



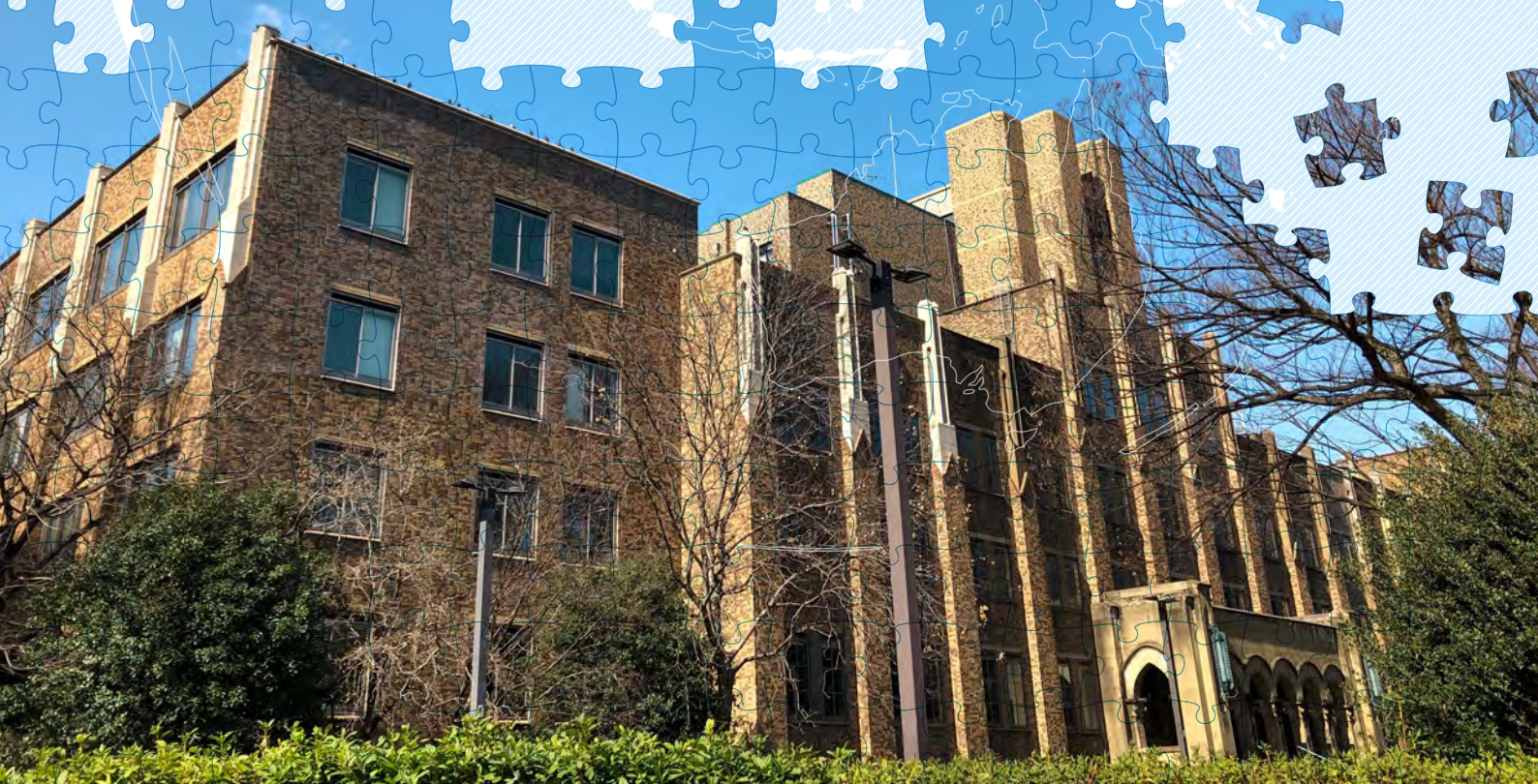
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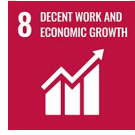
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CSRDA Discussion Paper

The Relationship between Wages and Hiring in the Japanese Labor Market



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The Relationship between Wages and Hiring in the Japanese Labor Market

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Abstract

In this study, we utilized job listing data from public employment services spanning from April 2019 to March 2021 to explore the relationship between wages and the hiring of job seekers. The analysis revealed that unfilled job listings (those which did not lead to a hire) consistently offered higher monthly wages compared to those listings that were successfully filled across various job types, prefectures, municipalities, and fiscal years. The difference between the average monthly wage for unfilled vacancies and that for filled vacancies was ¥21,241 for the fiscal year 2019 and ¥22,454 for the fiscal year 2020. These findings suggest a potential issue in the appropriate matching between job listings and job seekers.

