Disability Employment and Productivity

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Japan's disability employment policy is a levy system based on employment rates. The policy has been reinforced in recent years, in conjunction with Japan's ratification of the United Nations Convention on the Rights of Persons with Disabilities. This paper takes a sample of individual companies continuously listed on the Tokyo Stock Exchange between 2003 and 2010 and coming under the jurisdiction of the Tokyo Labour Bureau to conduct empirical analysis on the relationship between statutory employment rates and corporate performance. The aim in doing so is to evaluate the effectiveness of Japan's disability employment policy. The results of this analysis reveal that companies that met the statutory employment rate within the estimation period performed worse (in terms of profits) than those that did not. No impact could be found from the fact that persons with mental disabilities were added to employment rates during the period in question. Furthermore, it was also confirmed that achieving the statutory employment rate has no impact on a company's productivity. Therefore, disability employment policies aimed at equalizing corporate burdens need to be reinforced.

I. Introduction

On January 20th, 2014, the Japanese government ratified the "Convention on the Rights of Persons with Disabilities" adopted by the United Nations. The Convention is a global initiative aimed at improving the socially inferior status of persons with disabilities. Japan signed it on September 28th, 2007, but the necessary preparations delayed ratification until this point. In future, domestic legislation and others aimed at enhancing the social rights of persons with disabilities will be developed in Japan.

Policies for persons with disabilities in developed countries largely consist of policies on employment and income security. With advances in medicine and rehabilitation technology in recent years, persons with disabilities are now able to achieve the same productivity as those without disabilities, as long as they are given a degree of consideration. Moreover, since achieving the general employment[1] of persons with disabilities has the ultimate

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[1] Disabled persons who wish to start work are provided with employment through a special welfare system. This is because the mainstream employment system is heavily biased against the limited abilities of the handicapped, and regular kinds of work are difficult for them. For persons employed in rehabilitation institutions, social participation occurs concurrently with rehabilitation for vocational aid. Labor law is not applicable to this employment system. In this paper, the term "general employment" is used in contradistinction to work obtained through the special welfare system. Therefore,

goal of enabling them to participate in society, employment policies have a particularly central role to play. Therefore, disability employment policy should be such that general employment of the disabled is efficiently promoted. Disability employment policies adopted in developed countries largely consist of anti-discrimination laws and employment quota and levy systems. However, neither of these could be said to promote general employment of the disabled with any efficiency. Moreover, given the relationship with income security policy, it is not clear what kind of policy would be preferable (Burkhauser and Dary 2002; OECD 2003; National Institute of Vocational Rehabilitation 2002).

Anti-discrimination laws have taken shape under the concept of guaranteeing the human rights of persons with disabilities. These laws oblige companies to provide reasonable accommodation (such as barrier-free workplace environments) enabling persons with disabilities to perform their work duties smoothly. They also prohibit discrimination against persons with disabilities in connection with employment. Under these laws, persons with disabilities have their rights guaranteed and are no longer subjected to discriminatory treatment (Jones 2006). As such, these laws could ensure the quality of employment for disabled workers. However, companies have to cover the cost of providing reasonable accommodation to jobseekers and employees with disabilities. In other words, anti-discrimination laws do not include the function of compensating employers for the costs involved in disability employment. In countries that adopt this policy, therefore, it has been shown that the policy either has no effect or has a negative impact on disability employment and wages, owing to the opportunity cost of disability employment incurred by companies. This result has not been overturned to date (Acemoglu and Angrist 2001; Delaire 2000; Jones 2008; Burkhauser, Houtenville, and Rovba 2007).

Meanwhile, the employment quota and levy system arose out of the concept that it is society's obligation to protect persons with disabilities, as they are socially vulnerable. This system imposes a fixed disability employment quota on companies and obliges them to employ persons with disabilities. Levies are imposed on companies that fail to meet the statutory employment rate, and these are used to create funds that promote the general employment of the disabled. The funds are used as a financial resource for the rehabilitation needed for general employment of the disabled, as well as paying employment subsidies to companies. Moreover, subsidies known as adjustment payments are distributed to companies that achieve the statutory employment rate (Thornton 1998). Under this system, the aim is for the burden of costs associated with disability employment by companies to be borne equally by companies as a whole. As such, corporate burdens associated with disability employment ought to be taken into account. However, this system does not guarantee the rights of persons with disabilities. Therefore, since persons with disabilities could undeniably suffer discrimination when employed, the possibility remains that even if they find employment, their welfare will not improve. Since disability employment policy is expected to play a

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general employment is used to imply "regular" or "usual" employment.

central role within policies for persons with disabilities, and numerous countries adopt the employment quota and levy system, the effects of the employment quota and levy system will need to be analyzed in detail in order to consider a preferable disability employment policy.

The purpose of this paper is to study the effectiveness of the employment quota and levy system adopted in Japan, by verifying the relationship between corporate performance and levels of achievement of the statutory employment rate. Firstly, as will be explained in Section III, there has been no major change in the system, other than an increase in the types of disability counted in employment quotas. The effectiveness and problems of the system will be discussed by viewing differences in the corporate performance of companies whose achievement of the statutory employment rate changed between 2003 and 2010, when the average real employment rates of private companies gradually increased. Secondly, by viewing the relationship between companies' productivity and their achievement of the statutory employment rate, problems with the system will be highlighted and the future impact of introducing a Discrimination Elimination Act will be discussed.[2]

Below, in Section II, research evaluating disability employment policies in developed countries will be reviewed. Section III will give an outline and history of Japan's employment quota and levy system, then survey the employment status of persons with disabilities in private companies in recent years. Empirical analysis will be conducted in Section IV, insights obtained from the results will be summarized in Section V, and finally, future policies will be discussed.

