition: HHD is the household in which at least one member reports four years of activity limitations, whatever the seriousness of activity limitations.
c) Strong definition: HHD is the household in which at least one member reports four years of severe activity limitations.

The same definition of Benchmark, Weak, and Strong activity limitations apply to HHTL as well, which are therefore complementary to HHD, while HHND is stable across alternative definitions. According to the chosen definition of disability the groups under investigation are the following ones (percentages are calculated over the whole sample of 2833 households, Table 1b):

Table 1b. Households distribution according to the disability definition

	HHND		HHTL		HHD	
Definition	Obs.	%	Obs.	%	Obs.	%
Benchmark	1496	52.81%	1130	39.89%	207	7.31%
Weak	1496	52.81%	1005	35.47%	332	11.72%
Strong	1496	52.81%	1264	44.62%	73	2.58%

Source: our elaboration on IT-SILC data

The probability of being socially excluded may vary across households according to heterogeneous characteristics (observable and unobservable) and true state dependence, i.e. how the probability of being currently socially excluded depends on the probability of being socially excluded in the previous period. Observable heterogeneity is controlled for by including the following covariates: age, gender, marital status, being migrant, education and employment status of the household head[6], as well as household size, presence of elderly (aged more than 64), presence of children (aged 0-14), area of residence, and employment status of the partner.

Descriptive statistics

Descriptive statistics of observable factors are reported in table 2, and provide some preliminary information.

[6] The reference person is identified according to the *relpar* variable included in the L07r file of the longitudinal component of the IT-SILC data. According to this information the digit one identifies the reference person, while digits two and three identify their partner (married or cohabitant).

Table 2. Descriptive statistics (Benchmark definition).

	HHND		HHTL		HHD	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Social exclusion at time t	0.208	0.406	0.288	0.453	0.488	0.500
Social exclusion at time t-1	0.211	0.408	0.283	0.450	0.475	0.500
Social exclusion at time 0	0.221	0.415	0.278	0.448	0.459	0.499
Age	46.281	10.492	53.748	12.256	62.969	11.559
Male	0.789	0.408	0.802	0.398	0.757	0.429
Consensual union	0.704	0.456	0.739	0.439	0.670	0.471
HH size	2.942	1.235	3.145	1.147	3.198	1.122
Elderly	0.069	0.300	0.301	0.592	0.771	0.772
Children	0.430	0.495	0.278	0.448	0.110	0.313
Migrants	0.024	0.154	0.026	0.159	0.005	0.069
North	0.500	0.500	0.440	0.496	0.377	0.485
Centre	0.202	0.401	0.235	0.424	0.227	0.419
South	0.298	0.457	0.325	0.469	0.396	0.489
Low education	0.414	0.493	0.577	0.494	0.765	0.424
Medium education	0.446	0.497	0.339	0.473	0.193	0.395
High education	0.139	0.346	0.082	0.274	0.021	0.143
Education missing	0.001	0.026	0.002	0.045	0.021	0.143
Employed	0.795	0.403	0.601	0.490	0.233	0.423
Unemployed	0.028	0.165	0.028	0.164	0.043	0.204
Partner employed	0.399	0.490	0.317	0.465	0.156	0.363

Source: our elaboration on IT-SILC data

With respect to social exclusion HHND and HHTL show similar incidences, while it is much higher for HHD.

The average age of HH head increases monotonically in the three groups considered, from 46 in HHND to 54 in HHTL to 63 in HHD. The age characteristic also explains other demographic characteristics in the three groups; in particular, in demographic terms, it explains the monotonical increase in the incidence of elderly people in the HH of each of the three groups, and the comparable monotonical decrease in the incidence of children in the HH of the same three groups.

Several personal characteristics of the HH head clearly identify HHND, HHTL, and HHD as three distinct groups. This is the case for area of residence, with the monotonically decreasing incidence of living in the North, the monotonically increasing incidence of living in the South; given that self reported disability refers to ease in performing daily activities, this can partly be explained by an environment which in the South is less favorable to the inclusion of disabled people. In educational terms, the incidence of medium and high education if the HH head decreases from HHNT, to HHTL to HHD. It is also the case in employment terms, with the monotonical decrease in the incidence of the HH head employment from HHNT, to HHTL, to HHD; this can partly be explained by the above noted increasing age of the HH Head for the same three groups. It is also the case for HH size, which slowly but monotonically increases among the three groups; this may be explained by the need to share the care of disabled members among several people; obviously an adequate provision of public service would make the HH size less relevant. Other groups of characteristics identify strong similarities between HHND and HHTL, compared with HHD which shows very different values.

The incidence of unemployment is quite similar for HHND and HHTL heads, and nearly double for HHD heads; also, for HHD the incidence of the partner being employed is much smaller, i.e. less than half, than for the other two groups. The considerations developed about these last three variables contribute to explain for HHD the high value of the work intensity dimension of social exclusion as we will show in Table 3 and 4 above.

