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Speculation on a Flexicurity Index for Disabled People: The Italian Case

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Abstract The aim of this paper is to analyze a flexicurity index for disabled people by using Italian regional data. To this purpose, the empirical results are based on a composite index denoted as Mazziotta-Pareto Index. Our results show that Northern Italy regions show a higher flexicurity degree than Southern Italy ones. In addition, by estimating an augmented matching function, we verify that flexicurity increases the probability of finding employment for a disabled person. In particular, we test that the flexicurity indicator that gives more weight to the economic independence of disabled people represents the indicator that most favors the labour matching process.

Keywords Disabled people · Public policy · Non-labour market discrimination · Flexibility · Social security

JEL Classification J08 · J48 · J65 · R12

1 Introduction

Empirical literature shows that Italian households with one or more disabled person are more prone to the risk of poverty (Parodi 2007; Parodi and Sciulli 2008). In particular, some studies have shown that the presence in a family of a disabled person usually reduces the income potentially generated by the spouse, who usually has to leave her job in order to

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dedicate to the disabled care. Besides, the pension incomes received by people with disabilities are not able to compensate for the loss of income of the person who takes care of them, as most of pension income is used to provide medical care and assistance to the disabled person.

More specifically, Table 1 shows that the average net household income of households with at least one person with a disability in Italy was equal to 30.923 in 2006, while the one of households without disabled people was 35.282. Table 2 shows that 23.4 % of households with at least one disabled person is at risk of poverty, against 18.4 % of households without disabled people.

The relevant question is the following one: how to reduce the risk of poverty for households with at least one disabled person? One way would be to allow the spouse who renounces his labor income to return to work. But how to enable this? For example, the state could provide some hours of assistance to the disabled while the person who usually takes care of him is absent, in order to guarantee an additional income to the family. However, is the state able to offer this service in a period of economic crisis? In addition, would this service completely solve the problem of care addiction for the disabled person? The answer is negative.

However, according to us, it would be appropriate to change the vision of disability. The disabled person should not be considered for his disability but for his residual abilities. The vision of the disabled as a capable individual would activate an integration process that would extend beyond the social sphere, embracing also the economic sphere. For economic sphere we mean the possibility for a disabled person to work, even in the boundaries of his residual capacities. To secure a job for people with disabilities, in fact, would reduce the risk of poverty among their families, and also would help to integrate them into society, as the work, in addition to being an income source, also represents an important element of autonomy.

Figure 1 shows that in 2008 only 58 % of working age disabled people have a job, against a percentage of employment rate for non-disabled people equal to 70.2 %. We may also note a higher percentage of working age disabled people that receive a pension (26 %) than non-disabled people (8 %). This high percentage could be justified by a high disability degree for those receiving a pension that do not put them in condition to work. Another reason is the difficulty, for a disabled person, to find an employment. Moreover, the cultural problem is the more complicated one to remove. Some empirical studies conducted in Italy (Agovino and Parodi 2012), in United Kingdom and in the United States

Table 1 Net household income (including imputed rent) by geographic area and disability presence—year 2006 (average value in euro)

Geographic area	Households without disabled persons	Households with at least a disabled person	Total households
Average income			
Northern Italy	37,746	33,902	36,289
Central Italy	38,165	35,177	36,952
Southern Italy	29,198	24,777	27,213
Italy	35,282	30,923	33,509

Source: Survey on living conditions (EU-SILC). ISTAT, disabilità in cifre, section "economic condition", http://www.disabilitaincifre.it/indicatori/indi_testo.asp?cod_ind=cond8

Table 2 Households at risk of poverty (We define people at risk of poverty people whose equivalent household income is below 60 % of median national income) by geographic area and disability presence—year 2006 (for 100 households with same characteristics)

Geographic area	Households without disabled persons	Households with at least a disabled persons	Total households
Northern Italy	11.1	16.0	12.9
Central Italy	15.0	18.0	16.0
Southern Italy	33.0	36.2	34.4
Italy	18.4	23.4	20.4

Source: Survey on living conditions (EU-SILC). ISTAT, disabilità in cifre, section "economic condition", http://www.disabilitaincifre.it/indicatori/indi_testo.asp?cod_ind=cond8

Fig. 1 Working age population and people with disabilities in Italy, percentage distribution by prevailing condition—years 2008. *Source*: ISFOL—Survey Plus 2008

(McVicar 2006, 2008) has shown a trend towards concentration of civil disability pensions among working-age people in the poorer areas of a country. In particular, these studies have analysed the use of civil disability pensions as a tool against poverty and as social safety net. This risk is inherent in the nature of these tools, that do not exhaust their effect during periods of economic recovery but continue to exist regardless of the state of economy health (Silva et al. 2010). In addition, we can observe that the probability of social exclusion and the probability of ending up in the poverty trap is greater for disabled people with residual abilities who receive the disability pension (Eichorst et al. 2010).

Hence, the main question is the following one: how to increase the probability of employment for a disabled person?

In Italy, an example is given by Law 68 of March 12, 1999 (from now on Law 68/99). This law, aimed at the regulation and the promotion of the employment of persons with disabilities, has contributed significantly to their employment, and hence to their social inclusion (Orlando and Patrizio 2006).

Some recent studies have analysed the factors which have increased the effectiveness of this law. Agovino and Rapposelli (2012) have analyzed the importance of support services for the successful employment of disabled people in Italian regions. Further work by Agovino and Rapposelli (2013a) focused on regional data has examined the importance of

both social capital and environmental aspects to make the application of Law 68/99 effective in Italian regions. At provincial level, Agovino and Rapposelli (2013b) have shown that the efficiency of this law mainly depends on provinces' efficiency, and on special policies geared at the work of disabled people.

In summary, these researchers have performed the efficiency analysis of Law 68/99 by means of Data Envelopment Analysis (DEA). However, they have omitted relevant economic policy variables that could address the different results registered, in terms of employment matching, at regional and provincial level. In this work, we want to fill this gap in the analysis of Law 68 by focusing on both active and passive measures of economic policy in favour of people with disabilities and by examining their impact on the employment process of disabled people.

Law 68/99, social capital and support services are important factors for the employment of disabled people but they are not enough. The unemployment problem of people with disabilities is especially linked to the inability to deal with their health problems in the workplace. It is necessary both to focus on their residual work ability and to develop a social integration culture on the demand side of the labour market.

Flexicurity[1] could be a valid measure to improve the inclusion of people with disabilities in the labour market. It is important to promote a balance between flexibility and social security, because a high level of social security may result in an increased risk of disabled people with partial work capacity getting trapped in the disability benefits system. In addition, it is likely that the current economic crisis and the high unemployment rate will increase the use of disability benefits to control the labour supply.

Bekker and Wilthagen (2008) suggest that each country has to find its own concept of flexicurity by using a distinct combination of instruments that fit the national institutional, social and civil context. In OECD context, Denmark was highlighted as a best-practice example after its disability scheme reform in 2003, which has led to a fundamental conceptual shift towards focusing on work capacity (OECD 2009a, b).

By focusing on Italian data, Agovino and Garofalo (2014) have demonstrated the existence of a strong positive link between flexicurity and the employment matching process for people with disabilities: a greater flexicurity degree is linked to a higher probability of finding employment for disabled people. In addition, Agovino and Garofalo (2014) show that a best balance of factors—active (ALMP) and passive (CDP) policies—that participate to the construction of the flexicurity indicator for the disabled would guarantee an increase in their employment rate. In particular, they suggest to reduce access to CDP, whose abuse increases both he risk of poverty and social exclusion, and to promote access to ALMP, because of their ability to promote both social and economic integration of people with disabilities. However, this work does not provide considerations on the real positive effect of flexicurity on the employment process of disabled people, whilst the present study examine this impact by means of some econometric analyzes.

Hence, the objective of this work is to develop a flexicurity indicator for people with disabilities relying on Pareto–Mazziotta index. This methodology allows to obtain an objective indicator, regardless of any a priori assumption made by the researcher. In addition, we propose to combine this indicator with three further indicators, computed by

[1] The term flexicurity is used to refer to the combinations of labour market flexibility and high levels of social security. Flexicurity can be characterized as a "third way" strategy between the flexibility generally attributed to the Anglo-Saxon labour market and the strict job security characterizing Southern European countries or between the flexibility of liberal market economies and the social safety nets of the traditional Scandinavian welfare states (OECD 2004; Madsen 2004, 2007).

using a weighted arithmetic mean, whose weights are chosen subjectively. The subjective choice of weights will help us to verify how varies the flexicurity degree for each region by giving more weight to a factor rather than another. More specifically, we are interested to analyse how varies the strength of the link (the correlation) between the flexicurity indicator and the matching rate[2] for disabled people at varying weights. The strength of this relationship will allow us to identify the factor, constitutive of the indicator, which is able to increasing (reducing) the probability of finding employment by a disabled person. Finally, we examine the factors that generate the flexicurity indicator—ALMP and CDP—in order to provide economic policies indications that could allow to change them (reduce or increase) with the aim of achieving greater flexicurity in regional labour markets.