II. Review of Existing Research

1. Anti-Discrimination Laws

Laws prohibiting discrimination against persons with disabilities have been adopted by western nations. Acemoglu and Angrist (2001) have produced notable research analyzing the effects of these laws. They use data from the CPS (Current Population Survey) and the EEOC (Equal Employment Opportunity Commission) to verify the effects of the "Americans with Disabilities Act" enacted in 1990, and use the Difference-in-Differences method (DD method) to verify the effects of policies. As a result, they reveal that both employment and wages have fallen. Meanwhile, Delaire (2000) uses different data to reach the same conclusion with regard to employment, though unable to verify a decrease in wages. Since then, other researchers have tried various ways of re-verifying the effects of the Act, but have been unable to overturn the results of research conducted immediately after it came into effect (Burkhauser, Houtenville, and Rovba 2007; Jones 2008). The consensus currently obtained from research on anti-discrimination laws is that, because they fail to account

[2] Japan's anti-discrimination law is known as the Discrimination Elimination Act. It comes into force in April 2016.

for the corporate burden of opportunity cost incurred by disability employment, they have consequently not enhanced the economic welfare of persons with disabilities.

2. The Employment Quota and Levy System

Countries that have adopted the employment quota and levy system are mainly concentrated in Europe. In these countries, the system is founded on the long-standing acceptance of a social obligation to employ individuals with disabilities (Thornton 1998). Lalive, Wuellrich, and Zweimüller (2013) analyze policies in Austria. The system adopted in Austria obliges companies to hire one additional person with disabilities for every 25 new employees, with financial penalties imposed on companies that fail to do so. They examine two groups of companies, one that just managed to meet the requirement for disability employment, and another that just failed to do so, incurring penalties. Comparing the distribution of corporate scale in terms of the numbers of persons with disabilities and non-disabled full-time workers employed by these two groups, companies that had to pay penalties tended to hire more persons with disabilities than those that did not. This shows that financial penalties produce incentives for disability employment, while subsidies tend to cause moral hazard in this respect. In addition, Edzes, Rijnks, and van Dijk (2013) reveal that the location of companies that hire persons with disabilities also has an impact on their employment. This suggests that the monetary amounts of subsidies and penalties provided under the system should not be uniform.

Economic research on the effects of the system in Japan includes that of Tsuchihashi and Oyama (2008). They state that “There are problems, in terms of efficiency, with each company always having to employ persons with disabilities in proportion to their corporate scale when society as a whole employs a fixed number of such persons.” They go on to assert that “Each company’s stance on acceptance of disability employment differs depending on the type of industry, the type of occupation and the corporate scale. Therefore, uniform employment rates are inefficient in social terms, in that they lead to wastage of resources and a diminishment of social welfare.” They go on to propose a system design that could improve problems with the system, though in reality, it would be difficult to put into practice. Meanwhile, Nakajima, Nakano, and Imada (2005) conduct simulation analysis based on the existing system, and find that increasing subsidies for disability employment could promise certain effects in terms of the social balance, but that conversely, increasing levies and subsidies and raising the statutory employment rate would not necessarily produce good effects. Finally, Nagae (2005) suggests the possibility that penal measures are not effective, based on the fact that the positive impact of these penalties on stock prices.

What is highlighted in these research results is that there is still room for improvement in order to make the policy less wasteful. In particular, a point asserted by all research studies in common is that the policy should take account of companies’ opportunity cost with regard to disability employment, and that in order to achieve this, the amounts of levies and subsidies need to be appropriately adjusted. In this paper, this point will additionally be

confirmed and the discussion expanded.

III. An Outline of Japan's Disability Employment Policy and Trends in Recent Years

1. System Outline

Japan's system of disability employment is based on the 1960 "Act on Employment Promotion etc. of Persons with Disabilities." Disability employment policy in its present form has been developed since the amendment of the Act in 1976. This law promotes disability employment among corporate employers by establishing a system of employment quotas, to ensure that persons with disabilities are employed at a fixed proportion of all employees. It also imposes disability employment levies of 50,000 yen per month on employers not meeting the employment quota for every person falling short of the quota, with the resultant income to be used for promoting disability employment. Levies from these companies are mainly converted to subsidies paid to employers who employ persons with disabilities beyond the statutory employment rate. Employers failing to achieve disability employment targets and meeting certain conditions set by the Ministry of Health, Labour and Welfare are ordered by the Ministry to draw up "Plans for Employment of Persons with Disabilities." If they fail to do so, they are fined up to 200,000 yen. Furthermore, if they fail to employ persons with disabilities in accordance with these plans, they receive the maximum penalty of "naming and shaming" (publication of the company name). The main purpose of the system is taken to be (i) to promote and stabilize employment for persons with disabilities, and (ii) to correct the imbalance in corporate burdens involved in employing persons with disabilities.

(1) Examples of Policy Reinforcement in Recent Years

With the ratification of the Convention on the Rights of Persons with Disabilities, an anti-discrimination law was added to Japan's disability employment policy. To prepare for this, the government has been taking steps to reinforce the policy over the last ten years. The first step was to expand the number of companies subject to levies. The statutory employment rate for private companies had been set at 1.8% until 2012, but was raised to 2.0% in 2013. Similarly, levies had been applicable to companies with 301 or more full-time employees up to 2009, but in 2010 the scope was expanded to include companies with 200 or more full-time employees, and again in 2015 to those with 100 or more. Secondly, types of disability subject to employment quotas were expanded and different treatment for ways of working depending on the degree of disability was introduced. In the policy until then, mental disabilities had not been included in the disabilities applicable to employment quotas. But they were included from 2006 onwards, and in 2010 the scope was again expanded to include minor physical disabilities and intellectual disabilities. Also in that year, part-time

