Does disability discourage?
An empirical analysis of the disabled labour force in Italy

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Abstract

This paper contributes to the literature on the working conditions of people with disability using Italian microdata collected through a survey carried out by Istat in 2004. The case of Italy remains a flagship in the international context, given its specific legislation in favour of the placement of the disabled in the labour market. Applying the theoretical framework of the Capability Approach to the analysis of the disability status, this paper studies the labour market participation of people with disability in Italy, considering the impact of conversion factors and different types of disability. The empirical analysis confirms the key role played by personal characteristics and the environment in determining the possibility of being in the labour force and in explaining the characteristics of the job position for those who are employed.

Key Words: disability, capability approach, labour market, working conditions, personal characteristics and environmental factors.

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1 Introduction

The living conditions of people with disabilities have become a topical issue in recent years, for both policy-makers and scholars.
In the past, people with disability were confined in hospitals and excluded from the society. In most modern societies, the value of every person is increasingly recognized and protected independently from his or her health condition.
This study applies the conceptual framework of the Capability Approach to the analysis of the disability status. More specifically, we study empirically the working conditions and patterns of labour market participation of disabled people in Italy.
The Capability Approach, developed by Amartya K. Sen in the '80s, is particularly suited to the study of disability given its focus on the multidimensional essence of well-being. In particular, the set of choices faced by each individual is defined as a *capability set* and the outcome that results from each choice is the individual *functioning*. As suggested by Mitra (2006), the disability status is defined as a deprivation in terms of capability or functionings, caused by the interaction of personal characteristics (e.g. age, sex and health conditions), goods available (e.g. income and assets) and the (physical, cultural, political, economic and social) environment.
As a complement to this definition, the International Classification of Functioning, Disability and Health (WHO, 2001) characterizes disability as an ordinary condition, unhooked from the negative meaning of disease or disorder, and interpreted as an universal experience that can affect everyone during life. Therefore, everyone can experience a peculiar health condition, which could become disability if circumstances are unfavourable.
Starting from these frameworks, we analyse Italian microdata on people with disability, with a specific focus on work conditions and labour market participation. This study contributes to the scarce literature about working conditions of disabled people, especially in the Italian context, and enriches the knowledge of labour market dynamics for this population among countries. The data confirms the key role played by personal factors and the environment in determining the possibility of being in the labour force and the characteristics of the job for those who are employed. The results are in line with the dynamics suggested by the capability approach, showing that different factors influence the composition of individuals' capability set and contribute to the conversion of capabilities into functionings.
In section 2, we refer to the theoretical approaches usually followed in the literature to define disability, with special reference to the one that we applied: the capability approach of Amartya Sen. In section 3, the literature on disability and work is summarized to focus on the key issues that our applied research develops in the following sections. In terms of the legal framework, treated in section 4, Italy is shown to be a particularly interesting case due to the high employment quota and non-compliance sanctions on firms. In sections 5 and 6, we introduce the data analysed and we describe the characteristics of the population. In section 7 we present different probit models to identify which personal characteristics and environmental factors influence the probability of being in the labour force, a Heckman model to explain the number of hours worked by those who are employed and a sequential logit model to understand which factors affect significantly the transitions among

different working situations. Finally, section 8 ends the analysis with some concluding remarks.

2 Theoretical Framework: the capability approach and the main models on disability

There is no clear consensus on what disability constitutes. Different disciplines have tried to define this condition, using various perspectives and different models. Among those, the most known are the Medical Model, the Nagi Model, the Social Model and the different Classifications elaborated by the World Heath Organization (WHO).

2.1 Models of disability

The Age of Enlightenment in the 18th century brought about a more scientific understanding of the causes of impairment and the confidence in medical science to cure (or at least rehabilitate) disabled people. The notion of 'normality' is built during these years, and impairments are seen as a deficit, underlining what a person cannot do, instead of what one can do. This line of thinking is at the core issue of the called 'medical model' (Pfeiffer (2001) and Mitra (2006)).

This model sees disability as an individual problem caused by a disease, a trauma or an injury. People are defined by their medical condition and, consequently, need medical care in form of treatment and rehabilitation, in order to be adapted to fit the world as it is. Since the disabled person is identified by his/her impairments, (s)he is considered unable to function normally (as recovered and 'normal' ones can do) and indeed are classified in specific categories, which generate stigma. During this period disabled people's life is handed over to experts that can decide where they can go to school, what kind of support they get, where they have to live, what benefits they are entitled to, whether they can work and even, at times, whether they are born at all, or allowed to have children themselves. The direct consequence of this view is that the major political aim is to provide health care and related services, because disability is not considered an issue that concerns other people than the affected individual.

As a reaction to the dominant medical model, the 'people with disability' movements introduced in the 1960s a different perspective on the issue that gave rise to the social model. The movements perceive the difficulties faced by disabled people as the results of the social and physical barriers, which obstruct them in different dimensions: at school, at home and at work (Pfeiffer (2001) and Mitra (2006)). Consequently, the social model sees disability as a social construct, created by the external environment through the society response to disabled people. Under this approach, public policies should aim to remove social barriers, in order to ensure full participation of people with disability in the society. Health conditions become disability because the society is not able to deal with differences in human functionings.

In 1965, the sociologist Saad Nagi introduced another model to conceptualize disability, the 'Nagi Model'(Nagi (1965) and Nagi (1991)). He underlined the importance of the environment

that, together with family, society and community factors, influence disability. In the model, the consequences of disease and injury for an individual are described at both the individual and the social levels. It reconfigures the perception of disability away from a focus on physical limitations, by defining it as the product of a change in the expected interaction between the individual and the environment. To understand the disability, consideration must be given to the capabilities of the individual per se and in relation to the social context. In sum, disability is strictly correlated with the individual's roles and as expected by the society. The example in Mitra (2006) explains the mechanism at work. A young girl with mental retardation who doesn't go to school is considered disabled only if the society expects all the girls to attend school during the same age period. Therefore the Nagi model 'promotes a social and cultural relativistic view of disability'(Mitra, 2006, p. 238) and cannot be considered complete and exhaustive.

2.2 The International Classification of Functioning, Disability and Health

The ICF has been the most recent disablement model created by the World Health Organization (WHO), after several revisions started in 1980. It has been defined the biopsychosocial model of disability and it has been introduced with the goal of creating a common language for disability. The ICF has been developed after years of international revision efforts coordinated by the WHO and has been officially endorsed in 2001 by all 191 WHO Member States, with the purpose of being used as the international standard to describe and measure health and disability.

Its first version, the ICIDH (International Classification of Impairments, Disability and Handicaps), was created in 1980 to provide a unifying framework that classifies the consequences of disease. Subsequently, the ICIDH-2 version (International Classification of Functioning and Disability, 1999) was developed from the first one, in order to measure the consequences of health conditions[1].

The ICF 'attempts to achieve a synthesis, in order to provide a coherent view of different perspectives of health from a biological, individual and social perspective' (WHO, 2001, p. 20). The goal of the latest ICF revision is to remove the negative connotations associated with disability by using more positive terms to describe its characteristics, in line with all modern disablement models. Differently from previous versions, the ICF codes the components of health and provides an uniform perspective on health based on biological, individual and social factors[2]. The ICF's domains are defined from the body, individual and social perspectives and are summarized in two lists: one of body functions and structure, and the other of domains of activity and participation. Additionally, it includes a list of environmental factors that take into account the context within which disability occurs.

[1]The ICIDH-2 was elaborated because another WHO's classification in use at that time (the ICD-10, 1990) was considered inadequate to evaluate health care needs.
In particular, the ICD-10 (International Classification of Diseases and Related Health problems), which is the most known WHO's classification, is the tenth version of the ICD (International Classification of Deseases). It is the standard diagnostic classification for all health situations of population groups and it is used to classify diseases and other health problems, including death certificates and health records.

[2]The ICF, used together with the ICD-10, is the main instrument to draw a broad picture of populations' health conditions. However, the ICF classifies functioning and disability, whereas the ICD-10 is an etiologic framework that classifies diseases, disorders and injuries.

The ICF is structured around the following broad components: Body Functions and Body Structures (respectively, the psychological functions of body systems and the anatomical parts of the body); Activities (related to tasks and actions by an individual) and Participation (with regard to the involvement in a life situation); and, finally, Environmental Factors.
Impairments are seen as problems in body functions and structure and as significant deviations or loss of body function or structure. Activity Limitations are defined as difficulties in executing activities, and Participation Restrictions are interpreted as problems that an individual may experience in life situations. The term Disability encompasses a decrement at each of these levels.
The Figure 1 summarizes the key features of this classification.

[Figure 1 here]

Disability and functionings are outcomes of the interaction between health conditions (i.e. diseases and disorders) and contextual factors. These are composed by environmental factors (i.e. physical and social environment in which people live) and personal factors (i.e. gender, age, education and social background)[3].
In conclusion, the ICF is the most suitable and universal classification in health-related analysis. Its purpose is the measurement of functionings within the society, without taking into account the reasons of the impairment and hence it shifs the focus from cause to impact.

2.3 The capability approach and Disability

Different authors have recently used the capability approach to understand disability. The pillars of the conceptual framework are the definitions of functionings and capabilities. Capabilities are defined as 'various combinations of functionings (beings and doings) that a person can achieve. Capability is, thus, a set of vectors of functionings, reflecting the person's freedom to lead one type of life or another' (Sen, 1992, p. 40)[4]. In the literature, disability is defined as a deprivation of functionings or capabilities, shifting the focus from the disability status per se to its impact on the individual's opportunities and choices.
One of the reason why the capability approach is particularly suitable for defining disability is the centrality of human diversity that this approach reminds. It inscribes the 'understanding of the relation between impairment, disability and the design of social arrangements in an ethical framework' (Terzi, 2003, p. 451), considering the disability status as one expression of human diversity.
Furthermore, an important aspect of the capability approach, especially in those situations where people are not independent in their daily activities, is the concept of *external capabilities* (this notion is widely explained in Foster and Handy (2008)). External capabilities are

[3]For an in-depth analysis of the ICF's components, see WHO (2001).

[4]It should be noted that the concept of functioning is different in the capability approach respect to the ICF. In the former the term is broader, including activities and desirable states (e.g. being healthy). In the ICF, instead, functionings are directly correlated with health (body functions and body structures) and with activities and participations, representing a specific application of the capability approach (Mitra, 2006).

'abilities to function that depend on direct human relationships. Specifically, they depend on an individual access to the capabilities of another person' (Foster and Handy, 2008, p. 8). A person has external capabilities if (s)he is able to achieve additional functionings through direct contact with another person. The daily social interactions can thus change the capability set of each individual[5].

In sum, the capability approach can cover a wide variety of experiences correlated with the disability status, without emphasizing specific health conditions. According to Mitra (2006), disability can be seen as the result of a combination of different factors. It can result from the nature of the impairment and other personal characteristics, such as age, gender and race. It can also be a consequence of the amount of available resources and of the ability to convert these resources in valuable functionings or, finally, it may be due to the physical, economic, social, political and cultural environment.

The major advantage of using the capability approach to explain disability is its complete and exhaustive view in term of opportunities and freedom to choose a valued life. Unlike the ICF, which is nonetheless an important step toward the understanding of disability, the capability approach considers also circumstances that are not specifically correlated with health conditions (i.e. the social-economic factors)[6].

3 Related Literature

In 'Inequality Re-examine' (Sen, 1992) Amartya Sen tackles the issue of diversity arguing that 'The effect of ignoring the interpersonal variations can, in fact, be deeply inegalitarian, in hiding the fact that equal consideration for all may demand very unequal treatment in favour of disadvantaged' (Sen, 1992, p. 1).

According to Sen, people are different not only because of their personal characteristics (e.g. age, sex, skills), but also for external ones (e.g. tenures, income, external factors). For this reason, equality in one dimension can coexist with inequality in another one: 'equal incomes can still leave much inequality in our ability to do what we would value doing. A disabled person cannot function in the way an able-bodied person can, even if both have exactly the same income' (Sen, 1992, p. 20).

