

The Employment Effect of the Employment Rate System for Persons with Disabilities in Japan^{*}

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Abstract

We investigate the effects of the 2010 and 2013 reforms to the Employment Rate System for Persons with Disabilities on the employment of persons with disabilities using aggregate data and micro data of enterprises. An analysis of the aggregate data examining the types of disabilities most affected by the reforms indicates that the 2010 reforms positively affected full-time employment of persons with severe intellectual disabilities and mental disorders. An analysis of the same data indicates that the 2013 reform did not affect employment for persons with any type of disability. According to the micro data of enterprises, however, the 2013 reforms promoted the employment of the disabled at the target enterprises, that is, enterprises with 50 or more employees. Hence, we conclude that the Employment Rate System in Japan has had certain positive effects on the employment of persons with disabilities.

JEL Classification: I18, J14, K31

Keywords: employment of persons with disability, Employment Rate System, employment reforms, statutory employment, employment promotion policies

* The following provided assistance with this research: The Grant-in-Aid for Research in Nagoya City University

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1 Introduction

Japan has been promoting employment of the disabled by imposing a regulatory employment rate on employers. The Employment Rate System for Persons with Disabilities came into force in 1960 with the enactment of the Act on Promotion of Employment for Persons with Disabilities, which requires private sector firms to employ the physically disabled. In 1976, the Act on Promotion of Employment for Persons with Disabilities was revised to mandate enterprises with more than 67 regular employees to employ the physically disabled at the rate of 1.5% of regular employees. The Disabled Employment Levy System, which was established at the same time, requires only private enterprises with 301 or more regular employees that do not satisfy the statutory employment rate to pay levies and grants to employers who hire a larger number of employees with disabilities than the statutory rate.

Although the Employment Rate System for Persons with Disabilities plays a central role as an employment policy for the disabled, its effects have not been examined since it came into force. Since the Employment Rate System is now being enforced in earnest, it is important to examine whether the system works effectively toward improving employment for the disabled. Our study is the first to analyze the policy effects of this system on employment of the disabled in Japan and provides valuable evidence for a policy debate relating to disability employment in the country.

We examine the effects of this mandate on the employment of the disabled using two types of data. First, we use the aggregate data of employment of the disabled from 2005 to 2013, which is collected annually by the Ministry of Health, Labour and Welfare (MHLW). Using these aggregate data, we investigate which types of disabilities are most affected by the reforms to this law in 2010 and 2013. Second, we employ the survey data of enterprises in Japan's Aichi prefecture to examine whether the enterprises that were newly targeted by the 2013 reforms increased their employment of persons with disabilities.

DeLeire (2000), Acemoglu and Angrist (2001), Kruse and Schur (2003), Hotchkiss (2004), Jolls (2004), and Jones (2008) studied the policy effects of the Americans with Disabilities Act (ADA). Enacted in 1990, the ADA prohibits employers from discriminating against persons with disabilities in hiring, firing, and payment. The above studies found that the ADA did not have distinct positive effects on the employment of the disabled.

The effects of Japan's Employment Rate System for Persons with Disabilities on the employment of the affected persons and the labor market have rarely been studied. Nagae (2005, 2014) focused on the Employment Rate System and its effect on the labor market.

Nagae (2005) found that after the names of enterprises that did not meet the employment rate in 2003 were revealed, their stock prices rose, while those of firms that complied with the law fell. Nagae (2014) observed that the profit of firms that met the employment rate was lower than that of those that did not meet it. However, the productivity of both sets of firms was similar. Both the aforementioned studies by Nagae did not directly examine the effectiveness of the system on employment for persons with disabilities. Hence, we intend to investigate whether the system actually promotes employment for the disabled.

This remainder of this paper is structured as follows. Section 2 provides an overview of recent trends in the Employment Rate System and the employment situation of persons with disabilities in Japan. Section 3 examines the effect of reforms to the Employment Rate System in 2010 and 2013 on the employment of the disabled, using aggregate data in order to distinguish between the effects among the disabled. Section 4 analyzes the effects of the reforms undertaken in 2013 for the enterprises that were newly targeted by the reform, using their micro data. We provide the conclusion and discuss issues for further research in the final section.

The results of this study are as follows. An analysis of the aggregate data to examine which types of disabilities were most affected by the reforms indicates that the 2010 reform had positive effects on full-time employment of persons with severe intellectual disabilities and mental disorders. The 2013 reform did not appear to have any effect on employment for persons with any type of disability. Hence, according to our analysis of the aggregate data, the 2010 reform enhanced employment for persons with particular types of disabilities, while the 2013 reform did not have any effect despite the type of disability.

We investigated the effects of the reforms in 2013 on the enterprises targeted by the reform using micro data at the enterprise level for a particular prefecture. The results of the empirical analysis show that the reforms in 2013 promoted the employment of the disabled in enterprises subject to the said law (i.e., the newly targeted enterprises), that is, those employing 50 and more employees. Thus, we conclude that the Employment System in Japan has had positive effects on the employment of persons with disabilities.

2 The Employment Rate System for Persons with Disabilities in Japan

The Act on Promotion of Employment for Persons with Disabilities was enacted in 1960 and set the employment rate of the disabled to encourage certain private-sector enterprises whose business is office-oriented to employ persons with disabilities at the rate of 1.3% of

their regular employees, and those whose business is site-oriented, at the rate of 1.1%. However, at the time, the law only made recommendations, urging the private-sector enterprises to employ the physically disabled as a “duty.” In 1976, the law was revised, changing the recommendation to a mandate, wherein private-sector enterprises were required to employ the physically disabled at the rate of 1.5% of their regular employees. The employment rate was changed to 1.6% in 1988, 1.8% in 1998, and 2.0% in 2013.¹⁾ The rate is revised every five years in accordance with the following equation which is defined by the law:

Statutory employment rate = (Number of physically or intellectually disabled regular employees + number of physically or intellectually disabled unemployed)/((Number of non-disabled regular employees + number of non-disabled unemployed) Number of excluded employees).²⁾

The types of disabilities covered by the law were also expanded. At first, when the law was enacted, persons with physical disabilities were covered by the law and the employees with severe physical disabilities were subject to double counting (i.e., employment of one person with severe disabilities (first or second grade disability, as provided by the Act on Welfare of Persons with Physical Disabilities) was regarded as employment of two persons with disabilities). Persons with intellectual disabilities were brought under the ambit of the law in 1992, and the severely intellectually disabled were also subject to double counting. Since 2010, not only full-time but also part-time regular workers with physical or intellectual disabilities have been covered under the law. Enterprises will need to employ persons with mental disorders from 2018.

More enterprises were brought under the ambit of the law after 1976 depending on the

1) Government-affiliated organizations, such as national and local public organizations, prefectural boards of education, and independent administrative corporations, were also mandated by law to employ the disabled since 1976. However, the statutory employment rate is higher than that for private enterprises. The statutory employment rate in 2014 was 2.3% for national and local public organizations and independent administrative corporations, and 2.2% for prefectural boards of education. However, the Disabled Employment Levy System is not applicable to government-affiliated organizations.

