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Occupational Integration of
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An Analysis of Law 68/99

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Occupational Integration of People with Disabilities: An Analysis of Law 68/99

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Occupational Integration of People with Disabilities: An Analysis of Law 68/99

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Abstract

The integration in the labour market is a fundamental right. Nonetheless, it is often hard to guarantee to workers with disabilities, as disabilities are often seen as a stigma on the labour market. To foster the inclusion of disabled workers in the labour market Italy implemented an integration policy based on a quota system. According to it, firms have to hire, at specific thresholds, a quota of disable individuals. Surprisingly, in the literature, there is scarce evidence both on the compliance of this policy and on its causal effects. Therefore, it is impossible to establish whether it reaches its goal. To overcome this lack of information, we study the policy from different perspectives. First of all, we calculate its compliance level using different sources of data. We find a low average compliance level over regions and time. Later on, we investigate on the impact of the policy specifically for the group of disable individuals with high disability levels. The analysis evidences the policy has no impact on the hiring of individuals with high levels of disability.

Key-words: worker with disabilities, quota policy, Law 68/99.

Parole chiave: disabili, inclusione, mercato del lavoro, Legge 68/99.

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1 Sintesi Non Tecnica

Il principale contributo del presente lavoro è la valutazione della Legge 68/99. Quest'ultima ha l'obiettivo di favorire l'integrazione di categorie protette nel mercato del lavoro. Lo studio si focalizza sugli aspetti della legge che riguardano l'integrazione dei lavoratori disabili. Si basa principalmente sui dati Inps sulle dichiarazioni contributive delle aziende. Ad essi vengono affiancati dati INAPP più specifici sull'implementazione della Legge 68/99, dati dell'Ispettorato del Lavoro e dati Cerved sulle caratteristiche delle imprese.

L'integrazione dei lavoratori disabili sul mercato del lavoro in Italia è tuttora scarsa. La letteratura evidenzia come questa categoria di lavoratori abbia una minore probabilità di entrare e di rimanere nella forza lavoro, nonché di trovare un'occupazione full-time (Addabbo, Krishnakumar, et al. 2012, Agovino et al. 2014, Addabbo and Sarti 2014). Per aumentare il livello di integrazione è stata introdotta nel 1999 la Legge 68 la quale prevede l'obbligo, per le imprese che superano un determinato livello della forza lavoro, di assumere una quota di lavoratori disabili. La legge prevede anche decontribuzioni fiscali per l'assunzione di lavoratori con gradi di disabilità al di sopra di specifiche soglie. Sebbene sia implementata da diversi anni, le evidenze empiriche sul rispetto e l'efficacia di tale politica sono incredibilmente scarse (con l'eccezione del report INAPP sul suo funzionamento). Per tale ragione riteniamo fondamentale un suo studio più attento.

Il nostro studio si articola in due parti principali. Nella prima parte verifichiamo il rispetto della politica da parte delle imprese che superano la soglia. Per farlo utilizziamo dati amministrativi provenienti dall'Inps in concomitanza con i dati dei report dell'INAPP sull'implementazione della politica. Il primo database contiene le dichiarazioni contributive delle aziende. Da esso otteniamo i dati sulla forza lavoro di ciascuna azienda e riusciamo a ricostruire il numero di aziende che superano ciascuna soglia per l'assunzione dei lavoratori disabili per regione e per anno. Il secondo database lo ricostruiamo dai report dell'INAPP che riportano dati dei Centri per l'Impiego sul numero di disabili assunti per ciascuna soglia di assunzione, regione ed anno. Il confronto tra questi due valori ci permette di trarre conclusioni sulla porzione di imprese la cui quota di lavoratori disabili rispetta i requisiti della Legge 68/99. La porzione di imprese che rispettano la legge è molto eterogenea tra le regioni, in media incredibilmente bassa, e dovrebbe essere un primo campanello di allarme per i policy makers. L'eterogeneità regionale non sembra essere riconducibile né al numero di disabili disponibili a lavorare nella regione né al livello di controllo da parte delle autorità.

Nella seconda parte dello studio verifichiamo l'impatto della politica sul numero di disabili con alto grado di disabilità impiegati nelle aziende. Per svolgere quest'analisi ricostruiamo dal database Inps sulle dichiarazioni contributive delle aziende il numero di lavoratori ed il numero di disabili gravi impiegati per impresa. Confrontiamo poi aziende con livelli di forza lavoro poco al di sotto delle soglie previste dalla legge con aziende poco al di sopra di esse. Dall'analisi emerge che la legge 68/99 non ha un impatto significativo sul numero di disabili gravi impiegati nelle aziende che superano la soglia.

2 Introduction

There are no doubts on the importance of the social and economic inclusion of people with disabilities. It is their fundamental right to be occupationally integrated and it is a duty of the establishments to guarantee it. European Union recognize the importance of such an integration, which is fundamental to accomplish the Europe 2020 Strategy (Commission 2010). Nevertheless, the inclusion of people with disabilities in the labour market is a complicated task. Disability is often seen as a stigma. In Italy, there are strong evidences of the difficulty for disabled workers to be occupationally integrated. Disabled workers, and more in general individuals without an optimal health status, have a lower probability to enter and to stay in the labour force and a higher probability to have a part-time job (Addabbo, Krishnakumar, et al. 2012). This result is especially true when the disability status is persistent, although even past disability statuses may influence the current probability to be employed (Agovino et al. 2014). Moreover, the probability to be employed decreases more for specific types of disabilities (Addabbo and Sarti 2014).

