

A Note on Responses of Vacancy Posting to COVID-19 shock in Japan*

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Abstract

The COVID-19 shock has brought significant impacts to the labor market all over the world, and Japan is not an exception. We document changes in the job vacancy postings behaviors in Japan using a new, unique microdata on online job postings. We find that the changes are hardly uniform across many dimensions. First, there were larger declines in the number of job vacancy postings for part-time jobs, services or manufacturing industries, production or services occupations, the largest or the smallest establishments, and lower skilled jobs. Second, we found little response of posted wages to COVID-19 shock, even though 30% of consecutively posted jobs change wages every month. Finally, the posted wages are equally flexible both upward and downward, which implies little support for the downward nominal wage rigidity.

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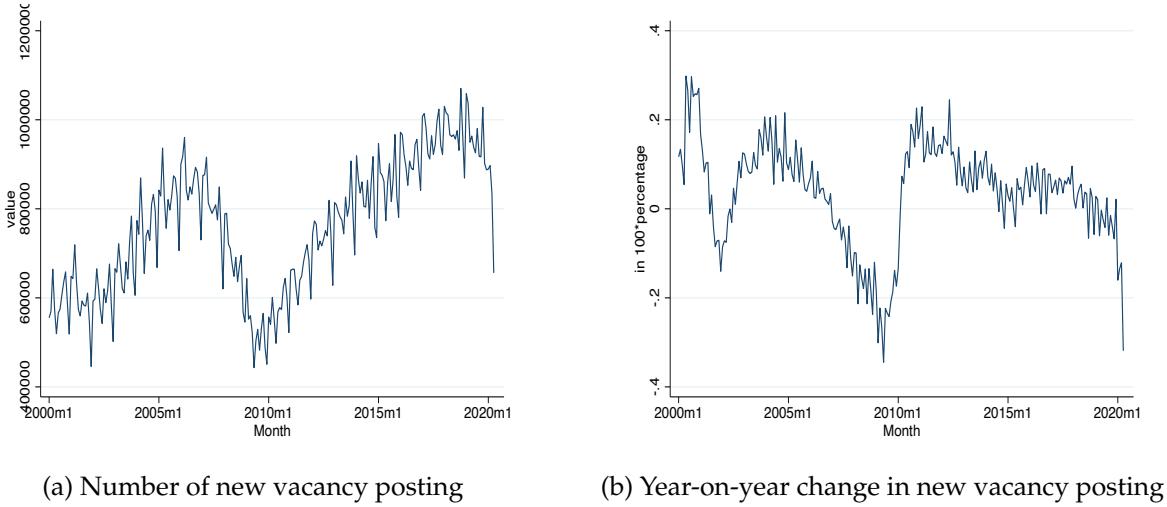
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1 Introduction

The COVID-19 shock has brought significant impacts to the labor market all over the world, and Japan is not an exception. While the Japanese labor market did not present a hike in unemployment rate (2.9% in April 2020) compared to other developed countries, job vacancy posting behaviors has dramatically changed. Figure 1 shows the aggregate number of new vacancy postings in Japan from January 2000 to May 2020. Figure 1a shows the number in real, and Figure 1b shows the year on year changes compared to the same months in the previous year in percentage. While the number of vacancy postings is still larger than that during the financial crisis, the number fallen by more than 30% in May 2020.

Figure 1: Aggregate Vacancy posting (ERGW)



Source: ERGW (MHLW)

Notes: Data is not seasonally adjusted. Both panels include part-timers.

In this paper, we provide descriptive evidence on job posting behaviors in Japan by job posting dates, job title, firm identifier, ZIP-code-level geographical information, industry, occupation, firm size, and posting wages. To do so, we use a unique, near-universe microdata, collected by Goalist that contains the near-universe of electronically posted job vacancies.

We find that changes in job posting behavior are hardly uniform across many dimensions. First, there were larger declines in the number of job vacancy postings for part-time jobs, services or manufacturing industries, production or services occupations, the largest or the smallest establishments, and lower skilled jobs. Second, median posting wages have been increasing even after the COVID-19 shock. Finally, we show that the wage for new hires is equally flexible both upward and downward, which contrasts with the downward nominal wage rigidity.

2 Data and Empirical Methodology for Job Postings

2.1 Data Sources

Our main data come from a unique source, HRog, which is a microdata from online job postings in Japan. These job postings were collected and assembled by Goalist, a leading labor market information firm. These data are continuously updated by crawling over 100 job information websites in Japan. The data for each posting contain job posting dates, job title, firm identifier, ZIP-code-level geographical information, industry, occupation, firm size, and posting wages.

We supplement and validate that microdata by a governmental, aggregate data, Employment Referrals for General Workers (ERGW). ERGW reports aggregate job posting and hiring data administrated by “Hello-work” (Public Employment Security Office).