2) Excluded employees are those who are not considered in the denominator of the equation, reflecting the difficulties faced by the industry in hiring persons with disabilities. The actual number of excluded employees is calculated using the exclusion rate designated by the industry, such as 5% for transportation equipment manufacturers, 40% for medical service providers, 45% for the forestry industry, 50% for child welfare businesses, and so on. The exclusion rate is defined by the law and was decreased by 10 percentage points for all industries in 2010.

enterprise's size. In 1976, the law was applicable to enterprises with 67 or more regular employees. This number was changed to 63 or more employees in 1988, 56 or more employees in 1998, and 50 or more employees from 2013.

The Disabled Employment Levy System was established in 1976 and came into force in 1980. It required enterprises with 301 or more regular employees that do not satisfy the statutory employment rate to pay levies and grants to employers who employ persons with disabilities exceeding the statutory rate. The size of the enterprises covered by the law was lowered to 201 or more regular employees in 2010, and 101 or more employees in 2015. The monthly amount of levies is ¥50,000 per unfulfilled person. The collected levies are distributed to the enterprises that satisfy the statutory rate as adjustment grants. Enterprises with 201 or more regular employees that employ persons with disabilities over the statutory employment rate receive grants of ¥27,000 per month per person who is employed, while those with 200 or less regular employees receive ¥21,000 per month per person employed over the statutory employment rate.

The MHLW requires enterprises to report the employment rate on June 1 every year. Enterprises with 50 or more employees are obliged to calculate the employment rate using the following equation:

$$\text{Employment rate} = (2.0 \times \text{Number of full-time employees with severe disabilities and number of full-time employees with mild disabilities}) + (0.5 \times \text{number of part-time employees with disabilities}) / ((\text{Number of full-time employees} + 0.5 \times \text{Number of part-time employees}))$$

Figure 1 shows changes in employment as reported by the enterprises on June 1 since 1976. The employment rate was 1.09 in 1977 when the law came into force.³⁾ The rate increased to 1.65 in 2011, indicating that more persons with disabilities started securing employment after the law was enacted. However, as the law has been revised several times with regard to the change in the size of the enterprises or types of disabilities applicable to the law, the rates shown in Figure 1 cannot be simply interpreted as a consecutive increase in employment for persons with disabilities.

In order to see whether employment for persons with disabilities has actually improved, we examine the employment ratio calculated by the number of employed persons with disabilities divided by the number of persons with disabilities.⁴⁾ Figures 2–12 show the chang-

3) The law came into force in the autumn of 1976, and the figure was first reported in June 1977.

4) The number of people employed with disabilities is obtained from the Survey of Current Employment

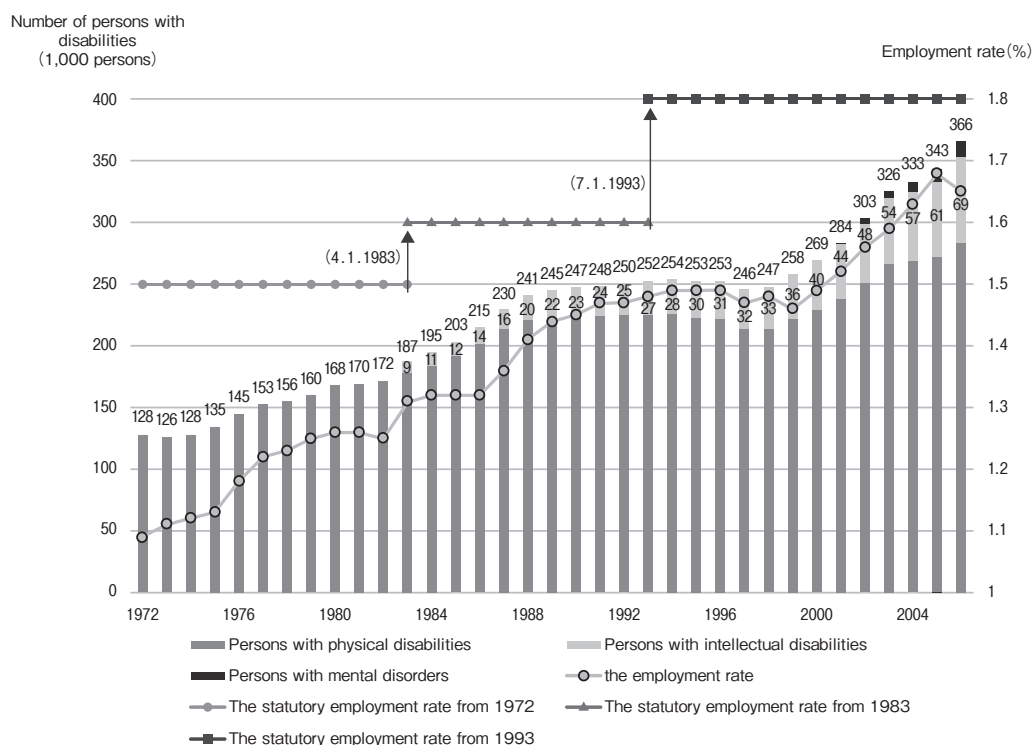


Figure 1 Changes in the Employment Rates and Number of Employed Persons with Disabilities

Source: Survey of Current Employment Situation for Persons with Disabilities (as of June 1), MHLW

es in the calculated employment ratio. The changes in the employment ratio for private enterprises of any size (Figure 2) indicate that the highest ratio occurred for enterprises employing full-time regular workers with mild intellectual disabilities, with the ratio increasing continuously between 2005 and 2013. The second highest ratio can be attributed to the employment of persons with mild physical disabilities as full-time regular workers. The third highest ratio results from employment of persons with severe intellectual disabilities as full-time regular workers.

The full-time employment of persons with disabilities increased remarkably since 2005, from 8.8% in 2005 to 12.1% in 2013 (Figure 2). The number of persons with severe intellec-

Situation for Persons with Disabilities (conducted by MHLW on June 1 every year). The number of persons with disabilities is obtained from the Report on Social Welfare Administration and the Services and Patient Survey (both conducted by MHLW). We count the number of persons with disabilities as the sum of (a) the number of persons who have a certificate for either physical or intellectual disability and (b) the number of patients who suffer from mental illnesses, since persons with mental disorders tend not to apply for disability certification.