In particular, Fig. 2 shows how to proceed in the computation of the indicator. In addition to the indicator implemented with penalty method, that assigns equal weight to the elementary indicators, and is denoted as indicator A, we also develop two indicators, by assigning different weights to its two component factors. In particular, we have an indicator B [with greater weight to ALMP (2/3) and less weight to CDP (1/3)] and an indicator C [with greater weight to CDP (2/3) and less weight to ALMP (1/3)].

The paper is organised as follows. Section 2 presents some flexicurity measures in the case of disabled people, Sect. 3 introduces the data and the methods used for constructing the flexicurity index, Sect. 4 presents the results obtained, Sect. 5 investigates the impact of flexicurity on the employment process of disabled people and Sect. 6 concludes.

2 Flexicurity in the Case of Disabled People

The flexicurity strategy is at the heart of the European debate about reforming social security. At European Union level, this concept is integrated in the European Employment Strategy, which is aimed at increasing employment and reducing unemployment in EU countries. The concept of flexicurity promotes the idea of finding the right balance between flexible employment arrangements and workers' security on the labour market. Therefore, flexicurity suggests that flexibility and security should not be perceived as mutually exclusive but as complementary (Bekker and Wilthagen 2008; Rogowski 2008). In line with Lisbon agenda, flexicurity has been proposed as a promising reform concept for enhancing both Europe's economic growth and social cohesion (European Commission 2006, 2007a, b; Boeri et al. 2007). On the one hand, more flexible labour markets would reduce the costs of firms in order to adjust to the dynamics of the highly integrated global economy, thus improving European competitiveness. On the other hand, increased labour participation and higher income security would contribute to higher levels of social inclusion. As such, flexicurity is also explicitly integrated in Europe 2020 strategy and it is expected to contribute to the achievement of its objectives.

There is no agreement in literature on the definition of flexicurity (see Viebrock and Clasen 2009). Bekker and Wilthagen (2008) suggest that each country has to find its own concept of flexicurity by using a different combination of instruments that fit the national institutional, social and civil context. In addition, Madsen (2002a, b) points to Danish flexicurity model and its emphasis on productivity gains, which potentially do not offer very much to some groups such as immigrants, unskilled workers or workers with health problems who might find themselves left outside the "golden triangle". In our case, it seems appropriate to consider Wilthagen's definition that connects the term flexicurity with

[2] By the term matching rate we mean the percentage of disabled people that are employed.

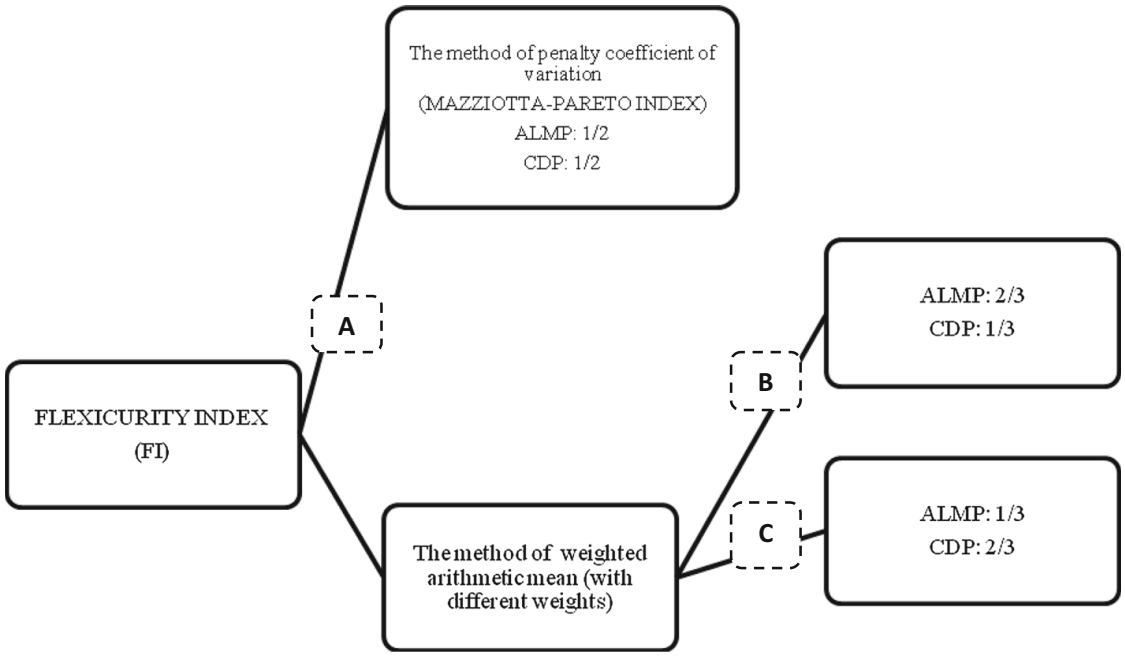

Fig. 2 The analysis framework

a form of public policy aimed at disadvantaged workers groups. In particular, we refer to a political strategy that combines both the flexibility of the labour market and workers' safety with emphasis on the most vulnerable groups inside and outside the labour market (Wilthagen and Rogoswski 2002; Wilthagen and Tros 2004).

The key challenges that European Union countries are facing with respect to people with disabilities are low employment rates among them but also a high dependency on benefits, high and increasing public spending on sickness and/or disability benefits as well as an increased poverty risk among them. In the last decade, there has been increasing emphasis in EU member States on reinforcing both social and labour market inclusion of people with disabilities.

The approaches followed can be divided into two types of measures: the contributory benefits transfer programmes (passive measures) and employability and integration of disabled people in the labour market (active measures). More explicitly, the movement away from passive to active measures has been achieved by the implementation of legislative instruments (such as obligatory employment quota schemes, anti-discrimination legislation, job protection rights) and targeted active labour market policies, which aim at supporting the participation of people with disabilities. In this case, the flexicurity approach is likely to have positive effects on the employment of disabled people. In particular, this approach involves the combination of active labour market policies and social protection systems. "It is key to promoting the right balance between flexibility and security, since high levels of social security include the risk of disabled people with partial work capacity becoming "trapped" in the disability benefit system" (Eichorst et al. 2010).

Furthermore, targeted active labour market policies are implemented in most countries in order to further the social integration of the people concerned, partly through financial incentives to employers who hire persons with disabilities and through vocational rehabilitation programmes.

3 Measuring Flexicurity for Disabled People

The aim of this section is to illustrate both data and methods for constructing flexicurity indices.

3.1 Data

The variables we use for the identification of active and passive measures in the case of disabled people are the following ones:

- Active labour policy for disabled people (*Assunzione agevolata dei disabili*). Active Labour Market Policy (ALMP) is a core aspect of European Employment Strategy. Its aim has been to transfer the use of passive support to active help for integration of people in the labour market. Looking at equality in society for disabled people, the implementation of an effective ALMP is thus extremely important. ALMPs, that make easier for disabled people to enter or remain in the labour market, thus help achieving European Employment strategy goals. In particular, we use the percentage of disabled people who benefit of ALMPs at the regional level (source ISTAT).[3,4] Data on ALMPs for disabled workers were obtained in compliance with Article 13 of Law 68/1999.[5]
- Contributory benefits transfer programmes (e.g. disability pensions). These tools are part of the passive labour market policies and the European Union objective is to reduce their impact in favour of ALMPs (flexicurity approach). The main objective of the benefits system is the protection of people who are sick or injured, whilst the other aim is to help people who can work and want to stay in the workforce, even if they have lost part of their ability to work. Consequently, the disability benefits must allow the return to work where there are residual abilities in order to avoid social exclusion. To this end, it is essential to promote the inclusion culture. The OECD points out that the disability benefits still contain perverse incentives that make the possibility to return to work unattractive, also in the case of people with partial disability. This "benefit culture" is seen as a particularly serious problem, especially among younger people with disabilities, who are those applying more frequently for disability pensions (OECD 2009a). Both OECD and Eurofound note that structural reforms of disability benefit systems are necessary in order to promote a culture of inclusion (Eichorst et al. 2010). The expenditure on disability benefits has increased in the past decade. Since 2000, spending on disability benefits has increased by 18.6 % in EU-15. In addition, this increase occurred during a period of economic growth. This result is an indicator of the fact that people with disabilities are still not seen as a labour source (McAnaney and Wynne 2010). Disability pensions are not a flexible instrument; once granted, they are very rarely withdrawn, even though such withdrawal is technically possible.