Therefore, human diversity can be seen as a double inequality. One stems from the chosen functionings, the other from the capacity of convert the available resources into suitable functionings (i.e. into a set of beings and doings). The consequence is that, even with the same capability set, people achieve different outcomes on the basis of their preferences. Personal, social and environmental factors intervene in the process of converting different

[5]Another concept that could be significant to the study of disability is the one of *group capabilities* (Stewart, 2005). Being a member of a group (e.g. an association) leads to share resources and, consequently, to modify the capability set and the preferences about functionings. This is important for people with disabilities who, sharing a common space of capabilities, could increase their real opportunities and reach a larger choice of functionings that would be unattainable without membership. Furthermore, Qizilbash (1997) introduces the concept of *compensating abilities* to explain the phenomenon of adjustment of abilities because of deprivation.

[6]Some researches, like Zaidi and Burchardt (2005) and Cullinan et al. (2011), stated this specific point in their work.

commodities into functionings[7].

Mitra (2006) uses the Capability approach in defining the disability status as a deprivation of capabilities or functionings which is caused by the type of disability (or from other individual characteristics), the resources available and the environment.

The philosopher Martha Nussbaum (2003) deals with the issue, drawing from Eva Kittay's studies[8]. She affirms that a fair society should allow everyone (independently of health conditions) to participate in the social and political life of the community. Children and adults with a disability (she especially refers to intellectual and mental ones) are citizens and 'any decent society must address their needs for care, education, self-respect, activity, and friendship.' (Nussbaum, 2003, p. 420). The capability approach contributes conceptually to this scope, highlighting the ideas of equality, well-being and freedom and putting the attention on the opportunities for each individual to live a valuable life.

Recent studies have explored empirically the relationship between disability and labour market outcomes. Gannon and Nolan (2003) examine the factors correlated with participation and non-participation in the labour market by people with disability or with chronic illness in Ireland, exploiting cross-sectional and, in small part, panel variation (Living in Ireland Survey, 1995-2000). Using data from the Living in Ireland Survey 2000 and Quarterly National Household Survey 2002, they show that a severely hampering chronic condition strongly reduces the probability of labour force participation, especially for men. Furthermore, married men are more likely to participate in the labour market than married women. The marginal effect of education is much higher for women and the presence of young children (less than 12 years old) discourage women's participation, while there is no effect for men. In their paper, disability is measured on the basis of the presence of chronic illness or disability (distinguishing between severity levels), while the two conditions are not analysed separately.

Jones et al. (2003) perform a similar empirical exercise using UK data from the 2002 Labour Force Survey. They compare the non-disabled to the disabled population, with particular attention to the probability of being employed and the corresponding earnings by gender[9]. Their results point to a larger positive role of education on the likelihood of being employed for disabled than for non-disabled people. Similarly to Gannon and Nolan (2003), they find that married men (disabled or not) are more likely to be employed than married women. Moreover, the presence of dependent children has a negative impact on the probability of being in employment, although the effect remains insignificant for disabled men. Finally, within the sub-sample of disabled people, the authors find a higher disadvantage in the labour market for people with mental health forms of disability, which include both mental and intellectual problems.

In a subsequent paper, Jones et al. (2006) analyse data from the British Labour Force Survey in 1997-2003, excluding repeated observations given that individuals remain in the survey for

[7]Terzi (2003), reminding Sen (1992), argues that human beings are different with respect to personal characteristics (e.g. gender, age, abilities), external circumstances (i.e. environmental factors) and their ability to convert resources into valued functionings (p. 450).

[8]See (Kittay, 1999, p. 77): 'Dependency must be faced from the beginning of any project in egalitarian theory that hopes to include all persons within its scope.'

[9]In the paper, people with disability are defined as those 'who have long-term illness (twelve months or more) which limits the type or amount of work they do' (Jones et al., 2003, p. 10).

five consecutive quarters. They split the sample into those who are affected by work-limiting disabilities (self-reported long-term illness which lasts at least twelve months and limits the type or the amount of work), the remaining disabled people (i.e. non-work-limited) and the non-disabled ones. They find similar result for 1997 and 2003 and, in particular, a significant and positive impact of education on the probability of being employed for all the categories and without distinctions by sex, and with stronger effects for the work-limited disabled people[10]. Furthermore, they find that people with mental health form of disabilities are less likely to be employed than those with other types of disabilities, independently of gender and if they are or not work-limited.

In another study on the patterns of labour force participation in UK, Kidd et al. (2000) find substantial differences between disabled men and non-disabled ones. In particular, disabled men are more likely to work part-time and to be absent from work for sickness. Again, education is significant and positive factor in explaining the probability of being employed, for both disabled and not disabled males. Finally, the authors find that, among disabled men, psychological or learning difficulties are the most disadvantageous conditions for the probability of being in employment.

As for the inclusion of disabled people in the workforce of developing countries,

Mitra and Sambamoorthi (2006) study the employment of people with disability in India, using the National Sample Survey carried out in 2002 and representative of all non-institutionalized persons. The employment rate for disabled people[11] is lower for women than for men (16.1% and 51% respectively), higher in rural areas than urban ones (38.4% and 34.9%) and lower for people with mental retardation and especially mental illness compared to those with other types of disabilities[12]. Being married has a positive effects on the probability of being employed for men, but a negative one for women, a result that is broadly in line with the evidence reported for developed countries in the aforementioned papers. Moreover, people with mental retardation and mental illness are less likely to be employed especially in urban areas and independently of gender.

Finally, several studies deal with the relationship between disability and low-income levels in households. Among those, Parodi and Sciulli (2012) look at the Italian situation using the IT-SILC dataset (i.e., the Italian component of EU-SILC) for the period 2004-2007. They find that the probability of staying in a low-income status is higher for households with disabled members, and some structural variables, such as living in the South of Italy or having a small size household, increase the probability of being in low income for households with disabled members.

Cullinan et al. (2011), using Irish Data, and Zaidi and Burchardt (2005), with UK data, consider the presence of people with disability within the households as an additional source of expenditure that might impact the standards of living of all family members. In support of this hypothesis, they find that the magnitude and the composition of the additional

[10]The dependent variable is equal one when the person is an employee with a positive wage and equal zero otherwise.

[11]People with disability are those with restrictions or lack of abilities to perform an activity, compared to what is defined normal for human beings.

[12]The employment rate is calculated as the proportion of workers on the working age population (15-64 years old).

costs borne by households with disabled members depend on the type and severity of the impairment.
Unlike previous studies, in this paper we are able to identify which characteristics (demographic, human capital, health) increase the probability of being in the labour force for disabled persons in Italy. We make use of an unique dataset constructed from a national survey that was undertaken specifically to collect data on disabled people and their labour market outcomes, contributing to the scarce literature about their working conditions, especially in Italy. The Italian case is of particular interest, since the country has among the highest employment quota and non-compliance sanctions on firms, which make the Italian legislation a flagship in the European setting.

4 Legislation on disability in Italy

This section deals with the main juridical measures on disability in Italy, especially with regard to the main laws on access to the labour market (Law 104 of 1992 and Law 68 of 1999 on targeted employment). The work integration process had a significant change of view in the last year, passing from considering only the individual productivity to enhancing the real integration. In 2004 people with disability in Italy are the 4.8% of the whole Italian population (considering persons with at least 6 years old), with higher percentages among old people and women (Istat (2010)). The type of disability more represented is the mobility one and in 93% of cases disabled persons live with their family. Less than 18% of disabled people in working age are employed, against almost 54% of non-disabled ones, and the most problematic disabilities for the entrance in the labour market are mental and intellectual ones (Multi-Purpose survey 'Health status of the population and use of health services in Italy', 2004-2005, Istat (2010)).
Nevertheless at international level there are many laws and regulations, the problem of underemployment and unemployment for people with disability still exists. In 2002, the International Labour Office published a series of good practices to deal with the problematic work conditions of disabled persons. The purpose is to develop a guide for employers in public or private sector for the adoption of positive strategies to promote safe and healthy employment for disabled people, even if governments play an essential role in creating a supportive legislation. The guide would assure equal employment opportunities, facilitating work placement and re-placement after the arising of a new health condition (ILO (2002)).
In Italy, the employment protection measures in favour of people with disability start gaining importance at the end of 1960s', but it is only with Law 104 of 1992 - 'Framework Law on support, social integration and the rights of disabled people' ('Legge-quadro per l'assistenza, l'integrazione sociale e i diritti delle persone handicappate')[13] that compulsory employment system[14] is extended to disabled people with psychological impairments.

[13]Supplement to Official Journal, n. 39, February 17, 1992.

[14]Compulsory employment is introduced by Law 482 of 1968 - 'General rules on compulsory enrolment of disabled persons in the public administration and private enterprises' ('Disciplina generale delle assunzioni obbligatorie presso le pubbliche amministrazioni e le aziende private').

Law 104/1992 gives the official definition of 'handicapped person'[15] and it concerns medical issues, rehabilitation, education, work, transport, mobility, civil rights, housing, taxes, etc. This law contains innovation for creating conditions oriented to freedom, autonomy, integration and participation in community life, pointing out a detachment from previous legislative actions, which were fragmentary, sector-based and exclusively based on assistance.

However, the real innovative change is introduced by Law 68 of 12 March 1999, 'Regulation on the right to work of disabled persons' ('Norme per il diritto al lavoro dei disabili')[16], which points out the principles of target employment ('collocamento mirato'), based on the concept of matching the needs of the enterprises with the characteristics of the disabled person. That means that employers have an obligation in hiring people with disability, but the engagement has to take into account potentialities and competences of the person, with the aim at putting the right person in the right place (article 2)[17].

Law 68/1999 concerns public and private employers with more than 15 employees, which are obliged to employ disabled workers following these proportions ('quota di riserva')[18]:

- 15-35 employees (only in case of new engagement for private employers): 1 disabled worker (nominative call)[19]
- 36-50 employees: 2 disabled workers (1 nominative call and 1 numerical call)
- More than 50 employees: 7% of the employees (60% nominative call and 40% numerical call)[20].

Furthermore, this law also comprises a benefits framework for partial relief from social security contributions and financial measures to support any adaptation of work environment. It also introduces sanctions for employers that do not meet the disability employment target, through a compensation fee to a specific fund managed at regional level aimed at integrating disabled people in the labour market. Finally, it assigns high responsibility in its application to regions, which have to coordinates the different actors involved in the placement of disabled

[15] Article 3 of Law 104/1992 provides the following definition: 'A handicapped person is one who has a physical, psychological or sensory handicap, which can be either stabilised or progressive, and the cause of learning, relational or work integration difficulties, and so determining a process of social disadvantage or alienation. The handicapped person has the right to resources established for them in relation to the nature and severity of the disability, the overall residual capacity of the individual and the effectiveness of rehabilitative therapies'. This law continues to stress what lacks or remains from a negative point of view even if, mentioning the 'overall residual capacity', it tries to overcome the concept of inability expressed in ICIDH (International Classification of Impairments, Disability and Handicaps, 1980), of which it is the legislative expression.

[16] Supplement to Official Journal, n. 57, March 23, 1999.

[17] Law 68/1999 aims at promoting inclusion and integration for people at working age suffering from physical, psychical, sensory or intellectual disorders, which reduce the work ability over 45% (the percentage is recognized by qualified experts in a medical commission); people with disability due to accidents on workplace (with inability over 33%), blind and deaf-mute persons, civil and war invalids (article 1).

[18] Employers in unfavourable economic situations may be exempted from meeting the target or from paying the compensation fee as long as their situation doesn't improve. Furthermore, there are some exceptions from the obligation for political parties, unions and organizations of social solidarity, nevertheless they are obliged in case of new hirings.

[19] People with disabilities must be registered in a specific unemployment list to benefit from this law and employers may hire by nominative call (introduced by Law 68/1999) or numerical call (through a specific ranking). Furthermore, article 11 introduces the possibility of hiring through special Agreements stipulated with authorized offices, which concern the possibility of apprenticeships and vocational training, longer trial period in the company, reduced working time and part-time contracts, temporary insertion in social cooperatives, etc.

[20] Quotas introduced by Law 68/1999 are more applicable than that fixed by Law 482 of 1968. For an in-depth comparison between Law 482/1968 and Law 68/1999, see Borzaga and Loss (2002).

people, such as employment offices, schools, provinces, associations, cooperatives, unions, etc. Nevertheless this law represent an important step toward the full integration of disabled people in the labour market, there are some difficulties in its implementation, especially due to the differences on the quality and the level of its application among regions, the challenge of coordinate all the actors involved in its implementation and the tendency to no compliance the obligation by private and public bodies, which prefer the risk to be sanctioned and count on delays in public controls and verifications[21].