To foster the inclusion of disabled workers in the labour market, three main types of policies have been implemented by the Governments (Murray 2003). The introduction of anti-discrimination laws, according to which employers can't discriminate people with disability both during recruitment and during employment or training. The introduction of job retention laws, according to which employers have to maintain workers who acquire a disability on the job. Finally, the integration policies based on a quota system. According to them, firms have to hire, at specific thresholds, a quota of disabled individuals. Non-compliant firms are usually subject to a fine. In Italy, since 1999, it is implemented a quota policy: Law 68/99. In addition to the quota system the policy provides tax credits to firms hiring disabled workers with a minimum level of disability. It also gives to employment offices the role of mediators between workers with disabilities and firms to provide a tailored placement and ensure the perfect match between the two. There are some descriptive studies on the implementation of the Law in specific areas. Among them, Belotti and Gardonio (2002) evidenced as, in Veneto region, only half of the demand of disabled workers is covered by a supply. The undercoverage is higher for smaller firms. To explain these results the authors underline that it is harder to find the proper role for disabled people in smaller firms and that the period under study is shortly after the introduction of the law. In addition, the analysis shows that two thirds of the disabled workers are hired through regular hiring patterns.

To the best of our knowledge, there are no counterfactual evaluations of the policy at a national level. To overcome this lack of information we study the policy from different perspectives. First of all, we calculate the compliance level of the policy. To do it, we use the database UNIEMENS¹ (which contains administrative data on social security for all employees) and data from the National Institute for the Evaluation of Public Policies (INAPP, former ISFOL) reports on Law 68/99. In particular, we get data on the number of disabled workers that should be hired in a region (calculated according to the number of firms crossing the policy thresholds) from UNIEMENS. We get the number of hired disabled workers in a region from INAPP reports. The average compliance level over the regions and over time is very low.

After the calculation of law compliance we investigate on the impact of the policy specifically for the group of disabled individuals with high disability levels. We investigate whether the policy increases the number of disabled workers hired by firms. To do it, we employ UNIEMENS data and a regression discontinuity design. Not surprisingly given

¹We had access to it thanks to the participation to VisitINPS program, a program implemented by the National Social Security Institute (INPS).

the low level of compliance, the analysis evidences that the policy has no impact on the hiring of individuals with high levels of disability. The result does not change after an increase in the non-compliance fine in 2011.

Moving to the international context there is a richer literature on the effectiveness of quota policies. Lalive et al. (2013) studied a quota policy implemented in Austria, concluding it has a positive and significant impact. The authors applied a regression discontinuity design and they found that firms crossing the threshold increased their disable workforce of about 12%. Exploiting a policy reform the authors investigated as well on the impact of an increase of the non-compliance fine. They found a positive effect of it on disable employability. This last result was confirmed by Wuellrich (2010). Barnay et al. (2019) studied a quota policy introduced in France in 1987. Using survey data, and the employment status of disable individuals as an outcome, they found a negative effect of the reform. They concluded firms preferred to pay fines than to hire a disabled worker. Malo and Pagà (2014) employed survey data and a regression discontinuity design, to study the impact of a quota policy implemented in Spain. The survey was submitted directly to the firms. They found a positive and significant effect. The effect was heterogenous across firms and the compliance decreased as the size of firms increased. Mori and Sakamoto (2018) studied a quota-levy policy implemented in Japan employing a regression discontinuity design. According to it, only firms with more than 300 employees are subject to the fine, although firms below this threshold as well have to have a quota of disabled workers. The authors found a significant effect of the policy both under the levy and without the levy system.

As there are no evaluations of quota policies in the Italian context this paper can still give an important contribution to the topic. Indeed, the social characteristics and the perception of disability of a Country, may strongly influences the effectiveness of such a policy (Silverstein et al. 2005). None of the Countries mentioned above can be considered equivalent to Italy in terms of social characteristics and perception of disability. In addition to that the literature returns heterogeneous results.

The remainder of the paper is organised as follows: in section 3 we describe more in detail Law 68/99, in section 4 we introduce the data sources we have used throughout the estimation, in section 5.1 we describe the methodology used to calculate compliance to the law and we present the results, in section 5.2 we do the same for the estimation of the impact of Law 68/99 on the number of employees with severe disabilities, finally in section 6 we draw our conclusions on the policy.

3 Law 68/99

Law 68/99 was implemented in 1999 and, notwithstanding some updates, is still valid today. Its goal is to integrate people with disabilities in the labour market. The law demands to firms to hire a determined quota of disabled workers. In particular, firms with a number of employees ranging between 16 and 35 have to include among them at least a disable person, firms with a number of employees ranging between 36 and 50 employees have to include at least two disable people and firms with more than 50 employees have to have at least 7% of disable people among their labour force. The policy also foresees the inclusion of other vulnerable categories but we will focus on disability-related quota only. Disable individuals has to have a disability level of at least 45% or a work-related disability of at least 33%. Blinds, deafs and people with war-related disabilities are also included. Firms in “Cassa Integrazione Guadagni” (an extraordinary redundancy fund used by the Government to help firms having financial troubles) are excluded.

