

# Fixed-Term Contract Employees and Intra-Firm Wage Gaps

Focusing on the Reasons Why Companies Use Them



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While the system of long-term employment forms the backbone of Japan's employment society, this system benefits open-ended contract employees, such as "regular employees." In contrast, the employment situation of fixed-term contract employees is insecure, and their wage levels are also low. Of all fixed-term contract employees, the problems faced by full-time fixed-term contract employees, in particular, are thought to be serious. This paper has therefore used employer-employee matching data to analyze (i) the size of the intra-firm wage gap between regular employees and full-time fixed-term contract employees, and (ii) factors that affect this, while comparing with the situation of part-time fixed-term contract employees. As a result, in the case of part-time fixed-term contract employees, although there was the problem that wage levels were low in absolute terms, differences in the content of duties compared to regular employees were generally reflected in differences in the wages paid compared to regular employees. In the case of full-time fixed-term contract employees, on the other hand, wage levels were relatively high but differences in the content of duties compared to regular employees did not clearly affect differences in wages compared to regular employees. It is probable that some of them do the same kinds of work as regular employees, but the difference in their respective wages is disproportionately large.

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## I. Introduction

### 1. The wage gap between regular and fixed-term contract employees

While the system of long-term employment forms the backbone of Japan's employment society (Sugeno 2004), this system benefits workers who have entered labor contracts with no fixed contract period ("open-ended contract employees"), such as "regular employees." By contrast, those who have entered labor contracts with fixed contract period ("fixed-term contract employees") tend to face not only insecure employment, but also low wages. Given this situation, the 2012 amendment of the Labor Contracts Act introduced rules on the wage gap between open-ended and fixed-term contract employees. Recent survey results, however, suggest that companies have not yet done enough to address this issue.

Of all fixed-term contract employees, the problems faced by full-time fixed-term contract employees, in particular, are thought to be serious. This paper analyzes (i) the size of the intra-firm wage gap between regular employees and full-time fixed-term contract employees, and (ii) factors that affect this, while comparing with the situation of part-time fixed-term contract employees. The aim in doing so is to clarify the current situation and challenges facing the wage management of fixed-term contract employees, and in particular that of full-time fixed-term contract employees.<sup>1</sup>

After the financial crisis in autumn 2008, many fixed-term contract employees had their employment terminated and lost their jobs. Such events attracted attention of general public when reported in the media, and helped to trigger the introduction of a “from fixed-term to open-ended conversion rule” in the 2012 amendment of the Labor Contracts Act (Article 18). Many fixed-term contract employees are expected to convert to open-ended contracts under this rule in April 2018.<sup>2</sup>

**Table 1. International comparison of the wage gap between open-ended and fixed-term contract employees**

	(a) Open-ended contract employees			(b) Fixed-term contract employees			100×(b)/(a)		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
UK	19.14	21.51	16.73	15.59	15.91	15.32	81.5	74.0	91.6
France	17.92	19.27	16.33	14.63	16.06	13.76	81.6	83.3	84.3
Germany	19.01	21.28	16.35	13.76	14.67	12.95	72.4	68.9	79.2
Italy	15.91	16.42	15.27	12.92	12.85	12.98	81.2	78.3	85.0
Japan (yen)	1,829	2,042	1,460	1,191	1,355	1,096	65.1	66.3	75.1

Sources: Data for the UK, France, Germany and Italy are taken from Eurostat (<http://ec.europa.eu/eurostat>). Those for Japan are from the Ministry of Health, Labour and Welfare (MHLW) “Basic Survey on Wage Structure.”

Note: For the European countries, the average 2014 wages for “unlimited duration” and “limited duration (except apprentice and trainee)” are shown (per hour, euro). For Japan, the average 2016 wages for “open-ended contract employees” and “fixed-term contract employees” (contractual wages converted to hourly wage, yen) are shown.

The disadvantage suffered by fixed-term contract employees in Japanese companies is not limited to the insecurity of employment alone. Table 1 shows the wage gap between open-ended and fixed-term contract employees in western European countries and Japan. Taking the wages of open-ended contract employees as 100, those of fixed-term contract employees in Japan are 65.1, lower than in the European countries. Given this situation, the 2012 amendment of the Labor Contracts Act (Article 20) also prohibited unreasonable differences in working conditions between open-ended and fixed-term contract employees.

Of course, these figures compare average values for wages of open-ended and fixed-term contract employees in the labor market as a whole. The fact that these figures are low is not a problem in itself. Article 20 of the Labor Contracts Act stipulates that, if the working conditions of fixed-term contract employees differ from “those of open-ended contract employees working for the same employer,” the difference is not to be found unreasonable, considering the content of duties of the workers, the extent of changes in the content of duties and work locations, and other circumstances. The issue addressed here is merely whether or not the intra-firm wage gap is reasonable.

In that case, what sort of problems arise in connection with intra-firm wage gaps between open-ended contract employees (or regular employees) and fixed-term contract employees? History of legislations and previous studies suggest that the two types of fixed-term contract employees — i.e. part-time and full-time fixed-term contract employees — are differently situated.

In Japan, rules on the wage gap between employment forms were first set down in the Part-Time Workers Act, and its 2007 amendment was particularly important in this respect. The amendment prohibited differential treatment in terms of employment conditions between ordinary workers and part-time workers who are equivalent to ordinary workers, and provided that steps should be taken, even for

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part-time workers who are not necessarily equivalent to ordinary workers, to balance their treatment with that of ordinary workers.<sup>3</sup> As for fixed-term contract employees who are not part-time workers (or in other words, full-time fixed-term contract employees), Part-Time Workers Act was not applied directly,<sup>4</sup> although they are more often engaged in higher-level duties than part-time fixed-term contract employees.<sup>5</sup> Partly because of this situation, full-time fixed-term contract employees are more prone to regard a wage gap compared to regular employees in their workplace as unreasonable than part-time fixed-term contract employees (Takahashi 2012).