Social exclusion and disability: descriptive evidence

Descriptive evidence provides a preliminary framework of the association between social exclusion and disability, according to the indicators and the definitions discussed above. With reference to the benchmark definition, HHD tend to diverge quite strongly from the other two groups, both in terms of incidence of being socially excluded and by type and number of dimensions for which households are socially excluded. HHTL usually are positioned in an intermediate position.

Looking at Table 3, just above one fifth of all HHND are socially excluded, and this percentage monotonically increases among the three groups, as 28.5% of all HHTL are socially excluded, and 48,07% of HHD are socially excluded.

Considering now the individual dimensions of social exclusion, Table 3 shows that: 1) the incidence of each dimension of social exclusion increases from HHND, to HHTL, to HHD; 2) the incidence of the income dimension of social exclusion is higher than the incidence of other dimensions of social exclusion for HHND; 3) the incidence of the work intensity dimension of social exclusion is close to the income dimension of social exclusion for HHTL while for the group of HHD it reaches the very high value of 36,59%[7].

Table 3. Incidence of social exclusion among household types and by dimensions.

HH type	SE	SE income	SE work intensity	SE deprivation
HHND	21.12%	14.32%	9.38%	3.96%
HHTL	28.54%	16.11%	16.62%	6.15%
HHD	48.07%	18.24%	36.59%	12.44%

Source: our elaboration on IT-SILC data

The stronger disadvantage for HHD obviously emerges in terms of the incidence of not being socially excluded in any dimension (Table 4, first row): it is 79% for HHND,

[7] The predominance of social exclusion in the work dimension, may be partly explained by the demographic characteristics of HHD, for which the presence of elderly people (more likely to be associated to daily activity limitations) is more frequent. Nevertheless, this explanation cannot be exhaustive, as the predominance of work social exclusion for HHD is common to each age group of the HH head (Table A1).

about 71% for HHTL and just 52% for HHD. Similarly, the probabilities of being socially excluded in one, two or three dimensions are higher for HHD than for HHTL and HHND, with the exception of the income dimension, possibly indicating a positive role of disability benefits in reducing the risk of income social exclusion[8]. In this context it also emerge that social exclusion for HHD is more likely due to the work dimension (four times greater than for HHND), while the income dimension is relatively less relevant. As anticipated this finding can be partly associated to the higher incidence of elderly people in HHD. However, further explanations about the structure of social exclusion for HHD may consist in the combined effect of disability benefit and poor caring services for disabled people that possibly affects the labour market participation of other household members (Parodi and Sciulli, 2008).

Finally, Table 4 also shows that, even though different dimensions of social exclusion may intervene at the same time, exclusion in multiple dimensions is less likely than exclusion in one dimension (e.g. social exclusion among HHD is in one dimension 33% and 15% for more than one, and other households follow quite similar patterns).

This finding is also confirmed by the correlation coefficient among different dimensions that ranges from 0.17 to 0.26, indicating weak correlation among social exclusion dimensions[9].

[8] This finding confirms Atkinson and Marlier (2010) p. 148: "In each of the 25 countries analysed here, the presence of at least one person in bad health (self-defined status) in the household seems to have no significant impact on the risk of income poverty".

[9] See Poggi (2007) for a similar finding.

Table 4. Incidence and severity of social exclusion by household types and dimensions

	HHND		HHTL		HHD	
	#	%	#	%	#	%
Non SE	4720	78.88%	3230	71.46%	430	51.93%
SE in one dimension	940	15.71%	896	19.82%	276	33.33%
Income	*550*	*9.19%*	*373*	*8.25%*	*39*	*4.71%*
Work	*302*	*5.05%*	*429*	*9.49%*	*194*	*23.43%*
Deprivation	*88*	*1.47%*	*94*	*2.08%*	*43*	*5.19%*
SE in two dimensions	257	4.29%	321	7.10%	85	10.27%
Income-Work	*175*	*2.92%*	*210*	*4.65%*	*62*	*7.49%*
Income-Deprivation	*65*	*1.09%*	*72*	*1.59%*	*13*	*1.57%*
Work-Deprivation	*17*	*0.28%*	*39*	*0.86%*	*10*	*1.21%*
SE in three dimensions	67	1.13%	73	1.62%	37	4.71%

Source: our elaboration on IT-SILC data

Three main considerations emerge. First, the income support received by HH with disabled people appears to succeed in protecting their incomes against being socially excluded only in terms of the income dimension of social exclusion, and this protection is more successful for HHD. Second, income support appears to protect HHD from the income dimension of social exclusion, but much less so from the deprivation dimension of social exclusion. This suggests that the consumption needs of HHD are not sufficiently taken into account by the policy instruments geared at supporting HH with disabled people: support income received by HH with severe disabilities appears just sufficient to pay for the extra needs of their disabled members, and the HH cannot therefore afford the consumption goods to which the deprivation dimension of social exclusion refers to. Third, the work intensity dimension of social exclusion has high values for HHD.