[3] Secondo Rapporto sulla coesione sociale, http://www.istat.it/it/archivio/53075 (accessed 16 November 2013).

[4] ALMPs measure can be defined as either the expenditure on ALMPs (as a percentage of GDP) or the number of participants in ALMP programmes. The empirical analysis uses the participants in programmes of active policies as a percentage of the labour force (Altavilla and Caroleo 2011). We use the number of disabled people participating in ALMP as a percentage of the labour force of people with disabilities.

[5] Law 247 of 29 December 2007 has changed Article 13 of Law 68/99, providing the employer with a contribution for each disabled worker on permanent contracts by agreement in compliance with Article 11 of Law 68/99. The requirement for giving the employer a contribution for each disabled worker is that hiring has occurred under a permanent contract and that the employment relationship is still ongoing.

Consequently the grant of a pension disability makes it difficult to reintegrate the percipients in social and working life. In this case, we use the percentage of percipients of civilian disability pensions (CDP) in working age[6] (Agovino and Parodi 2012) (source ISTAT).[7]

We exclude from our analysis the employment protection legislation level because we only deal with one country and the legislation protecting employment is unique and is not characterized by specific norms at regional level. ALMPs and CDP data are at regional level and are available for the period 2006–2011.

Figure 3 shows the percentage of disabled people participating in ALMPs for the three macro-areas of the country. There is an evident high participation in active measures by disabled people residents in Northern Italy, followed by disabled of Central Italy and finally by Southern Italy ones. The causes of this disparity are the result of the persistent economic dualism in Italy: Northern Italy with its higher economic growth, lower unemployment rates and more competitive firms, and Southern Italy with an industrial sector in difficulty and high unemployment. The worst economic situation in Southern regions and the high unemployment rates could justify the low proportion of disabled people participating in ALMPs. In addition, we note that even after 2008 the percentage of disabled people in Northern Italy tends to decrease and in 2011 is equal to the percentage registered in Central Italy; after 2 years of steady participation in ALMPs, Southern regions decline from 2008 onwards.

The situation change when we plot CDP (Fig. 4). In particular, we can observe that Southern Italy shows the highest percentage of CDP, while Northern Italy registers the lowest percentage. Figures 3 and 4 show a very important result: people with disabilities in Southern Italy have less chance of participating in the labour market than those in Northern Italy. Besides, greater access to passive measures makes them more vulnerable and increases the probability of being trapped in the disability benefits system; hence, also the risk of social exclusion increases (Eichorst et al. 2010).

These results are in line with Agovino and Parodi (2012). In particular, they show that in Italy CDP are used by people in working age as an anti-poverty instrument, especially in the most depressed areas of the country, that register high unemployment and poverty rates.

3.2 Mazziotta–Pareto Index

The penalty coefficient of variation method allows us to construct a composite measure of the infrastructural equipment of a set of territorial units, assuming that each component is not interchangeable with the other or is interchangeable only partially.[8] In this context, the aggregate function (arithmetic mean of the standardised values) is corrected by a penalty coefficient that depends, for each territorial unit, on the indicators' variability with respect

[6] Civilian disability pensions are not connected with national insurance contributions; they are paid to disabled people on the basis of their physical characteristics (e.g., people affected by blindness, deafness, or other types of impairments). These pensions are also paid to people with no income or insufficient income after the age of 65 (Ministry of Labour and Social Policy 2006, 2008).

[7] http://www.istat.it/it/assistenza-e-previdenza (accessed 16 November 2013).

[8] Generally, in the case of non-substitutability of the basic components, it is normal to use the geometric mean (Biehl 1991). However, the geometric mean assumes that the greatness to synthesize is multiplicative rather than additive, and gives greater weight to lower values. Besides, it cannot be computed in the presence of negative values or zero.

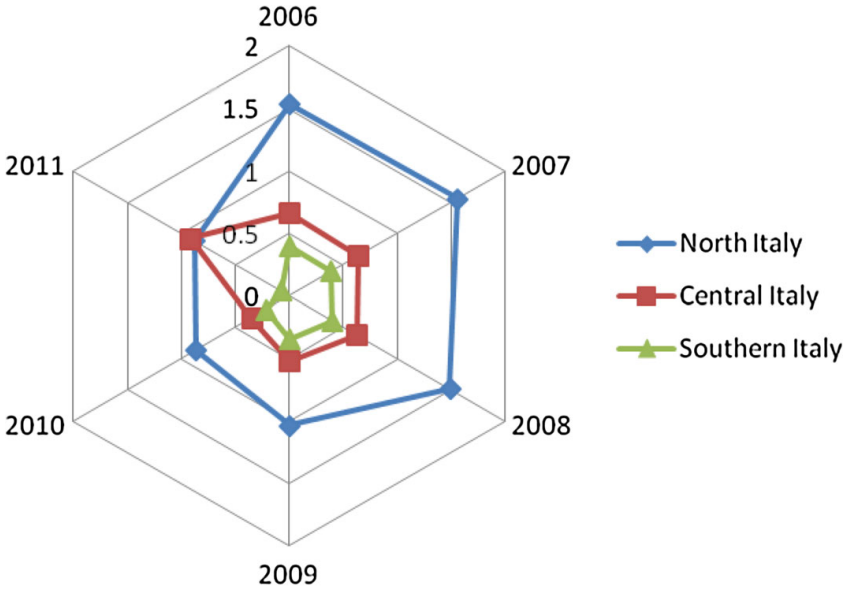

Fig. 3 ALMP for disabled people, 2006–2011. *Source*: our elaboration on ISTAT data

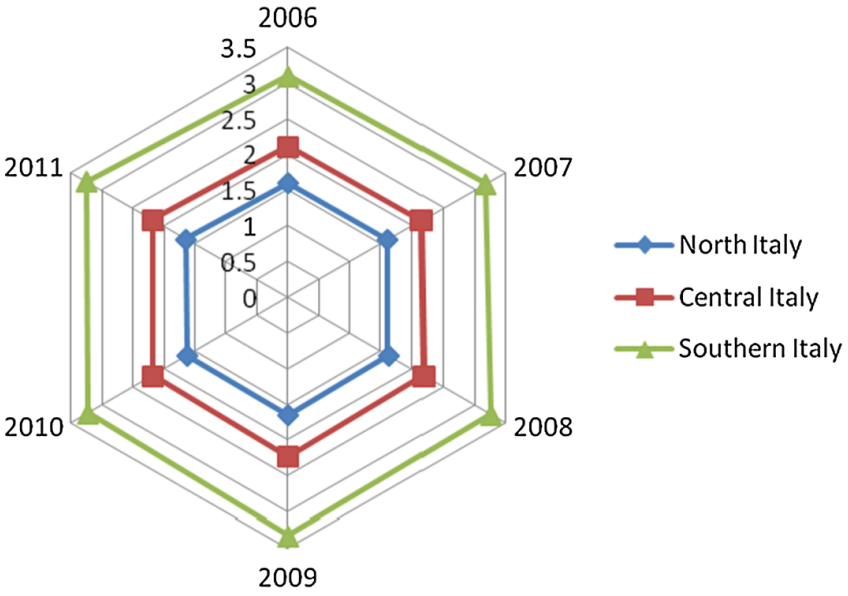

Fig. 4 Percentage of percipients of civilian disability pensions (CDP) in working age, 2006–2011. *Source*: our elaboration on ISTAT data

to the average value ("horizontal variability"). This variability, measured by the coefficient of variation, penalises the score of each unit that, with the same mean, shows a greater disequilibrium among indicators' values.

Finally, the use of standardised deviations allows us to obtain a "robust" measure, less influenced by outliers (Mazziotta et al. 2010). This approach needs a balanced endowment of elementary components (Mazziotta 2005; Mazziotta and Pareto 2007; Mazziotta et al. 2010). The indicators are constructed as illustrated below.

3.2.1 Normalisation of Indicators

Let $\mathbf{X} = \{x_{ij}\}$ be the matrix with n rows (geographical units) and m columns (indicators) and let M_{xj} and S_{xj} denote the mean and the standard deviation of the *j-th* indicator:

$$M_{x_j} = \frac{\sum_{i=1}^{n} x_{ij}}{n}, \quad S_{x_j} = \sqrt{\frac{\left(\sum_{i=1}^{n} x_{ij} - M_{x_j}\right)^2}{n}} \tag{1}$$

The standardized matrix $\mathbf{Z} = \{zij\}$ is defined as follows:

$$z_{ij} = 100 \pm \frac{\left(x_{ij} - M_{x_j}\right)}{S_{x_j}} 10 \tag{2}$$

In this type of normalisation the "ideal vector" is the set of mean values and it is easy to identify both the units that are over the mean (value greater than 100) and the units that are below the mean (value less than 100) (De Muro et al. 2011).