KEY WORDS: Labor Market, Job Listing

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1. Introduction

This research utilizes the employment introduction services of Public Employment Security Offices, employing job listings that have been submitted by companies². Out of 11,934,723 full-time job listings³ accepted by Public Employment Security Offices nationwide from April 2019 to March 2021 (fiscal years 2019 and 2020), we acquired 11,306,437 listings⁴ published online. We examined the difference in average monthly wages between filled and unfilled positions (hereafter referred to as "DWFU"⁵) across different occupations, prefectures, municipalities, and fiscal years. DWFU is defined as the amount derived by subtracting the average monthly wage of filled positions from the average monthly wage of unfilled positions, expressed in yen. A positive DWFU indicates that unfilled vacancies offer higher average monthly wages than filled ones, whereas a negative value suggests the opposite.

As for empirical analyses on job listings, Fukui & Kikuchi (2020) reported that during the COVID-19 shock, occupations with a high proportion of remote work saw a smaller reduction in job listings, and despite the decrease in job postings, the wages listed in job listings were not significantly affected. Hangartner et al. (2021) analyzed recruitment officers' online search behaviors and used machine learning methods to study approaches from recruiters to job seekers. Modestino et al. (2020) explored changes in skill requirements for job seekers in the US using instrumental variable techniques. Horton & Moshe (2021) conducted a randomized field experiment to see if the ability of employers to observe candidates' salary histories affected hiring outcomes.

2. DWFU by Occupation

Tables 1 through 3 display the descriptive statistics for job vacancies categorized by

² Data was provided by HRog Co.,Ltd. from the HR List for Academia, for which we express our appreciation.

³ Employment Referrals for General Workers

⁴ For the job listings data acquired, outlier management measures were taken by narrowing down to listings with monthly wages ranging from 105,000 to 1,500,000 yen. The lower limit of 105,000 yen is based on the calculation of $750 \text{ yen} \times 140 \text{ hours}$.

⁵ The initial letters of each word in 'The difference in average monthly wages between filled and unfilled positions' were taken.

occupation. These tables include an aggregated table for fiscal years 2019 and 2020 (Table 1) and individual tables for each year (Tables 2 and 3). There are 15 occupations that exceed 1% of the total number of job listings, which were selected for occupation-specific analysis of DWFU⁶. Given the total of 11,306,437 listings, 1% represents approximately 113,000 listings.

Table 1 reveals that the highest number of vacancies was in the category of administrative staff, making up about 7% of the total vacancies. Following this category were positions in sales, care workers, drivers, and nurses, which each accounted for around 5% of all vacancies. IT engineers had about a 2% share. The rate of vacancy fulfillment, which indicates the proportion of vacancies that were filled, often fell into the 10% range. The fulfillment rate for administrative staff was 37%, significantly outpacing other categories. Conversely, fulfillment rates for IT engineers and construction worker were below 10%.

Tables 2 (for fiscal year 2019) and 3 (for fiscal year 2020) present the descriptive statistics for each fiscal year. During this period, the COVID-19 pandemic occurred around the midpoint between fiscal years 2019 and 2020, and its effects are partially observable. On April 7, 2020, the Cabinet decided on emergency economic measures in response to the COVID-19 pandemic, which included hiring freezes and the adoption of remote work in the labor sector. The total number of full-time job listings changed from 6,219,285 in fiscal year 2019 to 5,087,152 in fiscal year 2020, marking an 18.3% decrease in fiscal year 2020 compared to 2019. Occupations experiencing significant reductions in job listings in 2020 included sales, chefs, and administrative staff, with reductions of about 40%. In contrast, the number of employment opportunities for construction workers exhibited a marginal increase. Despite the widespread adoption of remote work, which might suggest that job listings for IT engineers would not decrease significantly, there was a 30% reduction, exceeding the average decrease.