5 Empirical Strategy and Data

The data used in this paper are from the Italian Survey on People with Disability, carried out in 2004 by Istat (Italian National Institute of Statistics), (Istat, 2004a).
The survey is directed to Italian disabled persons who live in households (institutionalized people are excluded) and aims to analyse their social integration in everyday life (e.g. at school, at work and during leisure activities) and understands which factors limit their full participation in the society (e.g. lack of access and limitation in mobility). The purposes of the survey are in line with the ICF, given the extended concept attributed to disability and the inclusion of questions concerning participation in social life and the influence of the contextual factors (e.g. architectural barriers and services provided).
People involved in the survey are those who stated some difficulties in functions (physical, sensory or in daily activities) and some impairments or reductions in autonomy during a previous survey taken in 1999-2000 ('Health conditions and use of health services survey'). Therefore, people with disability or limitations in functions during that period are asked to be re-interviewed in 2004. In this paper, due to the source of data, we do not aim at identifying disabled people by using the capability approach, rather to analyse how the development of one relevant capability (the capability of working and its functioning in the employment status and hours of work) is affected by the disability status.
The sample is composed of 4,011 persons. Unfortunately, given the elapsed time between the two surveys, some people weren't available for the second interview or couldn't be reached. Therefore, the 2004 survey counts 1,632 individuals and the sample should be representative of the 1 million and 641 thousands Italian disabled people of the same age even if, given the particular sampling design, the questionnaire is not aimed at disabled people with a disability risen after the period 1999-2000.
Individuals excluded from the analysis are those who passed away in the meanwhile, have been institutionalized, have moved abroad or declared slight limitations in the preliminary interview in 2004.
Given the specific focus of the paper, the capability approach framework gives the possibility to split between those who work (and, indeed, have the capability to work) and those who don't, but may have this capability. A crucial empirical challenge is to verify whether disabled

[21] For further information on the implementation of Law 68/1999, see Ministero del Lavoro (2006), Ministero del Lavoro (2008) and Ministero del Lavoro (2011) since, every two years, Italian Ministry of Labour presents to the Parliament a report about the implementation of Law 68/1999.

persons have the practical opportunity to work, given their personal characteristics, the environment where they live and the resources available. After having analysed these groups within the disabled population, a further differentiation is done with respect to gender and how it affects the attitudes and perspectives towards working.
It should be noted that 'capabilities, by definition, cannot be directly measured', while functionings can be and, specifically, 'these achievements are generally identified by proper indicators, reflecting the performance in the associated dimension' (Krishnakumar, 2007, p. 43). Moreover, as showed in figure 2, the development of one capability and the achievement of some correlated functionings can enlarge the capability set in another dimension. One example is given by the work and education spheres. Achieving a good education level (because there are schools available in the area and the individual propensity for learning is high) could lead to improved personal skills and abilities and also to the development of the capability of working, since these enhancements can facilitate the access to the labour market. Once having obtained a job, the same person can obtain experiences and amplify his/her knowledge and thanks to these changes, (s)he could also improve her/his career prospects. Given these connections and influences among dimensions, we analyse the capability to work in a broader spectrum, including other important spheres like education.

[Figure 2 here]

The literature on disability and employment clearly shows different likelihood of employment by types of disability and there is a strong heterogeneity according to the types of disability that should be accounted for an applied research. This made us looking for a survey that could detect different health conditions, in order to control for their impact on the probability of being in the labour force. Moreover, the sample allows to disaggregate the data by area, which is particularly relevant in a country like Italy, characterized by deep differences in the labour market among areas. One of the disadvantage of this survey is that it is not a primary source of data with a capability oriented questionnaire[22] and this makes also difficult the very definition of disability in the capability approach, but many studies on disability use secondary sources of data not designed in the capability approach and the use of appropriate econometrics techniques tackle this problem.
Furthermore, as underlined previously, given the characteristics of our data, the definition of disabled person is already built in the survey and, consequently, we use the capability approach not for defining this health status, but for measuring the capability of working and its functioning (through employment status and hours of work).

6 Descriptive Analysis

As underlined in the previous section, the sample is composed by 1,632 individuals from 4 to 67 years old. The number of men and women interviewed is almost the same, 817 and 815,

[22] An example of capability oriented questionnaire is given by Trani and Bakhshi (2008).

respectively. The most representative age group is 55-64, followed by the 45-54 one and 65+.

[Table 1 here]

The majority (60.6%) of people interviewed (with no difference by gender) are married and live with their partner, while 30.1% are single or have never been married, this share being higher among men (35.2%). As for the geographical location, 44.6% live in the South of Italy or in Sicily and Sardinia, 37.3% in the North and 18.1% in the Center.
Descriptive evidence on the education levels shows that men have on average higher qualifications than women. In particular, in most cases (34.4%) males have a leaving certificate awarded by a secondary school, while females have a primary school qualification (36%). Only 3,7% of the population (with 1,220 observations, given by people from 25 to 64 years old[23]) have a master or bachelor degree, while 7.4% don't have any qualification.
The greatest percentage of people without any qualification is in the South of Italy (11.9% of females and 9.9% of males), while the highest percentage of graduates is in the North, without any difference by gender (5.1%).

6.1 The disability status of the population

To give an overview of the limits faced in daily activities and the types of disability within the sample, Table 2 shows that 52.6% of the sample has only one disability (with a majority of men, 55.6%) 31.7% is without disability (especially among women, 36.8%) and 12% has two types of disabilities, with a prevalence among men, 13.9%[24].

[Table 2 here]

However, within the group of people without any disability, 71.2% of the interviewees present limitations in daily activity (limits that last at least six month), serious and constrictive in 15.9% of the cases, and 74.4% of the non-disabled people have chronic diseases. Among those who present one or more types of disabilities, 67.6% state serious limits in daily activities and 75.5% have a chronic disease (with similar percentages for men and women)[25]. Those who have just one disability are affected by mobility impairments in 53% of cases, with a prevalence of women. The second type of disability stated is correlated with hearing

[23]The age restriction is applied throughout the analysis, in order to find more reliable results, especially when the education level is involved. At 25 years old, in fact, students should have finished their studies, even when they have been enrolled at university. With this restriction, the sample is composed by 1,220 people, 51.2% men and 48.8% women.

[24]Disabled interviewees state different types of disability. Physical disability is identified as lack of one or more limbs or ankylosis of one or more articulations. Sensory disability is referred as vision and hearing impairments, but other senses can be involved too. Intellectual disability ranges from mental retardation to cognitive deficits (e.g. learning disability), while Mental Health / Emotional disability includes mental disorder or illness with a psychological or behavioural pattern.

[25]Italian data from Istat 2004-05, which can be consulted on the web-site *http://www.handicapincifre.it*, show that people with disability have serious chronic diseases (58.4%) or multi-chronic diseases (60.8%) more than the rest of population (respectively 11.6% and 11.8%).

impairments and men are more represented in this group than women, with a gender gap of 10.1%. Other disabilities present lower percentages and the language one is never present alone[26].
Descriptive evidence shows that intellectual disability is correlated with a wide disadvantage in education. The overall majority (69.1%) of interviewees with this condition obtained, at most, a primary school qualification, none of them received a university degree and only 9.8% have a high school qualification, which is the lowest percentage among types of disabilities for this level of education. The group affected by mental health problems presents the highest number of graduates (13.7%), even though it presents high heterogeneity, and physical or sensory disabilities are the most represented health conditions in secondary and high schools. Finally, if we consider the cause of disability, we find that if the limits have a genetic cause the impact on education is stronger for women, while men don't seem to have been influenced. With the increase in the number of disability there is a reduction in the level of education obtained and, if we compare disabled people and non-disabled ones we can notice that women are less likely to achieve high education levels than men. Surprisingly, especially among people without any disability the gender gap is higher, with 40.6% of men and 26.7% of women with at least a high school diploma. Furthermore, non-disabled women do not have any qualification or have only a primary school certificate in 42.8% of cases, while for men this percentage is equal to 22.4%. Among people with at least one type of disability, the difference between men and women is slight for well educated people (29.1% of women and 32.3% of men have at least a high school diploma), while for lower education levels disabled women are those with higher percentages.

[Tables 3 and 4 here]

Table 5 reports education levels of IT-SILC data in 2004. We can notice that university degree is obtained by 10.7% of interviewees, with really close percentages between men and women, while the majority obtained a high school diploma (37.1%), followed by a secondary school certificate (33.1%). However, for higher education levels, there are no significance differences between men and women while, as noted before, in our sample women are those with a shorter tenure in school.

[Table 5 here]

In conclusion, the descriptive statistics show the connection between chronic diseases and disability and the disadvantages faced by those with intellectual disabilities. In general, men are more educated than women and, on average, people from the Centre/North are more educated than those from the South/Islands of Italy. Finally, the origin of the daily limits influences the education level and having a genetic disability seems to be much more disadvantageous for women than for men.

[26]If interaction between two disabilities are included, the most common situation present mental health and intellectual disability at the same time or cognitive and mobility impairments together.

6.2 The employment situation in the context of disability

Considering the population between 25 and 64 years old, if we compare the employment rate of those with at least one disability to the employment rate in 2004 according to Italian component of EU-SILC (European Union Statistics on Income and Living Conditions) we can see that the employment rate is much lower among disabled people, with a larger disability gap for men than for women.

[Table 6 here]

In our whole sample, 41.9% of men are employed, a fraction that decreases sharply (24%) for women (considering the whole sample of people between 25 and 64 years old and with 1,220 observations). As the number of disabilities increases, the percentage of employed people decreases and nobody with more than three types of disability has a job (people with four or five disabilities are all unable to work). Most women between 25 and 64 years old are housewives (34.6%), while men of the same age range work at home only in 0.2% of cases. Only 1.1% of the sample is in a student status, while 5.9% of men and 4% of women are looking for a first or a new job.
If we compare the work conditions of the disabled population (with at least one disability) with those obtained from IT-SILC in 2004, we find that 58.7% of IT-SILC population is employed, with a significant prevalence of men (72%) while, in our sample, 31.6% of those with at least one disability is employed, again with a prevalence of men (40.9%). In Table 7, we can notice that 16.4% of the IT-SILC population fulfil domestic tasks and care responsibilities and this percentage, as expected, is much higher for women (30.7%). However, in Table 8 we find a similar framework, with 13% of people with at least one disability who affirm to be housewives, of which 28.2% women and only 0.3% men with disability. This result suggest that family rules persist even among the disabled population and that disabled women tend to be out of the labour market even more frequently than among the Italian population.

[Table 7 here]

[Table 8 here]

If we focus on the working hours of those who are employed (also considering self-employed workers) in IT-SILC 2004, we find that 89.3% work full-time, especially among men (96.0%) while, among people with at least one disability of our sample, the percentage of those working full-time is reduced (79.7%). The percentage of people working part-time is much higher for the disabled population and this is probably due to the disadvantageous health conditions, but also to family responsibilities, especially among women (Table 9).

[Table 9 here]

In our whole sample, among those who are employed, 83.3% has a permanent contract and the 80.8% has a full-time job, especially among men (86.5%). People with a part-time job justify their working hours in different ways on the basis of gender. For the majority of women, having a part-time job is dictated by family reasons in 30.4% of cases, especially in the group with 45-54 years old women. This could happen because they have to look after elder members of the family or children. For men, instead, family reasons are the cause of half-time work only in 1% of cases and the majority of them (52.7%) don't have a full-time job because of health reasons, with higher percentages in the age ranges of 35-44 and 45-54. Among those with a part-time job, 22.5% would like to have a full-time one. This happens for 27.5% of women, especially between 55 and 64 years old, and among young men (15-24 years old).

To sum up, women seem to provide care work within the household in most cases and this task influences their working hour decisions (but only among those with more than 25 years old), while for men the health condition is definitively the major cause for choosing a part-time job.

Considering the job position for people with one type of disability[27], physical disability allows to achieve higher positions, while the intellectual one creates the biggest disadvantage (all people affected by intellectual disability are blue-collar workers). Among white-collar workers, women are more represented than men (35.4% and 27.2% respectively), while the opposite happens for managerial positions, which are nevertheless seldom held by disabled people.