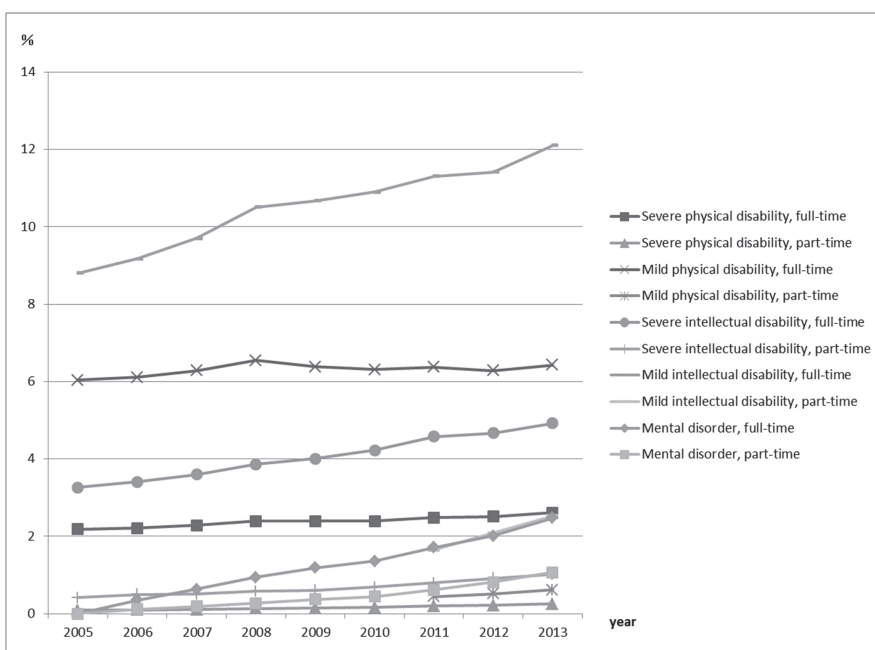


Figure 2 Employment Ratios of Private Enterprises (All Sizes)

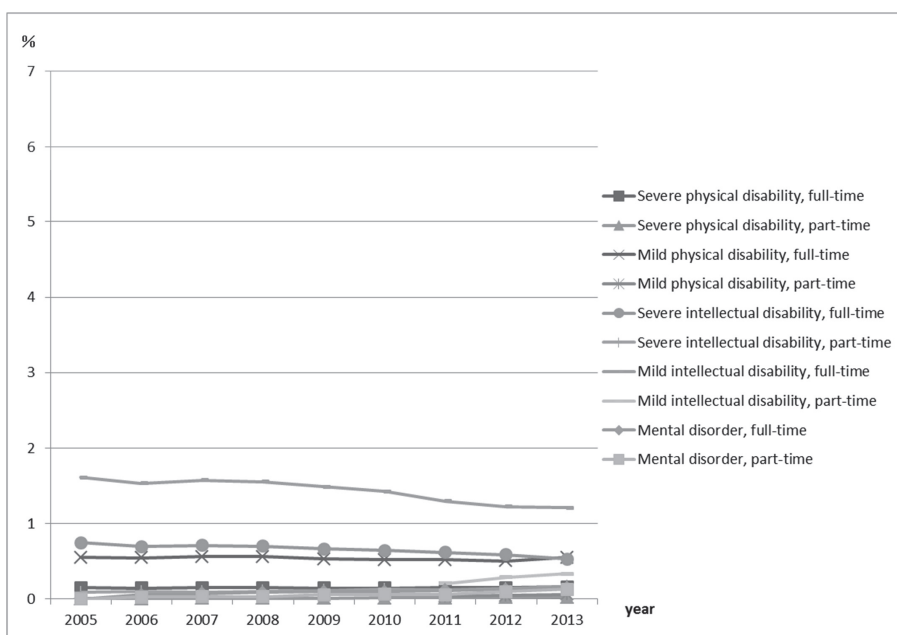


Figure 3 Employment Ratios of Private Enterprises with 56-99 Regular Employees

tual disabilities employed as full-time regular workers and those with mental disorders employed as full-time or part-time regular workers also increased throughout the period. However, other categories of disability do not show large changes. However, the ratio of full-time regular workers with severe or mild physical disabilities decreased at enterprises with 56–99 regular employees (Figure 3).

Figures 3–7 continue to track the changes in the employment ratios of private sector enterprises by size. In terms of enterprise size, the highest ratio, about 6.0% in 2013 for the mildly intellectually disabled, was recorded for enterprises with 1000 and more regular employees (Figure 7). All government-affiliated organizations, conversely, show quite low ratios (Figures 8–12). One reason for this result could be that these organizations are free from the Disabled Employment Levy System. Moreover, they prefer to employ persons with mild physical disabilities compared to those with other more serious types of disabilities.