Eventually, thanks to the Labor Contracts Act amendment mentioned above, rules on the wage gap between open-ended and fixed-term contract employees were stipulated. For full-time fixed-term contract employees, this was the first time that rules on the wage gap compared to regular employees had been established by law. As it stands, however, companies have not made enough progress in addressing what should be done about the wage gap between these two types of employee.

This situation is reflected in the surveys conducted by the Japan Institute for Labour Policy and Training (JILPT) in 2013 and 2015.<sup>6</sup> The results of these surveys reveal that the number of companies taking steps to clarify their policy on responding to the “from fixed-term to open-ended conversion rule” introduced by the amendment of Labor Contracts Act increased significantly in the two years from 2013 to 2015. But on the other main point of the amendment — i.e. the rule prohibiting unreasonable differences in working conditions between open-ended and fixed-term contract employees — the proportion of companies responding that they have “Already made adjustments” or are “Considering the possibility of adjustment in future” increased only slightly, from 10.6% to 14.8%.

What is required, therefore, is to ascertain the actual situations of the intra-firm wage gap between open-ended and fixed-term contract employees, particularly the gap between regular employees and full-time fixed-term contract employees. In the following, existing research on (i) the intra-firm wage gap between employment forms, and (ii) the factors that affect it will be reviewed, and the tasks for this paper will be specified.

## 2. Previous studies

### (1) The intra-firm wage gap between employment forms

Generally, the MHLW “Basic Survey on Wage Structure” is often used when analyzing wage gaps. There, however, the distinction between employment forms such as “regular or non-regular” and “open-ended or fixed-term” was only introduced in 2008; until 2007, the only distinction was “full-time or part-time.” There are many constraints in the survey, moreover, such as a shortage of information on occupations and an absence of data on the educational level of part-time workers.

When analyzing wage gaps between employment forms, therefore, data from other questionnaire surveys have been used. Although various data and analytical models are used, the wage gap between regular and part-time employees was addressed by Nagase (1994, 1997)<sup>7</sup> and Hori (2012, 2013),<sup>8</sup> and the wage gap between regular and non-regular employees other than part-time employees was estimated by Asao (2010). All of these confirm the existence of wage gaps between employment forms that cannot be completely explained by the attributes of individual workers or companies.

However, these existing research studies do not analyze wage gaps between employment forms within the same company or business establishment. Regarding this point, Takahashi (2016) estimated that an intra-firm wage gap of 25.7% between regular and non-regular employees exists, after controlling gender, age, academic background, occupation and length of service, based on the special tabulation in the MHLW “General Survey on Diversified Types of Employment” (2010).<sup>9</sup> Takahashi (2016), on the other hand, treated non-regular employees as a single group, and could not identify the wage gap between regular employees and full-time fixed-term contract employees.

Therefore, the task for this paper will be, first, to divide non-regular employees into part-time and

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full-time fixed-term contract employees, and then to estimate the intra-firm wage gap (i) between regular employees and part-time fixed-term contract employees and that (ii) between regular employees and full-time fixed-term contract employees.

## (2) Factors affecting the intra-firm wage gap

Other than the explanatory variables dealt in the previous studies above, the most important factor affecting the intra-firm wage gap between employment forms is the content of duties. Both the Part-Time Workers Act and the Labor Contracts Act use the phrase “content of duties” and provide that this must be taken into account when deciding wages.

One possible parameter for measuring differences in the content of duties between employment forms is whether they are core duties, on the one hand, or routine or unimportant duties on the other. Non-regular employees are generally assigned routine or unimportant duties inside companies,<sup>10</sup> but as the ratio of non-regular employees increases, some companies are starting to assign core duties to non-regular employees (Takeishi 2002). When assigning routine or unimportant duties to non-regular employees, the intra-firm wage gap between regular and non-regular employees is naturally expected to be large, but when assigning core duties it should be smaller.

Another possible parameter for measuring differences in the content of duties between employment forms is whether the work is of a specialist nature or not. Sato (ed.) (2008) points out that full-time fixed-term contract employees include both a “general duties type” taking care of the more routine-type work previously undertaken by regular employees, and a “specialist duties type” taking care of specific work requiring specialist knowledge or skill. In the employer questionnaire of JILPT “Fact-finding survey on diversified types of employment” (2011) used as data in this paper, too, the most commonly cited reason for using full-time fixed-term contract employees was “To perform specialist work.” When non-regular employees are used for specialist work, they are paid more highly due to the rarity of their skills, and the intra-firm wage gap between regular and non-regular employees is therefore expected to be smaller.

Apart from differences in the content of duties, according to the compensation wage hypothesis in economics, wage levels should be set higher for work in which employment is insecure (Rosen 1986).<sup>11</sup> Because non-regular employees (and particularly fixed-term contract employees) enjoy less security of employment than regular employees, one could argue that their wages should be set higher to compensate. Of course, they are not likely to be paid higher wages than regular employees purely because of the insecurity of their employment. But it might be possible that the wage gap compared to regular employees is smaller when employment insecurity is large.

The reasons for using and policy of using non-regular employees could be cited as indicators of differences in the content of duties between regular and non-regular employees inside companies and differences in the insecurity of employment. Takahashi (2013) shows that hourly wages of fixed-term contract employees differ depending on the reason for using them.<sup>12</sup> Ariga, Kambayashi and Sano (2008) have also demonstrated how a policy of using non-regular employees affects the length of service of non-regular employees.<sup>13</sup> However, these studies show the relationship between reasons for using or the policy of using non-regular employees and their working conditions, but not the relationship between these reasons or policy and the size of the wage gap between regular and non-regular employees. To summarize, after estimating the intra-firm wage gaps between regular employees and part-time fixed-term contract employees and between regular employees and full-time fixed-term contract employees, this paper will attempt to clarify how the size of these wage gaps is affected by the respective reasons for using non-regular employees.