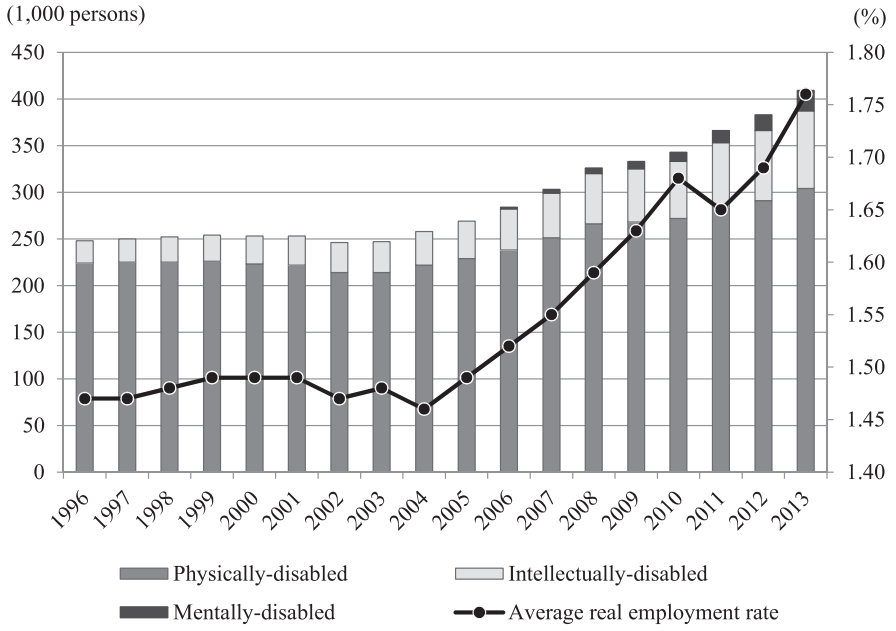
workers were included for the first time.[3] Thirdly, penal measures have been intensified. Until 2003, hardly any companies were "named and shamed," but several company names have been published in most years since 2003. In 2006, moreover, the standards for orders to formulate "Plans for Employment of Persons with Disabilities" as the precursor to naming and shaming have also been reinforced (Ministry of Health, Labour and Welfare 2006). Fourthly, the exclusion ratios have been reduced. Provisions on exclusion ratios permit companies to exclude some employees from calculations of the statutory employment rate, when their jobs are considered difficult to apply to disability employment. However, since this system could conversely cause a disparity in burdens between companies, a decision was made to abolish it in stages. Although there has been little progress in implementing this abolition measure, in 2011 the ratios were reduced by a uniform 10 percentage points.

Of employment promotion policies designed for the economic welfare and social participation of socially disadvantaged minority groups, the primary objective of the employment quota system is to increase the employment volume among relevant groups. This system may be regarded as the very first step in the social inclusion of these previously excluded groups. But since this policy sets a "framework" for applicable groups and aims to forcibly increase their employment volumes, it does not guarantee the welfare or rights of persons with disabilities. On the other hand, an anti-discrimination law based on the now ratified Convention on the Rights of Persons with Disabilities is an attempt by society to guarantee the rights of persons with disabilities and improve their welfare. In countries that have adopted employment quota systems, ratifying the Convention means that they face the tricky predicament of both expanding the social participation of persons with disabilities and guaranteeing their rights at the same time. In this section, attempts to reinforce the policy over the last ten years or so have been introduced. Confirming what happened during that time will present a good environment for confirming the effectiveness of the employment quota and levy system and examining where its problems lie.

(2) The Impact of Policy Reinforcement

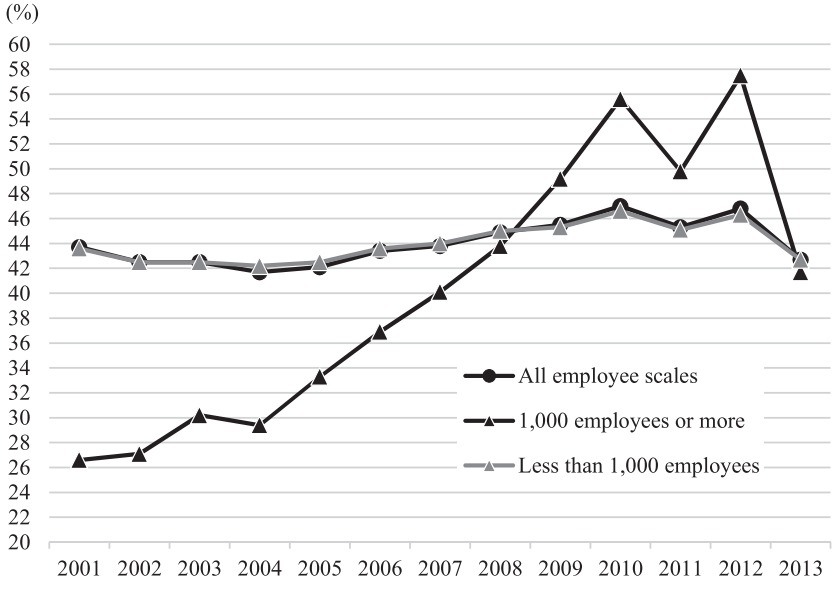
Firstly, the impact arising from reinforcements of the policy in recent years will be confirmed. Figure 1 is a graph showing numbers of persons in disability employment and trends in average real employment rates in the private sector from 1996 to 2013. According to this, both persons in disability employment and average real employment rates in the private sector remained more or less constant until 2005, but both figures have been increasing since 2006. However, real employment rates have been increasing more vigorously than the number of persons in disability employment. This phenomenon is being led by companies with a large employee scale. Figure 2 shows how only these larger scale companies have been leading the rise in the statutory employment rate. Nevertheless, people who

[3] Workers with contractual weekly working hours of between 20 and less than 30 hours were added to the quotas, each being counted as 0.5 persons.