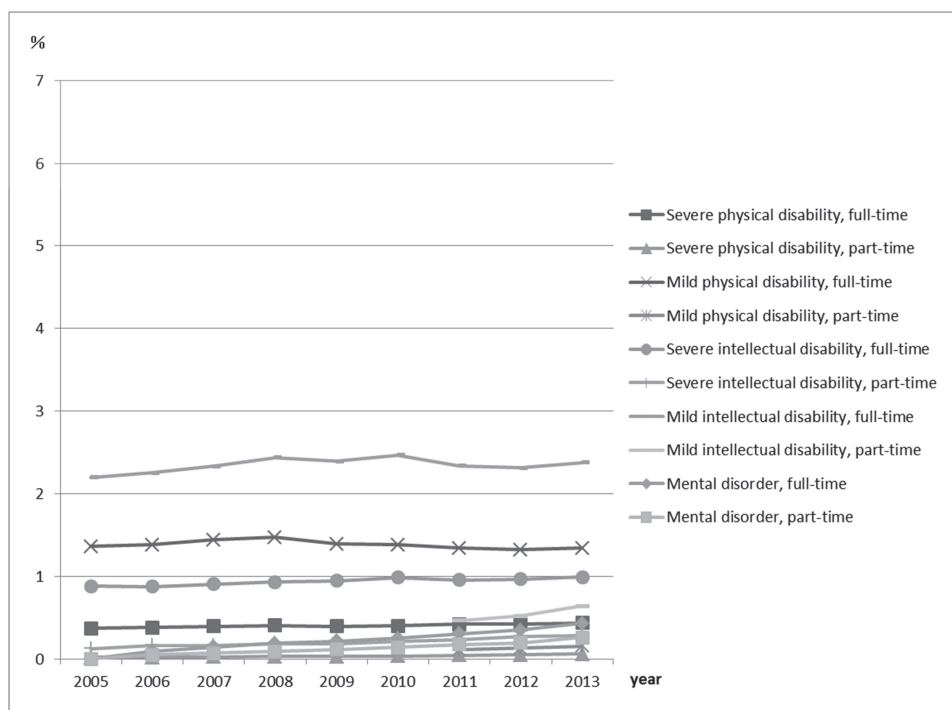


Figure 4 Employment Ratios of Private Enterprises with 100–299 Regular Employees

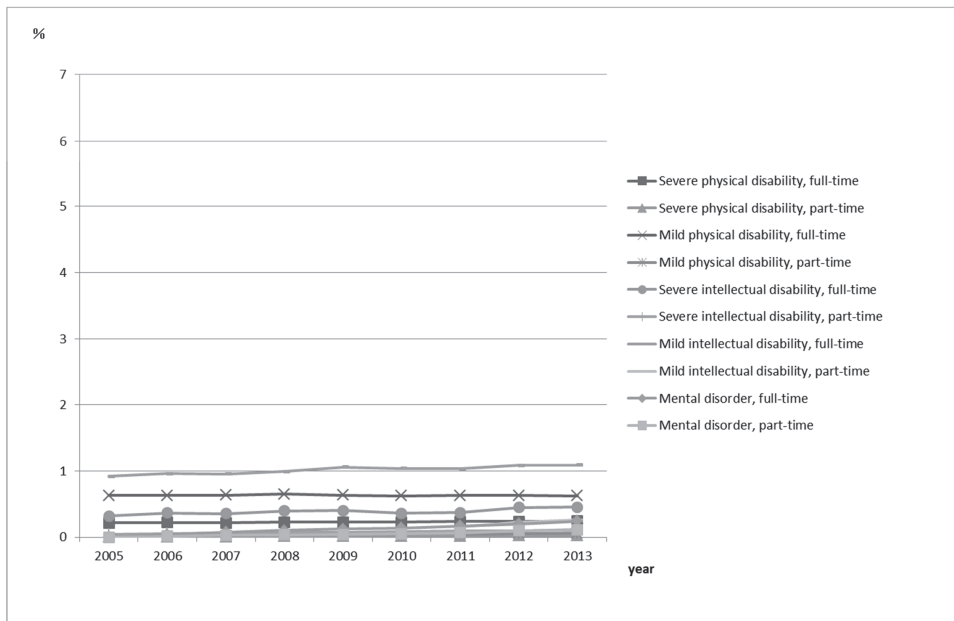


Figure 5 Employment Ratios of Private Enterprises with 300—499 Regular Employees

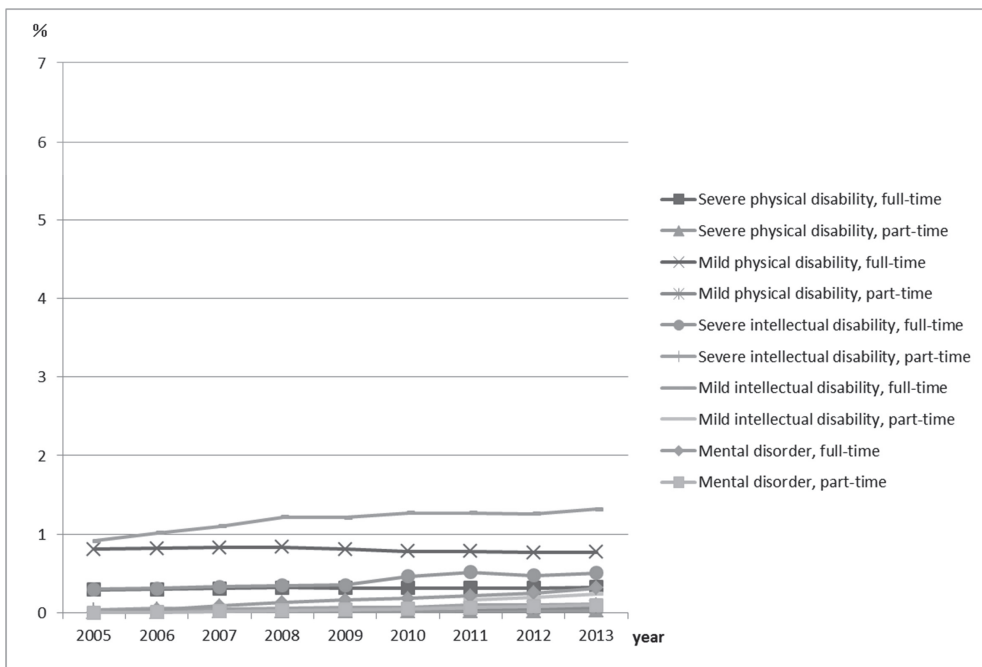


Figure 6 Employment Ratios of Private Enterprises with 500—999 Regular Employees

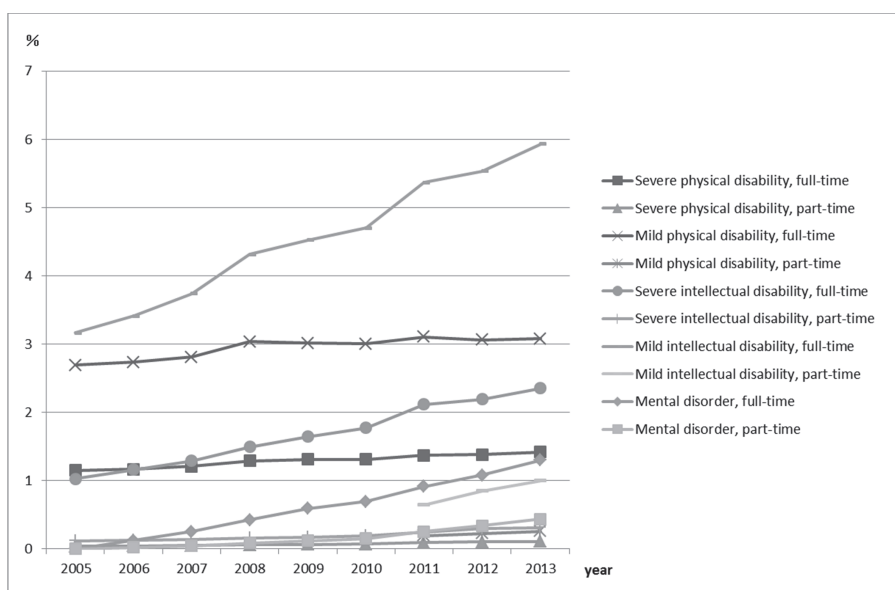


Figure 7 Employment Ratios of Private Enterprises with 1000 or More Regular Employees