## 3. Composition of this paper

The composition of this paper is as follows. In Section II, government statistics will be used to

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overview the use and working situation of part-time and full-time fixed-term contract employees. In Section III, the data, variables and analytical models used in this paper will be explained. In Section IV, the size of the wage gap facing full-time fixed-term contract employees will be analyzed, along with the factors that affect it, in comparison with the situation of part-time fixed-term contract employees. In Section V, finally, the current situation and challenges facing the wage management of fixed-term contract employees (and particularly that of full-time fixed-term contract employees) will be summarized.

## II. The situation of use and employment of fixed-term contract employees

This Section will overview the situation of use and employment of regular employees (in section 2, 3, and 4, abbreviated to “Regular”), part-time fixed-term contract employees (“Part-fixed”), and full-time fixed-term contract employees (“Full-fixed”). Although these three employment forms are precisely categorized in the MHLW “Basic Survey on Wage Structure,” information on academic background and occupations is limited in that survey. Moreover, it gives no precise information on workers in companies with fewer than 10 employees or business establishments with fewer than five. Therefore, while the “Basic Survey on Wage Structure” will be used when dealing with distributions of gender, age group and industry, the Ministry of Internal Affairs and Communications (MIC) “Employment Status Survey” will be used as an alternative when looking into the distribution of academic background, occupations and size of enterprise. Categories of employment forms in that survey are based on the name described in places of employment, but generally “regular staffs” will be regarded as corresponding to Regular in this paper, “part-time workers” and “*arbeit* (temporary workers)” to Part-fixed, and “contract employees” and “entrusted employees” to Full-fixed.

### 1. Companies using different types of employee

What sort of companies use Regular, Part-fixed, and Full-fixed, respectively?

Judging from the industry distribution by employment form in the upper section of Table 2, Regular are found most often in “Manufacturing,” “Medical, health care and welfare” and “Wholesale and retail trade.” On the other hand, Part-fixed are overwhelmingly numerous in “Wholesale and retail trade,” followed by “Accommodations, eating and drinking services” and “Medical, health care and welfare.” The distribution for Full-fixed is close to that for Regular as a whole, although companies in “Services, n.e.c.” are relatively numerous there.

Looking at the distribution of company size by employment forms in the lower section of Table 2, we find that “part-time workers and *arbeit* (temporary workers)” (correspond to Part-fixed) are more widely distributed in small enterprises compared to “regular staffs and employees,” and that “contract employees and entrusted employees” (Full-fixed) are more numerous in large corporations and public bodies.

A general characteristic is that Part-fixed are distributed more heavily in “Wholesale and retail trade” and “Accommodations, eating and drinking services,” and Full-fixed in large corporations and public bodies. What this suggests is that Part-fixed are distributed in sectors where wage levels of Regular are low, and Full-fixed in sectors where they are high.<sup>14</sup>

### 2. Individual attributes and worker attributes

Next, let us look at individual and worker attributes. The upper section of Table 3 shows the distribution of gender and age groups by employment form. The male ratio is 68.7% for Regular, 25.7% for Part-fixed, and 49.6% for Full-fixed. Compared to Part-fixed, therefore, Full-fixed are closer to Regular. As for the age distribution, the younger age brackets of 19 and under and 20-24 are more common among Part-fixed than among Regular, while Full-fixed include many older workers in the 60-64 bracket.

The lower section of Table 3 shows the distribution of academic background and occupations by employment form. In the distribution of academic background, the ratio of university graduates or higher

**Table 2. Distribution of industries and size of enterprise by employment form (by columns)**

(%)

Industry	Regular	Part-fixed	Full-fixed
Mining and quarrying of stone and gravel	0.1	0.0	0.0
Construction	7.1	0.6	3.4
Manufacturing	24.3	6.7	20.1
Electricity, gas, heat supply and water	0.8	0.1	0.2
Information and communications	5.6	0.8	3.2
Transport and postal activities	7.5	4.8	6.6
Wholesale and retail trade	15.0	31.4	13.8
Finance and insurance	4.8	2.4	2.8
Real estate and goods rental and leasing	1.3	1.9	1.4
Scientific research, professional and technical services	3.8	0.9	2.8
Accommodations, eating and drinking services	1.9	14.4	2.9
Living-related and personal services and amusement services	1.6	4.7	2.7
Education, learning support	2.8	4.8	2.2
Medical, health care and welfare	16.8	16.3	13.7
Compound services	1.3	1.3	3.5
Services, n.e.c.	5.3	9.0	20.7

  

	Regular staff or employees	Part-time workers, <i>arbeit</i> (temporary workers)	Contract employees, entrusted employees
4 or fewer employees	5.3	6.7	1.2
5-9 employees	5.8	9.1	2.4
10-19 employees	6.1	10.4	3.5
20-29 employees	3.8	5.6	2.8
30-49 employees	4.9	6.0	3.9
50-99 employees	6.9	7.7	7.1
100-299 employees	10.0	10.0	12.6
300-499 employees	4.7	4.1	6.0
500-999 employees	5.6	4.8	6.8
1,000 or more employees	21.9	19.5	24.8
Government agencies, etc.	11.7	3.4	13.2
Other corporations or groups	13.5	12.8	15.9

Sources: MHLW, "Basic Survey on Wage Structure," 2016; MIC, "Employment Status Survey," 2012.

Note: Industry distribution is based on the "Basic Survey on Wage Structure." There, full-time workers classified as "regular staffs and employees" who are on open-ended labor contracts are called Regular here, part-time workers other than "regular employees" who are on fixed-term labor contracts are called Part-fixed, and full-time workers other than "regular employees" who are on fixed-term labor contracts are called Full-fixed. The same applies to Table 3. The distribution of company size is based on the "Employment Status Survey."

is 36.6% for "regular staffs and employees" but only 9.6% for "part-time workers and *arbeit* (temporary workers)" (Part-fixed), and 26.8% for "contract employees and entrusted employees" (Full-fixed). In the distribution of occupations, "regular staffs and employees" are most commonly clerical workers, professional and/or engineering workers, and manufacturing process workers in that order, while for "part-time workers and *arbeit* (temporary workers)" the order is service workers, sales workers, and clerical workers. For "contract employees and entrusted employees," the order is the same as for "regular staffs and employees" — namely, clerical workers, professional and /or engineering workers, and manufacturing process workers.