The sign $\pm$ depends on the relation of the *j-th* indicator with the phenomenon to be measured, such as the flexicurity index for disabled people ($+$ if the individual indicator represents a dimension considered positive and $-$ if it represents a negative dimension). In our case the *j-th* CDP indicator will have a negative sign because passive measures are the cause of social exclusion of disabled people, while the *j-th* ALMP indicator will have a positive sign because active measures promote the matching process of disabled people.

3.2.2 Aggregation

Let $\mathbf{CV} = \{cv_i\}$ be the coefficient of variation for the *i-th* units:

$$cv_i = \frac{S_{z_i}}{M_{z_i}}, \tag{3}$$

where

$$M_{z_i} = \frac{\sum_{j=1}^{m} z_{ij}}{m} \quad \text{and} \quad S_{z_i} = \sqrt{\frac{\left(\sum_{j=1}^{m} z_{ij} - M_{z_i}\right)^2}{m}} \tag{4}$$

3.2.3 Construction of the Composite Index

The composite index based on the penalty coefficient of variation method can be written in the following generalised form:

$$MPI_i^{\pm} = M_{z_i} \pm S_{z_i} cv_i \tag{5}$$

where the sign $\pm$ of the penalty depends on the kind of phenomenon to be measured and, therefore, on the direction of the individual indicators (De Muro et al. 2011).

If the indicator is "increasing" or "positive", i.e. increasing values of the indicator correspond to positive variations of the phenomenon, then we use MPI with a negative penalty:

$$MPI_i^- = M_{z_i} - S_{z_i} cv_i \tag{6}$$

Vice versa, if the indicator is "decreasing" or "negative", i.e. increasing values of the indicator correspond to negative variations of the phenomenon, then we use MPI with a positive penalty:

$$MPI_i^+ = M_{z_i} + S_{z_i} cv_i \tag{7}$$

In the first example, the penalty coefficient corrects the mean of the standardised indicators by pushing it down, whilst in the latter case it pushes it upwards.

For the flexicurity index, the indicator has a negative sign: this means that increasing values of the indicator correspond to positive variations of the flexicurity index of a region.

3.3 Weighted Arithmetic Mean Method

We propose an alternative index to Mazziotta-Pareto one. We list the steps for the construction of the flexicurity index.

3.3.1 Normalisation

Let $\mathbf{X} = \{x_{ij}\}$ be the matrix with n rows (geographical units) and *2* columns (indicators, e.g. ALMP and CDP). Thus, the normalized matrix $\mathrm{Z} = \{z_{ij}\}$ is computed as follows, when the j-th indicator is a good (ALMP):

$$z_{ij} = \frac{z_{ij} - min(z_j)}{max(z_j) - min(z_j)} \tag{8}$$

And alternatively, if the *j-th* indicator is a bad (CDP), we have:

$$z_{ij} = \frac{max(z_j) - z_{ij}}{max(z_j) - min(z_j)} \tag{9}$$

Hence, the normalized variable CDP will provide a measure for the reduction of dependence on pension by working age people. Its increase will denote a reduction in people aged 15–64 who receive CDP and, therefore, a reduction in dependence and welfare degree. It can be understood as a proxy of the degree of autonomy of disabled people and of their participation in social life and in the labour market.

In both cases, the values of the normalized indicators vary between 0 and 1, where 0 always corresponds to the worst (cross-section) performance (in terms of flexicurity) and 1 to the best performance in the sample.

3.3.2 Aggregation

The FI is given by:

$$\frac{1}{2} z_{i1} + \frac{1}{2} z_{i2} \quad \forall i = 1, \ldots, 20 \quad \text{(C)}: \frac{2}{3} z_{i1} + \frac{1}{3} z_{i2} \quad \forall i = 1, \ldots, 20 \tag{10}$$

$$\text{(D)}: \frac{1}{3} z_{i1} + \frac{2}{3} z_{i2} \quad \forall i = 1, \ldots, 20 \tag{11}$$

where z_{i1} is normalized ALMP and z_{i2} is normalized CDP.

The flexicurity index is computed as an arithmetic mean of the two dimension indices. This allows us to check what happens to flexicurity if a government decides to assign the same weight (or different weights) to active and passive measures.

Hence, the indicators computed in this way will allow us to answer the following question: to give greater weight to a measure rather than another will encourage more the employment of disabled people?

4 Flexicurity Indices Results

In this section we present the results for the different flexicurity indices (FI) (in Appendix 1, we show in Tables 4, 5, and 6 the three indicators at regional level for each year).

We plot the annual average of the different FI as a standard deviation map. By observing Figs. 5 and 6, we can note two clusters for the different FI. In particular, we can observe that A index, e.g. Mazziotta-Pareto index, shows values that are above the average in Northern Italy and below the average in Southern Italy. Hence, this first result shows that Northern regions register a higher flexicurity degree than Southern regions; consequently, this could suggest that the probability to find a job for disabled people should be higher in Northern Italy than Southern Italy.

B and C indices, even if they show a persistent dualism between Northern and Southern Italy, register some differences with respect to index A. In particular, for index B (that assigns greater weight to ALMPs) we observe that some regions show a lower flexicurity degree. For example, Marche and Piemonte register a flexicurity degree below the average value, while Veneto despite having a lower flexicurity registers a value above the average. Sardinia, on the contrary, seems to benefit from the greater weight assigned to ALMPs. In the case of Marche, Piemonte and Veneto a greater labour market flexicurity is mainly ensured by the ability to develop in the disabled people a greater autonomy degree and social participation by reducing the dependency on passive measures (CDP), whilst increased investment in ALMPs do not have the desired effect. On the contrary, in the case of Sardinia increased investment in ALMPs are able to produce a greater flexicurity in the local labor market.

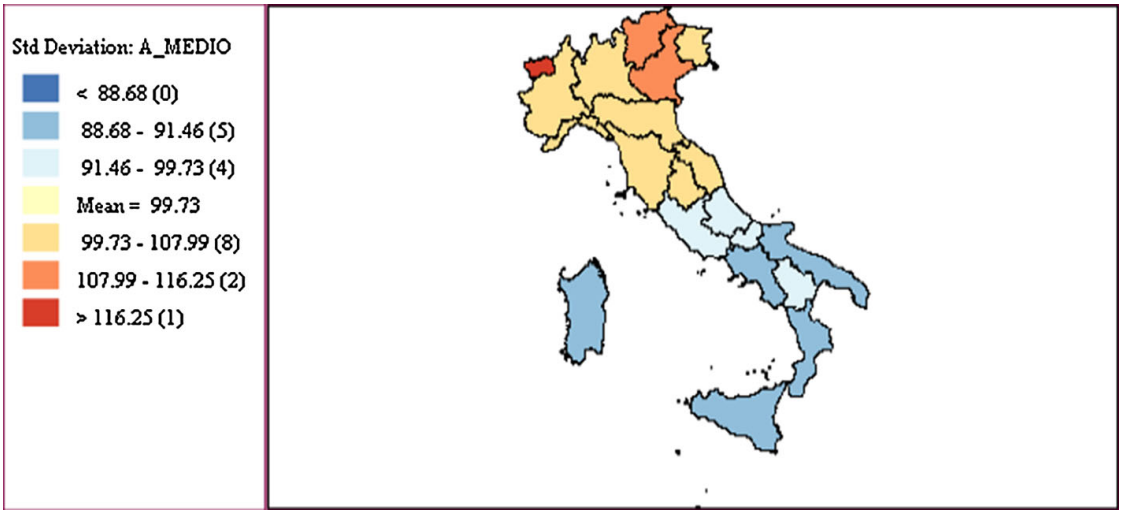

Fig. 5 Annual average FI—Mazziotta–Pareto index (A Index). *Source*: our elaboration on ISTAT data