Having a genetic impairment doesn't seem to be a disadvantage in obtaining higher job positions than those obtained by people with other sources of disability. Quite surprisingly, 10.8% of men with this characteristic are executive or manager, and the majority is white-collar (63.7%). This founding might be correlated with the fact that men with genetic disability tend also to achieve higher education levels, as also showed previously. Genetic limitations are a disadvantage especially for women, as they lead them to be more represented among blue-collars group, while men state a lower level in their job position when the limits are consequence of accidents.

7 Results

In this section, we go beyond simple descriptive evidence to draw more robust inference from the data.

A probit model is used to identify the personal characteristics and environmental factors that influence the possibility of being into the labour force, with a focus on the differences between men and women. To corroborate further our findings, a Heckman model is applied to explain the number of hours worked by those who are employed. Finally, a sequential logit model is proposed to understand which factors affect significantly the transitions among different working situations.

[27]The questionnaire provides a question about the current job or the last position. In the last case, the question is direct to retired people, to those who are looking for a new job or to those who are in another condition but have worked during the past.

7.1 The probit regression model for the disabled labour force

Probit regression is used to model binary outcome variables and, in our framework, the dependent variable is an indicator that is equal to 1 if the person is in the labour force, and 0 otherwise.

More precisely, let y_i^* be the net utility gain each individual i receives from participating in the labour force. We obtain the following function:

$$y_i^* = \beta_1 + \beta_2 x_{2i} + ... + u_i. \tag{1}$$

We assume that the probability density function of the error term is the standard normal distribution: $u_i \sim N(0,1)$. While y_i^* is unobserved, we can observe the outcome variable y_i, which is the participation indicator.

$$y_i = \begin{cases} 0 & \text{if } y_i^* < 0 \\ 1 & \text{if } y_i^* \geq 0 \end{cases}$$

y_i^* is the additional utility that individual i would get by choosing $y_i = 1$ rather than $y_i = 0$, and u_i represent a threshold such that if $\beta_1 + \beta_2 x_{2i} + ... + \beta_k x_{ki} > u_i$ then $y_i = 1$.

In our case, disabled persons included in the labour force group are those who stated to be employed, who are seeking the first job or a new one (independently from the fact that they sought actively or not in the last 4 weeks) and housewives, students, retired and people in other conditions but all actively seeking a job[28]. Thus our endogenous variable is an indicator of whether the person feels (s)he is able to work or not, as either the person actually has a job or is actively seeking a job.

Potential determinants of labour force participation include the following: health and disability characteristics (e.g. chronic diseases, type of disability and disability status)[29], human capital characteristics (e.g. age, age squared[30] and education) and demographic characteristics (e.g. place of residence, gender and marital status). Table 10 lists the explanatory variables of the probit models.

[28]The real definition of Labour Force includes employed people and those seeking work. The OECD, in the Glossary of the statistical terms states that 'the total labour force, or currently active population, comprises all persons who fulfil the requirements for inclusion among the employed or the unemployed during a specified brief reference period'. The ILO defines the labour force as the number of working-age people engaged actively in the labour market, either by working or looking for work. As such, the labour force is obtained summing the number of employed and unemployed. In our setting, however, some people state to be housewives, students, retired or in other conditions and, at the same time, they admit they are looking for a job (this group is very small) and thus are included in the labour force. Others state to be in the category of those who are looking for the first or a new job, even if in practice they didn't do any active action to find a job in the previous 4 weeks. For this last category, the broader definition of unemployment is applied, relaxing the criterion of being an active job seeker, as suggested by ILO.

[29]In this model, the sign of the disability coefficient can be lower since the sample itself is not representative of the whole population. The questionnaire, in fact, is not aimed at disabled people with a disability risen after the period 1999-2000.

[30]Proxy of work experience.

[Table 10 here]

The coefficients from the probit model are difficult to interpret since they measure the change in y_i^* (unobserved) associated with a change in one of the explanatory variables. For this reason, we report the average marginal effects in Table 11.

[Table 11 here]

We first estimate the model for the full sample, pooling men and women together. While Column (1) of Table 11 reports a negative and significant average marginal effect of age, the probit coefficients (not reported) show a significant inverted-U shape relationship between the likelihood of participating in the labour force and age. Therefore, being older decreases the chances of entering the labour force and this effect occurs relatively early in the life of disabled people. Interestingly, the civil status does not have a significant effect on the likelihood of participation in the labour force, while being a woman decreases significantly the possibility of being in the labour force by 14.2%[31]. On average, people affected by chronic diseases have a 9.5% lower probability to enter the labour force, while being disabled doesn't have a statistically significant impact[32]. Furthermore, the coefficient of the interaction term between the dummy variable for the disability status and the indicator variable for the chronic disease (not reported) remains insignificant. Education levels higher than the primary school certificate, which is the reference group, increase the possibility of entering in the labour force by 12%, 27.6% and 26.5% if the education level correspond to secondary school certificate, high school diploma or university degree, respectively. Conversely, not having attended any school significantly lowers the likelihood of entering the labour force by 13.8%. Furthermore, if we compare the marginal effects correlated to different education levels, it is found that having high school or university degree doesn't make a big difference, while jumping from no qualification to primary school, from secondary to high school or from primary to secondary school matters[33].
Finally, people living in the South/Islands in the sample (i.e. the area with the slacker labour market) are less likely to participate in the labour force than those living elsewhere in Italy, with a marginal effect of 7.2%.

As a further analysis, we split the sample into men and women. Columns (2) and (3) of Table 11 report the average marginal effects estimated from the Probit model for labour market participation.
Like in the pooled sample, the likelihood of participating in the labour force is increasing in age, though the effect fades out and turns negative for old people. Being married and living with the partner is a significant predictor of the participation in the labour force, with

[31] This result could be explained by the double discrimination faced in the labour market (but not only in this sphere) by disabled women, which have a double disadvantage: being female and being disabled (Abu Habib (1995) and Sen (2005)).

[32] As underlined in section 6.1, the majority of people in the sample suffer from chronic diseases and 75.5% of those who report at least one type of disability have chronic diseases.

[33] The importance of obtaining qualifications for disabled people also emerges in the UK context analysed in Jones et al. (2003) and Jones et al. (2006).

a positive effect for men and a negative one for women, confirming the existing evidence found in Gannon and Nolan (2003), Jones et al. (2003) and Mitra and Sambamoorthi (2006). Furthermore, Gannon and Nolan (2003) find that the presence of young children (less than 12 years old) decreases the probability of participation in the labour force for women, while the effect is insignificant for men[34].

Women affected by chronic diseases are less likely to participate in the labour force than those without such type of diseases, on average by 11.1%, while disabled women are 8% less likely to participate in the labour force than disabled ones. This finding is similar to the one found by Jones et al. (2003) in UK, where is shown that having a number of health problems influence negatively the probability of being employed for men and women with disability.

Moreover, in our probit analysis the coefficient of the interaction term between being disabled and having a chronic disease (not reported) is significant and negative for men and not significant for women. Furthermore, the descriptive analysis in section 6 suggests that health conditions are the main reason for having a part-time job and this is particularly true for men. The econometric evidence in Table 11, Columns (2) and (3), shows in fact that health conditions are a significant factor in determining also the decision to participate in the labour force.

Any education level higher than the primary school certificate (the reference group) has a positive and significant impact on the probability of entering in the labour force for men. For women, instead, it is more likely to participate in the labour market only if the two highest levels of education (university degree or high school diploma) are achieved. Furthermore, for men achieve a secondary school certificate than a primary school one or having a high school diploma than a secondary school certificate is statistically significant, while the difference between high school and university is not significant. Differently, for women the only difference that matters is the one between secondary and high school.

Finally, the probability of being in the labour force is 11.2% lower for men living in the South than for those living elsewhere in Italy. Conversely, disabled women in the South do not have a statistically different probability of participating in the labour force from that of disabled women living elsewhere in Italy.

Heretofore, the econometric analysis has focused on the whole sample of disabled and non-disabled persons. We now exclude people who did not report a disability 'stricto sensu'. The probit regression model has the same dependent variable (equal one if the person is in the labour force and zero otherwise) and explanatory variables, except for the type of disability indicators, which substitute the variables indicating the presence of chronic diseases and the absence of disability.

The average marginal effects estimated from the modified probit model are reported in Column (4) in Table 11.

Again, we estimate an inverted-U shaped effect of age on labour force participation, with the marginal effect being negative on average. Being female has a negative and significant impact of 14.3% on the probability of participating in the labour force, while the civil status

[34]In our data, further information on children and the husband's work condition and his wage level would allow us to delve more into the family dynamics behind this result.

doesn't affect it. The marginal effects of the education indicators are measured with respect to those people having a primary school education. In general, obtaining a high education level (high school diploma or university degree) has a positive and significant effect on the likelihood of participating in the labour force, with average marginal effects of 31.5% and 29.9% respectively, even if the difference between obtaining an high school diploma and a university degree is not statistically significant[35]. People living in the South or in the Islands are, on average, 7.3% less likely to participate in the labour force than people living elsewhere, confirming the territorial duality of the Italian economy. Finally, the marginal effects of the type of disability indicators are estimated taking the physical disability as reference group. Having a hearing disability rather than a physical one increases the probability of being in the labour force by 14.9%, while people with intellectual disability are 24.7% less likely to enter the labour force. This result is in line with the descriptive evidence in subsection 6.2, the empirical findings in Jones et al. (2006) and Jones et al. (2003) on the probability of being employed in the British labour market and with the Indian study of Mitra and Sambamoorthi (2006).

We then proceed by estimating the same probit model for men and women separately. Columns (5) and (6) of Table 11 report the marginal effects.
Like in the pooled sample, being one year older decreases the likelihood of participating in the labour force by about 1.6% for men and 1.7% women, but again the effect is significantly positive for increases starting at young ages. Married women and men do not display different patterns of labour force participation with respect to their unmarried counterparts. Compared to physically disabled people (the reference group), women with an hearing disability are 21.3% more likely to participate in the labour force, while the effect of hearing disability for men is much smaller (13%). Furthermore, women with intellectual disability or mental health are less likely to enter in the labour force than those with a physical disability (with marginal effects of 19.5% and 13.4%, respectively), while these types of disability do not have a significant effect on labour force participation of disabled men. Jones et al. (2003), instead, find that having mental health forms of disability influences significantly and negatively the probability of being in employment for both men and women in UK.
Obtaining a higher education level than primary school has a positive and significant effect on the likelihood of participation in the labour force for men, and the difference between obtaining a primary school certificate than a secondary one or a secondary school certificate than a high school diploma matters, even if the difference between high school and university remains insignificance.
For women, instead, only a high school diploma has a significant effect of 20.8% on average and, if we compare different levels of education, we obtain a statistically significant difference only between secondary school and high school. Finally, disabled women in the South/Islands do not have a statistically different probability of participating in the labour force from those living elsewhere in Italy, while for men there is a negative and significant effect of 8.4% on average.

[35]Only jumping from secondary school to high school is statistically significant.

Overall, the type of disability seems to be an important factor in determining the labour force participation of women only, with mental and intellectual disabilities having a negative effect. Conversely, the level of education play an important role mainly for men. Furthermore, health conditions seem to affect men within the labour market and, as we saw, in the decision of not working full-time (section 6), while for women the health status plays a role in the probability of entry in the labour force, that is, 'before' the labour market.

7.2 The Heckman model for employed people

Among people with disability who are employed (378 individuals in the age range 25-64) the number of hours worked in one week ranges from only 1 hour to 72, with two picks in 40 hours (32.3%) and 36 hours (19.3%), as showed in Figure 3.