The number of dimensions in which the household is socially excluded is interpreted as a proxy for the latent phenomenon of the severity of social exclusion. At descriptive level, HHD appear to experience a stronger severity of social exclusion. The percentage of HHD socially excluded in one dimension is 33.3% against 19.8% for HHTL and 15.7% for HHND. Social exclusion in two dimensions is experienced by 10.3% of HHD, 7.1% of HHTL and 4.3% of HHND, while being socially excluded in all three dimensions is experienced by 4.7% of HHD, 1.6% of HHTL and 1.3% of HHND. An empirical analysis on the severity of social exclusion is provided below.

Dynamics of Social Exclusion and Disability: descriptive evidence

Evidence emerging from Table 5 (number of years in social exclusion) points in the same direction and adds new information. The percentage of households that have been never socially excluded represent 64% of HHND, 56% of HHTL and just 34% of HHD. The incidence of being socially excluded in one year is very similar for all households, while the incidence of being socially excluded during two or three years is higher for HHD than for other household types. Finally, the incidence of being socially excluded along four years, i.e. all years under analysis, is 31% for HHD: respectively two and three times more than for HHTL and HHND. This points in the direction of a stronger persistence in social exclusion for HHD.

Table 5. Social exclusion by number of years and household types

	HHND		HHTL		HHD	
HH socially excluded	Obs.	%	Obs.	%	Obs.	%
Never	957	63.97%	635	56.19%	71	34.30%
Only 1 year	194	12.97%	125	11.06%	25	12.08%
2 years	117	7.82%	118	10.44%	25	12.08%
3 years	76	5.08%	79	6.99%	21	10.14%
4 years	152	10.16%	173	15.31%	65	31.40%

Source: our elaboration on IT-SILC data

The previous evidence is confirmed from information from Table 6, where we show both the correlation coefficient between social exclusion at time t and t-1 and the transition matrix. Interestingly, the correlation coefficient is very similar across household types, while the transition probabilities in the main diagonal (persistence) quite strongly differ across households. Specifically, the probability of remaining in not social exclusion is 73% for HHND, 65% for HHTL and just 43% for HHD while, on the contrary, the probability of remaining in social exclusion is much higher for HHD (39%) than for HHTL (22%) and HHND (15%).

The causes of this evidence are more deeply investigated by the econometric analysis.

Table 6. Social exclusion dynamics: correlation coefficient and transition matrix

	Correlation coefficient	Correlation matrix		
		t-1 \ t	Not SE	SE
HHND	0.622	Not SE	72.79%	6.13%
		SE	6.39%	14.68%
HHTL	0.661	Not SE	64.57%	7.17%
		SE	6.64%	21.62%
HHD	0.646	Not SE	43.00%	9.50%
		SE	8.21%	39.29%

Source: our elaboration on IT-SILC data

THE ECONOMETRIC MODELS

A dynamic probit model

The probability of a household being social excluded is estimated by applying a dynamic probit model accounting for both unobserved heterogeneity and true state dependence. The introduction of the lagged social exclusion indicator among the covariates allows us to identify the presence and the magnitude of the state dependence phenomenon in social exclusion. The equation for the latent dependent variable is:

(1) $se_{it}^{*} = \gamma se_{it-1} + x_{it}^{'}\beta + \alpha_i + u_{it}$

with i = 1,…,N indicating the cohort-member and t = 2…T the time periods. x_{it} is a vector of explanatory variables, β is a vector of unknown parameters to be estimated, 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 independent of x_{it} and that there is not serially correlated in u_{it}. Finally, se_{it}^{*} is the latent dependent variable and se_{it} is the observed binary outcome variable, se_{it-1} is the lagged social exclusion status and γ is the state dependence parameter to be estimated. se_{it} may be defined as:

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

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

It follows that the probability of being socially excluded for household i at time t is specified as:

(3) $\Pr[se_{it} = 1 \mid se_{it-1}, x_{it}, \alpha_i] = \Phi(\gamma se_{it-1} + x_{it}^{'}\beta + \alpha_i)$

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

The assumption about the independence between α_i and x_{it} may be relaxed adopting the Mundlak approach (Mundlak, 1978). This approach takes into account possible correlation between random effects and observable characteristics, simply allowing a relationship between α and either the time means of time-variant explanatory variables. This implies to decompose the unobserved heterogeneity term in two parts:

(4) $\alpha_i = x_i^{'}\vartheta + \varsigma_i$

where x_i represents the part of unobserved heterogeneity correlated with the explanatory variables and ς_i represents the part of unobserved heterogeneity uncorrelated with the explanatory variables.