**Table 3. Distribution of gender, age groups, academic background and occupations by employment forms (by columns)** (%)

Gender and age group	Regular	Part-fixed	Full-fixed
Male	68.7	25.7	49.6
Female	31.3	74.3	50.4
Age 19 and under	1.0	7.6	0.5
Ages 20-24	7.8	10.7	6.1
Ages 25-29	12.0	5.2	10.0
Ages 30-34	12.4	5.7	10.1
Ages 35-39	13.3	7.1	9.8
Ages 40-44	15.3	10.3	10.8
Ages 45-49	13.8	11.0	10.0
Ages 50-54	11.3	10.1	8.9
Ages 55-59	9.2	9.3	8.5
Ages 60-64	2.8	10.5	17.8
Ages 65-69	1.0	9.0	6.3
Age 70 and over	0.3	3.4	1.1
Academic background / Occupation	Regular staff or employees	Part-time workers, <i>arbeit</i> (temporary workers)	Contract employees, entrusted employees
Primary school or junior high school	5.1	12.0	8.6
Senior high school, former secondary school	41.3	50.2	46.9
Professional training college	8.8	6.7	6.6
Junior college, college of technology	8.0	11.9	10.7
University	32.6	9.2	24.7
Graduate school	4.0	0.4	2.1
Still in education	0.2	9.5	0.5
Administrative and managerial workers	0.6	0.0	0.3
Professional and/or engineering workers	20.5	7.3	15.6
Clerical workers	23.4	15.4	26.8
Sales workers	12.9	16.9	9.8
Service workers	7.4	24.4	11.1
Security workers	2.6	1.0	2.9
Agricultural, forestry and fishery workers	1.0	1.3	0.8
Manufacturing process workers	16.0	11.8	12.4
Transport and machine operation workers	4.9	1.8	5.7
Construction and mining workers	4.6	1.1	2.7
Carrying, cleaning, packaging, and related workers	3.5	14.5	8.4
Workers not classified by occupation	2.6	4.6	3.5

Sources: MHLW, "Basic Survey on Wage Structure," 2016; MIC, "Employment Status Survey," 2012.

Note: Gender and age group distributions are based on the "Basic Survey on Wage Structure," and academic background and occupation distributions on the "Employment Status Survey."

Judging from this, if we take Regular as the standard, Part-fixed tend to have a higher ratio of females, workers with lower academic background, service workers and sales workers, while the individual attributes and worker attributes of Full-fixed are expected to be closer to those of Regular, compared to Part-fixed.

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### III. Data, variables and analytical models

#### 1. Data

Individual questionnaire data from the “Fact-finding survey on diversified employment types” conducted by JILPT in August 2010 were used for the analysis.<sup>15</sup> The survey targets were the personnel divisions of private establishments with 10 or more employees, and the employees working for those establishments. The establishments were selected through stratified sampling from the corporate database owned by Teikoku Databank Ltd., based on numbers of establishments by industry and size of enterprise in the “Establishment and Enterprise Census of Japan.”

The survey consisted of an employer questionnaire and an employee questionnaire. The employer questionnaire was distributed to 10,000 establishments, yielding 1,610 valid responses (valid response rate 16.1%). The employee questionnaire was distributed to 10 employees per business, with valid responses from 11,010 employees (valid response rate 11.0%). Of the collected employee questionnaires, those of 9,710 employees could be matched with the employer questionnaires.

#### 2. Variables

Three employment forms were analyzed — Regular, Part-fixed and Full-fixed. Regular refers to full-time, open-ended contract workers identified as “regular staff or employees” in their place of work according to the employee questionnaire.<sup>16</sup> Meanwhile, of all workers called “part-time workers,” “*arbeit* (temporary workers),” “contract employees” or “entrusted employees” in their workplaces, those working part-time on fixed-term contracts are referred to as Part-fixed, and those working full-time on fixed-term contract as Full-fixed.

The explained variable is wage. Specifically, a logarithmically transformed value of the contractual hourly wage calculated from each worker’s contractual earnings amount and working hours was used.<sup>17 18</sup>

As explanatory variables, (i) the employment forms of Regular, Part-fixed and Full-fixed, (ii) reasons given by establishments for using part-time and full-time fixed-term contract employees, and (iii) interaction terms between employment forms and reasons for using them were input. In the employer questionnaire, reasons for using each employment form were to be selected from 13 options based on multiple responses. Here, however, “to allow regular employees to specialize in important work” are classed as “routine unimportant work,” “to perform specialist work” as “specialist work,” and “to adjust workforce according to changes in business conditions” or “to meet temporary or seasonal changes in demand” as “variable work,” based on existing research.

As other control variables besides these, the gender, age, years in education, occupation, length of service, and position given in the employee questionnaire were input.

#### 3. Analytical models

For the analysis, different statistical models were used: Models (i) (ii) (iii) and (iv), Model (v), and Model (vi).

For Models (i) (ii) (iii) and (iv), OLS (ordinary least squares) was used. Although Models (i) (ii) and (iii) and Model (iv) are based on different samples for analysis, the statistical models themselves are the same.

For Model (v) and Model (vi), the hierarchical linear model (HLM) was used.<sup>19</sup> Although HLM is used for various purposes, it will be explained in line with the purpose adopted here. Namely, it has the advantage that, when personal data (employee data) exist within group data (establishment data) as a nested structure, the impact of variables at group level on variables at personal level can be properly controlled, and the impact of variables at group level on relationships between variables at personal level can also be properly estimated.<sup>20</sup>



In Model (v), the random intercept model (one type of HLM) was used. Unlike normal linear regression analysis, the random intercept model incorporates probability variables normally distributed in intercepts. Specifically, it is expressed by Eq. (1).<sup>21</sup>

$$(1) \text{ Ln Contractual hourly wage} = \beta_0 + \beta X + r$$

$$\beta_0 = \gamma_{00} + u_0$$

Here, X is the personal level explanatory variable, r the personal level error term, and  $u_0$  the establishment level error term (on the supposition of normal distribution). By using this model, differences in wage level in each establishment (the so-called “unobserved heterogeneity in each establishment”) can be properly controlled, and disparity thought to arise within the same establishment can be estimated.