[Figure 3 here]

The Heckman selection model assumes that the dependent variable is not always observed and sample selection bias refers to problems where the dependent variable is only observed for a restricted and non-random sample (in our case, it is observed only if the person works at least 10 hours per week). Since we want to predict the hours of work from some explanatory variables, but we have data only for people who are employed, we use the Heckman selection model, which allows to use information on non-working people to improve estimations of the parameters in the outcome equation.
Let's start with a basic selection equation

$$z_i^* = w_i'\alpha + u_i \tag{2}$$

$$z_i = \begin{cases} 0 & \text{if } z_i^* \leq 0 \\ 1 & \text{if } z_i^* > 0 \end{cases}$$

and a basic outcome equation

$$y_i^* = x_i'\beta + \epsilon_i \tag{3}$$

$$y_i = \begin{cases} \text{not observed} & \text{if } z_i^* \leq 0 \\ y_i^* = x_i'\beta + \epsilon_i & \text{if } z_i^* > 0 \end{cases}$$

We also make the following assumption about errors terms in selection and outcome equation:

$$u_i \sim N(0,1) \tag{4}$$

$$\epsilon_i \sim N(0,1) \tag{5}$$

$$corr(u_i, \epsilon_i) = \rho \tag{6}$$

We assume a bivariate normal distribution with zero means and correlation ρ. Every correlation between the two errors means that we have to take account of selection.

In our paper, the Heckman model consists of two equations: a selection equation to employment (the first stage of the procedure) and a hours of work equation (the second stage), where we consider the logarithmic transformation of the dependent variable. Each stage has a residual for each observation and to test for bias we analyse the relationship between the residuals of the two stages. When $\rho = 0$ (the first stage does not affect the second stage), Ordinary Least Squares (OLS) regression provides unbiased estimates while, when $\rho \neq 0$, OLS estimates are biased without correction.
The bivariate sample selection model with normal errors is theoretically identified without any restriction on the regressors, but it is close to unidentified if exactly the same regressors are used in both equations. Therefore estimation of the bivariate sample selection model requires that at least one regressor in the participation (i.e. selection) equation is excluded from the outcome equation (Cameron and Trivedi (2005)).
In our case, we believe that the type of disability does not influence the number of hours of work, but has an impact on the probability of being employed. In fact, both descriptives statistics and legislative framework suggest that physical and sensory disabilities are those status that allow a better integration within the labour market, but there is no evidence of reducing working hours on the basis of the type of disability. Furthermore, people living in the South/Islands of Italy face more difficulties to enter the labour market, but the place of residence does not influence their working hours. This statement is confirmed by descriptive evidence in our sample, where almost 80% of employees work full-time independently from the place of residence. For these reason, the two explanatory variables indicating the type of disability and the place of residence are included in the selection equation, but not in the outcome one.
The explanatory variables used in our selection and outcome equations are listed in Table 12.

[Table 12 here]

Table **??** reports the adjusted effects for every observation, taking into account that some variables appear in both equations. More specifically, it reports the marginal effects for the expected value of the dependent variable conditional on being observed, E($y|y$ observed) and the marginal effects for the probability of the dependent variable being observed, Pr(y observed)[36].

[Table 13 here]

The Wald test on zero correlation between the residuals of the two equations allows to reject the null hypothesis of absence of correlation. The results of the estimation show that for one year of age more, the hours of work decrease by 0.8%. The same negative effect is found for women, for which the hours worked decrease by 13.5%, and this result is in line with the finding in section 6.2, where is showed that 80.8% of people employed has a full-time job, with

[36]In addition to the two equations, the model estimates rho (and the inverse hyperbolic tangent of rho), which represent the correlation of the residuals in the two equations, and sigma (and the log of sigma), which is the standard error of the residuals of the outcome equation. Lambda is rho × sigma. The output also includes a likelihood ratio test of rho = 0.

higher percentage among men (86.5%). At the contrary, being married increase the hours worked by 12.2%, such as a level of education lower than the primary school certificate. It should be noted that information about children would be very important in interpreting this result, since it could be possible that more educated persons have children more frequently and this is the reason why they work less hours.
Concerning the probability of being in employment, instead, we find a negative and significant average marginal effect of age, while the probit coefficients (not reported) show a significant inverted-U shape relationship between the likelihood of being in employment and age. Moreover, being female has a negative and significant impact of 16.5% on the probability of being in employment, while the civil status does not affect it. The marginal effects of the education indicators are measured with respect to those people having a primary school education. People with high education levels (high school diploma or university degree) have a positive and significant probability of being employed, with average marginal effects of 26% and 34.4% respectively, and this result is in line with the analysis made in Jones et al. (2006) on the British labour force. People living in the South or in the Islands are, on average, 8.6% less likely to entering the labour market than people living elsewhere, confirming the territorial duality of the Italian economy. Finally, health status strongly influence the employment condition, since having a sensory disability or a mobility one increases the probability of being in employment compared to mental or intellectual disabilities, confirming the empirical findings in Jones et al. (2006). Finally, people with chronic diseases are less likely to be employed, with a marginal effect of 14.4%.

[Table 14 here]

We can indeed conclude that there are groups of disabled people that are strongly disadvantaged for entering the labour market, such as women and people with mental and intellectual disabilities. Moreover, once employed, women work on average less hours, probably because of their family responsibility (as also confirmed in section 6.2).

7.3 A sequential logit model for the work conditions

In order to understand which variables influence the 'transitions' between different conditions in the labour market, a sequential logit model is applied[37].
This model can be interpreted as corresponding to a tree decision structure of the form depicted in Figure 4. More specifically, the model identifies which factors influence the entry in the labour force and which rather lead to a non-labour force status. Once an individual is into the labour force, then (s)he can be unemployed or employed. If (s)he is employed, then (s)he could be part-time worker or full-time one. Each of these 'transitions' is influenced by different personal and external factors, such as age, marital status, gender, education level, place of residence and health status[38], and the sequential logit model models the probabilities

[37] For more information about the model, see Buis (2007).
[38] The choices specified in the sequential logit tree don't have to be necessarily binary (i.e. pass or fail).

of passing these transitions.

[Figure 4 here]

The effects in each scenario are estimated using maximum likelihood and the likelihood function for an individual i can be written as:

$$L_i = \begin{cases} 1 - p_{1i} & \text{if } y_i = \text{no labour force} \\ p_{1i} \times (1 - p_{2i}) & \text{if } y_i = \text{unemployed} \\ p_{1i} \times p_{2i} \times (1 - p_{3i}) & \text{if } y_i = \text{employed part-time} \\ p_{1i} \times p_{2i} \times p_{3i} & \text{if } y_i = \text{employed full-time} \end{cases}$$

The probability of observing someone who is not in the labour force equals the probability of failing the first transition. The probability of observing someone unemployed equals the probability of passing the first transition and failing the second one. The probability of observing someone employed part-time is equal to the probability of passing the fist and the second transition, but failing the third one. Finally, the probability of observing someone employed full-time is equal to the probability of passing all the transitions (Buis (2011)).
We see at least two reasons for the use of a sequential logit model. First, as mentioned earlier in section 7, we would like to argue that disability is a discouraging factor for working. Despite this, the willingness to work for disabled people is above all the result of a concious decision-making process that goes beyond the consideration of economic conditions and overcomes the discouraging factor. Additionally, we prefer a sequential logit framework rather than a nested model, because in the latter model the property of IIA (Independence of Irrelevant Alternatives)[39] holds within the branches and we believe that there is no reason to assume IIA a priori in our framework.
Table 15 lists the explanatory variables of the model[40].

[Table 15 here]

The model can be estimated by a number of logit models, but the sequential logit package allows to test hypotheses across transitions, given that it estimates the whole model simultaneously. In particular, it allows to control for unobserved variables that influence the outcome, since it is very likely that we do not observe all the variables that influence the probability of passing a transition (Cameron and Heckman (1998)). The presence of unobserved variables leads to biased estimates of the individual-level effects and, even if the variable excluded is

[39]The Independence of Irrelevant Alternatives means that an individual's choice between two alternatives is unaffected by other choices available. If A is preferred to B out of the choice set A,B, introducing a third alternative X, which expands the choice set to A,B,X, do not change the preference for A or B. In other words, X is irrelevant to the choice between A and B. Therefore, 'this assumption implies that the relative probabilities between pairs of alternatives are independent of the number or the characteristics of the other alternatives' (Weiler (1986)).

[40]The dummy variable concerning the family income represents a personal perspective of the economic resources in the household considering the last 12 months. The questionnaire does not provide any additional information about income level or wage level.

independent to any of the observed variables at the first transition, it could be correlated with them at a higher transition, leading to omitted variable bias. As a consequence, if we do not control for unobserved heterogeneity we can interpret only group level effects, and not individual effects[41]. In our model, we specify a set of scenarios concerning the extent of unobserved heterogeneity and we estimate the effects of our observed variables given those scenarios. For practical purpose, we don't consider a single unobserved variable, but a weighted sum of all the unobserved variables, which can be approximated by a normal distribution, even if its components are non-normally distributed. Therefore, the scenario proposed assumes that the composite unobserved variable is normally distributed and its value and effect remain constant over the transitions. The resulting composite unobserved variable could be a standardized variable called u (with mean 0 and standard deviation 1) or an unstandardized random variable called v_k (with mean 0 and a standard deviation fixed *a priori* in the scenario), where the two are related in the following way: $\beta_{uk}u = v_k$. Consequently, it is possible to compare the effects of observed variables when there is a small, medium or large amount of unobserved heterogeneity (Cameron and Heckman (1998)).
Table 16 shows the results obtained by sequential logit models with different amount of unobserved heterogeneity, starting from the case of absence of unobserved variables. The aim is to understand the impact of unobserved heterogeneity (β_{uk}) on the statistics of interest and to find out how extreme a scenario has to be before our conclusions change. More specifically, we fix the values of β_{uk} from 0 to 2, where u is the standardized variable (mean equal 0 and standard deviation equal 1) and β_{uk} is its effect in terms of log odds ratios on the odds of passing transition k. Finally, we assume β_{uk} to be constant over transitions.

[Table 16 here]

Results show that being older is beneficial at each transition (even if at the second transition the effect is insignificant for the first two scenarios), but the effect fades out and turns negative for old people. For a one year more of education, the log odds of being in the labour force (versus not being in the labour force) or in employment (versus being in unemployment) increases by 0.74 and 0.49 respectively (with risen effects due to increases in unobserved heterogeneity), and this is coherent with expectations and what has been found in section 7.1. Having a disability and living in the South/Islands are not favourable for passing the first transition (whether or not to be in the labour force) and the second one (unemployed vs employed), and the size of the effects increases as the amount of unobserved heterogeneity increases. Having a chronic disease is disadvantageous in the first and in the third transition (employed full-time versus part-time) and this is in line with the results found in section 6.2, where health conditions are recognized as one of the major causes of part-time employment. Furthermore, good or very good family income is particularly beneficial for passing the second and the third transition, with a positive and increasing effects on the basis of the amount of unobserved heterogeneity. This finding suggests that

[41] The sequential logit package allows to specify the amount of unobserved heterogeneity and how it varies over transitions or over variables, as well as the correlation between unobserved variables and the observed variables of interest and the distribution of unobserved variables

good economic resources are an incentive for working and they also could represent a *proxy* of family background (e.g. parents' education), indicating that favourable family environment stimulates the employment of disabled members. However, the most significant result is that being married is an advantage for passing the first and the third transitions, but being married and female (interaction term) turns negatively the effect. These results has been in part anticipated by our findings in section 7.1, where being married turned out to be negative for the probability of being in the labour force only for women, and in section 6.2 where family responsibilities are found to be the main reason for working part-time for women. Finally, some variables (such as being married and the interaction married and female at the second transition, or education level and being disabled are the third transition) are insignificant when we don't control for unobserved heterogeneity or its amount is fixed at a low level, but they become significant when the amount of unobserved heterogeneity is higher[42].

We can conclude that people with disability and health problems, such as women and people living in less productive areas face more obstacles in entering the labour market, especially when these characteristics occur together.

8 Conclusions and avenues for further research

From the descriptive evidence on the disabled population aged 25-64 years old in Italy in 2004, emerge that men have, on average, higher qualifications than women and that physical and sensory disability allow a longer tenure in school. Furthermore, as expected, with the increase in the number of disabilities there is a reduction in the level of education obtained. Considering the work conditions we find that, among those who are employed, physical disability allows to achieve higher job positions, while the intellectual one creates the biggest disadvantage. It is also confirmed the strong influence of health status on the access to the labour market, which becomes even more disadvantageous for women (especially if married). In the group of disabled people, those with intellectual disabilities are more likely to be unemployed or employed in lower positions, suggesting that there are still prejudices and scarce knowledge toward this health condition. Finally, achieve high education levels is always profitable for the access to the labour market and to cover a good job position, and this is true for both men and women.
These results suggest that the integration of people with disability in the labour market needs coherent personalized programmes and interventions, which involves also educational institutes and health services. The knowledge of disability is the main step toward the full participation, for which it is desirable a major involvement of all operators. Finally, it has to be considered that the main character of all actions remain the disabled person, with his/her characteristics and potentiality, which has to be considered as a positive resource within the society.