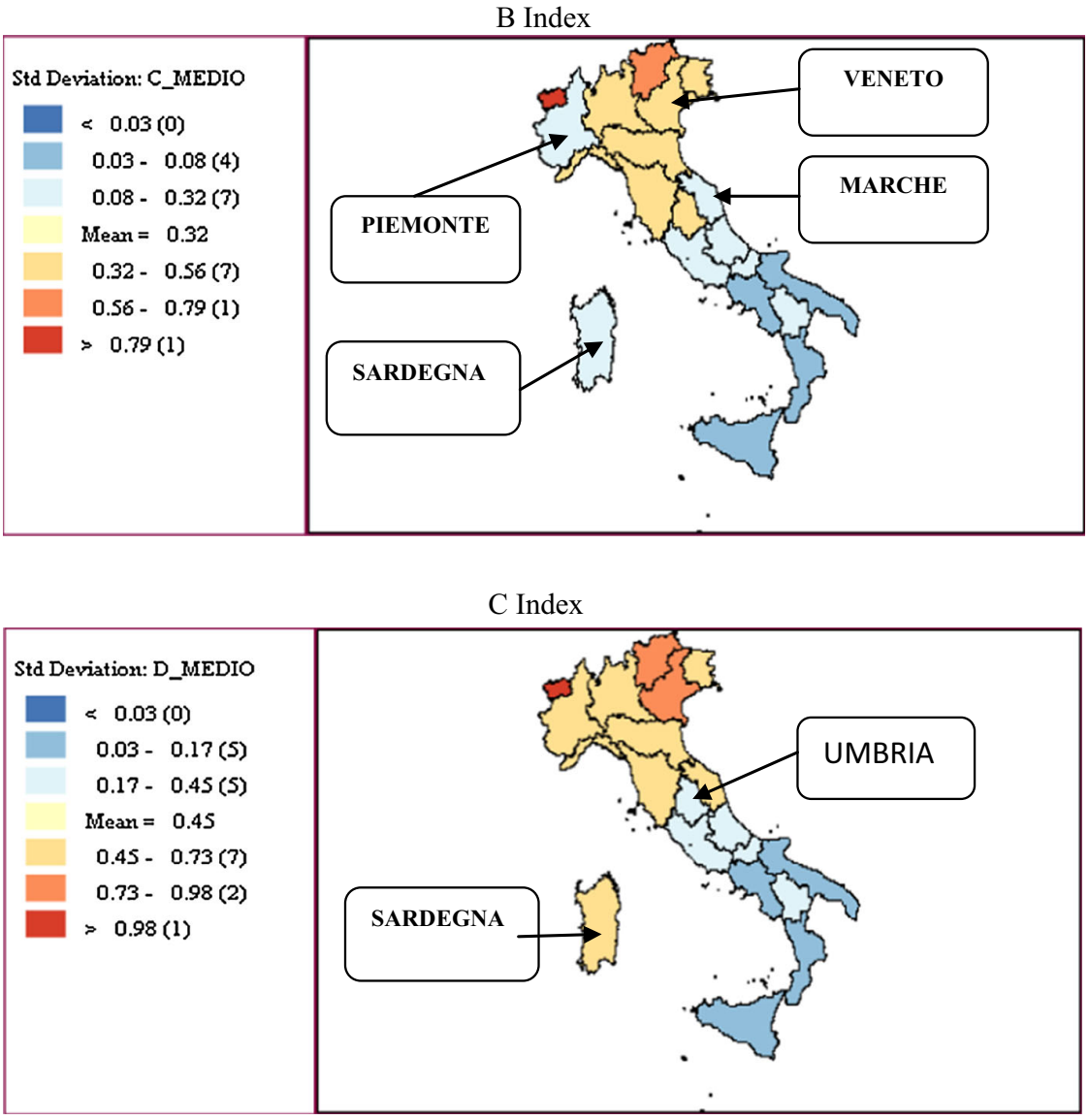

Fig. 6 Annual average FI—index with weighted arithmetic mean method. *Source*: our elaboration on ISTAT data

Finally, in the case of C index (that assigns a greater weight to CDP[9]) we observe that only Umbria and Sardinia exhibit some differences with respect to A index. In particular, we may note that Umbria is located below the average value, while Sardinia enjoys so much the greater autonomy degree of disabled people to be located among regions that show a flexicurity degree above the average value. The greater autonomy degree of disabled people favours, in terms of flexicurity, Sardinia more than an hypothetic increased investment in ALMP (see Fig. 6).

At this point of the analysis, an important issue to investigate is the following one: how flexicurity affects the employment process of disabled people? Which of the three

[9] We remind that CDPs enter in the indicator as "bad" variables; consequently, they are normalized according formula (9) which enables to change its meaning (when the standardized variable grows, the dependence degree on CDP reduces).

indicators most influence the matching process between supply and demand for the employment of disabled people?

5 Does Flexicurity Affect the Employment Process of Disabled People?

In this section we evaluate, through the estimation of an augmented matching function, both the separated effect (not synergistic) of ALMP and CDP in influencing the matching process of the disabled and the ability of the three flexicurity indicators (therefore the combined effect of ALMP and CDP) to influence the probability of employment for disabled people. This analysis allow us to answer, under the hypothesis of synergistic interaction between passive and active measures, to the following question: it is better, for the government, to invest more in ALMP or in CDP?

5.1 The Augmented Matching Function and the Econometric Strategy

In order to analyse the effects of active (Active Labour Market Policies for Disabled People) and passive (Civilian Disability Pensions) measures on the matching process we derive a matching function augmented by ALMP and CDP, as suggested by Lehmann (1995) and Puhani (1999).

By using a usual Cobb-Douglas specification we can write the augmented matching function as:

$$M = A(cU)^{\beta_1} V^{\beta_2} \tag{12}$$

where M is the $(NTx1)$ vector of the flow of matches and A describes the augmented matching productivity (see Fahr and Sunde 2004); in particular, changes in the value of A can capture changes in the geographic and skill characteristics of employers and jobs, or other differences between them, as well as differences in the behaviour between job searchers (Broersma and Van Ours 1999). U and V denote the $(NTx1)$ vectors of unemployment and vacancies stocks.

Generally, c represents a search effectiveness index of the unemployed people in the absence of search enhancing labour market schemes which takes a value between 0 and 1 (Layard, Nickell and Jackman 1991; Lehmann 1995; Hujer and Zeiss 2003). In the case of disabled people, c represents an index that directly (indirectly) measures the ability of regions to implement Law 68/99 (in order to find a job for disabled people).[10] Generally, cU defines the search effective stock of the unemployed. In our case, it represents the proportion of disabled people who find a job thanks to the ability of the region in the employment matching process for disabled people; hence, greater is c, the greater is the number of disabled people who find work through an effective implementation of Law 68/99.[11] We assume that c is affected by AMLP and CDP. The basic idea is that ALMP

[10] Law 68/1999 specifies that regions have the greatest responsibility in its application and, consequently, its successful implementation depends almost exclusively on regions' actions and ability to efficiently coordinate the various actors (people with disabilities, employers, job centers, etc.) involved in the employment of disabled people in order to reach the matching between demand and supply of jobs for disabled people (Agovino and Rapposelli 2014).

[11] In the case of disabled people, we cannot speak of unemployed "effective" stock who are looking for a work, because the unemployed people with disabilities stock only includes people with disabilities who are looking for employment, therefore they are all effective. Law 68/99 provides that disabled people who want to work must enroll in lists maintained by employment centers. Consequently, we find in these lists only

helps regions in the process of finding employment for people with disabilities and allow, therefore, to better implement Law 68/99. On the contrary, we expect a negative effect of CDP on this process.

In order to introduce ALMP and CDP into the matching function we define the parameter c as:

$$c = \sigma(1+\tau) \quad \text{with} \quad \tau = \sum_{j=1}^{J} \pi_j p_j \tag{13}$$

The parameter σ denotes the search effectiveness of the region in the absence of ALPM and CDP, and τ is the impact of ALMP and CDP programmes on the search effectiveness. The general effect τ can be decomposed into the several effects π_j of ALMP and CDP measures p_j. τ can be seen as a linear combination of the two measures, under the following assumptions: $0 \leq \pi_j \leq 1$ and $\sum_{j=1}^{J} \pi_j = 1$. In this regard, in addition to considering a version of Eq. (6) with disjoint effects of the two measures (active and passive), we will consider a version with their combined effect (the flexicurity indicator). In particular, we will construct some flexicurity indicators from the combination of the two policies. In this way we could verify both the impact of individual measures on the matching process and the joint impact (calibrated with different weights).

The log-linearized form of Eq. (6)

$$lnM = lnA + lnU\beta_1 + lnV\beta_2 + ln(\sigma(1+\tau))\beta_1 \tag{14}$$

can be approximate for small τ as:

$$lnM = A^* + \ln U\beta_1 + lnV\beta_2 + \sum_{j=1}^{J} \pi_j p_j \beta_1 \tag{15}$$

where

$$A^* = lnA + \beta_1 ln\sigma \tag{16}$$

The augmented matching function we estimate is given by:

$$lnM = lnU\beta_1 + lnV\beta_2 + lnALMP\beta_3 + lnCDP\beta_4 + lnNETL\beta_5 + A^* \tag{17}$$

$$A^* = A + \mu_i + \nu_t + \varepsilon$$

where variables U, V and M have already been defined above.