For Model (vi), another type of HLM was used — the random intercept & random slope model. The random intercept & random slope model incorporates probability variables with normal distribution not only in intercepts, but also in the coefficients of specific explanatory variables. Its basic form is expressed in Eq. (2), while the model actually used in Model (vi) is expressed in Eq. (3).

$$(2) \text{ Ln Contractual hourly wage} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + r$$

$$\beta_0 = \gamma_{00} + u_0$$

$$\beta_1 = \gamma_{10} + u_1$$

$$(3) \text{ Ln Contractual hourly wage} = \beta_0 + \beta_1 \text{ employment form dummy} + \beta_2 X_2 + r$$

$$\beta_0 = \gamma_{00} + \gamma_{01} \text{ reason for use dummy} + u_0$$

$$\beta_1 = \gamma_{10} + \gamma_{11} \text{ reason for use dummy} + u_1$$

Here,  $X_1$  is the personal level explanatory variable for the employment form dummy,  $X_2$  the personal level explanatory variable other than for the employment form dummy, r the personal level error term,  $u_0$  the establishment level error term for intercepts (on the supposition of normal distribution), and  $u_1$  the establishment level error term for employment form dummy slopes (on the supposition of normal distribution). Based on the hypothesis that the impact of the employment form dummy on wages is different for each establishment, using this model made it possible to properly estimate how that impact differs depending on the reason for using employment forms in each establishment.

#### IV. Actual situations and causes of the intra-firm wage gap

So, what are the actual situations and causes of the intra-firm wage gap between Regular and Full-fixed? And how do they differ from those between Regular and Part-fixed?

##### 1. Aspects that can be explained by individual attributes and worker attributes

First, the average contractual hourly wages of Regular, Part-fixed and Full-fixed were confirmed. Table 4 reveals that these were 1,732 yen, 1,039 yen, and 1,071 yen respectively, showing a higher average for Full-fixed than for Part-fixed. Compared with amounts obtained from the same year’s “Basic Survey on Wage Structure,” however, Regular and Full-fixed are slightly lower and those of Part-fixed are slightly higher. Caution is therefore required on this point.

Table 4. Average contractual hourly wage

	Data for analysis			"Basic Survey on Wage Structure" Average in 2010 (yen)
	Average (yen)	S.D.	N	
Regular	1,732	918.2	3744	1,896
Part-fixed	1,039	497.9	729	1,001
Full-fixed	1,071	420.4	1216	1,257

**Table 5. Coefficients of wage functions (OLS)**

Explained variable = Ln (contractual hourly wage)	Model (i)		Model (ii)		Model (iii)	
	B	Standard error	B	Standard error	B	Standard error
(Regular)						
Part-fixed	-0.4886	0.0153 **	-0.3991	0.0150 **	-0.2182	0.0151 **
Full-fixed	-0.4439	0.0125 **	-0.3470	0.0119 **	-0.1843	0.0121 **
Male			0.1964	0.0100 **	0.1615	0.0101 **
Age			0.0440	0.0035 **	0.0284	0.0033 **
Age squared			-0.0004	0.0000 **	-0.0003	0.0000 **
Years in education			0.0441	0.0025 **	0.0376	0.0024 **
Professional and/or engineering work					0.0856	0.0114 **
Administrative and managerial work (Clerical work)					0.0922	0.0274 **
Sales work					-0.0933	0.0183 **
Skilled work, manufacturing process work					-0.0539	0.0154 **
Transport and communications work					-0.1240	0.0295 **
Security work					-0.2156	0.0401 **
Agricultural, forestry and fishery work					-0.1680	0.0791 *
Services work					-0.0310	0.0186
Others					-0.0510	0.0189 **
Length of service					0.1412	0.0079 **
(No position)						
Site foreman					0.0527	0.0185 **
Senior and chief clerk class					0.0858	0.0131 **
Section manager class					0.2466	0.0261 **
Department manager class					0.3835	0.0395 **
Constant	7.3773	0.0062	5.5714	0.0749	5.9456	0.0709
N		5689		5689		5689
F value		947.98 **		648.68 **		304.51 **
Adjusted R squared		0.2498		0.4059		0.5163

Notes: 1. In ( ): Reference groups.  
 2. \*\*:  $p < 0.01$ , \*:  $p < 0.05$ .

Models (i) (ii) and (iii) in Table 5 show coefficients of wage functions based on OLS using the employee questionnaire data. In Model (i), only the employment form is input as an explanatory variable, while the male dummy, age, age squared, and years in education are added in Model (ii) and occupation, length of service, and position in Model (iii).

The size of the wage gap between Regular and Part-fixed, on the one hand, and between Regular and Full-fixed, on the other, was calculated from the coefficients of the Part-fixed dummy and the Full-fixed dummy. In Model (i) the gap was 38.7% and 35.8%, respectively, in Model (ii) 32.9% and 29.3%, and in Model (iii) 19.6% and 16.8%.<sup>22</sup> In all models, the wage gap is larger between Regular and Part-fixed. Moreover, because the absolute value of the coefficient decreases from Model (i) to Model (iii) in both the Part-fixed and Full-fixed dummy, we find that the wage gap between regular employees and fixed-term contract employees is to some extent explained by individual attributes and worker attributes.