[42] In our analysis we range from sd(0) to sd(2). If we expand the amount of unobserved heterogeneity to sd(5), we find an increase in the side of effects in every explanatory variable, while significances remain the same, a part for the variable indicating chronic diseases, for which the corresponding coefficient becomes significant at the second transition.

In 2011, Istat (Italian National Institute of Statistics) carried out a new survey addressed to people with disability in Italy. Once the more recent data will be available, it is in our purpose make a comparison between the empirical results of the two surveys.

References

Abu Habib, Lina (1995) 'Women and disability don't mix!: Double discrimination and disabled women's rights.' *Gender & Development* 3(2), 49–53

Addabbo, Tindara, Gisella Facchinetti, Giovanni Mastroleo, and Giovanni Solinas (2007) 'A fuzzy way to measure quality of work in a multidimensional perspective.' In *Advances in Information Processing and Protection,* ed. Jerzy Pejas and Khalid Saeed (Springer)

Agovino, Massimiliano, and Agnese Rapposelli (2011) 'Inclusion of disabled people in the Italian labour market: an efficiency analysis of Law 68/1999 at regional level.' *Quality and Quantity*

Ai, Chunrong, and Edward C. Norton (2003) 'Interaction terms in logit and probit models.' *Economics Letters* 80(1), 123–129

Alkire, Sabina (2002a) 'Dimensions of human development.' *World Development* 30(2), 181–205

_ (2002b) *Valuing Freedoms: Sen's Capability Approach and Poverty Reduction* (Oxford University Press)

_ (2005) 'Why the capability approach?' *Journal of Human Development and Capabilities* 6(1), 115–135

Anand, Paul, Graham Hunter, and Ron Smith (2005) 'Capabilities and Well-Being: Evidence Based on the Sen-Nussbaum Approach to Welfare.' *Social Indicators Research* 74(1), 9–55

Arias, Carlos, and Thomas L. Cox (1999) 'Maximum simulated likelihood: A brief introduction for practitioners.' Wisconsin-Madison Agricultural and Applied Economics Staff Papers 421, Wisconsin-Madison Agricultural and Applied Economics Department, January

Bellanca, Nicolò, and Mario Biggeri (2010) *Dalla relazione di cura alla relazione di prossimità. L'apporccio delle capability alle persone con disabilità* (Collana Biòtopi, Liguori, Napoli)

_ (2011) 'L'approccio delle capability applicato alla disabilità: dalla teoria dello sviluppo umano alla pratica.' Technical Report, Dossier UmanamENTE

Borzaga, Carlo, and Monica Loss (2002) 'Work integration social enterprises in Italy.' *EMES European Reserach Network*

Buis, Maarten L. (2007) 'Seqlogit: Stata module to fit a sequential logit model'

_ (2010) 'Stata tip 87: Interpretation of interactions in nonlinear models.' *Stata Journal* 10(2), 305–308

_ (2011) 'The consequences of unobserved heterogeneity in a sequential logit model.' *Research in Social Stratification and Mobility*

Burchardt, Tania (2004) 'Capability and disability: the capabilities framework and the social model of disability.' *Disability and Society* 19(7), 735–751

Cabrita, Jorge, and Heloísa Perista (2007) 'Measuring job satisfaction in surveys - comparative analytical report.' Technical Report, Eurofound

Cameron, Colin A., and Pravin K. Trivedi (2005) *Microeconometrics* (Cambridge University Press)

Cameron, Stephen V., and James J. Heckman (1998) 'Life cycle schooling and dynamic selection bias: Models and evidence for five cohorts of american males.' *Journal of Political Economy* 106(2), 262–333

Cheng, Simon, and J. Scott Long (2007) 'Testing for IIA in the Multinomial Logit Model.' *Sociological Methods & Research* 35(4), 583–600

Cullinan, John, Brenda Gannon, and Sean Lyons (2011) 'Estimating the extra cost of living for people with disabilities.' *Health Economics* 20(5), 582–599

Del Boca, Daniela (2002) 'The effect of child care and part time opportunities on participation and fertility decisions in Italy.' *Journal of Population Economics* 15(3), 549–573

Di Tommaso, Maria Laura (1999) 'A Trivariate Model of Participation, Fertility and Wages: The Italian Case.' *Cambridge Journal of Economics* 23(5), 623–40

European-Commission (2010) 'European Disability Strategy 2010-2020: A Renewed Commitment to a Barrier-Free Europe'

European-Union (1992) 'Treaty on European Union (Consolidated Version), Treaty of Maastricht'

_ (1997) 'Treaty on European Union (Consolidated Version), Treaty of Amsterdam'

_ (2000) 'Charter of Fundamental Rights of the European Union'

Euwals, Rob, Marike Knoef, and Daniel van Vuuren (2007) 'The trend in female labour force participation: What can be expected for the future?' IZA Discussion Papers 3225, Institute for the Study of Labor (IZA), December

Foster, James, and Christopher Handy (2008) 'External capabilities.' *OPHI working paper series*

Gannon, Brenda, and Brian Nolan (2003) 'Disability and labour market participation.' Papers HRBWP04, Economic and Social Research Institute (ESRI), November

Garibaldi, Pietro, Lia Pacelli, and Andrea Borgarello (2003) 'Employment protection legislation and the size of firms.' IZA Discussion Papers 787, Institute for the Study of Labor (IZA), May

Greene, William H. (2002) *Econometric Analysis* (Prentice Hall; 5th edition)

ILO (1999) 'Decent work.' Technical Report, International Labour Organization, Geneva

_ (2002) 'Managing disability in the workplace.' Technical Report, International Labour Organization, Geneva

Isfol (2004) 'Rapporto isfol 2004. avviamento al lavoro delle persone disabili.' Technical Report, Isfol

_ (2009) 'Monitoraggio dei servizi per l'impiego 2008.' Technical Report, Ministero del Lavoro e delle Politiche Sociali

Istat (2004a) 'Indagine di ritorno sui disabili'

_ (2004b) 'Indagine sulle condizioni di vita. anno 2004'

_ (2006) 'Forze di lavoro. media 2004.' Technical Report, Istituto Nazionale di Statistica

_ (2010) 'La disabilità in italia. il quadro della statistica ufficiale.' Technical Report, Istituto Nazionale di Statistica

_ 'I servizi per l'impiego e l'inserimento lavorativo mirato, 2002-2004.' Technical Report, Istat

Jones, Melanie K., Paul L. Latreille, and Peter J. Sloane (2003) 'Disability, gender and the labour market.' IZA Discussion Papers 936, Institute for the Study of Labor (IZA), November

Jones, Melanie K., Paul L. Latreille, and Peter J. Sloane (2006) 'Disability, gender, and the British labour market.' *Oxford Economic Papers* 58(3), 407–449

Kidd, Michael P., Ivan Ferko, and Peter J. Sloane (2000) 'Disability and the labour market: an analysis of British males.' *Journal of Health Economics* 19(6), 961–981

Kittay, Eva Feder (1999) *Love's labor: essays on women, equality, and dependency* (Routledge)

Krishnakumar, Jaya (2007) 'Going beyond functionings to capabilities: An econometric model to explain and estimate capabilities.' *Journal of Human Development and Capabilities* 8(1), 39–63

Lalive, Rafael, Jean-Philippe Wuellrich, and Josef Zweimüller (2009) 'Do financial incentives for firms promote employment of disabled workers? a regression discontinuity approach.' NRN working papers 11, The Austrian Center for Labor Economics and the Analysis of the Welfare State, Johannes Kepler University, Linz, Austria

Meager, Nigel, and Darcy Hill (2005) 'The labour market participation and employment of disabled people in UK.' IES working papers, Work Research Institute, Norway

Ministero del Lavoro (2006) 'Terza relazione al Parlamento sullo stato di attuazione della legge 12 marzo 1999, n. 6 Norme per il diritto al lavoro dei disabili. Anni 2004-2005.' Technical Report, Ministero del Lavoro e della Previdenza Sociale

_ (2008) 'Quarta relazione al Parlamento sullo stato di attuazione della legge 12 marzo 1999, n. 6 Norme per il diritto al lavoro dei disabili. Anni 2006-2007.' Technical Report, Ministero del Lavoro, della Salute e delle Politiche Sociali

_ (2011) 'Quinta relazione al Parlamento sullo stato di attuazione della legge 12 marzo 1999, n. 6 Norme per il diritto al lavoro dei disabili. Anni 2008-2009.' Technical Report, Ministero del Lavoro, della Salute e delle Politiche Sociali

Mitra, Sophie (2006) 'The capability approach and disability.' *Journal of Disability Policy Studies* 16(4), 236–247

Mitra, Sophie, and Usha Sambamoorthi (2006) 'Employment of persons with disabilities: Evidence from the national sample survey.' *Economic and Political Weekly* 41(3), 199–203

Mitra, Sophie, Patricia A. Findley, and Usha Sambamoorthi (2008) 'Healthcare expenditures of living with a disability: Total expenditures, out of pocket expenses and burden, 1996-2004.' Fordham Economics Discussion Paper Series dp2008-18, Fordham University, Department of Economics

Morris, Christopher (2009) 'Measuring participation in childhood disability: how does the capability approach improve our understanding?' *Developmental Medicine and Child Neurology* 51(2), 92–94

Nagakura, Daisuke, and Masahito Kobayashi (2009) 'Testing the sequential logit model against the nested logit model.' *The Japanese Economic Review* 60(3), 345–361

Nagi, Saad Z. (1965) 'Some conceptual issues in disability and rehabilitation.' *Sociology and rehabilitation* pp. 100–113

_ (1991) 'Disability concepts revisited: Implications for prevention.' *Disability in America: Toward a national agenda for prevention* pp. 309–327

Norton, Edward C., Hua Wang, and Chunrong Ai (2004) 'Computing interaction effects and standard errors in logit and probit models.' *Stata Journal* 4(2), 154–167

Nussbaum, Martha C. (2003) 'Beyond the social contract: Toward global justice.' *The Tanner Lectures on Human Values*

_ *Frontiers of Justice: Disability, Nationality, Species Membership* (Cambridge, MA: The Belknap Press of Harvard University)

Parodi, Giuliana, and Dario Sciulli (2008) 'Disability in Italian households: income, poverty and labour market participation.' *Applied Economics* 40(20), 2615–2630

_ (2012) 'Disability and low income persistence in Italian households.' *International Journal of Manpower* 33(1), 9–26

Pfeiffer, David (2001) 'The conceptualization of disability.' *Research in Social science and disability* 2, 29–52

Poleis-Regione-Emilia-Romagna (2004) 'Valutazione di efficacia delle azioni formative per le persone disabili nell'ambito del P.O.R./F.S.E. 2000-2006 della Regione Emilia-Romagna.' Technical Report, Programma operativo regionale

Qizilbash, Mozaffar (1997) 'A weakness of the capability approach with respect to gender justice.' *Journal of International Development* 9(2), 251–262

Regione-Emilia-Romagna (2008) 'Il Sistema regionale delle politiche per l'integrazione e l'inserimento lavorativo delle persone con disabilità in Emilia-Romagna. Rapporto 2000-2006.' Technical Report, Regione Emilia-Romagna

Robeyns, Ingrid (2003a) 'The capability approach: An interdisciplinary introduction.' Technical Report, University of Amsterdam

_ (2003b) 'Sen's capability approach and gender inequality: selecting relevant capabilities.' *Feminist Economics* 9(2-3), 61–92

Sen, Amartya (1980) 'Equality of what?' The Tanner lectures on Human Values

_ (1985) *Commodities and Capabilities* (Amsterdam: North Holland)

_ (1987) 'The standard of living.' In *The Standard of Living,* ed. G. Hawthorn (Cambridge University Press)

_ (1992) *Inequality Re-examined* (Oxford Clarendon Press)

_ (1999) *Development as freedom* (Oxford University Press)