Firms are required to send an information sheet every March after they cross one of the afore-mentioned thresholds. The last has to be filled with information on firm's labour

force and number of disabled workers, the previous December 31st. The labour force is counted following law-specific rules. I.e., managers and drivers are excluded from the count. If firms do not send the information sheet as they should, they have to pay a fixed fine and an additional fine for each day of delay. Similarly, if they send the information sheet but the number of hired disabled workers is lower than it should, they have to pay a fine for each day of delay in the hiring of the missing disabled. Both fines are increased every five years. The last increase we have data on was implemented in 2011. After it, the fine for not sending the information sheet amounted at 635.11 euros plus 30.76 euros for each day of delay. The fine for not hiring the disabled worker amounted at 62.77 euros for each day of delay.

Once the firm crosses the employees threshold it has to hire a disable person within 60 days. Nonetheless, special agreements with the local Employment Office (EO) may delay the hiring. I.e., the firm can ask the EO to find a disabled worker that fit its requirements. In alternative, it can make an agreement with the EO and ask for an additional year. In alternative, it may ask to participate to the next call for bids presented by the EO. If this last option is selected, the firm is considered as compliant until the EO makes a call for bids. Call for bids frequency strictly depends on the EO efficiency. Another agreement the firm can make with the EO is to hire the additional disabled worker in a different plant from those crossing the threshold.

The policy works also on the reward side. In particular, firms hiring disabled workers have access to a tax credit of 50% for 5 years on disabled worker employment taxes if she has a disability level ranging between 67% and 79%. Firms hiring disabled workers with a disability level higher than 79%, instead have access to a tax credit of 100% for 8 years. Moreover, all the workplace adaptation expenses are covered by the regional disable fund.

4 Data

4.1 UNIEMENS database

The main database we use in the analysis is UNIEMENS. We had access to it thanks to the participation to VisitINPS program, a program implemented by the National Social Security Institute (INPS) to allow researchers to employ their data. UNIEMENS is an administrative database containing all social services information on employees. Each employer must communicate to INPS any information on their employees useful for the social secutiry services. Therefore, the database contains all recorded contracts with information on contract and job characteristics such as the type of contract, its starting and ending date, the qualification of the employee, whether she worked part-time or full-time and other information. The big advantage of the database is that it contains the universe of workers. This allows us to determine the exact number of employees working in a plant. This measure is more precise than the one we would get from firms declaration. Indeed, a none compliant firm is less likely to declare the actual number of employees. Nonetheless, the database has an important drawback. From it, it is not possible to identify disabled workers targeted by Law 68/99. The database contains information on the disabled workers for whom firms have access to the tax credits, while it is not possible to identify the rest of the disabled workers. I.e., tax credits are relevant for security service while compliance to the law is not. Hence, in the database we can identify disabled workers with disability levels from 67% onwards. We have used data from UNIEMENS over the period 2006-2015. Starting from UNIEMENS, we built a new panel database where each unit corresponds to a plant². For each plant we reported, in the new dataset,

²We excluded all plants in “Cassa Integrazione Guadagni”, as they are exonereted by law (see section 3).

the number of employees, calculated according to Law 68/99 count of employees (i.e. we excluded managers and drivers from the count), the number of disabled workers with a level of disability equal or higher than 67%, the geographical location of the plant and the sector of belonging.

Table 1 and table 2 present some descriptive statistics on the phenomenon of interest, derived from UNIEMENS database. In the first column of the first table we present the number of highly disabled workers employed by year. In the following columns we present the percentage of plants by range of employees' number, counted according to Law 68/99 by year. The first striking information we can derive from these descriptive

Table 1: NUMBER OF DISABLED WORKERS EMPLOYED AND PERCENTAGE OF FIRMS BY SIZE.

Year	Highly disabled workers	% of plants by size			Total Number of Plants
		[0:15] Empl	(15:35] Empl	(35:50) Empl	
2006	2472	93.5	3.9	0.8	1614220
2007	2821	93.4	3.9	0.9	1640715
2008	2599	93.5	3.9	0.9	1670748
2009	2183	93.7	3.8	0.8	1664875
2010	1445	93.7	3.8	0.8	1667820
2011	964	93.7	3.8	0.8	1671556
2012	639	94	3.6	0.8	1693915
2013	309	94	3.6	0.8	1658326
2014	226	93.9	3.6	0.8	1613267
2015	126	93.6	3.8	0.8	1643981

NOTE: The second column presents the total number of highly disabled workers employed by year. Highly disabled workers have a level of disability equal or higher than 67%. Columns 3 to 6 present the percentage of plants by size with respect to the total number of plants. Size is defined with respect to the number of employees who are counted in Law 68/99 definition. The last column presents the total number of plants.

statistics is the decrease in the number of highly disabled workers employed by year. A first explanation to this decrease is the introduction of the possibility to exclude workers on the construction site from those counted according to Law 68/99 definition. Another is the substitution of the tax credit with a subsidy for the hiring of disable workers which followed Law 247/2007. The subsidy was equal to 60% of the wage for workers with a disability higher than 79% and 25% of the wage for workers with a disability level between 67% and 79%. Notice that, the fact that this number decreases sharply and the number of firms targeted by the law doesn't is not a proof of decreasing compliance. Indeed, plants can be compliant hiring disabled workers with lower levels of disability as well. The distribution of plants across different sizes is quite stable over time. Most of plants have less than 15 employees. Therefore, only a minority of the italian plants have to hire disabled workers according to Law 68/99.