## 2. Analysis targeting only establishments that use the employees in question

Incidentally, because the analysis of Models (i) (ii) and (iii) is based on the employee questionnaire data only, regular employees of establishments that do not use fixed-term contract employees have been included in the targets for analysis. In Model (iv), therefore, the analysis targeted only Regular and Part-fixed of establishments that use part-time workers when estimating the wage gap between Regular and Part-fixed.<sup>23</sup> Again, the analysis targeted only Regular and Full-fixed of establishments that use Full-fixed when estimating the wage gap between Regular and Full-fixed. In all cases, questionnaire responses matched with the employer questionnaire responses were used. As a result, in Model (iv) the coefficient of the Part-fixed dummy was -0.2010 (18.2%) and that of the Full-fixed dummy was -0.2037 (18.4%).

Comparing Model (iii) and Model (iv), we see that the coefficient of the Part-fixed dummy has a

**Table 5. Coefficients of wage functions (OLS) (continued)**

Explained variable = Ln (contractual hourly wage) Analysis targets =	Model (iv)			
	Regular + Part-fixed		Regular + Full-fixed	
	B	Standard error	B	Standard error
(Regular)				
Part-fixed	-0.2010	0.0189 **		
Full-fixed			-0.2037	0.0171 **
Male	0.1353	0.0149 **	0.1566	0.0150 **
Age	0.0293	0.0050 **	0.0296	0.0050 **
Age squared	-0.0004	0.0001 **	-0.0003	0.0001 **
Years in education	0.0420	0.0037 **	0.0365	0.0038 **
Professional and/or engineering work	0.0955	0.0163 **	0.0898	0.0186 **
Administrative and managerial work (Clerical work)	0.1051	0.0362 **	0.1339	0.0430 **
Sales work	-0.0555	0.0275 *	-0.0120	0.0330
Skilled work, manufacturing process work	-0.0596	0.0264 *	-0.0142	0.0245
Transport and communications work	-0.0529	0.0533	-0.1468	0.0429 **
Security work	-0.2200	0.0676 **	-0.1872	0.0561 **
Agricultural, forestry and fishery work	0.0678	0.1180	-0.1630	0.1607
Services work	-0.0448	0.0264	-0.0779	0.0328 *
Others	-0.0415	0.0303	-0.0380	0.0312
Length of service	0.1706	0.0118 **	0.1391	0.0128 **
(No position)				
Site foreman	0.0111	0.0275	0.0784	0.0295 **
Senior and chief clerk class	0.1087	0.0185 **	0.0676	0.0205 **
Section manager class	0.2101	0.0352 **	0.1910	0.0406 **
Department manager class	0.3198	0.0554 **	0.3505	0.0637 **
Constant	5.8591	0.1086	5.9479	0.1090
N		2323 **		1895
F value		142.44 **		123.12 **
Adjusted R squared		0.5365		0.5506

Notes: 1. In ( ): Reference groups.

2. \*\*:  $p < 0.01$ , \*:  $p < 0.05$ .

smaller absolute value, while that of the Full-fixed dummy is larger. The implication of this is that, by limiting the analysis to establishments that use Part-fixed, the wage gap between Regular and Part-fixed becomes smaller (or in other words, Part-fixed are used more frequently in establishments where the wage levels of Regular are lower). Conversely, by limiting it to establishments that use Full-fixed, the wage gap between Regular and Full-fixed becomes larger (or in other words, Full-fixed are used more frequently in establishments where the wage levels of Regular are higher). These findings are consistent with the facts, as seen in Section II above, that Part-fixed are more commonly distributed in “Accommodations, eating and drinking services” and other sectors where the wage levels of Regular are lower, and Full-fixed in large corporations and other sectors where the wage levels of Regular are higher.

### 3. Intra-firm wage gaps and factors that affect them

Model (v) in Table 6 shows the results of estimation using HLM (random intercept model). As in the case of Model (iv), separate results are produced for “Regular and Part-fixed only” and for “Regular and Full-fixed only.” But here, wage gaps thought to arise inside the same establishment are indicated after controlling differences in the wage level for each establishment (the so-called “unobserved heterogeneity in each establishment”). Specifically, the wage gap between Regular and Part-fixed is shown to be -0.2112 (19.0%), while that between Regular and Full-fixed is -0.2039 (18.4%). From this, we know that, inside the same establishment, the wage gap between employment forms that still remains even after controlling individual attributes and worker attributes is almost the same between Regular and Part-fixed, and between Regular and Full-fixed.