_ (2005) 'Essere disabili due volte.' *Il Sole-24 Ore*

_ (2009) *The idea of justice* (Cambridge, MA: The Belknap Press of Harvard University)

Stern, Steven (1989) 'Measuring the effect of disability on labor force participation.' *Journal of Human Resources* 24(3), 361–395

Stewart, Frances (2005) 'Groups and capabilities.' *Journal of Human Development* 6(2), 185–204

Terzi, Lorella (2003) 'Beyond the dilemma of difference: The capapbility approach to disability and special education needs.' *Journal of Philosophy of Education* 39(3), 443–459

Trani, Jean-François, and Parul Bakhshi (2008) 'Challenges of Assessing Disability Prevalence: the Case of Afghanistan.' *ALTER - European Journal of Disability Research* 2(1), 44–64

United-Nations (1948) 'Universal declaration of human rights'

_ (1971) 'Declaration on the rights of mentally retarded persons'

_ (1975) 'Declaration on the rights of disabled persons'

_ (1989) 'Convention of the rights of the child'

_ (2006) 'Convention on the rights of persons with disabilities'

Weiler, William C. (1986) 'A sequential logit model of the access effects of higher education institutions.' *Economics of Education Review* 5(1), 49–55

WHO (2001) 'International classification of functioning, disability and health'

Wuellrich, Jean-Philippe (2010) 'The effects of increasing financial incentives for firms to promote employment of disabled workers.' *Economics Letters* 107(2), 173–176

Zaidi, Asghar, and Tania Burchardt (2005) 'Comparing incomes when needs differ: Equivalization for the extra costs of disability in the U.K.' *Review of Income and Wealth* 51(1), 89–114

9 Appendix

Table 1: Sample composition by age and gender

Age	Man	Woman	Tot
5-14	4.5	3.1	3.8
15-24	5.0	5.9	5.4
25-34	8.2	8.0	8.1
35-44	15.3	10.8	13.0
45-54	20.8	18.8	19.8
55-64	31.9	36.5	34.2
65+	14.3	16.8	15.6
Tot	100.0	100.0	100.0

Table 2: Number of disabilities by sex, 25-64 years old

N.Dis.	Man	Woman	Tot
0	26.8	36.8	31.7
1	55.6	49.5	52.6
2	13.9	10.0	12.0
3	2.9	3.5	3.2
4	0.5	0.1	0.3
5	0.3	0.1	0.2
Tot	100.0	100.0	100.0

Table 3: Education level for disabled (at least one disability) and non-disabled people, 25-64 years old - Men

Education Level	No Disability	Disability	Tot
University	5.8	3.6	4.2
High School	34.8	28.7	30.3
Secondary School	36.9	33.5	34.4
Primary School	21.3	25.5	24.4
No Qualification	1.1	8.7	6.7
Tot	100.0	100.0	100.0

Table 4: Education level for disabled (at least one disability) and non-disabled people, 25-64 years old - Women

Education Level	No Disability	Disability	Tot
University	2.2	3.7	3.2
High School	24.5	25.4	25.1
Secondary School	30.5	26.2	27.7
Primary School	39.4	34.0	36.0
No Qualification	3.4	10.7	8.0
Tot	100.0	100.0	100.0

Table 5: Education level, 25-64 years old - IT-SILC 2004

Education Level	Man	Woman	Tot
University	10.7	10.8	10.7
High School	37.2	37.0	37.1
Secondary School	35.6	30.7	33.1
Primary School	13.7	18.0	15.9
No Qualification	2.8	3.5	3.1
Tot	100.0	100.0	100.0

Source: Our elaboration of IT-SILC 2004

Table 6: Employment rate, 25-64 years old - 2004

	Man	Woman
IT-SILC 2004	73.4	46.1
At least one disability	40.9	20.6
Disability gap	32.5	25.5

Table 7: Self-defined current economic status by sex, 25-64 years old - IT-SILC 2004

Work condition	Man	Woman	Tot
Employed Full-time	47.9	28.2	38.0
Employed Part-time	2.0	8.0	5.0
Self-employed Full-time	21.2	7.7	14.4
Self-employed Part-time(min.30h/week)	0.9	1.7	1.3
Unemployed seeking new job	5.5	5.0	5.3
Seeking first job	1.3	1.8	1.5
Housewife	2.0	30.7	16.4
Student	1.7	2.2	2.0
Retired from work	12.6	8.8	10.7
Unfit to work	1.6	1.2	1.4
Military or community service	0.1	0.1	0.1
Other condition	3.2	4.5	3.8
Tot	100.0	100.0	100.0

Source: Our elaboration of IT-SILC 2004

Table 8: Self-defined current economic status by sex, 25-64 years old - People with at least one disability

Work condition	Man	Woman	Tot
Employed	40.9	20.6	31.6
Seeking new job	4.6	2.5	3.6
Seeking first job	2.0	3.2	2.5
Housewife	0.3	28.2	13.0
Student	2.1	0.1	1.2
Unfit to work	28.2	27.6	27.9
Retired from work	20.9	16.2	18.7
Other condition	1.2	1.5	1.4
Tot	100.0	100.0	100.0

Table 9: Hours of work by sex, 25-64 years old - IT-SILC population and People with at least one disability (Istat)

Working hours	Man	Woman	Tot
IT-SILC Full-time	96.0	78.7	89.3
IT-SILC Part-time	4.0	21.3	10.7
At least one disability Full-time	84.1	69.5	79.7
At least one disability Part-time	15.9	30.5	20.3
Tot	100.0	100.0	100.0

Source: Our elaboration of IT-SILC 2004 and Istat 2004

Table 10: Explanatory variables in Probit models

Variable	Definition
Age	Person's age
Age Squared	Interaction term: Age × Age
Female	Dummy variable = 1 if female and = 0 if male
Married	Dummy variable = 1 if married and live with the partner and = 0 otherwise
Disability	Dummy variable = 1 if disabled person and = 0 if non-disabled person
Chronic	Dummy variable = 1 if the person has chronic diseases and = 0 otherwise
Disability × Chronic	Interaction term between two dummy variables: Disability × Chronic
Education	= 1 No qualification, 2 = Primary Sch. (base), 3 = Secondary Sch., 4 = High School, 5 = University
South/Islands	Dummy variable = 1 if the person lives in the South/Islands and = 0 otherwise
Disabilities	= 1 Vision, = 2 Language, =3 Hearing, = 4 Intellectual, =5 Mental Health, = 6 Physical

Table 11: Probit models (25-64 years old) - Marginal Effects

	(1) Whole S.	(2) Man	(3) Woman	(4) Disabled	(5) Dis.Man	(6) Dis.Woman
Age	-0.0151***	-0.0177***	-0.0125***	-0.0166***	-0.0162***	-0.0172***
	(-10.17)	(-7.88)	(-6.67)	(-7.89)	(-4.85)	(-6.09)
Female	-0.142***			-0.143***		
	(-4.80)			(-3.80)		
Married	0.0181	0.125**	-0.0811*	-0.0237	0.0388	-0.0405
	(0.49)	(2.22)	(-1.80)	(-0.48)	(0.57)	(-0.68)
Disability	-0.0548	-0.00877	-0.0805*			
	(-1.64)	(-0.18)	(-1.86)			
Chronic	-0.0954***	-0.0736	-0.111**			
	(-2.87)	(-1.64)	(-2.47)			
Education						
No Qualif.	-0.138**	-0.239***	-0.0584	-0.0534	-0.267***	0.0393
	(-2.00)	(-3.42)	(-0.63)	(-0.46)	(-3.64)	(0.33)
Sec. Sch.	0.120***	0.176***	0.0580	0.0909	0.194**	-0.0268
	(2.87)	(2.83)	(1.07)	(1.60)	(2.38)	(-0.35)
High School	0.276***	0.308***	0.241***	0.315***	0.435***	0.208**
	(5.90)	(4.52)	(3.88)	(4.96)	(5.06)	(2.16)
University	0.265***	0.266**	0.255**	0.299***	0.403***	0.190
	(2.94)	(1.97)	(2.15)	(2.98)	(3.16)	(1.46)
Disabilities						
Vision				0.0498	0.108	-0.00575
				(0.95)	(1.60)	(-0.08)
Hearing				0.149**	0.130*	0.213***
				(2.51)	(1.83)	(2.63)
Intellectual				-0.247***	-0.190	-0.195**
				(-3.30)	(-1.51)	(-2.21)
Ment. Health				-0.116	-0.0377	-0.134*
				(-1.63)	(-0.32)	(-1.91)
South/Islands	-0.0716**	-0.112***	-0.0420	-0.0733*	-0.0841*	-0.0703
	(-2.36)	(-2.67)	(-1.03)	(-1.89)	(-1.67)	(-1.37)
N	1219	624	595	645	345	300
pseudo R^2	0.2695	0.2702	0.2698	0.3403	0.3438	0.3417
Education						
Dif NoQ-Pr	-0.138	-0.239	-0.0584	-0.0534	-0.267	0.0393
DifSE NoQ-Pr	(0.0690)	(0.0069)	(0.0926)	(0.116)	(0.0733)	(0.118)
Dif Pr-Sec	-0.120	-0.176	-0.0580	-0.0909	-0.194	0.0268
DifSE Pr-Sec	(0.0418)	(0.0623)	(0.0541)	(0.0567)	(0.0815)	(0.0763)
Dif Sec-High	-0.156	-0.131	-0.183	-0.224	-0.241	-0.235
DifSE Sec-High	(0.0429)	(0.0589)	(0.0598)	(0.0559)	(0.0741)	(0.0733)
Dif High-Un	0.0107	0.0419	-0.0142	0.0151	0.0318	0.0181
DifSE High-Un	(0.0902)	(0.134)	(0.119)	(0.0998)	(0.128)	(0.123)

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Explanatory variables in Heckman model

Variable	Definition
Age	Person's age
Age Squared	Interaction term: Age × Age
Female	Dummy variable = 1 if female and = 0 if male
Married	Dummy variable = 1 if married and live with the partner and = 0 otherwise
Education	= 1 No qualification, 2 = Primary Sch. (base), 3 = Secondary Sch., 4 = High School, 5 = University
Chronic	Dummy variable = 1 if the person has chronic diseases and = 0 otherwise
South/Islands	Dummy variable = 1 if the person lives in the South/Islands and = 0 otherwise
Sensory/Mobility	Dummy variable = 1 if sensory or physical disability and = 0 if intellectual or mental disability

Table 13: Heckman model (25-64 years old) - Marginal Effects

	E(y|y observed)	Pr(y observed)
Age	-0.00795**	-0.00856***
	(-2.26)	(-3.96)
Female	-0.135**	-0.111***
	(-2.52)	(-2.76)
Married	0.122**	0.00727
	(2.18)	(0.14)
No Qualification	0.244***	0.000730
	(2.72)	(0.01)
Secondary School	-0.0780	0.0383
	(-1.23)	(0.81)
High School	-0.0574	0.241***
	(-0.82)	(4.00)
University	-0.200**	0.425***
	(-2.01)	(4.26)
Chronic	-0.0683*	-0.166***
	(-1.72)	(-4.54)
Sensory/Mobility	0.222***	0.252***
	(4.04)	(3.88)
South/Islands	-0.0688***	-0.0781***
	(-2.75)	(-2.59)
N	632	632
rho	-.902309	
sigma	.350579	
lambda	-.3163306	

Wald test of indep. eqns. ($rho = 0$): $chi2(1) = 36.25$ $Prob > chi2 = 0.0000$

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14: Probit model (25-64 years old) - Marginal Effects - Selection equation

Age	-0.00869***
	(-4.20)
Female	-0.165***
	(-4.17)
Married	0.00503
	(0.09)
No Qualification	-0.00683
	(-0.05)
Secondary School	0.0692
	(1.30)
High School	0.260***
	(4.39)
University	0.344***
	(3.35)
Chronic	-0.144***
	(-3.70)
Sensory/Mobility	0.217***
	(2.99)
South/Islands	-0.0863**
	(-2.01)
N	644
pseudo R^2	0.2791

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 15: Explanatory variables in Sequential logit model