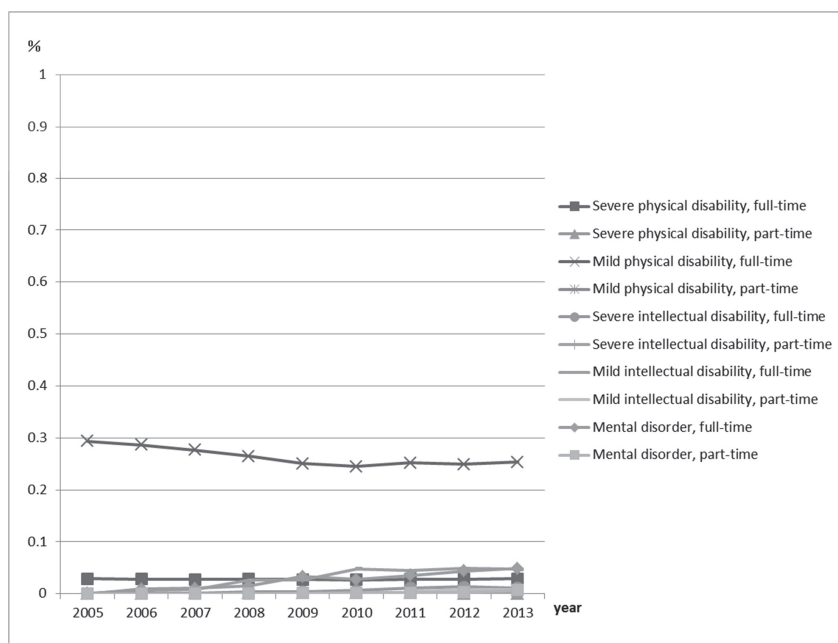


Figure 8 Employment Ratios of National Organizations

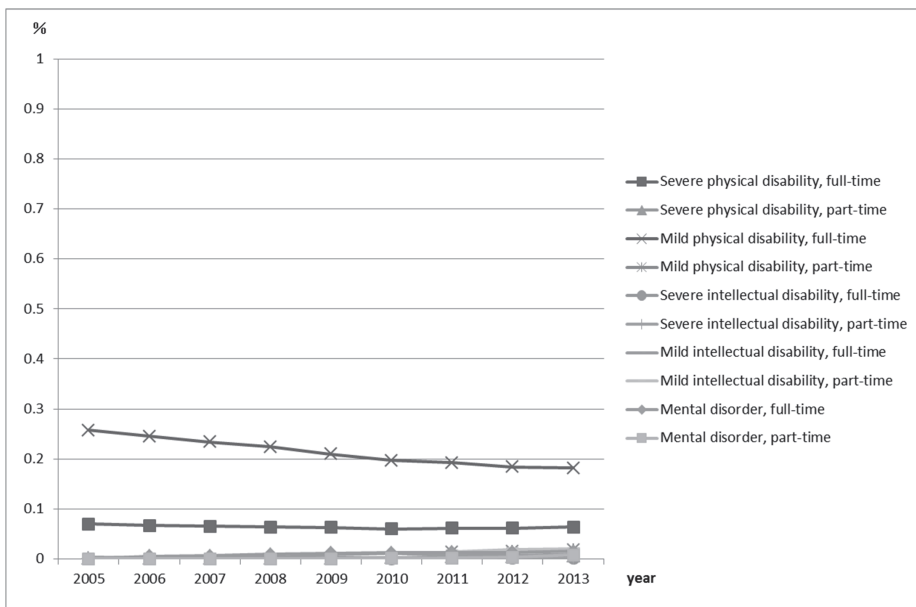


Figure 9 Employment Ratios of Prefectural Organizations

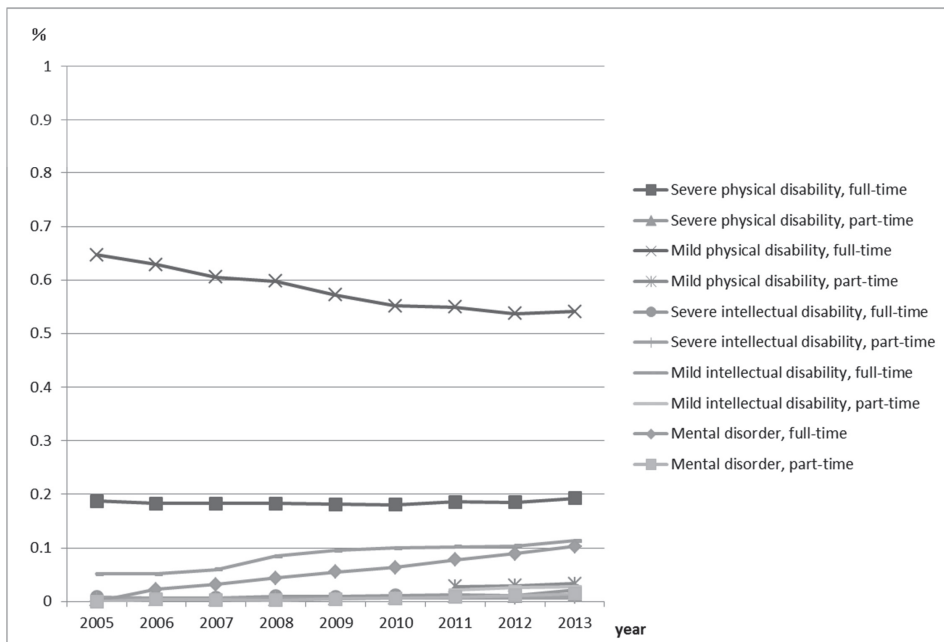


Figure 10 Employment Ratios of Municipal Organizations

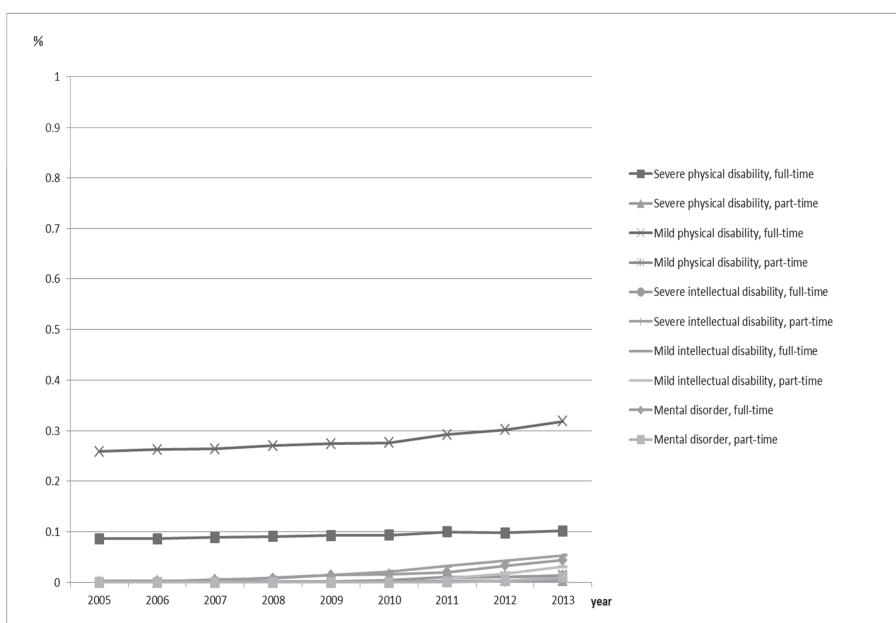


Figure 11 Employment Ratios of Prefectural Boards of Education

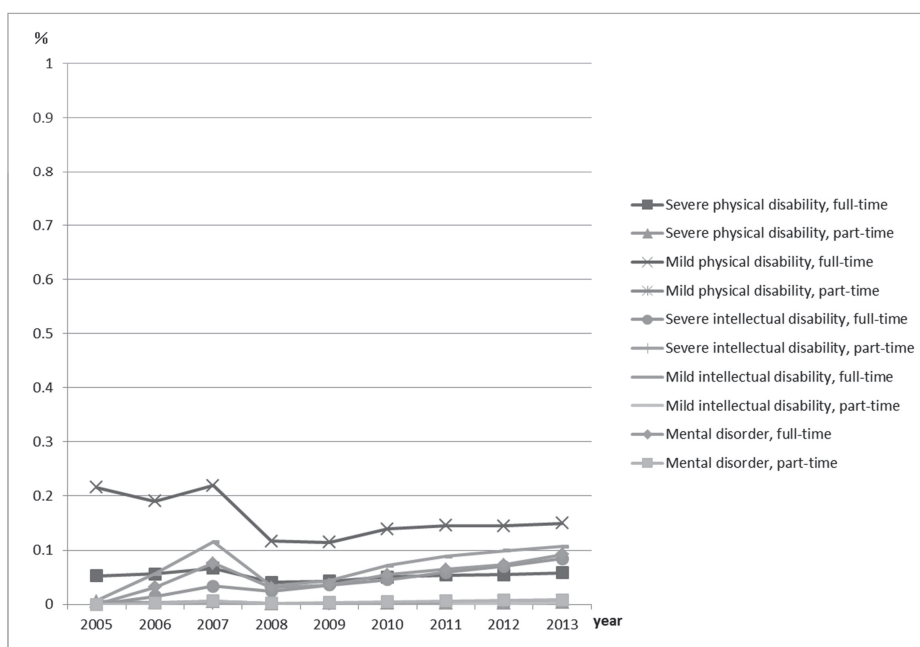


Figure 12 Employment Ratios of Independent Administrative Corporations

Note: The data for Figures 2-12 are sourced from the Survey of Current Employment Situation for Persons with Disabilities (MHLW), Report on Social Welfare Administration (MHLW), and Services and Patient Survey (MHLW).

3 Estimates with the Aggregate Data

In this section, we examine which types of disabilities were most affected by the reforms using the aggregate data of MHLW. We focus on the reforms of 2010 and 2013, that is, (a) the reform to the Disabled Employment Levy System in July 2010, which brought enterprises with 201 or more regular employees, and (b) the reform in April 2013, which changed the size of the enterprises from those with 56 or more employees to those with 50 or more employees, and increased the statutory employment rate from 1.8% to 2.0%. We use the aggregate data gathered by MHLW from 2005–2013 to plot Figures 2–12.

The MHLW, however, surveys enterprises covered under both the Employment Rate System for Persons with Disabilities and the Disabled Employment Levy System. Therefore, it is not possible to obtain the employment data of enterprises not covered by the abovementioned laws; in other words, it is difficult to examine the effect of the reforms on the employment of the disabled in the newly targeted enterprises using these aggregate data. If the strengthening of the employment policy has some positive effects on the employment of persons with disabilities on the whole, enterprises that were subject to the Employment Rate System but did not satisfy the statutory employment rate might be encouraged to increase the employment rate of persons with disabilities. Thus, we refer to the investigation of the effects of the reforms that might have caused newly targeted enterprises to offer employment to disabled persons in the next section. Here, we examine the overall effects of reforms on the employment of the disabled and distinguish the differences of the effects caused by the reforms by the type of disability.

The dependent variables are the calculated employment ratios (see Figures 2–12) by size of enterprise, types of disabilities, and employment, that is full-time or part-time regular employees. The explanatory variables are the dummy variables of types of disabilities and year dummies. To investigate the effects of the 2010 and 2013 reforms, we use a year dummy where the years after 2011 take 1 and a year dummy where the year 2013 takes 1, respectively.⁵⁾ We test whether the policy changes in 2010 and 2013 have positive effects on the employment of persons with disabilities, and if so, which types of disabilities are affected the most.