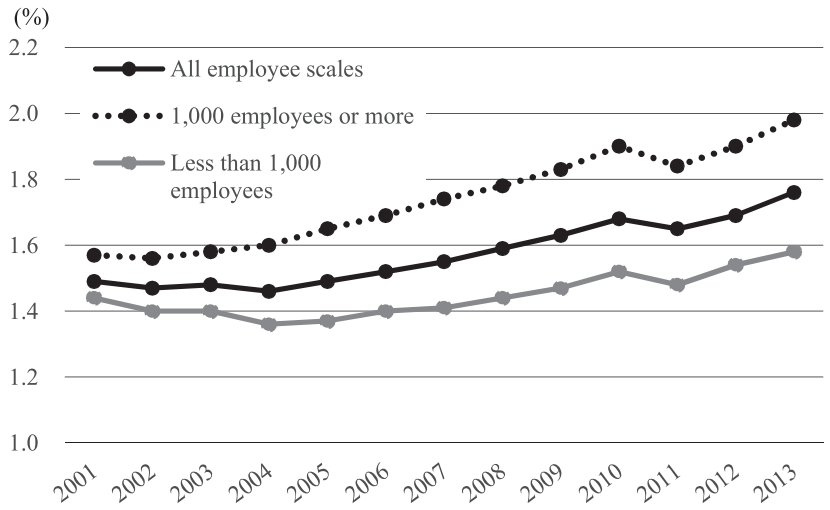
Source: Compiled by the author from Ministry of Health, Labour and Welfare, "2013 Aggregated Results of Disabled Employment Status."

Figure 1. Persons in Disability Employment and Changes in the Average Real Employment Rate



Source: Compiled by the author from Ministry of Health, Labour and Welfare, "2013 Aggregated Results of Disabled Employment Status."

Figure 2. Trends in the Proportion of Companies Meeting the Quota



Source: Compiled by the author from Ministry of Health, Labour and Welfare, "2013 Aggregated Results of Disabled Employment Status."

Figure 3. Trends in Average Real Employment Rates

work for companies with a scale of 1,000 employees or more account for less than half of all employees working in the private sector as a whole. This leads to the phenomenon whereby the rise in average real employment rates is higher than the increase in persons in disability employment.

The policy includes systems that are advantageous to large corporations, namely the special subsidiary system[4] and the special system for group calculation.[5] Since economy of scale is expected to work well with disability employment, it is thought to have caused disability employment to be led by large corporations that have used these systems in promoting disability employment. However, it is not that all large corporations are able to use these systems. Moreover, if the employee scale is large, the total cost incurred when employing persons with disabilities also rises. Figure 3 shows that even in corporate groups with large employee scales, average real employment rates fell in 2011, when the rate of exclusion was reduced. Figure 2 also shows that the proportion of companies meeting the statutory employment rate fell in 2013, when that rate was increased. As a result, even in groups with large employee scales, a considerable number of companies only just meet the statutory employment rate. Furthermore, Figure 3 shows that average real employment rates follow

[4] A system whereby, if a company creates a subsidiary with special consideration for employing persons with disabilities in order to promote and stabilize employment for such persons, and provided certain conditions are met, workers employed by the subsidiary may exceptionally be regarded as being employed by the parent when calculating real employment quotas (See Ministry of Health, Labour and Welfare [2014]).

[5] A system whereby real employment quotas for a group of employers may be aggregated provided certain conditions are met (Ministry of Health, Labour and Welfare 2014).

more or less the same trend in all groups. Based on this fact, we may surmise that, even for large corporations with reserve capacity to meet the statutory employment rate, a considerable burden of cost is required.

However, if the levy system were to achieve its goal of equalizing corporate burdens, no difference in corporate performance should appear as a result of whether or not the statutory employment rate is met. In the following, therefore, our attention will turn to the relationship between corporate profit and meeting the statutory employment rate. Specifically, of listed companies with a Head Office in Tokyo between 2003 and 2010 in which there has been a change in the achievement of the statutory employment rate, the relationship between corporate performance and whether or not they have met the statutory employment rate will be confirmed. In addition, to confirm that the inclusion of persons with mental disabilities in employment quotas has not had an impact, it will also be confirmed whether or not there was any difference in the corporate performance of companies meeting and those not meeting the statutory employment rate in around 2006.

IV. Empirical Analysis of Disability Employment and Corporate Performance

1. The Relationship between Corporate Profit and Meeting the Statutory Employment Rate

In this section, the relationship between corporate profit and whether or not the statutory employment rate is met will be verified. The following estimation model will be used for verification.

$$y_{it} = \beta_0 + \beta_1 d\_att_{it} + x'_{it} \cdot \pi_j + d'_t \cdot \gamma_m + \alpha_i + \epsilon_{it} \quad (1)$$

Here, y_{it} represents the profit margin on sales. Profit margin on sales is defined as "profit margin on sales ≡ (sales turnover – [cost of sales + marketing and general management costs]) ÷ sales turnover." d_att_{it} is a dummy variable for statutory employment rate achievement, with 1 representing achievement of the rate and 0 representing failure to do so. For x'_{it}, the capital-to-sales ratio is used to control the opportunity cost of capital, the debt-to-sales ratio to control the impact on profit of borrowings the company could make when the market suffers a negative shock, and the average age of employees as a control for the employee composition. Finally, the cross term of an industry dummy and a calendar year dummy is used to control the year-on-year effect of industries. d'_t is the calendar year dummy, while α_i expresses individual effects unobservable by the analyst.