It follows that the new equation for the latent dependent variable may be written as:

$$(5)\quad se_{it}^{*} = \gamma se_{it-1} + x_{it}^{'}\beta + x_{i}^{'}\vartheta + \varsigma_i + u_{it}$$

and the probability of being socially excluded for household *i* at time *t* reads:

$$(6)\quad \Pr\left[se_{it} = 1 \mid se_{it-1}, x_{it}, \alpha_i\right] = \Phi\left(\gamma se_{it-1} + x_{it}^{'}\beta + x_{i}^{'}a + \varsigma_i\right)$$

Finally, we consider the possibility of correlation between α_i and y_{it-1}, the so-called initial conditions problem (Heckman, 1981). We address the initial conditions problem following Wooldridge (2005) that has proposed an alternative Conditional Maximum Likelihood (CML) estimator that considers the distribution conditional on the initial period value. The idea is that the correlation between se_{i1-1} and α_i may be expressed by the following equation:

$$(7)\quad \alpha_i = \eta_0 + \eta_1 se_{i1} + z_{i}^{'}\eta + \varepsilon_i$$

where ε is another unobservable individual specific heterogeneity term that is uncorrelated with the initial social exclusion status se_1. Wooldridge (2005) specifies that z_i corresponds to the x_i contained in the Mundlak specification, calculated for periods 2 to *T*.

It follows that the probability of being socially excluded for household *i* at time *t* reads:

$$(8)\quad \Pr\left[se_{it} = 1 \mid se_{it-1}, x_{it}, y_{i1}, \alpha_i\right] = \Phi\left(\gamma se_{it-1} + x_{it}^{'}\beta + \eta_1 se_{i1} + z_{i}^{'}\eta + \varepsilon_i\right)$$

The Wooldridge approach is based on the conditional maximum likelihood (CML) that results in a likelihood function based on the joint distribution of the observations conditional on the initial observations. The contribution to the likelihood function for the cohort-member *i* is given by:

$$(9)\ L_i = \int \left\{ \prod_{t=2}^{T} \Phi\left[\left(\gamma se_{it-1} + x_{it}^{'}\beta + \eta_1 se_{i1} + z_i^{'}\eta + \varepsilon_i \right)(2y_{it} - 1) \right] \right\} g(\eta_i) d\eta_i$$

where *g(η)* is the normal probability density function of the new unobservable individual specific heterogeneity.

A dynamic ordered probit model

With the aim of estimating the severity of social exclusion we adopt a dynamic ordered probit model (see Contoyannis, Jones and Rice 2004, for an application), where the response variable is a discrete variable taking values 0, 1, 2 and 3 according to the number of dimensions for which the households is socially excluded. Consistently with the above analysis we include previous social exclusion status in order to capture state dependence. Moreover, we allow for normally distributed unobserved heterogeneity and, drawing from the Wooldridge's approach adopted above, we also deal with the initial condition problem.

In the standard approach, the latent variable specification of the empirical model can be written as follows:

$sse_{it}^{*} = \eta sse_{it-1} + x_{it}^{'}\zeta + \theta_i + v_{it}$ where i=1…N and t=2,…, T_i

To capture state dependence we include sse_{t-1} that is a vector of indicators for the number of social exclusion dimensions reported in the previous wave and the ηs parameters to be estimated. θ_i is an individual-specific and time-variant random component. v_{it} is a time and individual-specific error term which is assumed to be normally distributed and uncorrelated across individuals and waves, and uncorrelated with θ_i. v_{it} is assumed to be strictly exogenous, that is, the x_{it} are uncorrelated with v_{it} for all t and s. In the data the latent outcome (severity of social exclusion, *sse**) is not observable, while we can approximate the severity through the number of dimensions for which a household is socially excluded. In other words, the number of dimensions may be thought of as an indicator of the category in which the latent indicator falls (sse_{it}). The observation mechanism may be expressed as follows:

$sse_{it} = j$ if $\mu_{j\text{-}1} < sse^*_{it} \le \mu_j$, where j = 1,…, m

where $\mu_0 = -\infty, \mu_j \le \mu_{j+1}, \mu_m = \infty$. Given the assumption that the error term is normally distributed, the probability of observing the particular number of social exclusion dimensions experienced by household *i* at time *t*, conditional on the regressors and the individual effect is,

$$P_{itj} = P(sse_{it} = j) = \Phi(\mu_j - \zeta' x_{it} - \eta sse_{it-1} - \theta_i) - \Phi(\mu_{j-1} - \zeta' x_{it} - \eta sse_{it-1} - \theta_i)$$

where Φ is the normal standard distribution function. In order to deal with the identification of the intercept and the cutpoints (μ), the following normalization is usually adopted: β_0=0. By implementing the random effects estimator, the individual effect is integrated out, under the assumption that its density is N(0, σ_θ^2), to give the sample log-likelihood function:

$$\ln L = \sum_{i=1}^{n} \left\{ \ln \int_{-\infty}^{+\infty} (P_{itj}) \left[\left(1 \big/ \sqrt{2\pi\sigma_{\theta^2}} \right) \exp\left(-\theta^2 / 2\sigma_{\theta^2} \right) \right] d\theta \right\}$$

The expression may be approximated by the Gauss-Hermite quadrature procedure.