The results of the ordinary least squares (OLS) estimation appear in Table 1. Models (1) and (2) show the effects of the policy reform in 2010 and 2013 respectively. We use severely

5) The 2010 reform came into force in July 2010, and the MHLW surveys are conducted annually in June. Therefore, the data from 2011 can be assumed to reflect the effects of the 2010 reform.

Table 1 Impact of the 2010 and 2013 Reforms: OLS Estimation

VARIABLES	(1)	(2)
Severe physical disability, part-time	− 0.259*** (0.052)	− 0.262*** (0.048)
Mild physical disability, full-time	0.509*** (0.058)	0.502*** (0.049)
Severe intellectual disability, full-time	0.104*** (0.025)	0.123*** (0.025)
Severe intellectual disability, part-time	− 0.217*** (0.048)	− 0.214*** (0.043)
Mild intellectual disability, full-time	0.740*** (0.119)	0.773*** (0.111)
Mental disorder, full-time	− 0.178*** (0.045)	− 0.152*** (0.037)
Mental disorder, part-time	− 0.251*** (0.056)	− 0.243*** (0.048)
After 2011 × Severe physical disability, part-time	− 0.0121 (0.107)	
After 2011 × Mild physical disability, full-time	− 0.0273 (0.091)	
After 2011 × Severe intellectual disability, full-time	0.0804* (0.049)	
After 2011 × Severe intellectual disability, part-time	0.0118 (0.096)	
After 2011 × Mild intellectual disability, part-time	0.15 (0.248)	
After 2011 × Mental disorder, full-time	0.113* (0.066)	
After 2011 × Mental disorder, part-time	0.0402 (0.098)	
Year 2013 × Severe physical disability, part-time		− 0.014 (0.179)
Year 2013 × Mild physical disability, full-time		− 0.0241 (0.124)
Year 2013 × Severe intellectual disability, full-time		0.0703 (0.080)
Year 2013 × Severe intellectual disability, part-time		0.0111 (0.158)
Year 2013 × Mild intellectual disability, full-time		0.15 (0.412)
Year 2013 × Mental disorder, full-time		0.123 (0.087)
Year 2013 × Mental disorder, part-time		0.0477 (0.150)
Constant	1.212*** (0.145)	1.295*** (0.136)
Observations	700	700
R-squared	0.602	0.597

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

The estimations include year dummies, enterprise size, and interaction terms of year dummy and enterprise size.

physically disabled full-time employees as the reference for the dummy variables for types of disabilities. Throughout the period, both models show higher rates of employment for mildly physically disabled full-time, severely intellectually disabled full-time, and mildly intellectually disabled full-time persons compared to severely physically disabled full-time persons. The 2010 reform seems to have exerted positive effects in terms of full-time employment for persons with severe intellectual disabilities and mental disorders (Model (1)). On the other hand, the 2013 reforms did not appear to have any effect on the employment of persons with any type of disability. Hence, according to the aggregate data, the 2010 reform enhanced the employment of persons with particular types of disabilities, but the 2013 reform did not appear to affect employment for persons with any kind of disability.