Data on individual companies' disability employment status were obtained by information disclosure request. These data include company names, addresses, industrial categories, disability employment status, full-time employee employment status and other information on individual companies under the jurisdiction of Labour Bureaus. The data also include categories for different types of disability and information on whether part-time

Table 1. Basic Statistics 1

Name of variable	Observed value	Average	Standard deviation	Minimum value	Maximum value
Profit margin on sales	3880	0.449	0.341	-0.335	3.014
Capital ratio	3880	0.887	1.971	-0.467	53.834
Debt ratio	3880	1.252	8.798	0.038	268.855
Average employee age	3880	39.777	3.434	25.5	54.3
Real employment rate	3880	1.525	0.545	0	7.32
Statutory employment rate achievement dummy	3880	0.295	0.456	0	1
Employee scale 1,000 or more dummy	3880	0.589	0.492	0	1
Industry dummy					
Fisheries / Agriculture & forestry: base	3880	0.004	0.064	0	1
Mining	3880	0.004	0.064	0	1
Construction	3880	0.093	0.290	0	1
Foods	3880	0.064	0.245	0	1
Textiles	3880	0.029	0.167	0	1
Pulp and paper	3880	0.006	0.078	0	1
Chemicals	3880	0.087	0.281	0	1
Pharmaceuticals	3880	0.025	0.155	0	1
Petroleum & coal products	3880	0.008	0.090	0	1
Rubber products	3880	0.004	0.064	0	1
Glass, stone & clay products	3880	0.025	0.155	0	1
Steel	3880	0.021	0.142	0	1
Non-ferrous metals	3880	0.021	0.142	0	1
Metal products	3880	0.014	0.119	0	1
Precision equipment	3880	0.021	0.142	0	1
Machinery	3880	0.066	0.248	0	1
Electric equipment	3880	0.113	0.317	0	1
Transport equipment	3880	0.023	0.149	0	1
Other equipment	3880	0.033	0.179	0	1
Electric & gas	3880	0.002	0.045	0	1
Information and communications	3880	0.052	0.221	0	1
Services	3880	0.041	0.199	0	1
Warehousing & transport related industries	3880	0.012	0.111	0	1
Maritime transport	3880	0.004	0.064	0	1
Air transport	3880	0.004	0.064	0	1
Land transport	3880	0.025	0.155	0	1
Wholesale trade	3880	0.101	0.301	0	1
Retail trade	3880	0.047	0.213	0	1
Other finance business	3880	0.014	0.119	0	1
Securities and futures trading	3880	0.002	0.045	0	1
Real estate	3880	0.039	0.194	0	1
Calendar year dummy					
2003 : base	3880	0.125	0.331	0	1
2004	3880	0.125	0.331	0	1
2005	3880	0.125	0.331	0	1
2006	3880	0.125	0.331	0	1
2007	3880	0.125	0.331	0	1
2008	3880	0.125	0.331	0	1
2009	3880	0.125	0.331	0	1
2010	3880	0.125	0.331	0	1

Table 2. Corporate Profit and Achievement of Statutory Employment Rate

Profit margin on sales	(1)	(2)	(3)	(4)
Statutory employment rate dummy	-0.0088 **	-0.0095 **	-0.0074 *	-0.0090 **
	(0.0044)	(0.0045)	(0.0044)	(0.0045)
Capital-to-sales	0.0401 ***	0.0401 ***	0.0401 ***	0.0406 ***
	(0.0009)	(0.0009)	(0.0010)	(0.0010)
Debts-to-sales	0.0031 ***	0.0031 ***	0.0031 ***	0.0031 ***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Average age			-0.0042 ***	-0.0051 ***
			(0.0015)	(0.0015)
Constant term	0.4122 ***	0.4098 ***	0.5788 ***	0.6080 ***
	(0.0021)	(0.0040)	(0.0578)	(0.0613)
Calendar year dummy	no	yes	no	yes
Observations	3880	3880	3880	3880
No. of companies	485	485	485	485
Pseudo-coefficient of determination	0.18	0.18	0.21	0.21

Notes: 1. Brackets show standard error.

2. Analysis with control of employee scale was also carried out, but this is not shown as there was no significant difference in the results.
3. Estimations after introducing the cross term of the calendar year dummy and the industry dummy are not shown, as the results are not significantly different from those using the calendar year dummy only.
4. * significant at 10%, ** significant at 5%, *** significant at 1%.

work is involved or not, but these details are masked as they relate to personal information and could lead to individuals being identified. As such, these data are not used. Financial data are taken from *Kaisha Zaimu Karute 2011* (Toyo Keizai Inc.). The sample consisted of companies with a Head Office located in Tokyo, which had been continuously listed from 2003 to 2010 and which had no typological errors or omissions in the financial data and Labour Bureau data. Table 1 shows basic statistics.

Elements of companies' personnel policies and corporate culture are expected to be strongly related to disability employment. Therefore, effects that are unique to individual companies and unobservable by the analyst must be controlled. To this end, the method of fixed effect estimation, as used in research on corporate performance and personnel policies, is selected, and α_i is thus controlled.[6] Meanwhile, in consideration of effects peculiar to individual years, a model including a calendar year dummy for each year is also estimated.

Table 2 shows the results for estimation model (1). Rows (1) and (2) are the results of the model without control of workers' attributes, while (3) and (4) are the results of the model with control of workers' attributes. Rows (2) and (4) are models taking account of

[6] It has been confirmed that the fixed effect model is also adopted in Hausman tests.

effects peculiar to each year. In all of the models, the interesting coefficients are those of the statutory employment rate dummy variable. In terms of the effects seen there, the performance of companies that met the rate in this period is shown to be statistically significantly lower than that of those that did not, by around 7–9% in all models.