When we deal with the initial condition problem following the procedure suggested by Wooldridge (2005), the distribution of the individual effects is parameterized as follows:

$$\theta_i = \upsilon_0 + \upsilon_1 sse_{i1} + w_i' \upsilon + o_i$$

where o is another unobservable individual specific heterogeneity term that is uncorrelated with the initial social exclusion status sem_1. Wooldridge (2005) specifies that w_i corresponds to the average over the sample period of the observations on the exogenous variables calculated for periods 2 to T (Mundlak, 1983).

ESTIMATION RESULTS

The probability of being socially excluded may vary across households because of observable and unobservable factors, and because of true state dependence. In what follows we firstly discuss the estimation results concerning unobserved heterogeneity and true state dependence and then we focus on the role of observable factors affecting social exclusion. Moreover, for brevity, we do not comment on the estimation results from all dynamic probit specifications, but we mainly focus on those obtained from the Wooldridge's model using the benchmark definition of household with disabled people[10]. However, for comparative purpose, we also comment on the estimation of the true state dependence parameter obtained from the Mundlak model with the aim of highlighting the differences between the assumption of exogenous and endogenous initial conditions.

True state dependence and unobserved heterogeneity

Table 7 shows the state dependence parameters estimated by the Mundlak model, including the marginal effects. According to these estimates the magnitude and the significance of true state dependence is particularly strong. Specifically, being socially excluded in the previous period increases the probability of being socially excluded in

[10] Estimation results concerning weak and strong definitions of HHD are available upon request.

the current period by 46.1% for HHND, by 58.6% for HHTL and by 61.3% for HHD. This points in the direction of significant persistence in social exclusion, especially for HHD, agreeing with the descriptive evidence presented above. Results from the Mundlak model also show that unobserved heterogeneity is negligible and not statistically significant. It follows that, assuming exogenous initial conditions, our results reveal that state dependence strongly explain social exclusion and then policies aimed at reducing the risk of social exclusion should be addressed at keeping households (especially with disabled members) out of social exclusion (e.g. by providing monetary and non-monetary transfers aimed at increasing income and reducing material deprivation, as well as employment measures).

Table 7. State dependence parameters estimation in Mundlak model

	Coef.	s.e.	mfx	
HHND	1.574	0.062	0.461	***
HHTL	1.759	0.065	0.576	***
HHD	1.729	0.136	0.613	***

Source: our elaboration on IT-SILC data

Estimation results obtained from the Wooldridge model are showed in Table 8. As anticipated, this specification allows us to relax the exogeneity assumption, allowing for endogenous initial conditions. An initial condition problem arises when the start of the observation period does not coincide with the start of the process generating social exclusion. It follows that socially excluded households may be there at the start of the observed period because of factors favoring social exclusion or because of an earlier exclusion history.

Estimations from the Wooldridge model differ with respect to those obtained from the Mundlak model. Unobserved heterogeneity is statistically significant and not negligible in magnitude, and the estimated σ_u is greater for HHD (1.43) rather than for other household groups (0.94 for HHND and 0.76 for HHTL). According to the estimations obtained from the Wooldridge model true state dependence is smaller in magnitude for HHND and HHTL (the marginal effects are, respectively, 9.5% and 23.9%), and not significant for HHD. This seems to be strongly explained by the role of the starting status in social exclusion: the initial condition parameters are strongly significant and great in magnitude. In fact, being socially excluded at time 0 increases the probability of being socially excluded at current time by 27.7% for HHND, 41.5% for HHTL and by 81.3% for HHD. This points in the direction of a substantial correlation between the initial condition and unobserved heterogeneity, i.e. the probability of being socially excluded at the starting period is strongly affected by unobservable factors, and these determine a relevant propensity to be socially excluded in the current period. This effect is particularly strong for HHD and, looking also at the true state dependence estimates, it suggests that measures aimed at reducing the risk of social exclusion for HHD should be prevalently addressed at single-outing structural factors determining social exclusion and the history of previous social exclusion.

Table 8. State dependence and unobserved heterogeneity in the Wooldridge model

	HHND				HHTL				HHD			
	Coef.	Std. Err.	mfx		Coef.	Std. Err.	mfx		Coef.	Std. Err.	mfx	
Lag SE	0.640	0.126	0.095	***	0.872	0.135	0.239	***	0.207	0.292	0.082	
SE time0	1.403	0.182	0.277	***	1.415	0.204	0.415	***	2.643	0.567	0.813	***
Unobserved heterogeneity												
σu	0.937	0.113	LR-test ρ=0		0.760	0.122	LR-test ρ=0		1.432	0.305	LR-test ρ=0	
ρ	0.468	0.060	42.45	***	0.366	0.075	18.45	***	0.672	0.094	21.96	***

Source: our elaboration on IT-SILC data

Covariates

We now comment the Wooldridge estimation results, and the marginal effects, concerning structural variables affecting the probability of being social exclusion, and in particular we concentrate on statistically significant variables, i.e. HH size, area of residence, and also education, and attachment to the labour market of the HH head and his/her partner (Table 9).