Variable	Definition
Age	Person's age
Age Squared	Interaction term: Age × Age
Education	= 1 No qualification, 2 = Primary Sch., 3 = Secondary Sch., 4 = High School, 5 = University
Disability	Dummy variable = 1 if disabled person and = 0 if non-disabled person
Chronic	Dummy variable = 1 if the person has chronic diseases and = 0 otherwise
High Income	Dummy variable = 1 if family income excellent or good and = 0 if scarce or absolutely insufficient
South/Islands	Dummy variable = 1 if the person lives in the South/Islands and = 0 otherwise
Female	Dummy variable = 1 if female and = 0 if male
Married	Dummy variable = 1 if married and live with the partner and = 0 otherwise

Table 16: Sequential logit model (25-64 years old)

Transitions	($\beta_{uk} = 0$)	($\beta_{uk} = 0.5$)	($\beta_{uk} = 1$)	($\beta_{uk} = 1.5$)	($\beta_{uk} = 2$)
LF v No-LF					
Age	0.435***	0.454***	0.505***	0.578***	0.665***
	(6.57)	(6.56)	(6.52)	(6.48)	(6.45)
Age Sq	-0.00559***	-0.00584***	-0.00650***	-0.00744***	-0.00857***
	(-7.76)	(-7.75)	(-7.73)	(-7.71)	(-7.69)
Education	0.744***	0.779***	0.871***	1.001***	1.156***
	(8.85)	(8.89)	(8.94)	(8.96)	(8.97)
Disability	-0.657***	-0.684***	-0.759***	-0.867***	-0.997***
	(-3.59)	(-3.58)	(-3.56)	(-3.54)	(-3.53)
Chronic	-0.857***	-0.893***	-0.993***	-1.137***	-1.313***
	(-5.02)	(-5.01)	(-4.98)	(-4.97)	(-4.97)
High Income	0.0910	0.0985	0.114	0.132	0.152
	(0.56)	(0.58)	(0.61)	(0.61)	(0.61)
South/Islands	-0.351**	-0.367**	-0.411**	-0.476**	-0.555**
	(-2.17)	(-2.16)	(-2.16)	(-2.18)	(-2.20)
Married	1.080***	1.133***	1.272***	1.465***	1.694***
	(5.18)	(5.20)	(5.23)	(5.26)	(5.29)
Married × Female	-1.004***	-1.056***	-1.190***	-1.375***	-1.592***
	(-4.48)	(-4.50)	(-4.55)	(-4.58)	(-4.61)
cons	-8.932***	-9.340***	-10.40***	-11.90***	-13.70***
	(-5.95)	(-5.94)	(-5.89)	(-5.85)	(-5.82)
Empl v Unempl					
Age	0.172	0.198	0.265*	0.360**	0.473**
	(1.20)	(1.34)	(1.66)	(2.06)	(2.47)
Age Sq	-0.000831	-0.00112	-0.00187	-0.00297	-0.00429*
	(-0.50)	(-0.65)	(-1.02)	(-1.47)	(-1.95)
Education	0.491**	0.545***	0.681***	0.862***	1.066***
	(2.42)	(2.60)	(3.01)	(3.48)	(3.95)
Disability	-0.831**	-0.878**	-1.008**	-1.193**	-1.404***
	(-2.12)	(-2.18)	(-2.34)	(-2.55)	(-2.76)
Chronic	-0.312	-0.339	-0.422	-0.551	-0.708
	(-0.95)	(-1.00)	(-1.15)	(-1.38)	(-1.62)
High Income	0.966***	1.015***	1.128***	1.259***	1.391***
	(2.94)	(2.99)	(3.07)	(3.13)	(3.16)
South/Islands	-1.193***	-1.245***	-1.378***	-1.547***	-1.730***
	(-3.55)	(-3.58)	(-3.65)	(-3.73)	(-3.80)
Married	0.561	0.641	0.847*	1.115**	1.414**

Continued on next page

Table 16 – *Continued from previous page*

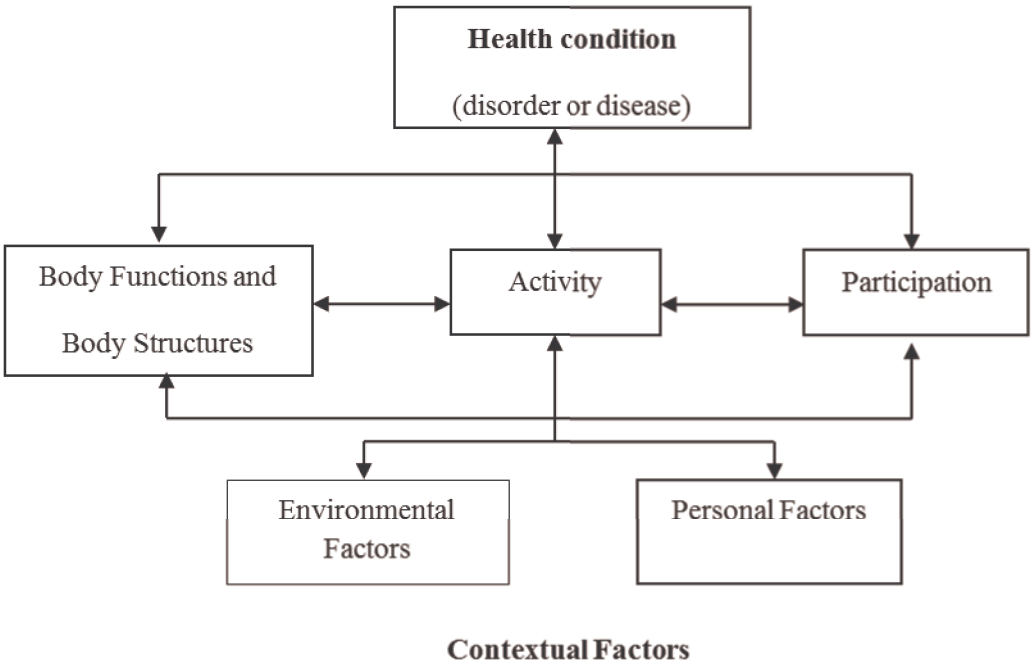
Transitions	($\beta_{uk} = 0$)	($\beta_{uk} = 0.5$)	($\beta_{uk} = 1$)	($\beta_{uk} = 1.5$)	($\beta_{uk} = 2$)
	(1.30)	(1.44)	(1.76)	(2.12)	(2.46)
Married × Female	-0.594	-0.643	-0.785	-0.990*	-1.229*
	(-1.25)	(-1.31)	(-1.49)	(-1.72)	(-1.96)
cons	-4.931	-5.646*	-7.482**	-10.00***	-12.91***
	(-1.61)	(-1.78)	(-2.18)	(-2.65)	(-3.12)
Full-t v Part-t					
Age	0.226*	0.262*	0.354**	0.478***	0.617***
	(1.67)	(1.87)	(2.31)	(2.85)	(3.37)
Age Sq	-0.00229	-0.00269*	-0.00372**	-0.00514***	-0.00676***
	(-1.51)	(-1.71)	(-2.17)	(-2.74)	(-3.31)
Education	0.201	0.257	0.401**	0.588***	0.794***
	(1.12)	(1.38)	(1.98)	(2.66)	(3.30)
Disability	-0.278	-0.335	-0.479	-0.668	-0.872*
	(-0.82)	(-0.95)	(-1.26)	(-1.59)	(-1.90)
Chronic	-0.539*	-0.595*	-0.738**	-0.926**	-1.127***
	(-1.66)	(-1.77)	(-2.02)	(-2.32)	(-2.60)
High Income	0.554*	0.610*	0.734**	0.877**	1.021**
	(1.73)	(1.84)	(2.03)	(2.22)	(2.37)
South/Islands	0.254	0.214	0.112	-0.0180	-0.154
	(0.70)	(0.56)	(0.27)	(-0.04)	(-0.32)
Married	1.879***	1.987***	2.268***	2.627***	3.007***
	(4.00)	(4.14)	(4.47)	(4.83)	(5.17)
Married × Female	-2.366***	-2.484***	-2.787***	-3.170***	-3.569***
	(-4.84)	(-4.95)	(-5.22)	(-5.52)	(-5.79)
cons	-4.665	-5.654*	-8.148**	-11.44***	-15.08***
	(-1.57)	(-1.83)	(-2.42)	(-3.09)	(-3.73)
N	1007	1007	1007	1007	1007

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

List of Figures

Figure 1: A representation of the ICF



Source: (WHO, 2001)

Figure 2: A representation of the capability approach dynamics

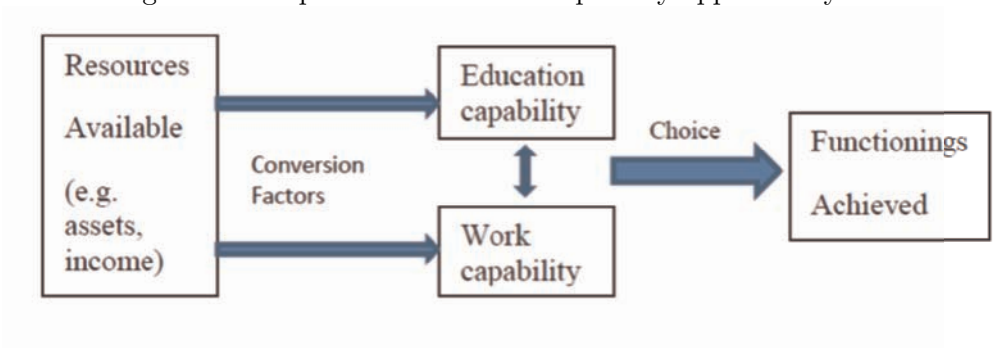


Figure 3: Hours of Work per week by sex (25-64 years old)

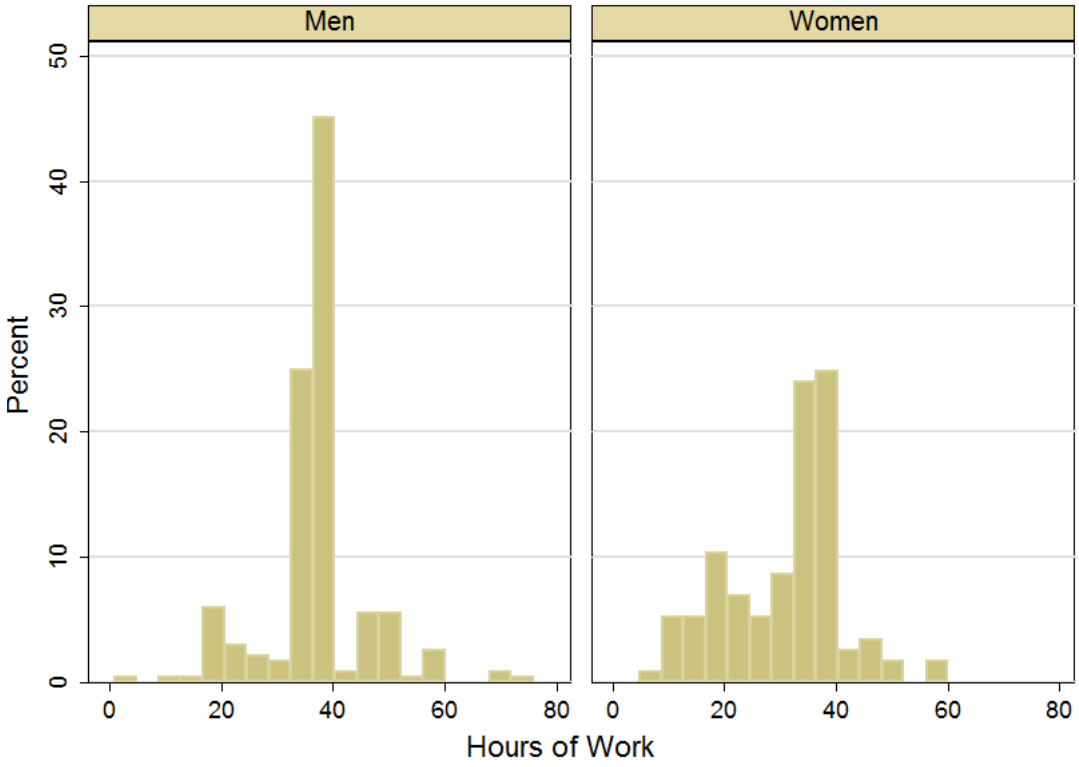


Figure 4: Sequential logit tree