ALMP is the percentage of disabled people who benefit of active measures at regional level, CDP is the percentage of recipients of civilian disability pensions in working age, and NETL is the number of employees in temporary layoff hours. We check for this variable for two reasons: first, it acts as an indicator of the state of the local labour market; second, also law 68/1999 provides that companies with employees in temporary layoffs are not enforced to employ disabled people. The variable A^* captures the remaining explanatory variables for M. In particular, A is a constant, μ_i is a regional fixed effect, ν_t is the time fixed effect, and ε represents the ($NTx1$) vector of errors which are assumed to be i.i.d. across i and t with zero mean and constant variance σ^2.

Footnote 11 continued
people who truly seek a job and not all unemployed disabled people (such as discouraged workers or other unemployed categories who no longer seek a job).

In the case of flexicuritiy indices, the matching function we estimate is given by:

$$lnM = lnU\beta_1 + lnV\beta_2 + lnFI\beta_3 + lnNETL\beta_4 + A^* \tag{18}$$

$$A^* = A + \mu_i + \nu_t + \varepsilon$$

where FI are the three flexicurity indices.

Furthermore, Eqs. (17) and (18) introduce endogeneity problems. In particular, the effects of ALMPs may be biased because the resources used to finance active policies are not randomly assigned across regions and for this reason they cannot be considered as an exogenous variable (Boeri and Burda 1996; Boeri 1997). This endogeneity problem can be dealt by using instrumental variables: in this case, the crucial issue is to find the appropriate instruments, i.e. variables correlated with ALMPs measures but not with the error term.

In our work we refer to different instruments. In particular, we use the lag of unemployment and vacancy rate of disabled people and GDP per capita. Because the instruments listed are very general, we insert a more specific and highly correlated instrument with the ALMP for disabled people, the Regional Fund for Employment of People with Disabilities. This Fund, established by art. 13, paragraph 4, of Law 68/1999, is an instrument of incentive for employers who hire disabled workers through agreements, as provided by art. 11 of Law 68. In this case, we use the amount of the fund allocated to each region (source ISFOL).

We must underline that we have the same endogeneity problem in the passive measures (CDP). In particular, CDP are not homogeneously distributed in Italy. Agovino and Parodi (2012) show that socio-economic variables, such as poverty and unemployment rate, are significantly correlated with the attribution of civilian disability pensions in Southern Italy. This result suggests that the national legislation regarding the attribution of civilian disability pensions has a margin for discretionary interpretation by local institutions; consequently, the CDP are not necessarily related to the health status. In the case of CDP, we use instruments that allow us to capture the socio-economic aspects, such as the lag of unemployment and vacancy rate of disabled people and GDP per capita. We exclude the poverty rate because it is not available.

As flexicurity indicators are a combination of ALMP and CDP, we use the same tools.

By considering the endogeneity problem introduced by ALMP and CDP, we run a two-stage least squares regressions (2SLS) of the following form:

Second stage:

$$lnM_{i,t} = \beta_1 lnU_{i,t} + \beta_2 lnV_{i,t} + \beta_3 lnALMP_{i,t} + \beta_4 lnCDP_{i,t} + \beta_5 lnNETL_{i,t} + A + \mu_i + \nu_t + \varepsilon_{i,t}$$

First stage:

$$lnALMP_{i,t} = \beta + \sum_{j=1}^{2} \beta_1 lnX_{i,t-j} + \beta_2 ln\mathrm{RFEPD}_{i,t} + \eta_{i,t}$$

$$lnCDP_{i,t} = \beta + \sum_{j=1}^{2} \beta_1 lnX_{i,t-j} + \eta_{i,t} \tag{19}$$

We instrument our ALMP and CDP variable to extract their exogenous component. The instruments are the temporal lag of first and second order of unemployment and vacancy rate for disabled people and GDP per capita; we denote these variables by X. In addition,

we consider an additional instruments for ALMP: regional fund for employment of people with disabilities (RFEPD).

To test for over-identifying restrictions, we use Hansen's (1982) J test. We also report the first-stage F statistic because Staiger and Stock (1997) proposed as a rule of thumb that this statistic should have a value of at least ten, otherwise the instruments are weak.

We use the same methodology and the same tools we have used when we have insert among regressors flexicurity indices instead of ALMP and CDP.

5.2 Results

In this section we list the results of the econometric estimations conducted on the 20 Italian regions.[12]

We first estimate the matching specification augmented with ALMP and CDP (Table 3, column 1) and then we estimate the specification with the three FIs (Table 3, column 2, 3 and 4).

As suggested by the matching theory, the estimated elasticities of both stock variables are positive (unemployment and vacancies). In particular, the elasticity of matches on unemployment (vacancy) is about 0.46 (0.34), and this means that an increase of the unemployment (vacancy) stock by 1 % results in an increase of matching by 0.46 (0.30) %.

With regard to the specification which considers ALMP and CDP in a disjointed way (not synergistic), we can observe that:

- ALMP shows a negative sign but it is not significant. The cause of this result is to be found in art. 13 of Law 68/99. Article 13 of Law 68 (*Agevolazione per le assunzioni*: ALMP for disabled people) refers to paragraph 3 of art. 11; article 11 of Law 68 clearly refers to training internships.[13] The presence of training internships suggests the hypothesis of the training trap in the case of disabled people. In particular, some studies for different European countries (Caroleo and Pastore 2003, 2005; Dietrich 2003) have found evidence of the trap of vocational training (the so called training trap), that is, the tendency of some young people (in our case the disabled) to be involved in continuous training experiences of low quality, sometimes in order to obtain subsidies connected. An explanation of the training trap can be sought in the "locking-in effect" (Van Ours 2004), that is a lower intensity of job search by those engaged in the phase of training acquisition. The study of Van Ours (2004) refers to the Slovak Republic, but Lechner and Wunsch (2008) have found a similar effect in the case of Germany. The hypothesis of a locking-in effect in the case of disabled people is also confirmed by the data. In particular, Fig. 1 shows, since 2009, the emergence of a prevalence of traineeships and a reduction of apprenticeships oriented to recruitment. Probably, the economic trends related to the economic crisis are not irrelevant in the case of the disabled. In summary, an increase of traineeships instead of those oriented to the employment could explain the failure of ALMP for people with disabilities. Moreover, the duration of the internship, which can reaches 24 months, would be a further cause of the failure of ALMP for the disabled. The final effect from ALMP is the reduction of the level of efficiency of the regions in the matching process.

[12] In Appendix 2 we report the description of the variables used in the empirical analysis.

[13] The maximum duration of internships for disabled people is 24 months. The participation allowance is determined by taking into account the residual abilities and skills of the trainee as the valuation of the Provincial Technical Committee.

Table 3 Estimates of augmented matching functions by two-stage least squares estimator

	Estimate (1)	Estimate (2)	Estimate (3)	Estimate (4)
lnU	0.4612*** (5.03)	0.4584*** (4.23)	0.4113*** (3.47)	0.4861*** (4.95)
lnV	0.3436*** (3.44)	0.4125*** (3.18)	0.4530*** (3.25)	0.3929*** (3.34)
lnALMP	−0.2042 (−1.29)			
lnCDP	−0.5786*** (−3.49)			
lnNETL	−0.2152** (−2.62)	−0.2101** (−2.11)	−0.2101** (−2.15)	−0.2150** (−2.14)
lnA_FI		0.3288** (2.19)		
lnB_FI			0.2823 (1.67)	
lnC_FI				0.3337** (2.65)
Constant	2.1180*** (3.49)	0.6094 (1.67)	0.7769** (2.18)	0.4552 (1.18)
Regional fixed effects	Yes	Yes	Yes	Yes
Annual fixed effects	Yes	Yes	Yes	Yes
Observations	80	80	80	80
First-stage F statistic	24.25***	26.55***	34.67***	21.36***
Hansen J statistic	[0.330]	[0.257]	[0.304]	[0.266]

Standard errors are corrected for heteroskedasticity; t-statistics are in parentheses; *p* value are reported in brackets; ***, ** and * indicate coefficients that are significant at 1, 5 and 10 %, respectively

Source: our elaboration on ISFOL and ISTAT data

- CDP show expected negative sign, with an impact of about 0.58 %. An increase of the recipients of disability pensions civil as well as reducing the matching process also increases the probability of social exclusion. The main objective of disability benefits is to assure a decent standard of living for people who cannot work. The change to be made to this scheme is to ensure flexibility, so that people with a partial incapacity to work are not excluded from the labour market. In fact, it is observed that only 2 % of people who receive disability benefits are able to reintegrate within the labour market; accordingly, pensions become an absorbing state. It could also be that people who receive a disability pension are not able to participate in the labour market. However, it appears that many of those who benefit from disability pensions could play a part-time job. The inflexibility of the benefits system makes it unlikely the operation of flexicurity. The consequence of this result is that many people remain trapped in the schema of disability benefits and do not ever fall into the labour market. Another problem associated with the lack of flexibility of the system of benefits, as well as the social exclusion of people with a partial incapacity, is the increasing weight of public spending that is unsustainable in a period of economic crisis.