**Table 6. Coefficients of wage functions (HLM)**

Explained variable = Ln (contractual hourly wage)	Model (v) (randominterceptmodel)				Model (vi) (random intercept & random slope model)			
	Regular + Part-fixed		Regular + Full-fixed		Regular + Part-fixed		Regular + Full-fixed	
	B	Standard error	B	Standard error	B	Standard error	B	Standard error
(Regular)								
Part-fixed	-0.2112	0.0188 **			-0.2096	0.0241 **		
Full-fixed			-0.2039	0.0164 **			-0.2388	0.0259 **
Male	0.1244	0.0145 **	0.1547	0.0141 **	0.1215	0.0144 **	0.1512	0.0137 **
Age	0.0266	0.0048 **	0.0284	0.0047 **	0.0273	0.0048 **	0.0275	0.0046 **
Age squared	-0.0003	0.0001 **	-0.0003	0.0001 **	-0.0003	0.0001 **	-0.0003	0.0001 **
Years in education	0.0367	0.0036 **	0.0261	0.0037 **	0.0358	0.0036 **	0.0245	0.0036 **
Professional and/or engineering work	0.1045	0.0169 **	0.0854	0.0189 **	0.1031	0.0170 **	0.0752	0.0186 **
Administrative and managerial work (Clerical work)	0.0985	0.0345 **	0.1296	0.0388 **	0.0982	0.0341 **	0.1219	0.0371 **
Sales work	-0.0406	0.0281	0.0141	0.0322	-0.0331	0.0281	0.0056	0.0317
Skilled work, manufacturing process work	-0.0489	0.0277	-0.0340	0.0260	-0.0488	0.0277	-0.0256	0.0267
Transport and communications work	-0.0180	0.0543	-0.0848	0.0444	-0.0207	0.0539	-0.0898	0.0442 *
Security work	-0.1520	0.0746 *	-0.1277	0.0571 *	-0.1465	0.0746 *	-0.1222	0.0572 *
Agricultural, forestry and fishery work	0.0264	0.1302	-0.0698	0.1436	0.0376	0.1301	-0.0551	0.1450
Services work	-0.0364	0.0272	-0.0463	0.0333	-0.0403	0.0274	-0.0581	0.0340
Others	-0.0444	0.0295	-0.0191	0.0286	-0.0462	0.0298	-0.0102	0.0286
Length of service	0.1564	0.0116 **	0.1272	0.0123 **	0.1504	0.0116 **	0.1256	0.0121 **
(No position)								
Site foreman	0.0116	0.0263	0.0667	0.0268 *	0.0112	0.0261	0.0645	0.0262 *
Senior and chief clerk class	0.1244	0.0178 **	0.0980	0.0189 **	0.1270	0.0177 **	0.1001	0.0183 **
Section manager class	0.2271	0.0336 **	0.2119	0.0372 **	0.2293	0.0332 **	0.2159	0.0356 **
Department manager class	0.3442	0.0527 **	0.3564	0.0574 **	0.3431	0.0521 **	0.3656	0.0547 **
Routine unimportant work					0.0622	0.0209 **	0.0724	0.0263 **
Part-fixed x Routine unimportant work					-0.0864	0.0371 *		
Full-fixed x Routine unimportant work							-0.0321	0.0390
Specialist work					-0.0339	0.0198	0.0294	0.0204
Part-fixed x Specialist work					0.0902	0.0348 *		
Full-fixed x Specialist work							0.0423	0.0328
Variable work					-0.0122	0.0163	-0.0637	0.0206 **
Part-fixed x Variable work					-0.0441	0.0301		
Full-fixed x Variable work							0.0761	0.0308 *
Constant	5.9776	0.1052	6.0992	0.1028	5.9757	0.1046	6.1249	0.1010
N		2323		1895		2323		1895
Groups		794		531		794		531
X squared		2568.27 **		2514.07 **		2528.24 **		2266.35 **

Notes: 1. In ( ): Reference groups.

2. \*\*:  $p < 0.01$ , \*:  $p < 0.05$ .

3. In Model (vi), random effects have been input into the Part-fixed dummy and Full-fixed dummy.

4. "Routine unimportant work," "specialist work" and "variable work" express the reasons for using Part-fixed in the case of "Regular + Part-fixed" and the reasons for using Full-fixed in the case of "Regular + Full-fixed."

In Model (vi), information on reasons for using Part-fixed and/or Full-fixed was extracted from the employer questionnaire data, and HLM (random intercept & random slope model) was used to analyze how this leads to differences in wage levels and wage gaps between employment forms. Three major findings were produced as a result.<sup>24</sup>

First, the coefficient of "routine unimportant work" is positively significant for both "Regular + Part-fixed" and "Regular + Full-fixed." Using non-regular employees and thus allowing regular employees to specialize in important work could raise the productivity of the company as a whole. On the other hand, the coefficient for "variable work" is negatively significant for "Regular + Full-fixed." Although no significant results could be found in "Regular + Part-fixed," the negative coefficients are thought to show that wage levels as a whole are low in companies where the work volume fluctuates with seasons or economic cycles.

Second, from the interaction terms between Part-fixed and the reasons for using them, the wage gap between Regular and Part-fixed would appear to be larger when Part-fixed are used for routine unimportant work and smaller when used for specialist work. Conversely, no such result appears in the wage gap between Regular and Full-fixed.

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Third, from the interaction terms between Full-fixed and the reasons for using them, the wage gap between Regular and Full-fixed would appear to be smaller when Full-fixed are used for variable work. Again, no such result appears in the wage gap between Regular and Part-fixed.

## V. Discussion and conclusions

In this paper, (i) the size of the intra-firm wage gap between regular employees and full-time fixed-term contract employees, and (ii) factors affecting this gap have been analyzed through a comparison with the situation of part-time fixed-term contract employees. From the results of these analyses, the current situation and challenges facing the wage management of fixed-term contract employees, and particularly of full-time fixed-term contract employees, may be summarized as follows.

First, wage levels of full-time fixed-term contract employees are slightly higher than those of part-time fixed-term contract employees. This finding also appears when controlling individual and worker attributes and estimating wage functions.

Second, on the other hand, full-time fixed-term contract employees tend to be used more than part-time fixed-term contract employees in companies where the wage levels of regular employees are high. That is, the wage management of full-time fixed-term contract employees is undertaken in companies where wages are relatively high. Partly because of this, the size of the intra-firm wage gap between regular employees and full-time fixed-term contract employees was calculated to be about the same as that between regular employees and part-time fixed-term contract employees.

Third, there was a different logic behind wage gaps arising between regular employees and part-time fixed-term contract employees and those arising between regular employees and full-time fixed-term contract employees. Specifically, the former of these is smaller when part-time fixed-term contract employees are used for specialist work but larger when for routine or unimportant duties. This is the logic of wage determination compatible with the gist of the Part-Time Workers Act and Labor Contracts Act. Conversely, the latter wage gap is unrelated to the type of work assigned to full-time fixed-term contract employees, but tends to be smaller if their employment is insecure. This situation is similar to that the compensation wage hypothesis in economics assumes.

The current situation outlined above suggests that, though both are classed as fixed-term contract employees, the issues involved in wage management are different for part-time and full-time fixed-term contract employees, respectively. In the case of part-time fixed-term contract employees, differences in the content of duties compared to regular employees are generally reflected in differences in the wages paid compared to regular employees, despite the problem that wage levels are low in absolute terms. In the case of full-time fixed-term contract employees, on the other hand, wage levels are relatively high but differences in the content of duties compared to regular employees do not clearly affect differences in wages compared to regular employees. To put it another way, it is probable that some of them do the same kinds of work as regular employees, but the difference in their respective wages is disproportionately large. Clarifying the logic of wage determination for full-time fixed-term contract employees and verifying whether this logic is accepted by them remains an important research task.