In terms of the share of job listings by occupation, there was a notable difference between fiscal years 2019 and 2020. In 2019, administrative staff held the largest share at 7.3%, but this decreased to 6.5% in 2020, with sales and care worker occupations increasing their

⁶ The classification of job types in this paper is based on the job descriptions listed in the job postings. Within these listings, there are instances where jobs are described using unique titles or in a manner that makes the job type unclear. For these listings, there may have been challenges in converting them accurately to the intended job categories as envisioned by the recruiters. Furthermore, in some technical and production process roles, it was observed that there are difficulties in identifying a consistent naming convention for job types.

share. There were no occupations where the fulfillment rate differed by more than 5% between the two years, indicating no significant trend change. The largest discrepancy was observed in the occupation of chefs, with a difference of about 4% between 2019 and 2020.

Figures 1 and 2 depict the DWFU (Difference in Wages between Filled and Unfilled Vacancies) for fiscal year 2019 (April 2019 to March 2020) and fiscal year 2020 (April 2020 to March 2021), respectively, categorized by occupation. The left end of each red line represents the average monthly wage of filled vacancies, while the right end indicates the average monthly wage of unfilled vacancies⁷. The length of each red line signifies the magnitude of DWFU. For instance, in the case of administrative staff during fiscal year 2019, the left end of the red line indicates an average monthly wage of ¥187,061 for filled vacancies, whereas the right end shows ¥204,699 for unfilled vacancies, making the DWFU ¥17,638 for this occupation. The bar graph on the right side of the figures illustrates the sample size, indicating that there were 163,729 filled and 292,509 unfilled administrative staff vacancies in fiscal year 2019.

As shown in Figures 1 and 2, there is a tendency for the average monthly wages of unfilled vacancies to be higher than those of filled vacancies across occupations. While the magnitude of DWFU varies by occupation, the consistent occurrence of this trend among the top job categories, which account for more than 1% of total job listings, might be considered surprising. There is no significant difference in the levels of DWFU between fiscal years 2019 and 2020; for example, the DWFU for administrative staff was ¥17,638 in 2019 and ¥18,683 in 2020. Most occupations show a difference in DWFU between the two years within a few thousand yen, but for construction workers and machine operators, the difference exceeds ¥5,000, with the 2020 DWFU being higher.

Regarding the average monthly wages of unfilled vacancies used in calculating DWFU, some differences are observed between the fiscal years. For instance, the average monthly wage for unfilled vacancies for IT engineers in 2020 was ¥6,857 higher than in 2019. For the category "Other Occupations," which aggregates occupations outside the top 15 by share, the average monthly wage for unfilled vacancies in 2020 was ¥5,440 higher than in 2019.

⁷ Monthly wages are defined as the sum of the base salary and any fixed allowances paid regularly. Bonuses are not included. Although there are fields for entering the minimum and maximum monthly wages, this paper uses the midpoint between the minimum and maximum monthly wages as the monthly wage. Public Employment Security Offices require the inclusion of wage information when accepting job listings. Without displaying wage information, it is not possible to post a job listing.

3. DWFU by Prefecture

Figures 3 and 4 plot the DWFU for fiscal years 2019 and 2020, respectively, broken down by prefecture⁸. A color bar, transitioning from blue to red to represent varying amounts of DWFU, is located to the right of each figure. Here, blue signifies lower DWFU values, while red represents higher values. The boundary transitioning from blue to red, around ¥15,000, is plotted in a light grey color.

When observed by prefecture, many have DWFUs around ¥20,000. The prefecture with the smallest DWFU was Saga, at ¥11,680 in 2019 and ¥12,119 in 2020. Conversely, the prefecture with the highest DWFU was Miyagi, at ¥24,552 in 2019 and ¥26,289 in 2020. The largest difference in DWFU between the two fiscal years was observed in Saitama Prefecture, with a change exceeding ¥5,000.

Across all prefectures, DWFU was consistently above ¥10,000, indicating a trend where unfilled vacancies offered higher average monthly wages than filled ones. Moreover, there was no significant change in the level of DWFU between 2019 and 2020, with most prefectures showing a year-on-year difference within ¥3,000. Furthermore, both fiscal years demonstrated a tendency for DWFU to be lower in regions of Western Japan.

4. DWFU by Municipality

Figures 5 and 6 plot the DWFU for fiscal years 2019 and 2020, respectively, by municipality⁹. Like the previous charts, these figures utilize a color bar that ranges from blue to red to indicate the DWFU values, with blue representing smaller DWFU amounts and red indicating larger amounts. Unlike the prefectural data, some municipalities had very few job listings. Therefore, only municipalities with more than 30 filled job listings were included in the plots, resulting in 1,361 municipalities for Figure 5 (fiscal year 2019) and 1,342 municipalities for Figure 6 (fiscal year 2020). Municipalities not meeting this criterion are plotted in dark grey. For Tokyo's 23 special wards, each ward's DWFU is calculated separately, whereas for government-designated cities, the wards are calculated together as a single DWFU.