In addition, the expected sign of the number of persons in temporary layoff hours is negative with an impact of about 0.21 % for both estimates. The negative sign seems to capture a cyclical effect: a worse economic situation results in a reduction of the number of

matches. Therefore, an economic contraction has the effect of both reducing new hires and increasing the number of temporary layoff hours; in this case, as according to Law 68/99, firms affected by particular conditions, such as layoffs, are temporarily exempted from the recruitment of disabled persons. In terms of policy, it is necessary to promote policy actions aimed at supporting private firms in their production process, especially for those with a high number of temporary layoff hours (Agovino and Rapposelli 2014).

Regarding the specification which considers the joint action (or synergistic) of ALMP and CDP, we can observe that:

- The three flexicurity indicators show an expected positive sign, but only A_FI (column (2)) and C_FI (column (4)) are significant at the 5 %, whilst B_FI (column (3)) is not significant. The non-significance of B_FI is due to the fact that this indicator is mainly driven by ALMP (ALMP weigh more than CDP), which was not significant in the estimation (1).
- C_FI has a slightly greater impact than A_FI. The synergistic action of both measures has positive effects on the matching process. A synergistic action of both policies improves the action of the regions in searching work for disabled people. Moreover, these results provide two economic policy suggestions. In particular, in order to improve the effects of Law 68/99 and thus make more effective the action of the regions in the matching process it is possible:

(1) A synergistic action characterized by an equal combination of the two measures (the same emphasis—equal weight—for the two measures). In summary, an increase in ALMP for disabled people must matches an equal reduction of CDP that ensures increased independence to people with disabilities from the welfare state.[14]

(2) A synergistic action characterized by a combination of the two measures which gives greater weight to the formation of autonomy, thereby reducing the degree of dependency and welfare of disabled people. But how to increase the autonomy of disabled people from the welfare state? One way would be to use an alternative tool of income support not characterized by being an absorbing state,[15] that is public social expenditures (different from pension expenditure) in favor of disadvantaged groups, that has the characteristic of temporariness. The public social expenditure is still a burden to the government but, unlike CDP, appears to be a more flexible instrument (the allocation is reviewed from time to time). The flexibility of this tool would ensure the reduction of the degree of dependence of disabled people, thus reducing the risk of poverty and encouraging the process of social and economic integration of the disabled people.

Furthermore, it is important to highlight that a way to make effective ALMP for disabled people is: (1) to combine this measure with an action that reduces the degree of welfare towards disabled people with residual capacity; (2) to do not confer to ALMP, during the synergistic interaction of the various policy measures, the most weight (see the non significance of B_FI).

[14] We remind that in the construction of the flexicurity indicators, CDP have been considered as a negative measure and, consequently, they have been transformed into a positive measure.

[15] By "absorbing state" we mean that the probability of the individual subsequently exiting that state is close to zero.

Fig. 7 Job training and internships guidance and traineeships to hiring (2008–2011). *Source*: ISFOL—Ministry of Employment (2010–2011)

Finally, we observe, according to the results from Hansen's J test, that our instruments are exogenous, and therefore valid. In addition, we test the correlation between our instrumental variables and ALMP, CDP and FIs using the F-test suggested by Staiger and Stock (1997). The F-statistic for joint significance of the instruments in the first stage of the endogenous variable on the instruments and all other exogenous variables is, respectively, 24.25, 26.55, 34.67, and 21.36 (above the threshold of 10 suggested by Staiger and Stock 1997). Hence, we can conclude that our instrumental variables are not weak (Fig. 7).

6 Conclusions

This paper has attempted to calculate the flexicurity index for disabled people by applying two methods, i.e. the penalty coefficient of variation method and the weighted arithmetic mean method, to Italian regions data. We have computed the FI by using the percentage of working age percipients of civilian disability pensions (passive measure) and the percentage of disabled people who benefit of ALMP at the regional level (active measure).

Descriptive analysis shows that people with disabilities in Southern Italy have a lower chance of participating in the labour market than those living in Northern Italy. In addition, greater access to passive measures (CDP) makes them more vulnerable and increases the probability of getting caught in the disability benefits system; consequently, the risk of social exclusion increases (Eichorst et al. 2010). The dualism between Northern and Southern Italy also emerges from active measures (ALMP): we have found a high participation in active measures by disabled residents in Northern Italy, while the participation of disabled people in Southern Italy is very low.

The analysis of flexicurity indices shows that Northern regions have a greater flexicurity degree, followed by Central regions. Southern regions show the lowest flexicurity degree, that is below the national level. This low flexicurity level is a clear indication of the high use of CDP in this area.

The indicator that gives greater weight to CDPs is the indicator that ensures a greater success in the matching process of disabled people. To develop greater autonomy in

disabled people—by reducing their dependence from CDP—has the effect of ensuring a greater probability of their social and economic integration.

Econometric analysis shows that ALMP do not have effect on the matching process for the employment of disabled people. The failure of active measures may be justified by the training trap, that is generated by the growing number of unemployed disabled people that are employed in long-term internships not oriented to the employment. In contrast, the synergistic use of the two measures ensures an improvement of the matching process. The indicator that gives greater weight to the development of the economic independence of people with disabilities is that one that most favors the probability of finding employment for the disabled. In terms of policy it seems appropriate to reduce the use of CDP, as it represents an income support instrument not very flexible. One way to reduce CDP is represented by public social expenditure, which is characterized by less distortion and greater flexibility.

Appendix 1

See Tables 4, 5, and 6.

Table 4 Mazziotta–Pareto index—A index, 2006–2011

Macro-areas	Regions	2006	2007	2008	2009	2010	2011
Northern Italy	PIEMONTE (PIEM)	100.14	100.49	100.84	100.21	101.07	101.83
Northern Italy	VALLE D'AOSTA (VDA)	115.78	121.06	123.92	123.53	118.20	121.03
Northern Italy	LOMBARDIA (LOM)	100.78	100.95	101.33	101.09	103.12	102.62
Northern Italy	TRENTINO ALTO ADIGE (TAA)	117.66	113.82	109.75	108.41	119.85	112.08
Northern Italy	VENETO (VEN)	114.83	111.57	109.40	109.34	100.92	102.01
Northern Italy	FRIULI VENEZIA GIULIA (FVG)	99.11	99.54	100.42	99.94	111.42	106.50
Northern Italy	LIGURIA (LIG)	105.73	105.22	103.95	106.79	97.69	98.19
Northern Italy	EMILIA ROMAGNA (EMR)	105.30	107.28	105.89	105.57	103.22	102.39
Central Italy	TOSCANA (TOS)	104.42	104.45	104.16	103.57	103.07	102.07
Central Italy	UMBRIA (UMB)	98.67	98.24	98.25	99.18	98.76	109.99
Central Italy	MARCHE (MAR)	99.50	99.96	100.60	99.94	100.61	100.41
Central Italy	LAZIO (LAZ)	97.02	96.66	97.26	98.05	97.68	97.59
South Italy	ABRUZZO (ABR)	96.57	97.55	97.99	98.28	97.80	94.87
Southern Italy	MOLISE (MOL)	97.09	96.85	95.54	94.41	94.06	95.26
Southern Italy	CAMPANIA (CAM)	87.56	87.81	88.51	88.21	89.38	90.61
Southern Italy	PUGLIA (PUG)	91.89	90.95	90.96	90.93	90.74	90.86
Southern Italy	BASILICATA (BAS)	94.57	95.13	95.69	95.65	95.76	94.61
Southern Italy	CALABRIA (CAL)	88.73	88.88	89.46	89.93	90.34	90.40
Southern Italy	SICILIA (SIC)	89.61	90.06	90.62	90.38	90.28	90.49
Southern Italy	SARDEGNA (SAR)	89.87	88.79	90.12	90.86	90.71	89.83
Mean		99.74	99.76	99.73	99.71	99.73	99.68
Standard deviation		8.60	8.66	8.33	8.24	8.45	8.05