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### Notes

1. In this paper, workers who are called “regular staff or employees” in their places of work and are on full-time open-ended contracts will be referred to as “regular employees (or abbreviated to Regular).” By contrast, those who are not

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called “regular staff or employees” in their places of work will be referred to as “non-regular employees.” Of these non-regular employees, moreover, those who are on part-time fixed-term contracts will be called “part-time fixed-term contract employees (or abbreviated to Part-fixed),” and those on full-time fixed-term contracts will be referred to as “full-time fixed-term contract employees (or abbreviated to Full-fixed).” Logically speaking, eight different patterns could be created by combining these three conditions, i.e. whether known as “regular staff or employees” or not, whether full-time or part-time, and whether on an open-ended contract or fixed-term contract. Due to the practical approach adopted in this paper, however, attention will be focused on just three types — “regular employees” based on the definition above, “part-time fixed-term contract employees” (non-regular employees), and “full-time fixed-term contract employees” (non-regular employees).

2. Under the “from fixed-term to open-ended conversion rule,” workers who have repeatedly renewed fixed-term labor contracts with the same employer (company) and have worked there for more than five years in total may, upon request, convert to open-ended labor contracts. The rule came into force in April 2013, thus many conversions to open-ended contracts are expected to occur in April 2018.
3. See Sugeno (2012: 246-249). Although the interpretation of the concept of “ordinary workers” in that law is complicated, for the time being it should be understood as referring to “regular employees” in this paper.
4. It does not mean that no protecting hand was extended to them. The Amended Part-time Labor Guidelines (October 1, 2007) stated that, although they do not fall under the category of part-time workers as provided in the Part-Time Workers Act, the gist of the Part-Time Workers Act should be taken into account.
5. See the examples of Bookshop F and Department Store D in JILPT (2010).
6. “Survey on the utilization of older workers and employees on fixed-term contracts after the amendment of the Labor Contracts Act” in 2013 and “Survey on the response to the amended Labor Contracts Act and special cases, and the utilization of diverse regular employees” in 2015. For details of these surveys, see JILPT (2014, 2015).
7. Nagase (1997) not only analyzes the size of the wage gap between regular and part-time employees after controlling a number of variables, but also examines how far the wage gap between the two is explained by variables such as education and occupation.
8. Hori (2012) also conducts analysis using an endogenous switching regression model under the dual labor market hypothesis, showing that the probability of part-time employees belonging to a secondary labor market is very high.
9. Employer-employee matching data are used to estimate a wage function after controlling the fixed effect of the establishment.
10. As reasons given for using part-time workers (multiple responses) in the MHLW “General Survey on Part-time Workers” (2011), the most common was “Because they are cheaper (rationalization of labor costs)” (48.6%), followed by “Because the job content is simple” (36.5%).
11. Rosen (1986), a survey paper on compensation wages, gives a variety of economic situations in which compensation wages occur (or factors behind their occurrence), including (i) hazardous and polluted working environments, (ii) differences between cities and between regions in terms of climate, crime rate, pollution, overcrowding and other conditions, (iii) shift work and rigid working hours, the risk of layoffs and unemployment, and (iv) differences in remuneration systems, including holidays, pensions, and other employee welfare. Of these, this paper will only focus on the insecurity of employment corresponding to “risk of layoffs and unemployment.” As research dealing with compensation wages due to insecurity of employment in Japan, see Morikawa (2010) and Tsuru, Kume, Otake and Okudaira (2013).
12. For example, wages are shown to be higher when the reason is “To perform specialist work,” but lower when it is “To allow regular employees to specialize in important work.”
13. Specifically, though not the main argument of that paper, the average length of service of non-regular employees is shown to be longer in establishments that have a more active personnel policy of using non-regular employees.
14. According to the MHLW “Basic Survey on Wage Structure” (2016), the average wages (contractual hourly wage) of Regular, Full-fixed and Part-fixed in the totals for industry and size of enterprise are 1,960 yen, 1,318 yen and 1,065 yen, respectively, while the size of enterprise totals for “Accommodations, eating and drinking services” are 1,509 yen, 1,115 yen and 958 yen, and the industry totals for “1,000 or more employees” are 2,372 yen, 1,372 yen and 1,049 yen.
15. For more detail on the survey, see JILPT (2011).
16. For convenience, “full-time” was taken to mean 35 or more scheduled working hours per week, and “part-time” 34 hours or fewer.
17. Contractual hourly wages were worked out as follows. Firstly, for those receiving an “hourly wage,” the hourly wage amount was used as it was. Secondly, for those receiving a “daily wage,” the daily wage amount was multiplied by weekly working days, and this was then divided by weekly scheduled working hours. Thirdly, for those receiving a “weekly wage,” the weekly wage amount was divided by weekly scheduled working hours. Fourthly, for those receiving a “monthly wage,” the monthly wage amount was divided by four times the weekly scheduled working hours. Fifthly, those receiving an “annual salary” were removed from the analysis. The reason for this was that the annual salary amount could have included a portion equivalent to a bonus.

18. Those who replied that their weekly scheduled working hours were 8 hours or fewer were also removed from the analysis. This is because they might have misunderstood the question to mean “working hours per day” when replying.
19. Besides HLM, this is also known as the multilevel model or the mixed model, among others.
20. For details, see Raudenbush & Bryk (2002).
21. On the mathematical notation of HLM, see Tsutsui and Fuwa (2008). The same applies to Eqs. (3) and (4).
22. In the Part-fixed dummy in Model (i), for example, the calculation produces  $1 - \exp(-0.4886) = 0.386 = 38.6\%$ .
23. To be precise, when establishments reply that they utilize part-time workers, they include cases where part-time open-ended contract employees are utilized. Hereinafter, however, we ignore the minor exceptional cases for the sake of simplicity.
24. Since the analysis only targets a small number of employees (about three for every establishment), due care should be taken when interpreting the random intercept & random slope model. Nevertheless, there was no change in the three major findings (discussed below) even when the same estimate as this was attempted in the random intercept model.

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