In table 2, we present the number of highly disabled workers every 100'000 employees by plants size and year. In line with previous results, the number highly disabled workers employed every 100'000 employees decreases over time. The number is higher for plants with 15 to 50 employees. Surprisingly, it is higher in plants with less than 15 employees

Table 2: NUMBER OF HIGHLY DISABLED WORKERS EMPLOYED
EVERY 100'000 EMPLOYEES BY PLANTS' SIZE AND YEAR.

Year	Number of highly disabled workers employed every 100'000 employees	[0:15] Empl	(15:35] Empl	(35:50] Empl	50+ Empl
2006	10.82	47.03	47.03		2.56
2007	14.38	46.35	44.48		2.74
2008	13.62	39.14	56		2.01
2009	12.77	31.05	39.17		1.85
2010	8.73	18.77	23.59		0.974
2011	5.96	13.15	13.74		0.579
2012	4.15	9.4	9.23		0.389
2013	2.38	4.48	3.73		0.192
2014	1.88	3.26	2.45		0.136
2015	0.984	1.91	0.888		0.0759

NOTE: The number of highly disabled workers employed every 100'000 employees is presented by plant size and year. Highly disabled workers have a level of disability equal or higher than 67%. Size is defined with respect to the number of employees who are counted in Law 68/99 definition.

than in plants with more than 50 employees. The relatively high number of highly disabled workers in firms that are not required to hire them, can be explained by the tax credits provided, according to the law, to firms hiring highly disabled workers.

4.2 INAPP reports

As mentioned earlier, UNIEMENS database does not allow to identify all disabled workers targeted by Law 68/99. In particular, we miss information on disabled workers with disability levels between 45% and 67%. Therefore, using that database only, we can't establish the exact number of disabled workers hired by a firm. This is a huge issue in the calculation of the compliance level. To overcome this issue, we exploit the reports of INAPP (former ISFOL) on Law 68/99 from 2006 to 2015. The reports are presented each year from the Institute to the Parliament. They include information on the number of disabled individuals a plant declared to be compelled to hire and the total amount of disabled individuals hired thanks to Law 68/99 by plants crossing the threshold, by year and region of hiring. The information are collected from the Institute directly from the Provincial EO's. The data present a high number of missing values as the Institute is not always able to reach all of the EO's.

4.3 Other data sources

We furthermore use in section 5.1.2 data of the Italian State Labour Inspectorate on the number of inspections by region and year over the period 2006-2015. In the robustness check with covariate addition, we have used data on plants' characteristics from Cerved database. The last contains information on the economic status and other characteristics of all recorded Italian firms.

5 Identification: Strategy and Results

5.1 Compliance Level

To calculate compliance level we use UNIEMENS data to calculate, by region, the number of disabled workers plants have to hire according to their employees level. When available, we discount this value with the number of disabled employees plants are allowed not to hire thanks to an agreement with the EO in the same region, in the same year, recorded in INAPP reports. Later on, we compare the value obtained with the number of disabled workers hired in the same region and in the same year derived from INAPP reports. In particular, we calculate the compliance level as:

$$\phi_{it} = \frac{\delta_{it}^{Hired}}{(\delta_{it}^{Expected} - \alpha_{it})} \quad (5.1)$$

where δ_{it}^{Hired} is the number of disabled workers hired in region i during year t , $\delta_{it}^{Expected}$ is the number of disabled workers that should have been hired in the region during that year and α_{it} is the number of disabled firms are allowed not to hire thanks to agreements with the EO. To calculate the number of disabled employees that should have been hired we count the number of plants, residing in a specific region crossing each employees threshold, in a specific year. We compute the number of employees following the rules of Law 68/99. We exclude most of the employees that should not be computed according to the Law. We exclude the managers, individuals hired with a temporary contract lasting less than 6 months, home workers, some of the workers working abroad, workers with a “contratto di inserimento” or a “contratto di reinserimento” ³ and we take into account of part-time workers. We can’t exclude associates of cooperatives, individuals with “contratto di formazione e lavoro” ⁴, workers in security services, some of the workers for NGOs and miners, as they are not identifiable on the database. This may bias the estimation downward. Nonetheless, workers belonging to these categories are likely to be a minority. Therefore, we expect the inclusion of these employees not to affect the results in important ways. Moreover, as we show below, the compliance rate is so low that even a slightly higher value should be a wake-up call to policy makers. The use of administrative data to determine the number of disabled workers plants are compelled to hire allows us to overcome the cheating-error that can affect firms auto-declarations.