Table 9. Estimated parameters in the Wooldridge model: covariates

	HHND				HHTL				HHD			
	Coef.	Std. Err.		mfx	Coef.	Std. Err.		mfx	Coef.	Std. Err.		mfx
Age	-0.027	0.173		-0.003	-0.009	0.131		-0.002	-0.426	0.604		-0.170
Age square	0.000	0.002		0.000	0.000	0.001		0.000	0.004	0.005		0.002
Male	0.000	0.141		0.000	-0.003	0.145		-0.001	-0.433	0.510		-0.171
Consensual union	-0.252	0.462		-0.030	1.128	0.421	***	0.196	0.335	0.918		0.132
HH size	-0.136	0.153		-0.015	-0.289	0.146	**	-0.067	-1.399	0.410	***	-0.557
Elderly	-0.288	0.415		-0.032	-0.165	0.263		-0.038	0.519	0.570		0.207
Children	0.136	0.266		0.015	0.399	0.292		0.100	0.087	0.937		0.035
Migrants	1.063	0.258	***	0.234	0.580	0.253	**	0.171	0.670	1.908		0.253
North	-0.220	0.126	*	-0.024	0.027	0.116		0.006	-0.330	0.398		-0.130
South	0.621	0.136	***	0.085	0.588	0.125	***	0.150	0.918	0.436	**	0.354
Medium education	-0.288	0.099	***	-0.031	-0.183	0.100	*	-0.041	0.654	0.390	*	0.254
High education	-0.316	0.154	**	-0.029	-0.081	0.180		-0.018	0.537	0.983		0.208
Employed	-2.274	0.223	***	-0.562	-2.001	0.234	***	-0.529	-1.863	0.655	***	-0.577
Unemployed	-0.592	0.330	*	-0.042	-0.650	0.341	*	-0.105	-0.442	0.776		-0.169
Partner employed	-0.683	0.221	***	-0.070	-1.110	0.216	***	-0.208	-2.729	0.994	***	-0.633
Year 2006	0.179	0.092	*	0.021	0.203	0.086	**	0.049	-0.514	0.231	**	-0.201
Year 2007	0.161	0.120		0.019	0.076	0.094		0.018	-0.495	0.284	*	-0.193
Constant	-2.221	0.824	***	-	-2.780	0.817	***	-	-0.252	4.050		-
Observations	4488				3390				621			
Households	1496				1130				207			
Wald chi2(29)	583.93				623.62				76.24			
Prob > chi2	0.000				0.000				0.000			
Log likelihood	-1233.6				-1079.7				-226.3			

Source: our elaboration on IT-SILC data

The probability of social exclusion decreases with HH size, both for HHTL and, much more pronouncedly so, for HHD. The marginal effect of reducing the probability of social exclusion increase monotonically among the three groups: the marginal effect for

HHD is nearly 40 times that of HHND. The chance of sharing the care of the disabled person among more HH members is likely to increase the participation/hours worked outside the HH of the HH members, and this contributes to reduce the work intensity dimension of social exclusion.

The area of residence has a statistically significant impact on the probability of social exclusion, in particular living in the South compared with the base category of living in the Centre, increases the probability of social exclusion, more or less in the same way for HHND and HHTL, and more pronouncedly so for HHD. The marginal effects increase monotonically with the severity of disability: the marginal effect for HHD is over three times that of HHND. The South of Italy is characterized by both high poverty and unemployment, and these two variables contribute to two of the dimensions of social exclusion, therefore the probability of social exclusion is likely to be high for HH living in the South, whether with or without disabled members. In addition, the still typical scarcity of social services in the South is likely to particularly affect the possibility of labour market participation for members of HHD, and this may explain the particularly high estimated coefficient of the probability of social exclusion for HHD living in the South, which would reinforce the already high value of the work intensity dimension of social exclusion. This confirms the territorial duality characterizing the Italian economy. In any case, HHD living in the South appear to suffer the greatest penalty. This has some policy implications: the South-Islands are the areas of the country with the highest levels of diffusion and intensity of poverty, and with high unemployment, therefore policies to improve the situation in these areas would reduce the probabilities of social exclusion at least the two income and work intensity dimensions of social exclusion for all groups of HH considered here.

The medium or high educational level of the HH head above the base category “low education”, significantly decreases the probability of social exclusion for HHND; it is hardly or not significant for HHTL and for HHD. Education plays only an indirect role in the dimensions of social exclusion, either via the income or via the work intensity dimension. Our finding suggests that education above “low” succeeds in reducing the probability of social exclusion either by increasing earnings, and/or the work intensity for HHND, but hardly so for HHTL; the marginal effect of both medium and high education is around 3% for HHND. For HHD the sign of the estimate is reversed, even though scarcely significant, so that education of the HH head above the “low” level of education increases the probability of social exclusion for HHD.