In fiscal year 2019, there were 88 municipalities where DWFU was negative, primarily consisting of towns and villages, with the rest being 16 cities and 3 special wards. Meanwhile,

⁸ The terms "prefecture" and "municipality" refer to the place of employment listed on the job postings.

⁹ For the municipal plots, we used the municipal codes available on the Ministry of Internal Affairs and Communications website, and it is possible that data processing could not be properly performed for any entries other than the municipality names listed there.

<https://www.soumu.go.jp/denshijiti/code.html>

106 municipalities had DWFUs exceeding ¥30,000, with notable job-listing volumes found in Minato Ward and Hachioji City of Tokyo.

Moving to fiscal year 2020, 86 municipalities experienced a negative DWFU. Excluding towns and villages, this group included 13 cities and 2 special wards. A total of 148 municipalities saw DWFUs surpassing ¥30,000, with significant job listings in Toshima Ward, Bunkyo Ward, among others.

Approximately 95% of municipalities exhibited a positive DWFU, indicating a trend where unfilled vacancies offered higher average monthly wages than filled ones, similar to the prefectural analysis. There was no significant change in the level of DWFU between 2019 and 2020, with many municipalities showing a year-on-year DWFU difference within ¥3,000.

5. Summary

In this paper, we examined the relationship between wages and the hiring of job seekers, with a verification conducted by job type, prefecture, municipality, and fiscal year. The finding that unfilled vacancies tend to offer higher average monthly wages than filled ones might seem counterintuitive to hiring managers. It is a reasonable assumption that, when companies face a shortage of personnel or wish to attract more talent than their competitors, increasing wages would be one of the primary strategies considered. The expectation that job applications and hiring would increase for positions offering higher wages, leading to a higher average monthly wage for filled positions compared to unfilled ones, seems logical. However, the opposite was true for many occupations and regions. The findings of this paper suggest that the lack of proper matching between job vacancies and job seekers.

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Table 1: The number of hires and positions filled by occupations for FY 2019 and FY 2020

Occupations	Number of Hires	Percentage of Total Hires	Number of Positions Filled	Fulfillment Rate
Administrative Staff	785,980	0.070	290,906	0.370
Sales	771,378	0.068	79,606	0.103
Care Worker	701,132	0.062	60,079	0.086
Driver	517,895	0.046	65,795	0.127
Nurse	455,609	0.040	53,195	0.117
Chef	426,541	0.038	52,257	0.123
Retail Sales	359,442	0.032	42,447	0.118
Security Guard	326,621	0.029	21,760	0.067
IT Engineer	243,610	0.022	15,261	0.063
Machine Operator	239,470	0.021	29,525	0.123
Daycare Teacher	203,027	0.018	23,708	0.117
Manufacturing Worker	162,665	0.014	24,347	0.150
Construction Worker	154,427	0.014	3,944	0.026
Civil Construction Worker	130,458	0.012	4,151	0.032
Hair Stylist	121,132	0.011	3,238	0.027
Other Occupations	5,707,050	0.505	694,495	0.122
Total	11,306,437	-	1,464,714	0.130

Table 2: The number of hires and positions filled by occupations for FY 2019

Occupations	Number of Hires	Percentage of Total Hires	Number of Positions Filled	Fulfillment Rate
Administrative Staff	456,238	0.073	163,729	0.359
Sales	422,326	0.068	44,813	0.106
Care Worker	366,697	0.059	31,144	0.085
Driver	285,661	0.046	34,119	0.119
Chef	254,461	0.041	26,709	0.105
Nurse	237,948	0.038	27,533	0.116
Retail Sales	217,284	0.035	23,837	0.110
Security Guard	170,387	0.027	11,813	0.069
IT Engineer	136,569	0.022	7,854	0.058
Machine Operator	130,317	0.021	16,408	0.126
Daycare Teacher	111,859	0.018	13,022	0.116
Manufacturing Worker	91,938	0.015	13,792	0.150
Construction Worker	74,759	0.012	1,989	0.027
Hair Stylist	63,613	0.010	2,072	0.033
Civil Construction Worker	62,011	0.010	2,111	0.034
Other Occupations	3,137,217	0.504	377,808	0.120
Total	6,219,285	-	798,753	0.128