Table 3 presents the average level of compliance over the entire period by region, table 4 presents it over the Italian territory by year. The level of compliance is particularly low, on average over all years and all regions only 4% of the disabled workers that should be hired are actually hired, suggesting few plants are compliant to the policy. The values present a high variability both across regions (ranging from a minimum of 0.005 for Calabria to a maximum of 0.85 for Umbria) and across years (ranging from a minimum of 0.02 in 2010 to a maximum of 0.10 in 2009). It is important to notice in most of the years under analysis Italy was hit by the economic crises. There may be several causes for the high variability of the compliance rate across regions. It may follow the high variability in the number of disable individuals willing to work in the region. As we have mentioned before (see section 2) in Veneto region, immediately after the introduction of the law, the demand of disabled workers was not covered by a supply (Belotti and Gardonio 2002). It is reasonable to expect undercoverage to be negatively correlated with the amount of disabled workers available to work. Indeed, as the number of disabled

³These are specific contracts for the integration or reintegration of workers belonging to vulnerable categories in the labour market. The contract includes both working and training activities.

⁴This is an older version of the “contratto di inserimento”

Table 3: COMPLIANCE RATE BY REGION

Region	Average Compliance
ABRUZZO	0.12
BASILICATA	0.26
CALABRIA	0.005
CAMPANIA	0.13
EMILIA-ROMAGNA	0.33
FRIULI-VENEZIA GIULIA	0.05
LAZIO	0.02
LIGURIA	0.01
LOMBARDIA	0.03
MARCHE	0.39
MOLISE	0.02
PIEMONTE	0.17
PUGLIA	0.07
SARDEGNA	0.21
SICILIA	0.25
TOSCANA	0.20
UMBRIA	0.85
VENETO	0.01

NOTE: The compliance level is calculated as the ratio between the number of newly hired disabled workers and the number of new disabled workers that should be hired according to Law 68/99.

Table 4: COMPLIANCE RATE BY YEAR

Year	Average Compliance
2007	0.07
2008	0.03
2009	0.10
2010	0.02
2011	0.03
2012	0.07
2013	0.05

NOTE: The compliance level is calculated as the ratio between the number of newly hired disabled workers and the number of new disabled workers that should be hired according to Law 68/99.

workers increase, we expect the probability of finding a good worker-firm match (and, hence, undercoverage) to decrease. Therefore, if undercoverage is the cause of the high variability across regions (and of the low compliance level) we expect the compliance level to be higher in areas where more disabled workers are available to work. As we will see (see section 5.1.2) this is not the case. The high variability of the compliance rate may also follow the fact that there is a more restrictive enforcement of the laws. If that is the case, we expect regions with a higher number of labour inspections to have a higher compliance level. As we will see (section 5.1.2) this is not the case. Finally, it may follow from the fact that each EO handle the law compliance differently. I.e., some EOs may do a call of bids less often than others.