2. Employment of Persons with Mental Disabilities and Corporate Performance

No major change to the system occurred during the period highlighted in this paper, except that persons with mental disabilities were added to real employment rates. As such, the impact of making this addition needs to be confirmed.

One difficulty when considering disability employment is that there are many people who develop a disability after starting employment (i.e. "workers with acquired disability"). In such cases, corporate incentives for disability employment would be difficult to analyze because the workers are not newly employed from the (external) labor market. The same could be said of persons with mental disabilities. This problem is easier to understand if we consider the existence of workers with developmental disabilities and intractable diseases who are already in the workforce, in particular. Workers with developmental disabilities carry passbooks certifying that they have either an intellectual or a mental disability. However, if the advantages of obtaining a passbook when already working are not so great, many such workers do not apply for mental disability passbooks, as the very name carries a certain stigma. If these workers were to obtain a passbook on request from their employer, the number of persons in disability employment in that company would increase, but its productivity would be unchanged. In such cases, no impact on productivity or corporate profit would be observed as a result of the company achieving the statutory employment rate. Even if persons with mental disabilities have started to be employed, it is thought highly likely that factors such as the above would have a significant impact for a period after the start. Therefore, even if persons with mental disabilities are included in employment quotas, no change is expected to be observed in corporate performance.

In the following, it will be confirmed how corporate profit is affected by the inclusion of persons with mental disabilities in disability employment policy. As stated in the outline of the system, companies that fail to comply with the disability employment policy are advised by the Ministry of Health, Labour and Welfare to draw up plans for employing persons with disabilities, and these plans are supposed to cover a period of three years. Thus, the impact of system change between 2003 and 2008 will be verified using the DD method. Estimation model (1) will be modified as shown below for this purpose.

$$y_{it} = \beta_0 + \beta_1 d_t \cdot d_{att_{it}} + \beta_2 d_t + \beta_3 d_{att_{it}} + x'_{it} \cdot \pi_{it} + d'_t \cdot \gamma_m + i'_i \cdot \delta_i + \epsilon_{it} \qquad (2)$$

Here, d_t is a dummy variable set at 0 for 2003 to 2005 and at 1 from 2006 to 2008. i'_i is the industry dummy and d'_t the calendar year dummy, while x'_{it} also includes the industry × calendar year dummy. To measure the impact of workers with acquired disability,

Table 3. Impact from the Inclusion of Mental Disability

Profit margin on sales	(1)	(2)
Achievement dummy × period dummy	-0.0047	-0.0069
	(0.0190)	(0.0198)
Achievement dummy	0.0258 **	0.0275 *
	(0.0141)	(0.0148)
Period dummy	0.0173	0.0178
	(0.0153)	(0.0156)
Capital-to-sales	0.0633 ***	0.0638 ***
	(0.0158)	(0.0159)
Debts-to-sales	-0.0009	-0.0009
	(0.0007)	(0.0007)
Years since establishment	-0.0008 ***	-0.0008 ***
	(0.0003)	(0.0003)
Average age	-0.0111 ***	-0.0111 ***
	(0.0019)	(0.0019)
Constant term	0.8765 ***	0.8780 ***
	(0.0777)	(0.0799)
Calendar year × industry dummy	no	yes
Observations	2910	2910
Coefficient of determination	0.5455	0.5482

Notes: 1. All models include the calendar year dummy and industry dummy.
2. Brackets show robust standard error.
3. * significant at 10%, ** significant at 5%, *** significant at 1%.

information on average length of service would be needed, but since such information is not included in the data used in this paper, years of operation are used as a proxy variable. The estimation method is OLS.

Table 3 lists the estimation results. As expected, the inclusion of persons with mental disabilities in the quotas has had no impact on corporate profit. This tells us that the expansion of applicable disabilities had hardly any impact in the period when average real employment rates were gradually being increased in the private sector.

3. The Relationship between Disability Employment and Productivity

The analysis so far has revealed that companies meeting the statutory employment rate have poorer corporate performance than those that fail to do so. Finally, the relationship between disability employment and corporate productivity will be confirmed. In particular, it will be confirmed that the results revealed in the previous section are most likely due to inappropriate setting of levy and subsidy amounts.

There are a number of conceivable reasons why the performance of companies that meet the statutory employment rate worsens while that of non-achievers improves. Firstly, the levy and subsidy amounts could be too small. Let us suppose that there are two companies with similar attributes, identical gross production capacity and identical marginal cost of employing persons with disabilities. However, one of the companies meets the statutory

employment rate, while the other does not. In this situation, the cost of disability employment borne by the company that meets the statutory employment rate would be the marginal cost of the number of persons with disabilities it employs, plus the costs for newly employing persons with disabilities, minus the subsidy amount for the number in excess of the quota. By contrast, the cost of disability employment borne by the company that does not meet the statutory employment rate would be the marginal cost of the number of persons with disabilities it employs, added to the levy amount corresponding to the number falling short of the quota. Since these two companies both have the same gross production capacity, their income is also the same. However, even considering that economy of scale could have the effect of diminishing the marginal cost of disability employment, if the amounts of levies and subsidies are small, the company that fails to meet the statutory employment rate will have a smaller total cost related to disability employment. Therefore, the company that fails to meet the statutory employment rate will make a bigger profit than the company that meets it.

The second conceivable reason is the impact of penal measures. The rise in average real employment rates of persons with disabilities by private companies in recent years is due to an intensification of penal measures since 2006 (Ministry of Health, Labour and Welfare 2006). This means that, if a large corporation that achieved the statutory employment rate started to employ persons with disabilities beyond the optimal number, its personnel costs would go up and the surplus labor force would reduce its production capacity. This could have an impact on corporate profit. The third possible reason is that the productivity of employed persons with disabilities is lower (Jones 2006). This would mean that a company's productivity would decrease if it employed additional persons with disabilities. The fourth possibility is that companies' internal labor markets are not so efficient as to enable persons with disabilities to be allocated to suitable workplaces. In this case, again, additional employment of persons with disabilities would function as a reducing factor on productivity.