4 Estimates Using the Micro Data of Enterprises

In the previous section, we could not observe any positive effects from the 2013 reform on the employment of persons with disabilities as we used aggregate data. Here, we explicitly examine the policy effects on the targeted group using the micro data of enterprises. The reforms in 2013 increased the mandatory employment rate from 1.8% to 2.0% and brought more enterprises under its ambit by lowering the requisite number of regular employees from 56 or more to 50 or more. This heightened stringency of the Employment Rate System might be assumed to have had positive effects on the employment of the disabled. However, if enterprises do not consider the penalty of not satisfying the rate as being heavy enough to make them comply with the law, the reform in 2013 might not have any effects on the employment of the disabled.

We employ the data obtained from a survey conducted in July 2014, which queried enterprises about the rate of employment of the disabled. The survey included small- and medium-sized enterprises in Aichi prefecture, which is situated near the center of the Japanese main island of Honshu. We selected this area as it is economically abundant, with major manufacturing sectors. The data were collected through a mail survey sent to 2,265 enterprises, 451 of which responded. Table 2 shows the summary statistics of the data.

In order to investigate the effects of the 2013 reform in a more direct way, we adopt the employment ratios in 2012 and 2013 as dependent variables and check whether the coefficients of the enterprise size are positively significant or not. Here, we investigate the effectiveness of the Employment Rate System in three ways. First, using data for enterprises with 49 employees or less, which are exempt from the law, as the reference dummy, we ex-

Table 2 Descriptive Statistics

Sample for Table 3	Num. of Observations	Mean	Std. Dev.	Min	Max
Ratio of employment of the disabled in 2012	195	0.046	0.193	0	1.076923
Enterprise with 50–55 regular employees	195	0.010	0.101	0	1
Enterprise with 56–100 regular employees	195	0.046	0.210	0	1
Enterprise with 101–200 regular employees	195	0.026	0.158	0	1
Enterprise with 50 and more regular employees	195	0.108	0.311	0	1
Enterprise with 201 and more regular employees	195	0.026	0.158	0	1
Dummy variable if the enterprise's performance improved from 2009 to 2013	195	0.400	0.491	0	1
Industry: construction	195	0.200	0.401	0	1
Industry: manufacturing	195	0.374	0.485	0	1
Industry: service	195	0.169	0.376	0	1
Industry: other	195	0.149	0.357	0	1
Stock enterprise	195	0.667	0.473	0	1
Limited enterprise	195	0.190	0.393	0	1

Sample for Table 4	Num. of Observations	Mean	Std. Dev.	Min	Max
Ratio of employment of the disabled in 2013	196	0.049	0.207	0	1.5
Enterprise with 50–55 regular employees	196	0.010	0.101	0	1
Enterprise with 56–100 regular employees	196	0.046	0.210	0	1
Enterprise with 101–200 regular employees	196	0.026	0.158	0	1
Enterprise with 50 and more regular employees	196	0.107	0.310	0	1
Enterprise with 201 and more regular employees	196	0.026	0.158	0	1
Dummy variable if the enterprise's performance improved from 2009 to 2013	196	0.403	0.492	0	1
Industry: construction	196	0.204	0.404	0	1
Industry: manufacturing	196	0.367	0.483	0	1
Industry: service	196	0.163	0.371	0	1
Industry: other	196	0.158	0.366	0	1
Stock enterprise	196	0.658	0.476	0	1
Limited enterprise	196	0.189	0.392	0	1

Sample for Table 5	Num. of Observations	Mean	Std. Dev.	Min	Max
Dummy variable = 1 if the enterprise increased its employment of the disabled from 2012 to 2013	359	0.033	0.180	0	1
Enterprise with 50–55 regular employees	359	0.011	0.105	0	1
Enterprise with 56–100 regular employees	359	0.045	0.207	0	1
Enterprise with 101–200 regular employees	359	0.017	0.128	0	1
Enterprise with 50 and more regular employees	359	0.089	0.285	0	1
Enterprise with 201 and more regular employees	359	0.017	0.128	0	1
Dummy variable if the enterprise's performance improved from 2009 to 2013	359	0.384	0.487	0	1
Industry: construction	359	0.217	0.413	0	1
Industry: manufacturing	359	0.343	0.475	0	1
Industry: service	359	0.181	0.386	0	1
Industry: other	359	0.162	0.369	0	1
Stock enterprise	359	0.649	0.478	0	1
Limited enterprise	359	0.201	0.401	0	1

amine the results of the coefficients of the dummy variables of 50 or more employees. Positively significant estimation results suggest that the Employment Rate System effectively improves employment for persons with disabilities in enterprises that have complied with the law.

Second, comparing the coefficients of enterprises with 56 or more employees in 2012 to those of 2013, we try to capture the change resulting from the 2013 reform (in this case, from 1.8% to 2.0%). A larger coefficient for 2013 implies that enterprises with 56 or more employees increased their employment of the disabled.

Third, we focus on enterprises with 50–55 employees. If the coefficient is positively significant only for 2013, the 2013 reform that expanded the size of the targeted enterprises has had positive effects on the employment of the disabled in the newly targeted enterprises.⁶⁾

Table 3 Impact of the 2013 Reform on the Targeted Enterprises: Tobit Estimation
Dependent variable: Employment ratio of the disabled in 2012

VARIABLES	(1)	(2)	(3)
Enterprise with 50–55 regular employees		1.010 (0.870)	1.037 (0.815)
Enterprise with 56–100 regular employees			0.681*** (0.543)
Enterprise with 101–200 regular employees			0.525** (0.556)
Enterprise with 50 and more regular employees	0.707*** (0.356)		
Enterprise with 201 and more regular employees			0.758*** (0.578)
Dummy variable if the enterprise's performance improved from 2009 to 2013	– 0.410** (0.291)	– 0.328* (0.308)	– 0.398** (0.296)
Constant	– 1.168** (0.563)	– 1.143*** (0.599)	– 1.192** (0.573)
Observations	195	195	195
F-value	4.806	3.837	3.586
Prob. > F	2.16E–05	0.000334	0.000135
Pseudo R ²	0.134	0.0837	0.136
log pseudo-likelihood	– 75.47	– 79.86	– 75.31

Note: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
We omit the results of the dummy variables for industry and type of enterprise.