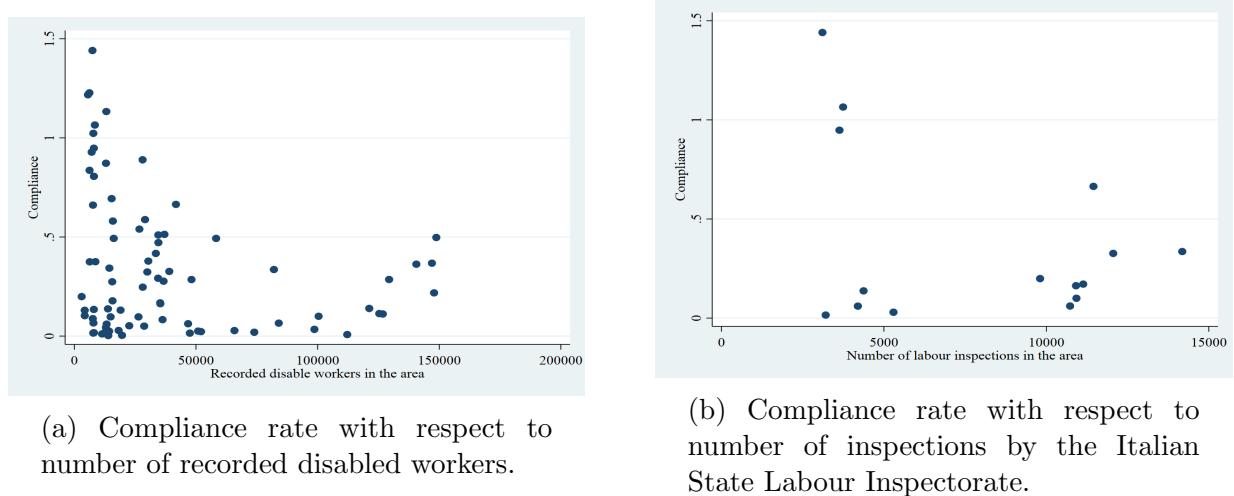
5.1.1 Potential Issues

There are a series of potential issues linked with the calculation of the compliance level. First of all, the high number of missing values contained in INAPP reports'. This is a issue mainly if the behaviour in the missing regions and during the missing years is different from those in the regions we are able to observe and for the years we are able to observe. A potentially more disturbing issue is that we are not able to detect all agreements between the EO's and firms. Indeed, INAPP reports include only the exemptions from disabled workers hirings. As we have mentioned above (see section 3) there may be several other deals that allow firms to post-pone their compliance to the law. This may affect the results in two ways. It may upward bias the number of disabled workers who should be hired by the firm. Indeed, we include disabled workers that, thanks to the agreement, can be hired by firms in the future. It may upward bias the number of disabled workers hired by the firms, as some of them may follow from previous post-ponement. Nonetheless, these two bias should cancel each other out considering the average of the compliance rate over the whole period.

5.1.2 Correlations

As mentioned above (section 5.1) the high variability in the compliance rate across italian regions may be due, among others, to the variability in the number of disabled workers willing to work in a region and/or to the restrictiveness of law enforcement in the area. If one of these two options is true, we expect the variability in the compliance rate to be correlated with the number of disabled workers willing to work or with the law enforcement level. In this section, we verify these two hypothesis. We use data on the number of disabled workers recorded in the EO's coming from INAPP reports to verify the first hypothesis. As a proxy for the strictness of the enforcement level we use data on the inspections by the Italian State Labour Inspectorate in each region.

In figures 11a and 11b we plot the compliance rate and, respectively, the number of disable recorded in the EO and the number of inspections by the Italian State Labour Inspectorate by region and year. From the graph it is clear the absence of correlation



(a) Compliance rate with respect to number of recorded disabled workers.

(b) Compliance rate with respect to number of inspections by the Italian State Labour Inspectorate.

Figure 1: The compliance level is calculated as the ratio between the number of newly hired disabled workers and the number of new disabled workers that should be hired according to Law 68/99.

between the compliance rate and these two measures. We can conclude the high variability

in the compliance rate across regions is due to the different attitudes of the EOs in the areas.

5.2 Impact of Law 68/99

In addition to the calculation of the compliance level, we study the impact of Law 68/99 on the number of disable individuals with high disability levels (i.e., disability levels of 67% or more) employed by the plants. As mentioned before, the number of disable individuals a plant is expected to hire has to satisfy a given quota, determined by a series of thresholds, established on the number of employees. We consider each threshold per se and label plants above the threshold as treated and plants below it as untreated. To determine the impact of the policy properly, we employ a regression discontinuity design at each threshold. The number of employees in the plant (computed as in section 5.1) is the forcing variable. We apply the regression discontinuity design at two thresholds established over this forcing variable: 35 and 50 employees thresholds. We exclude the 15 employees threshold because it is used for other policies as well and they may affect the number of disabled employees⁵. As usual in the regression discontinuity design, we use the following regression model inside the selected bandwidth:

$$\delta_{jt} = \alpha_0 + \beta_0 D_{jt} + \gamma_t + \theta_{jp} + \omega_{jh} + \epsilon_{jt} \quad (5.2)$$

where δ_{jt} is the number of highly disabled workers employed in plant j at time t , D_{jt} is a dummy taking value 1 if plant j has more than 35 (or 50) employees at time t and ϵ_{jt} is the error term. The parameters γ_t , θ_{jp} , ω_{jh} are, respectively, year common effects, province fixed effects and sector fixed effects. The use of these common and fixed effects are particularly important. The common effects control for the crises that hit Italy during some of the years under analysis. The province and sector fixed effects control for the high heterogeneity in the implementation of the law across these two dimensions evidenced by Belotti and Gardonio (2002) for the Veneto region and, partly, by our analysis of the compliance level. The impact of Law 68/99 is given by parameter β_0 .

The presence of a time-varying forcing variable does not allow us to use standard bandwidth selection methods (Pasquini et al. 2019). Therefore, we select the bandwidth as suggested in Pasquini et al. (2019). I.e., we select the bandwidth for which the impact of the policy is null for 90% of the placebo thresholds. The selected bandwidth includes firms with 35 to 36 employees for the first threshold. It goes from 49 to 50 for the second threshold⁶. The method we have used to choose the bandwidth allow us not to include the forcing variable in the regression model.

The results of the regression are presented in table 7. As it is possible to see, Law 68/99 does not increase the number of highly disabled individuals employed in a plant significantly. This result is in line with the low compliance rate found in section 5.1. It is not in line with the literature. Most of the previous papers found a positive and significant effect of the quota policies (Lalive et al. 2013, Malo and Pagà 2014, Mori and Sakamoto 2018). This testify the importance of conduced a specific analysis for the Italian framework, rather than generalising the previous results. Social norms and disability perceptions of the Country under analysis are not the only possible causes of these differences in the results. Some of the study in the literature focused on particular categories of

⁵The results do not change using this threshold (results available upon request).

⁶Note that in the first threshold firms that have 35 employees are not treated as the disabled worker has to be hired in correspondence to the additional hiring. In the second threshold, instead, firms with 50 employees are treated as firms have to hire the disabled workers as the 50th employees.