The covariates about the attachment to the labour market are assessed in terms of the base category “not participating to the labour market”; they are highly significant for most of the three groups considered. In particular, the probability of social exclusion is reduced if the HH head is employed rather than out of the labour market; even though also, and the estimated coefficients decrease monotonically from HHND to HHTL to HHD; however, the marginal effect of HH head employment in reducing social exclusion is the highest for HHD.

The covariate “unemployment of the HH head” reduces the probability of social exclusion with respect to the probability of social exclusion for a HH head out of the labour force, probably because of the income support received in terms of unemployment benefits; the estimated coefficients are very similar for the three groups; however, they are mostly of no statistical significance; the marginal effects are monotonically increasing among the three groups: for HHD an unemployed HH head compared with an out of the labour force HH head reduces by 17% the probability of social exclusion; however, the marginal effects for the covariate “unemployment” are never significant.

As expected, the employment of the HH head partner significantly reduces the probability of social exclusion for all the three groups considered, even though the highest effect appears for HHD, where the estimated coefficient is over four times that of HHND, and the marginal effect is about ten times that of HHND.

Severity of social exclusion

Tables 10 and 11 show estimates from the dynamic order probit model obtained using the benchmark definition of disability. The model formally tests for state dependence and takes into account the initial condition problem.

Since the ordered probit model estimates one equation over all levels of the dependent variable, an estimated positive coefficient indicates the approximated (because of non linearity of the ordered probit model) increase in the probability of being in a higher category of severity of social exclusion. Conversely, the ancillary parameters refer to the cut-points (thresholds) used to differentiate the adjacent levels of the response variable. A threshold can be defined as points on the latent variable, i.e. a continuous unobservable phenomena, that results in the different observed values on the proxy variable (i.e. the levels of our dependent variable used to measure the latent variable).

Table 10 presents evidence about state dependence and the estimated coefficients for the initial period observations introduced following the Wooldridge’s approach to the initial condition problem.

Table 10. Severity of social exclusion: state dependence and initial conditions

	HHND			HHTL			HHD		
	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
Lag SE1	0.447	0.108	***	0.790	0.107	***	0.240	0.222	
Lag SE2	0.726	0.177	***	1.270	0.174	***	0.665	0.347	*
Lag SE3	1.339	0.331	***	1.236	0.288	***	0.693	0.531	
SE01	1.377	0.153	***	1.012	0.139	***	1.924	0.368	***
SE02	1.809	0.233	***	1.641	0.219	***	3.215	0.592	***
SE03	2.647	0.469	***	2.737	0.351	***	4.666	0.855	***

Source: our elaboration on IT-SILC data

Our main findings suggest a significant state dependence for HHND and HHTL in terms of severity of social exclusion. For HHND, a stronger severity in the previous period increases the risk of stronger severity in the current period; for HHTL we find a similar effect, but the positive effect of past severity on current severity is flatter for HHTL when compared with HHND. With respect to HHD, we find a quite negligible link between the past and current severity of social exclusion: the only significant parameter (10% level) is Lag SE2, that is lower in magnitude when compared with other household groups. This agrees with the evidence about social exclusion for which we did not find evidence of state dependence. With respect to the initial period coefficients, we find a positive gradient in the estimated effects as the number of social exclusion dimensions increases. This suggests a positive correlation between the initial period observations and the unobserved latent severity of social exclusion. When we focus on different household groups we note that the positive correlation is much stronger for HHD than for other groups. This also agrees with evidence emerged above from the analysis of social exclusion, and suggests that also the severity of social exclusion for HHD is much more explained by unobservable factors than by state dependence.

Table 11 shows the effects of observable variables on the severity of social exclusion and the estimates of the ancillary parameters. Cut1 is the estimated ancillary parameter measuring the distance on the latent variable distribution between the lower value of our predictor variable (socially excluded in zero dimensions) and higher values (being socially excluded in one, two or three dimensions). In turn, Cut2 and Cut3 are the successive ancillary parameters that respectively measure the distance between zero/one dimensions and two/three dimensions, and zero/one/two dimensions and three dimensions. According to our estimates, the ancillary parameters for HHD are not statistically significant, while for HHND and HHTL they are strongly significant and similar in values. Finally, the Rho term indicates the proportion of the total variance contributed by the panel-level variance component.