Table 3: The number of hires and positions filled by occupations for FY 2020

Occupations	Number of Hires	Percentage of Total Hires	Number of Positions Filled	Fulfillment Rate
Sales	349,052	0.069	34,793	0.100
Care Worker	334,435	0.066	28,935	0.087
Administrative Staff	329,742	0.065	127,177	0.386
Driver	232,234	0.046	31,676	0.136
Nurse	217,661	0.043	25,662	0.118
Chef	172,080	0.034	25,548	0.148
Security Guard	156,234	0.031	9,947	0.064
Retail Sales	142,158	0.028	18,610	0.131
Machine Operator	109,153	0.021	13,117	0.120
IT Engineer	107,041	0.021	7,407	0.069
Daycare Teacher	91,168	0.018	10,686	0.117
Construction Worker	79,668	0.016	1,955	0.025
Manufacturing Worker	70,727	0.014	10,555	0.149
Civil Construction Worker	68,447	0.013	2,040	0.030
Hair Stylist	57,519	0.011	1,166	0.020
Other Occupations	2,569,833	0.505	316,687	0.123
Total	5,087,152	-	665,961	0.131

Figure 1 FY 2019 DWFU by Occupation



Figure 2 FY 2020 DWFU by Occupation

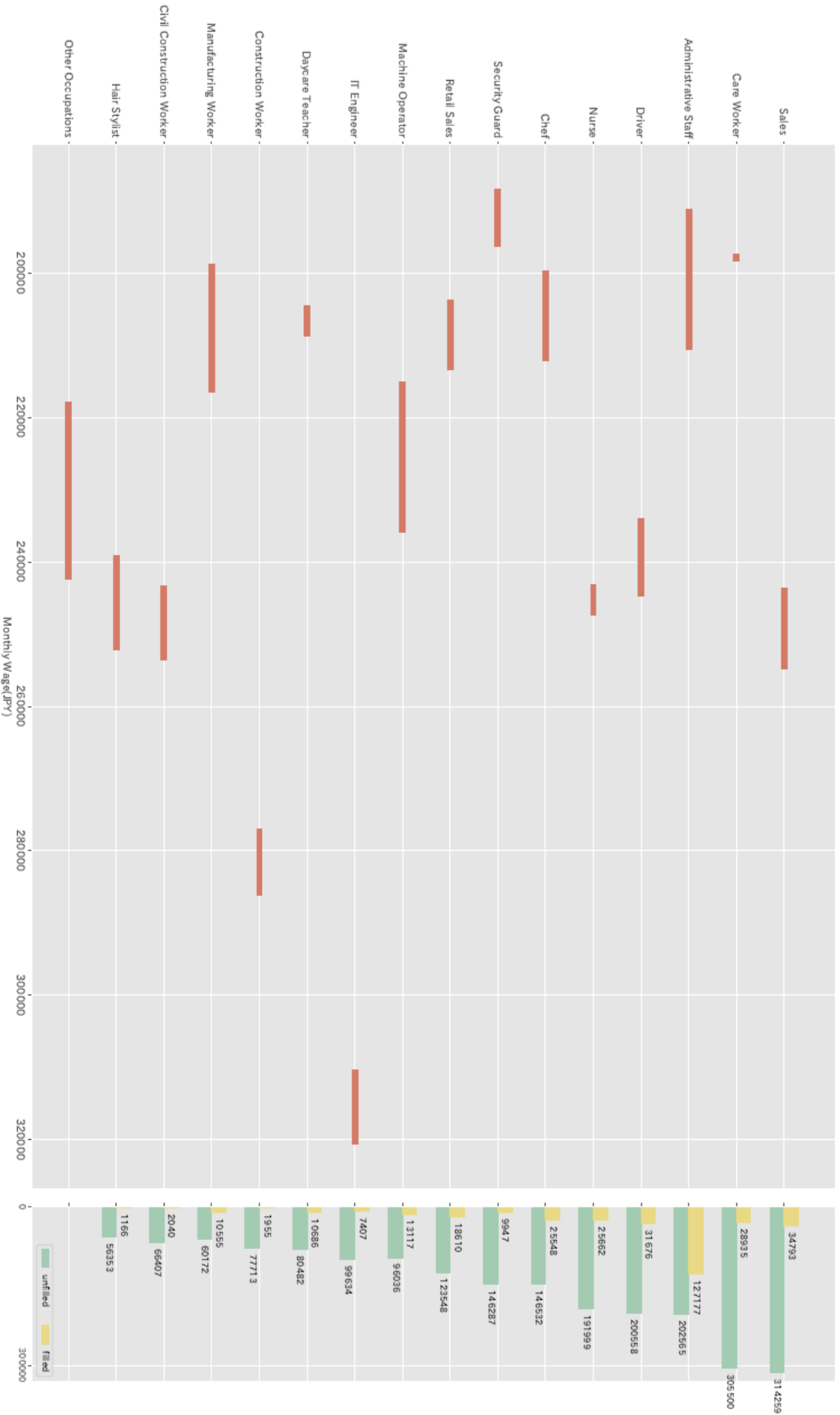


Figure 3: DWFU by Prefecture for FY 2019

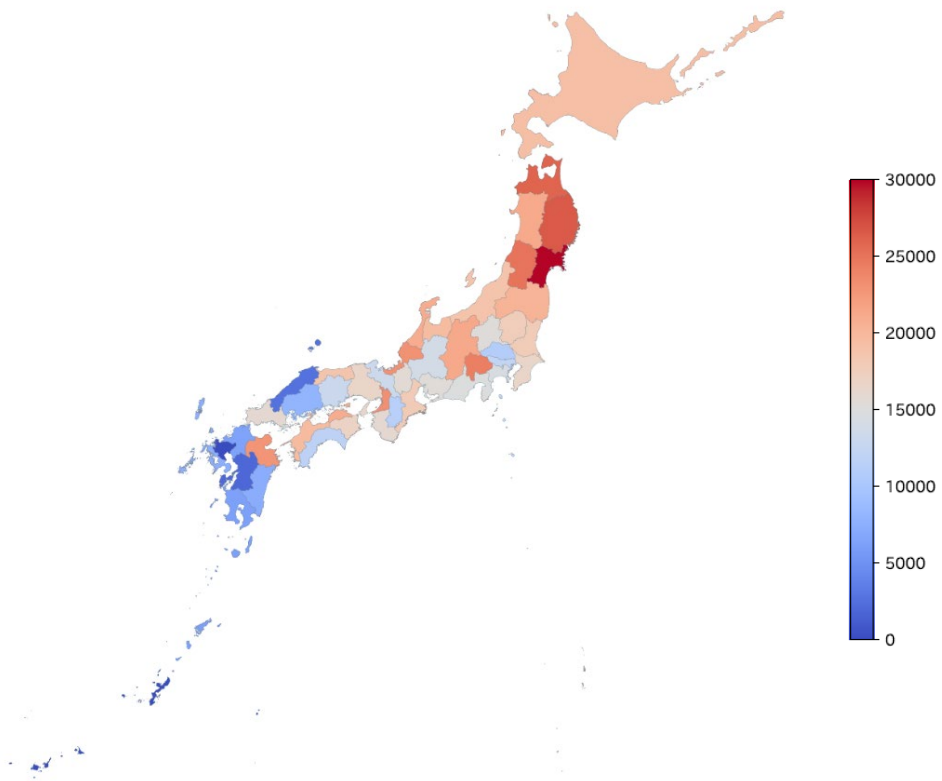


Figure 4: DWFU by Prefecture for FY 2020

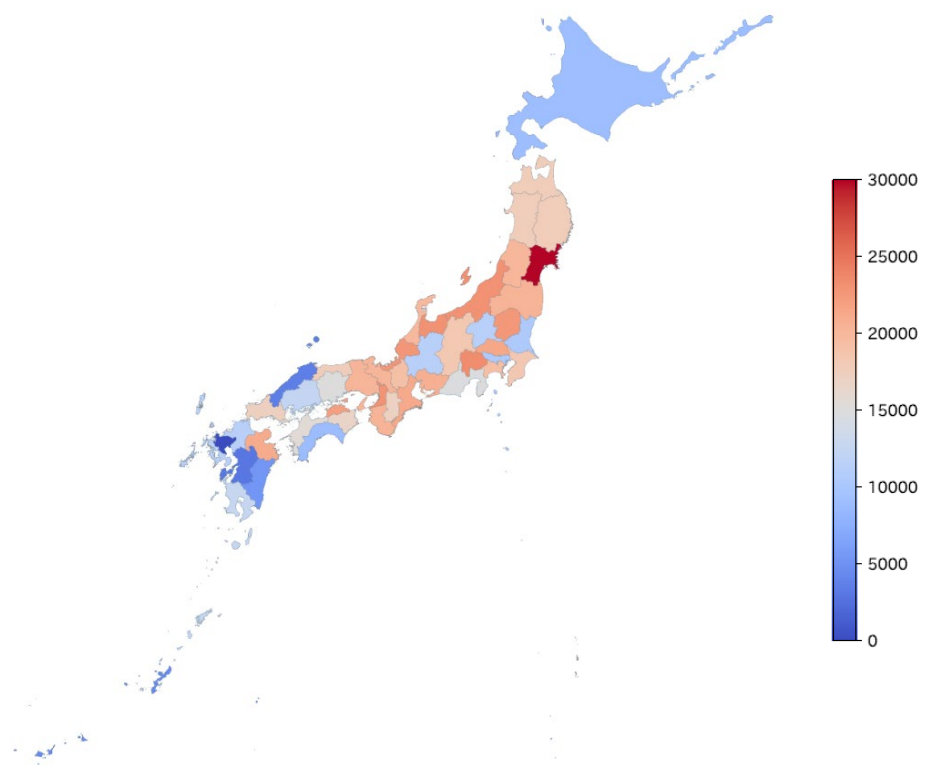


Figure 5: DWFU by Municipality for FY 2019

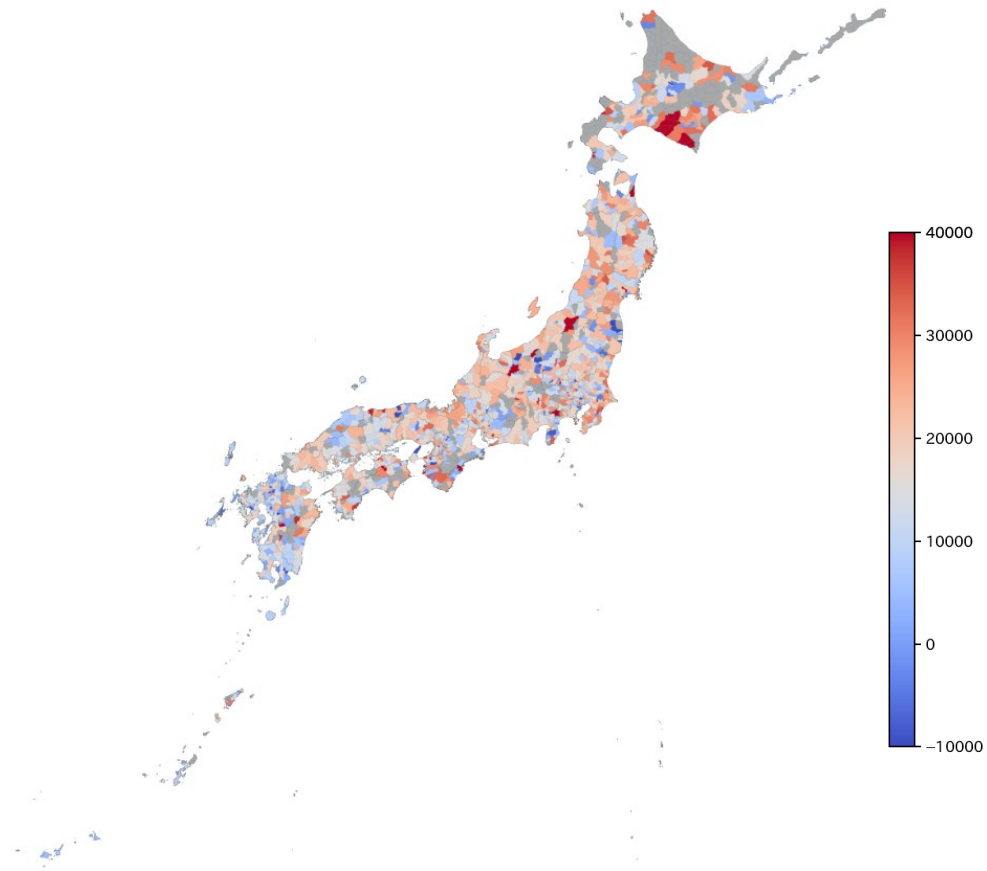


Figure 6: DWFU by Municipality for FY 2020