Table 5: ESTIMATION OF LAW 68/99 IMPACT ON THE NUMBER OF DISABLED WORKERS HIRED BY FIRMS

VARIABLES	Coeff 35 Thr	Coeff 50 Thr
Treat	0.038 (0.123)	0.544 (0.409)
Constant	0.719*** (0.072)	0.982*** (0.130)
Observations	28,459	14,052
R-squared	0.012	0.04

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

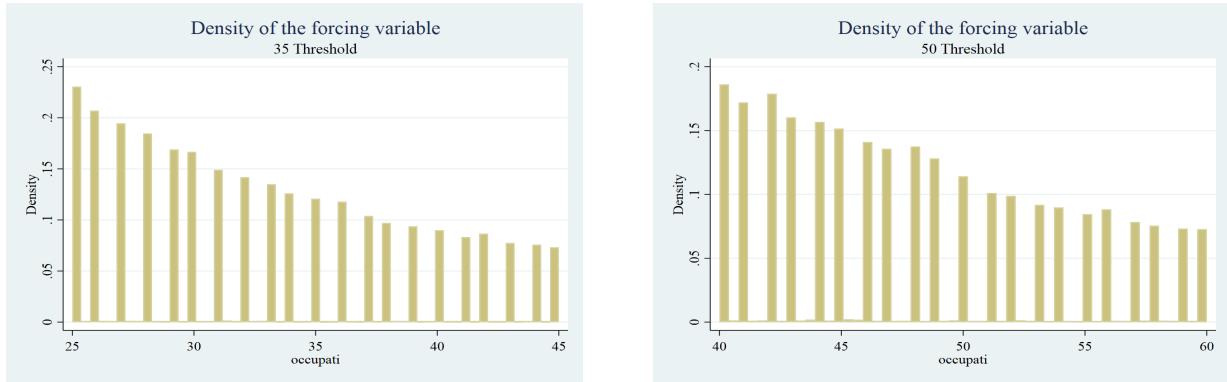
NOTE: The impact of Law 68/99 is given by “Treat”. For easier reading, coefficients and standard errors were multiplied by 100.

firms only. I.e., Mori and Sakamoto (2018) focused on manufacturing industry with more than 55 employees. Lalive et al. (2013) focused on services, manufacturing, constructions and tourism industries only. Some of them used firms’ declaration to measure compliance (Malo and Pagàn 2014, Mori and Sakamoto 2018), this may introduce a measurement error in case of cheating. Finally, we focused on workers with severe disabilities only, while the previous literature considered all disabled workers targeted by the policy. In line with Lalive et al. (2013) the magnitude of the impact is bigger for firms with a bigger size (i.e., for the second threshold).

5.2.1 Potential Issues

In our context the assumption of absence of sorting in the application of the regression discontinuity design may be violated. The results of the previous international literature reach conflicting results on the sorting behaviour of firms facing the quota threshold. Wagner et al. (2001) and Malo and Pagàn (2014) found no evidence of quota policy effects on firms’ employment choices or of sorting, respectively for Germany and Spain. Mori and Sakamoto (2018) found evidence of sorting at two of the thresholds under analysis. Lalive et al. (2013) found evidence of manipulation but they showed that it did not influence some observable variables of the firms. To check for the presence of sorting in the case of Italy at the two different thresholds, we checked the distribution of firms with respect to the number of employees. Consistent with what suggested by McCrary (2008), we expect, in presence of sorting, firms to be accumulated at 35 and at 49 employees. I.e., immediately before the threshold. As visible from figure 22a and 22b this is not the case. We can conclude there was no sorting in Italy in the period under analysis. This result is not surprising given that most of plants are not compliant to the policy. Moreover, it is in line with the results from Schivardi and Torrini (2008) who, in Italy, found only a modest impact on firm size at the threshold for a much more demanding policy.

As mentioned above, firms are allowed to hire the additional disabled worker in a different plant from those crossing the threshold, under an agreement with the EO. This rule may bias the results of the regression as disabled workers may be hired by other firms that are not treated. Although this bias should be negligible as there are few firms in Italy with multiple plants, we repeated the estimation using as an outcome the number of disabled workers hired in the corresponding firm. Therefore we study the impact of a plant crossing a threhsold on the number of disabled workers employed in the corre-



(a) Histogram of plants distribution by number of employees around 35 employees threshold.

(b) Histogram of plants distribution by number of employees around 50 employees threshold.

Figure 2: McCrary test for two of Law 68/99 thresholds.

sponding firm. The results are presented in appendix 7.1.1. Although, not surprisingly, the magnitude (and, in the case of 35 threshold, the sign) changes the impacts are still non-significantly different from zero, suggesting this issue is not a driver of the results.

As an additional robustness check we added some characteristics of the plants as covariates in the estimation of the regression model. Results are presented in appendix 7.1.2. As visible from the table, the coefficients at both thresholds do not change in magnitude and are still non-significantly different from zero.