Table 5 Index with subjective weights—B index, 2006–2011

Macro-areas	Regions	2006	2007	2008	2009	2010	2011
Northern Italy	PIEMONTE (PIEM)	0.32	0.32	0.31	0.30	0.32	0.31
Northern Italy	VALLE D'AOSTA (VDA)	0.90	1.00	1.00	1.00	0.91	1.00
Northern Italy	LOMBARDIA (LOM)	0.35	0.33	0.32	0.32	0.38	0.33
Northern Italy	TRENTINO ALTO ADIGE (TAA)	0.99	0.73	0.54	0.52	0.99	0.65
Northern Italy	VENETO (VEN)	0.88	0.67	0.54	0.55	0.31	0.31
Northern Italy	FRIULI VENEZIA GIULIA (FVG)	0.29	0.29	0.30	0.29	0.67	0.46
Northern Italy	LIGURIA (LIG)	0.60	0.51	0.41	0.51	0.23	0.21
Northern Italy	EMILIA ROMAGNA (EMR)	0.51	0.53	0.44	0.44	0.39	0.32
Central Italy	TOSCANA (TOS)	0.49	0.45	0.40	0.39	0.38	0.32
Central Italy	UMBRIA (UMB)	0.34	0.29	0.25	0.29	0.29	0.71
Central Italy	MARCHE (MAR)	0.32	0.31	0.30	0.29	0.31	0.28
Central Italy	LAZIO (LAZ)	0.27	0.23	0.22	0.25	0.24	0.21
Southern Italy	ABRUZZO (ABR)	0.29	0.29	0.25	0.27	0.27	0.13
Southern Italy	MOLISE (MOL)	0.28	0.25	0.18	0.16	0.13	0.14
Southern Italy	CAMPANIA (CAM)	0.04	0.03	0.02	0.01	0.04	0.05
Southern Italy	PUGLIA (PUG)	0.14	0.10	0.07	0.08	0.07	0.04
Southern Italy	BASILICATA (BAS)	0.20	0.20	0.18	0.19	0.20	0.13
Southern Italy	CALABRIA (CAL)	0.07	0.06	0.04	0.06	0.07	0.05
Southern Italy	SICILIA (SIC)	0.07	0.07	0.06	0.06	0.05	0.04
Southern Italy	SARDEGNA (SAR)	0.17	0.08	0.08	0.10	0.10	0.05
Mean		0.38	0.34	0.30	0.30	0.32	0.29
Standard deviation		0.27	0.24	0.22	0.22	0.26	0.25

Table 6 Index with subjective weights—C index, 2006–2011

Macro-areas	Regions	2006	2007	2008	2009	2010	2011
Northern Italy	PIEMONTE (PIEM)	0.63	0.62	0.62	0.60	0.62	0.61
Northern Italy	VALLE D'AOSTA (VDA)	0.95	1.00	1.00	1.00	0.96	1.00
Northern Italy	LOMBARDIA (LOM)	0.64	0.63	0.62	0.62	0.65	0.62
Northern Italy	TRENTINO ALTO ADIGE (TAA)	0.98	0.86	0.77	0.75	0.98	0.81
Northern Italy	VENETO (VEN)	0.91	0.80	0.74	0.74	0.62	0.62
Northern Italy	FRIULI VENEZIA GIULIA (FVG)	0.59	0.59	0.59	0.59	0.79	0.68
Northern Italy	LIGURIA (LIG)	0.62	0.57	0.52	0.56	0.43	0.42
Northern Italy	EMILIA ROMAGNA (EMR)	0.72	0.72	0.68	0.67	0.65	0.62
Central Italy	TOSCANA (TOS)	0.67	0.65	0.62	0.62	0.62	0.59
Central Italy	UMBRIA (UMB)	0.44	0.41	0.38	0.38	0.39	0.62
Central Italy	MARCHE (MAR)	0.54	0.54	0.53	0.52	0.53	0.50
Central Italy	LAZIO (LAZ)	0.42	0.40	0.38	0.38	0.37	0.36
Southern Italy	ABRUZZO (ABR)	0.36	0.36	0.34	0.33	0.33	0.27
Southern Italy	MOLISE (MOL)	0.40	0.37	0.30	0.25	0.26	0.28
Southern Italy	CAMPANIA (CAM)	0.04	0.04	0.02	0.01	0.03	0.07
Southern Italy	PUGLIA (PUG)	0.20	0.16	0.12	0.11	0.09	0.09

Table 6 continued

Macro-areas	Regions	2006	2007	2008	2009	2010	2011
Southern Italy	BASILICATA (BAS)	0.32	0.32	0.30	0.29	0.28	0.25
Southern Italy	CALABRIA (CAL)	0.08	0.08	0.05	0.05	0.06	0.05
Southern Italy	SICILIA (SIC)	0.13	0.14	0.12	0.11	0.08	0.07
Southern Italy	SARDEGNA (SAR)	0.08	0.04	0.04	0.05	0.05	0.02
Mean		0.49	0.46	0.44	0.43	0.44	0.43
Standard deviation		0.28	0.27	0.27	0.27	0.29	0.28

Appendix 2

The present study focuses on the twenty Italian regions, corresponding to the European NUTS-2 level in the official classification of the European Union. In particular, we use yearly data on unemployment, vacancies and matches for disabled people for the period 2006–2011. The data required are provided by ISFOL (Institute for the Development of Vocational Training for Workers). Although Law 68/99 came into force in 1999, ISFOL provides the regional details on unemployment, vacancies and matches for disabled people only from 2006 onwards (Ministry of Employment 2006–2007, 2008–2009, 2010–2011).

The match variable is a flow variable and it is defined on the basis of job placement as defined by article 7 of Law 68/99 (rules on compulsory recruitment).[16] The match variable also includes disabled people hired by firms which are not obliged, via the agreement[17] (art. 11, paragraphs 1 and 4, agreements, and agreements for work integration).

The unemployment variable is a stock variable and concerns disabled people enrolled in employment centers at the 31st of December.[18]

The vacancies variable is a stock variable and it is defined by art. 3 of Law 68/99 (compulsory recruitment, reserve shares). Public and private employers are obliged to have among their employees workers with disabilities, in proportion to the size of their firm (art. 3 of Law 68/999). In particular, the employer is obliged to have a reserve shares of:

- One disabled worker if the firm has a number of employees ranging from 15 to 35;
- Two disabled workers if the number of employees ranges from 36 to 50;
- 7 % of Workers if the number of employees is more than 50.

[16] ISFOL does not specify whether the match variable includes also employed disabled people who are looking for a job, in addition to the unemployed disabled people who find a job. Since job placement for disabled people is based on enrolment to employment centers, it is natural to think that after a job placement the disabled person is deleted from the list of unemployed people with disabilities looking for work; this suggests that a new enrolment means that the disabled person is unemployed again and therefore the match variable only includes the outflows into employment of unemployed disabled people.

[17] Through agreements, signed by the interested parties (workers, employers, provincial offices for the employment of disabled workers and authorities that promote labour integration), it is possible to define a personalized program of interventions in order to overcome barriers related to the inclusion in the workplace. The agreements represent the tool by which the legislation seeks to promote the integration targeted, through a gradual labour integration of people with disabilities, aimed at the achievement of the employment obligations.

[18] In this case, ISFOL does not make a distinction between the unemployed looking for employment and the unemployed who are not looking for a job; for this reason, the variable of unemployment will be distorted upwards.

Table 7 Summary statistics of 20 Italian regions (2006–2011)

Variables	Obs	Mean	SD	Min	Max
M	120	1456.15	1438.981	0	7113
U	120	37,640.58	44,308.37	0	166,571
V	120	3184.45	4786.677	0	20,145
ALMP	120	0.734765	0.97589	0	5.279746
CDP	120	2.374471	0.79723	1.381928	3.769418
NETL	120	77.56664	271.341	2.412246	2808.469

M number of matches, *U* number of unemployed disabled people, *V* number of vacancies, *ALMP* percentage of disabled people who benefit of ALMPs at regional level, *CDP* percentage of recipients of civilian disability pensions (CDP) in working age, *NETL* number of employees in temporary layoffs

Source: our elaboration on ISFOL and ISTAT data

The reserve share that is not filled (vacancies) allows to determine the stock of vacancies.

In addition, we also check for both ALPM and CDP. The definition and the computation of these two variables have already been defined in Sect. 2.2. Finally, since Law 68/99 provides that companies with employees in temporary layoff hours are not enforced to employ disabled people (Art. 3, Sect. 5), we include in our analysis the number of employees in temporary layoffs hours (NETL) (source ISTAT).

The descriptive statistics of variables included in the empirical analysis are listed in Table 7.

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