Of the above hypotheses, productivity would not be affected by whether the statutory employment rate is achieved only if the first hypothesis were true. If the other hypotheses were true, a company's productivity would be affected by whether the statutory employment rate is achieved or not. To confirm this point, the impact of achieving the statutory employment rate on productivity will be verified. The estimation model is represented by equation (3) below.

$$lnY_{it} = \beta_0 + \beta_1 lnK_{it} + \beta_2 lnL_{it} + \beta_3 d\_att_{it} + x'_{it} \cdot \pi_{it} + d'_t \cdot \gamma_m + \alpha_i + \epsilon_{it} \qquad (3)$$

Here, $\mathrm{lnY_{it}}$ is the logarithm of the value added amount, $\mathrm{lnK_{it}}$ the logarithm of tangible fixed assets, and lnL_{it} the logarithm of the number of full-time employees. $\mathrm{d\_att_{it}}$ is the dummy variable for statutory employment rate achievement and $\mathrm{x'_{it}}$ shows the control variable, but average employee age and industry × calendar year dummies are used

Table 4. Basic Statistics 2

Name of variable	Observations	Average	Standard deviation	Minimum value	Maximum value
Logarithm of value added amount	3456	9.884	1.316	4.217	14.579
Logarithm of full-time employees	3456	7.266	1.191	4.043	11.192
Logarithm of tangible fixed assets	3456	10.072	1.628	4.174	16.319
Average employee age	3456	39.844	3.412	25.5	54.3
Real employment rate	3456	1.543	0.539	0	7.32
Employment rate achievement dummy	3456	0.304	0.460	0	1
Industry dummy					
Fisheries / Agriculture & forestry: base	3456	0.005	0.068	0	1
Mining	3456	0.002	0.048	0	1
Construction	3456	0.090	0.287	0	1
Foods	3456	0.065	0.246	0	1
Textiles	3456	0.030	0.171	0	1
Pulp and paper	3456	0.007	0.083	0	1
Chemicals	3456	0.097	0.296	0	1
Pharmaceuticals	3456	0.028	0.164	0	1
Petroleum & coal products	3456	0.007	0.083	0	1
Rubber products	3456	0.005	0.068	0	1
Glass, stone & clay products	3456	0.023	0.150	0	1
Steel	3456	0.021	0.143	0	1
Non-ferrous metals	3456	0.016	0.126	0	1
Metal products	3456	0.016	0.126	0	1
Precision equipment	3456	0.016	0.126	0	1
Machinery	3456	0.069	0.254	0	1
Electric equipment	3456	0.104	0.306	0	1
Transport equipment	3456	0.021	0.143	0	1
Other equipment	3456	0.030	0.171	0	1
Electric & gas	3456	0.002	0.048	0	1
Information and communications	3456	0.053	0.225	0	1
Services	3456	0.037	0.189	0	1
Warehousing & transport related industrie	3456	0.012	0.107	0	1
Maritime transport	3456	0.005	0.068	0	1
Air transport	3456	0.005	0.068	0	1
Land transport	3456	0.028	0.164	0	1
Wholesale trade	3456	0.111	0.314	0	1
Retail trade	3456	0.051	0.220	0	1
Other finance business	3456	0.012	0.107	0	1
Real estate	3456	0.032	0.177	0	1
Calendar year dummy					
d2003 : base	3456	0.125	0.331	0	1
d2004	3456	0.125	0.331	0	1
d2005	3456	0.125	0.331	0	1
d2006	3456	0.125	0.331	0	1
d2007	3456	0.125	0.331	0	1
d2008	3456	0.125	0.331	0	1
d2009	3456	0.125	0.331	0	1
d2010	3456	0.125	0.331	0	1

Table 5. Achievement of Statutory Employment Rate and Productivity

Fixed effect model	(1)	(2)	(3)	(4)
Logarithm of full-time employees	0.2390***	0.2334***	0.2392***	0.2309***
	(0.0254)	(0.0252)	(0.0254)	(0.0253)
Logarithm of tangible fixed assets	0.3017***	0.2984***	0.3016***	0.2986***
	(0.0201)	(0.0200)	(0.0201)	(0.0200)
Employment rate achievement dummy	0.0113	-0.0044	0.0111	-0.0029
	(0.0191)	(0.0194)	(0.0192)	(0.0194)
Average age			0.0009	-0.0104
			(0.0069)	(0.0072)
Constant term	5.0133***	5.0268***	4.9754***	5.4490***
	(0.2522)	(0.2511)	(0.3785)	(0.3857)
Calendar year dummy	no	yes	no	yes
Calendar year dummy × Industry dummy	yes	yes	yes	yes
Observations	3456	3456	3456	3456
No. of companies	432	432	432	432
hausman	481.29	497.08	461.62	476.40
Pseudo-coefficient of determination	0.7496	0.7441	0.7487	0.7527

Notes: 1. Brackets show standard error.

2. All models show estimation results for the fixed effect model.
3. * significant at 10%, ** significant at 5%, *** significant at 1%.

here. d'_t is the calendar year dummy.

Table 4 shows the basic statistics. The base sample is the same as in the analysis until now, except that companies with omissions in their value added amounts and tangible fixed assets have all been removed. Moreover, variables such as the value added amount and tangible fixed assets have been converted to actual amounts using the SNA's GDP deflator by economic activity (chain-linked). At this time, if the coefficient of β_3 estimated in equation (3) is not significantly different from 0, the first hypothesis is highly likely to be true. However, when adopting a figure that is statistically significantly other than 0, one of the other hypotheses would apply.