Table 11. Severity of social exclusion: estimated parameters

	HHND			HHTL			HHD		
	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
Age	0.072	0.131		-0.044	0.103		0.482	0.428	
Age square	-0.001	0.001		0.000	0.001		-0.004	0.003	
Male	-0.110	0.132		-0.058	0.119		-0.305	0.409	
Consensual union	-0.636	0.386	*	0.448	0.364		0.661	0.731	
HH size	-0.066	0.138		-0.262	0.123	**	-0.968	0.297	***
Elderly	-0.222	0.343		-0.186	0.219		0.212	0.376	
Children	0.026	0.233		0.356	0.237		-0.355	0.690	
Migrants	0.938	0.234	***	0.620	0.197	***	0.308	1.585	
North	-0.236	0.122	*	0.006	0.097		-0.140	0.327	
South	0.578	0.128	***	0.531	0.101	***	0.564	0.337	*
Medium education	-0.329	0.094	***	-0.209	0.083	**	0.217	0.301	
High education	-0.374	0.151	**	-0.148	0.152		0.082	0.816	
Employed	-2.222	0.174	***	-1.822	0.168	***	-2.491	0.520	***
Unemployed	-0.078	0.214		-0.109	0.228		-0.747	0.528	
Partner employed	-0.771	0.202	***	-0.889	0.185	***	-1.994	0.679	***
Year 2006	0.060	0.076		0.161	0.070	**	-0.485	0.163	***
Year 2007	0.037	0.093		0.050	0.077		-0.329	0.187	*
Cut 1	1.781	0.771	**	2.202	0.665	***	-0.192	3.088	
Cut 2	3.908	0.780	***	4.048	0.676	***	2.504	3.081	
Cut 3	5.851	0.803	***	5.841	0.694	***	4.283	3.086	
Rho	0.485	0.046	***	0.279	0.057	***	0.625	0.069	***
Observations	4488			3390			621		
LR chi2(33)	1207.09			1151.72			228.58		
Prob > chi2	0.000			0.000			0.000		
Log likelihood	-1683.41			-1624.70			-406.11		

Source: our elaboration on IT-SILC data

with respect to observable variables, the evidence show that the severity of social exclusion is positively affected living in Southern regions, while household size, household head and his/her partner being employed reduce the risk of being socially excluded in multiple dimensions. We find similar evidence both for HHND and HHTL, but in those cases we find a significant contribution to the severity of social exclusion also from the migration variable (positive sign) and the medium/high level of education (negative signs).

It follows that interventions aimed at reducing the severity of social exclusion for HHD should be focused on structural factors rather than simply rely on monetary transfers, that prevalently produce short-term effects.

POLICY IMPLICATIONS AND CONCLUDING REMARKS.

This paper studies the social exclusion and its dynamics in Italy with a special focus on the situation of HHD. In a comparative perspective with the situation of HHTL and HHND, we analyze the 2004-2007 longitudinal component of the IT-SILC data applying a dynamic probit model accounting for unobserved heterogeneity and endogenous initial conditions.

Social exclusion, according to the recent approach of the EU, is defined along three dimensions: income, work intensity and material deprivation, while we define disability according to two criteria: limitation in daily activities (social model) and persistence of limitation. Finally, the situation of the household is approximated by the situation of the HH head.

Descriptive evidence show that almost 50% of HHD are socially excluded, about twice more than HHTL and HHND, and they are disadvantaged especially in terms of material deprivation and, overall, work intensity, while differences in terms of the income dimension are quite negligible. This structure of social exclusion for HHD may be explained not only in terms of demographic characteristics (overrepresentation of elderly people), but also by the combined effects of disability benefit and poor caring services for disabled people. Moreover, HHD are more likely to persist in social exclusion than other household types. Finally, the severity of social exclusion is stronger for HHD than for other household groups.

Estimation results provide further information. Both the probability of being socially excluded and its severity for all household types is explained by observable and unobservable factors. True state dependence is significant for HHND and HHTL nor for HHD, for which, instead, the initial conditions are particularly relevant to explain persistence in social exclusion. In other words, the probability of being excluded in the starting period is affected by unobservable (and observable) factors, that also determine the propensity of HHD of being excluded in the current period.

This has some policy implications. In fact, while short-term policies aimed at breaking the vicious circle determined by true state dependence (current social exclusion increases *per se* the probability of future social exclusion), are potentially effective for HHND and HHTL, but they could be quite ineffective for HHD. Instead, members of HHD could benefit more than other households from long-term policies aimed at removing structural factors determining a social exclusion history.

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APPENDIX

Table A1. Social exclusion across HH type by HH head age

	HH type	SE	SE income	SE work intensity	SE deprivation
Age 17-29	HHND	31.33%	24.90%	13.65%	7.23%
	HHTL	45.35%	37.21%	25.58%	13.95%
	HHD	100.00%	100.00%	100.00%	0.00%
Age 30-44	HHND	17.92%	13.77%	5.21%	3.96%
	HHTL	28.15%	21.37%	8.76%	7.25%
	HHD	40.00%	21.82%	23.64%	12.73%
Age 45-59	HHND	21.53%	14.71%	9.77%	3.89%
	HHTL	25.53%	15.11%	12.86%	6.55%
	HHD	42.80%	20.45%	25.76%	15.53%
Age over 60	HHND	30.11%	10.22%	25.84%	2.79%
	HHTL	32.66%	11.95%	28.67%	4.06%
	HHD	51.38%	16.21%	43.28%	10.87%