6) The employment ratio is calculated as follows. Employment ratio = $(2.0 \times \text{Number of full-time employees with severe disabilities and number of full-time employees with mild disabilities}) + (0.5 \times \text{number of part-time employees with disabilities}) / ((\text{Number of full-time employees without disabilities} + 0.5 \times \text{Number of part-time employees without disabilities}))$

Table 4 Impact of the 2013 Reform on the Targeted Enterprises: Tobit Estimation
Dependent variable: Employment ratio of the disabled in 2013

VARIABLES	(1)	(2)	(3)
Enterprise with 50–55 regular employees		1.378*** (0.870)	1.425*** (0.815)
Enterprise with 56–100 regular employees			0.623*** (0.543)
Enterprise with 101–200 regular employees			0.502** (0.556)
Enterprise with 50 and more regular employees	0.724*** (0.356)		
Enterprise with 201 and more regular employees			0.781*** (0.578)
Dummy variable if the enterprise's performance improved from 2009 to 2013	– 0.145 (0.291)	– 0.106 (0.308)	– 0.129 (0.296)
Constant	– 1.049*** (0.563)	– 1.031*** (0.599)	– 1.084*** (0.573)
Observations	196	196	196
<i>F</i> -value	5.047	2.269	3.95
Prob. > <i>F</i>	1.08E–05	0.0244	3.65E–05
Pseudo <i>R</i> ²	0.09	0.05	0.095
log pseudo-likelihood	– 82.06	– 85.67	– 81.61

Note: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
We omit the results of the dummy variables for industry and type of enterprise.

As for the employment ratio in 2012 (Table 3) and 2013 (Table 4), we use the reference dummy of 49 and less employees. We note that the coefficients of enterprises of 56 or more employees is positively significant both in 2012 and 2013, which suggests that enterprises with 56 or more employees are hiring more persons with disabilities than those having 49 or less employees, to which the law is not applicable. However, the size of the coefficients does not vary between the two periods, and thus, we cannot explicitly specify the effect of the 2013 reform in terms of the change in the rate of enterprises that comply with the law.

While the employment ratio of enterprises with 50–55 employees is not significantly different from the corresponding value of the other enterprises, it is positively significant for 2013 (see column (3) of Table 5). Therefore, the newly targeted enterprises with 50–55 employees were affected by the 2013 reform. Thus, the Employment System had certain positive effects on the employment of persons with disabilities.

In order to investigate the effects of the 2013 reform in a more direct way, we conduct a probit estimation that calculates the probability of the increase in employment for the dis-

abled from 2012 to 2013.⁷⁾ Thus,

$$P(y_i = 1) = F(x_i \beta)$$

where $y_i = 1$ if the enterprise increased its employment of the disabled from 2012 to 2013, and $y_i = 0$ otherwise. x_i is a vector of explanatory variables that includes the dummy variables of the size of the enterprises.

Column (1) of Table 5 shows the results for the dummy variables for the size of the enterprise, using enterprises with 49 employees or less as the reference. This allows us to check the coefficient of the dummy variable of enterprises with 50 employees or more, to verify the effect of the 2013 reform. The result is positively significant, indicating that the reform in 2013, which increased the rate to 2.0%, had a positive effect on the enterprises it targeted. Using enterprises with 49 employees or less and 56 employees or more as references, the results in column (2) shows that the 2013 reform did not create any particular ef-

Table 5 Impact of the 2013 Reform on the Targeted Enterprises: Probit Estimation
Dependent Variable: Dummy variable = 1 if the enterprise increased its employment of the disabled from 2012 to 2013

VARIABLES	(1)	(2)	(3)
Enterprise with 50–55 regular employees		1.410 (0.870)	1.700** (0.815)
Enterprise with 56–100 regular employees			0.617 (0.543)
Enterprise with 101–200 regular employees			1.718*** (0.556)
Enterprise with 50 and more regular employees	1.424*** (0.356)		
Enterprise with 201 and more regular employees			1.851*** (0.578)
Dummy variable if the enterprise's performance improved from 2009 to 2013	0.332 (0.291)	0.384 (0.308)	0.382 (0.296)
Constant	– 1.970*** (0.563)	– 2.003*** (0.599)	– 2.031*** (0.573)
Observations	359	359	359
Wald χ^2	33.22	34.03	60.34
Prob > χ^2	5.62E–05	0.0000401	8.03E–09
Pseudo R^2	0.288	0.147	0.327
log pseudo-likelihood	– 28.61	– 34.32	– 27.05

Note: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
We omit the results of the dummy variables for industry and type of enterprise.

7) We estimate the probit model with sampling weights.

fect on the newly targeted enterprises (those with 50–55 employees). However, the results in column (3) are significantly positive in almost every case (i.e., for enterprises with 50–55 employees, 101–200 employees, and 201 and more employees). Thus, the results in Table 5 lead us to conclude that the 2013 reform worked positively on enterprises to which the Employment Rate System was applicable; in all cases, the law increased the employment of persons with disabilities.

5 Conclusion

In this paper, we investigated the effects of the 2010 and 2013 reforms to the Employment Rate System for Persons with Disabilities on the employment of persons with disabilities using aggregate data and micro data of enterprises. First, we found that full-time employment of persons with mild intellectual disabilities increased considerably after 2005. Full-time employment of persons with severe intellectual disabilities and full-time or part-time employment of those with mental disorders also increased. However, the employment of persons with other types of disabilities did not change at all. Enterprises with 1000 and more employees drastically increased the employment of persons with mild intellectual disabilities. However, government-affiliated organizations showed quite a low rate of employment of persons with disabilities.

The effects of policy changes in 2010 and 2013 are as follows. Using aggregate data to examine which types of disabilities were most affected by the policy changes showed that the 2010 reform had positive effects on the full-time employment of persons with severe intellectual disabilities and mental disorders. An analysis of the data showed that the 2013 reform did not have any effect on the employment of persons with any type of disability. Hence, the 2010 reform increased the employment of persons with particular types of disabilities, but that of 2013 did not appear to have any effect on the same.

We then investigated the effects of the 2013 reform on specific enterprises, namely those targeted by the reform, using the micro data of those enterprises. The results of the empirical analysis indicated that the 2013 reform did in fact promote the employment of the disabled in the targeted enterprises, that is, those with 50 or more employees. Thus, we conclude that the Employment Rate System in Japan has had certain positive effects on the employment of persons with disabilities.

Further investigation of the policy effects of the Employment Rate System is possible provided we obtain micro data with a larger sample size. There is also a need to examine

the labor supply using the employee micro data containing information of persons with and without disabilities. However, we do not have sufficient labor supply survey data that include both persons with and without disabilities. Hence, it is impossible to analyze the policy's effects using the natural experimental method. In this regard, our study is one of the benchmarks of the examination of the policy effects of the Employment System in Japan.

The Act on the Elimination of Discrimination against Persons with Disabilities will come into force in 2016. The employment behavior of enterprises with regard to persons with disabilities is likely to be affected by this law. Moreover, the effects of the law may differ depending on the type of disability. We should therefore consider these differences and devise ways to further promote the employment of the disabled.

This study suffers from some limitations. We did not focus on the wage of the employed persons with disabilities. Although the employment rate of the disabled has increased, their wage level remains very low, and thus, the economic situation of the disabled in Japan is very severe. Therefore, we need to extend our investigation to the wage level of the employed disabled.

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