5.2.2 Fine Increase

As mentioned earlier (section 3) in 2011 the fine for non-compliant firms increased. In this section we investigate whether the increase in the fine level changed plants attitude towards the hiring of disabled workers with high disability level. Using the same outcome, the same thresholds, the same bandwidths and the same definition of treated and untreated plants as in section 5.2, we apply a diff-in-disc model to estimate this impact. Our time discontinuity threshold is 2011. In particular, we employ the following regression model:

$$\delta_{jt} = \alpha_1 + \beta_1 D_{jt} + \beta_2 D_{jt} T_t + \gamma_t + \theta_{jp} + \omega_{jh} + \nu_{jt} \quad (5.3)$$

where T_t is a dummy variable taking value 1 after 2011 and the rest of the notation is as before. The impact of fine increase is given by the coefficient β_2 . The results of the regression are presented in table 6. As it is possible to see, the increase in fine level did not have a significant impact on the number of highly disabled workers employed by the plant. Again, this result is in contrast with the previous literature on the topic (Wuellrich 2010, Lalivé et al. 2013). Nonetheless, in the other studies, the policies under analysis had a positive and significant impact in the first place. Unfortunately, with the data available, it is impossible to determine whether firms reacted to the fine increase but only in favour of disabled workers with low disability levels. Nonetheless, a more naif look to the compliance level by year suggests this is unlikely.

6 Conclusion

In the paper, we analyse a quota-based policy for the integration of disabled workers in the labour market. According to this policy, namely Law 68/99, firms with more than

Table 6: ESTIMATION OF 2011 FINE INCREASE IMPACT ON THE NUMBER OF DISABLED WORKERS HIRED BY FIRMS

VARIABLES	Coeff 35 Thr	Coeff 50 Thr
Treat	-0.106 (0.258)	1.41 (1.10)
Treat*Time	0.248 (0.290)	-1.47 (1.21)
Constant	0.719*** (0.072)	0.981*** (0.130)
Observations	28,459	14,052
R-squared	0.012	0.04

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.
NOTE: The impact of fine increase is given by “Treat*Time”. For easier reading, coefficients and standard errors were multiplied by 100.

15 employees have to hire a quota of their workforce among disabled workers. We show as the policy has a very low compliance level, which is unlikely due to undercoverage. We underline as the compliance level calculated may be downward biased, but even considering this possibility is strikingly low. We show that the compliance rate is highly heterogeneous across regions, probably for a high heterogeneity in the efficiency of the local EOs.

In the second part of the analysis, we show as Law 68/99 does not affect the number of workers with severe disabilities employed in the targeted firms. The increase in the non-compliance fine in 2011 did not have a significant impact on this outcome either. This result is in contrast with the previous literature. The differences may follow the focus on different countries, the use of different types of data (i.e., survey data or firms’ declarations) and the focus on all disabled workers targeted by the policy rather than those with severe disability only.

We believe this paper is a useful tool to raise awareness on the scarce effectiveness of Law 68/99, especially for highly disabled workers, and on the lack of data on the topic. We hope this paper to be a starting point for the dissemination of additional data on the implementation of Law 68/99 and the hiring of disabled workers which will allow to calculate more precisely the compliance rate and to estimate the impact of the policy for all disabled workers (and to use it to make a comparison with the previous literature).

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7 Appendix

7.1 Robustness checks for Law 68/99 impact

7.1.1 Regression using Firms

7.1.2 Covariates Addition

Table 7: ESTIMATION OF LAW 68/99 IMPACT ON THE NUMBER OF DISABLED WORKERS HIRED BY FIRMS

VARIABLES	Coeff 35 Thr	Coeff 50 Thr
Treat	-1.785 (1.558)	2.157 (2.269)
Constant	41.83*** (1.091)	40.38*** (1.487)
Observations	28,459	14,052
R-squared	0.189	0.148

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

NOTE: The impact of Law 68/99 is given by “Treat”.

Table 8: ROBUSTNESS CHECK: COVARIATES ADDITION

VARIABLES	Thr 35	cov	Thr 50	Thr 50
Treat	0.143 (0.145)	0.169 (0.147)	0.49 (0.467)	0.524 (0.526)
Birth Year		0.00464 (0.00373)		0.00853 (0.00833)
Fixed Assets		-1.22e-05** (6.17e-06)		-5.56e-05 (4.83e-05)
Trade receivables		1.53e-05 (1.63e-05)		4.28e-06 (2.54e-05)
Liquidity		-7.01e-06 (1.21e-05)		-9.18e-05 (1.31e-04)
Total Assets		8.22e-06 (5.42e-06)		8.41e-07 (2.27e-06)
Value of production		-3.98e-06* (2.13e-06)		4.07e-06 (5.32e-06)
Labour cost		-6.03e-05 (6.77e-05)		9.91e-06 (3.86e-04)
Operational Value Added		-1.34e-05 (1.45e-05)		5.2e-05 (6.59e-05)
Constant	0.720*** (0.0797)	-8.47 (7.45)	1.14*** (0.159)	-15.8 (16.6)
Observations	23044	22591	11609	11356
R-squared	0.014	0.014	0.046	0.048

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

NOTE: The impact of Law 68/99 is given by “Treat”. For easier reading, coefficients and standard errors were multiplied by 100. Data on firm characteristics were collected from Cerved firms’ database.