Table 5 shows the estimation results. None of the noteworthy parameters for dummy variables of statutory employment rate achievement is statistically significant. Therefore, as expected, the first hypothesis is highly likely to be true.

V. Conclusions and Discussion

1. Summary of Analysis in This Paper and Conclusions

In this paper, empirical analysis has been conducted on the relationship between whether private companies achieve the statutory employment rate and their corporate performance, to confirm the effectiveness of Japan's disability employment policy. Firstly, the reinforcement and expansion of disability employment policy in parallel with the ratification of the Convention on the Rights of Persons with Disabilities was explained. Then aggregated data were used to confirm that, in recent years, average real employment rates of

private companies have risen sharply, that this trend is observed in corporate groups with an employee scale 1,000 or more, and that more than half of Japan's private-sector employees work for companies with an employee scale of less than 1,000. They also confirm that, although it is difficult to make a general evaluation of the system because the proportion of achieving companies in this group has remained more or less constant, the number of disabled persons in general employment has increased.

Next, to confirm the effectiveness of the existing system, the period from 2003 to 2010 was selected as a time when average real employment rates grew steadily and the only other system change was that persons with mental disabilities were added to employment quotas from 2006. In this period, the difference between the corporate performance of companies that achieved the statutory employment rate and that of non-achieving companies was verified, and it was confirmed that there was no impact from other system change factors. As a result, it was revealed that companies that achieved the statutory employment rate had poorer performance than non-achieving companies. Finally, several hypotheses in which this trend could be observed were considered, and the relationship between statutory employment rate achievement and productivity was confirmed. As a result, no relationship between the two could be found.

From the above series of analyses, the implications obtained will be organized and conclusions drawn. The first is that, if official guidance and monitoring were carried out properly in the form of intensified penal measures, the employment quota system would have the effect of increasing general employment of the disabled. Until now, however, this effect has been led by large corporations for which the existing policy is advantageous. In order to maximize social welfare, several auxiliary systems incidental to disability employment policy should also offer benefits equally to all companies.

Secondly, equalization of corporate burdens associated with disability employment has not been achieved. Although the government has reinforced its disability employment policy over the last ten years, policies aimed at equalizing corporate burdens in the form of increased levies and subsidies have not been reinforced. Large corporations have greater reserve capacity than smaller businesses. In addition, the policy includes systems that are beneficial to large corporations. Thanks to these, policy reinforcement in recent years has mainly had an impact on large corporations, and has raised numbers of persons in disability employment and average real employment rates in general. Nevertheless, it was revealed that the performance of companies that achieved the statutory employment rate is worse than that of non-achieving companies. Therefore, as already pointed out in previous research, the policy should be improved with the aim of equalizing corporate burdens, so that they can reflect the opportunity cost connected with disability employment as much as possible.

2. The Convention on the Rights of Persons with Disabilities and Directions for Disability Employment Policy

The ultimate objective of policies for persons with disabilities is to promote their social participation. From this viewpoint, disability employment policy should play a central role within those policies. Japan's disability employment policy is a levy system based on employment quotas. It has been effective to a degree in increasing the number of persons with disabilities in general employment, i.e. those engaged in normal working formats. But it does not have the effect of guaranteeing the rights of persons with disabilities (Holzer and Newmark 1999). Since general employment of the disabled has increased to a certain extent, policies on persons with disabilities should also take account of guaranteeing their rights. In that sense, the introduction of the Discrimination Elimination Act can be regarded as opportune. Nevertheless, if employing persons with disabilities offers no merits in terms of corporate activity, no significant increase in general employment of the disabled can be expected.

According to research in countries where anti-discrimination laws have been adopted, the policy does not contribute to an increase in the number of employees with disabilities. A key point in this respect is the scope of "reasonable accommodation" that individual businesses are supposed to provide to enable persons with disabilities to work without barriers. Since disabilities are wide-ranging, the content of "reasonable accommodation" specified in writing is also determined "loosely." With that, however, it has been revealed that companies' opportunity costs increase, and disability employment by private companies is not promoted. Under existing Japanese law, the constraints of mandatory employment are not stringent, so that when measures to reinforce the policy are implemented with focus on certain specific corporate groups, disability employment does not progress in other corporate groups. Considered from this perspective, "loosely" determining the content of "reasonable accommodation" provides grounds for concern in terms of increasing the general employment of the disabled.

In Japan, the policy has been expanded and reinforced over the last ten years or so. As a result, companies with basic robustness that can devote energy to disability employment have increased their employment quotas. On the other hand, in small and medium-sized enterprises, where the proportion of costs needed for disability employment within general costs is larger, the proportion of achieving companies is more or less constant or even decreasing on average. Thus, a trend toward polarization of disability employment status is seen in the private sector. This suggests that some companies could find it easier to employ persons with disabilities while others will find it harder. If we are to evaluate the situation based on the welfare of persons with disabilities, this state of polarization is undesirable, as the type of job that persons with disabilities can perform will be limited. As has been discussed in this paper, research in other countries where employment quota systems are adopted has proved that monetary incentives have the effect of increasing the employment of persons with disabilities. Therefore, the policy should be reinforced with proper attention

to areas related to the equalization of corporate burdens.

An issue left unresolved in this paper is to check the precision and robustness of the estimation method. As the companies cited in this paper are large corporations, several factors need to be controlled in greater detail in order to measure the impact of personnel policies on productivity more strictly. To confirm whether the results obtained in this paper are robust, tasks for the future will be to gather suitable variables, refine estimation models and confirm the validity of results.

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