2.2 Coverage and Validity of HRog data from Goalist

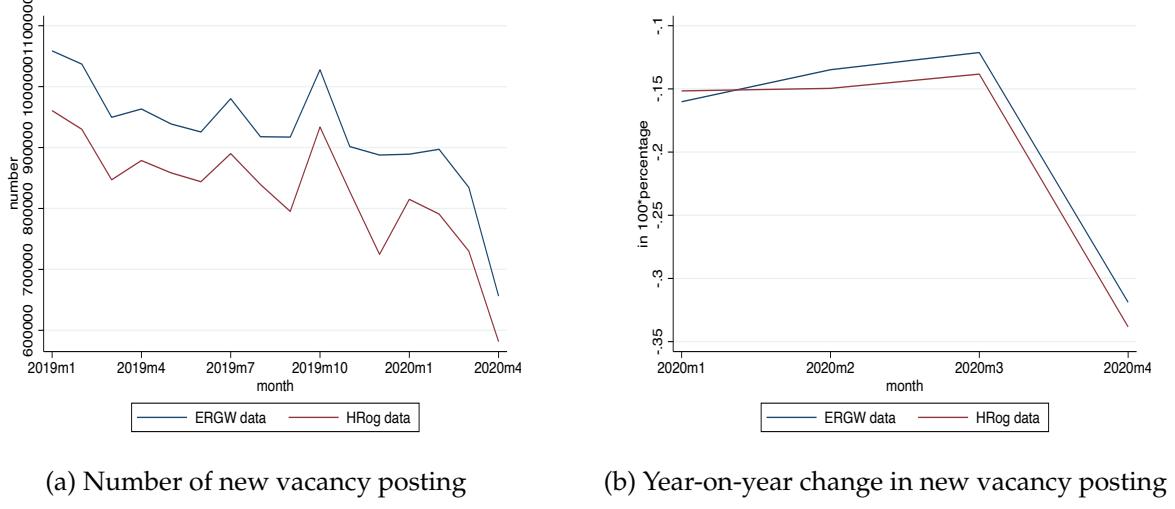
Our original microdata includes data not only from ERGM, but from all the major websites for new college graduates, and other websites for job changers. In this current version, we use only data on “Hello-work”, so that the universe is the same as the governmental official data up to assembling differences.

Goalist provides us with data they crawled once a month. For example, they crawled data on 2020/04/06 and 2020/05/06. This means that our samples omit vacancy postings, which are posted after 2020/04/06 and deleted before 2020/05/06. In this sense, the sample universe is not precisely the same as the governmental data (ERGW). Be that as it may, the time-series trend in aggregate vacancy postings is not much different. Figure 2 shows the data on new vacancy postings observed in both ERGW and Goalist data. Figure 2a compares the number of new vacancy postings from January 2019 to May 2020, and Figure 2b compares the year-on-year changes in the number from January 2020 to May 2020. Observing a few differences along the time-series, these data show quite similar trends in both the number and year-on-year changes.

3 Descriptive Evidence on Changes in Job Postings

In this section, we summarize the changes in job postings along several dimensions, using both ERGW and Goalist data. Table 1 summarizes which variables are available in each data, and which data we use for each variable. In particular, we use ERGW data to see the dimensions of industry, occupation, geography, and establishment sizes as ERGW observes these dimensions. We use Goalist data for workers’ skills, employment types, and posting wage. In the ongoing work, we will clean and use data from Goalist for all the dimensions.

Figure 2: Aggregate Vacancy posting (ERGW and Goalist)



(a) Number of new vacancy posting

(b) Year-on-year change in new vacancy posting

Source: ERGW (MHLW) and HRog (Goalist)
Notes: Data is not seasonally adjusted. Both panels include part-timers.

Table 1: Data/Variable availability for EGGW and HRog data

	ERGW	HRog
Samples Frequency	Aggregate Data Monthly	Micro data Daily
<i>Variable Availability</i>		
Industry	xx	x
Occupation	xx	x
Full/Part-time	xx	x
Prefecture	xx	x
Firm Size	xx (see notes)	x
Firm Capital		x
Workers' skills		xx
Posting Wage		xx

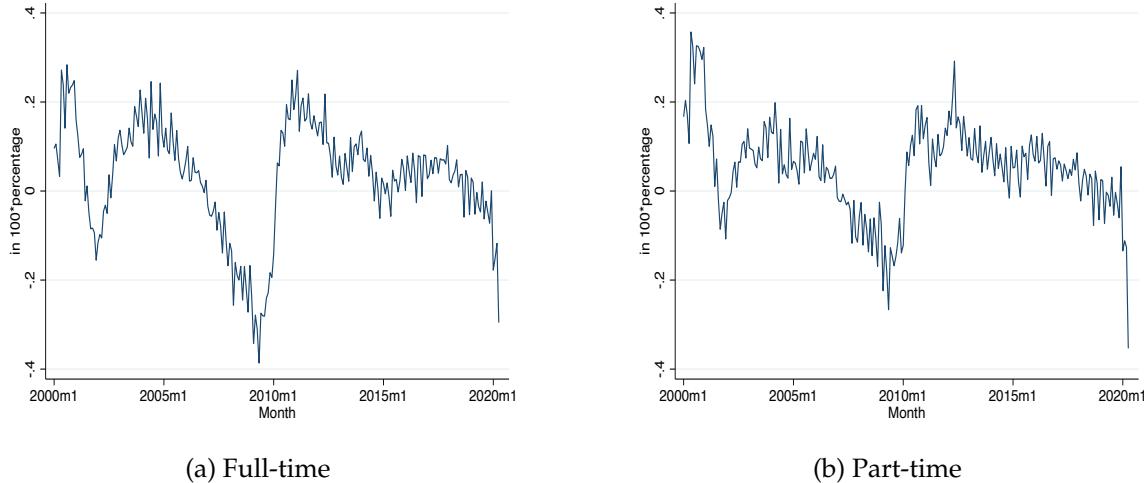
Notes: x indicates that the variables are available in the data source. xx indicates that we use the data for the variables in the current version. In ERGW data, establishment size, not firm size, by 5 categories is available.

3.1 Employment Types

First, we see heterogeneity across employment types: full-time or part-time. Figure 3 shows the changes in the number of job vacancy postings in April 2020 compared to April 2019 for each type. Numbers are in percentage.

Comparing these two types, during the COVID-19 crisis, the number of job vacancy postings decreases more for part-time than full-time jobs. This contrasts with the experience during the financial crisis in 2008-2009, where the number of postings for full-time declined more.

Figure 3: Changes in the number of vacancy postings (yoY)



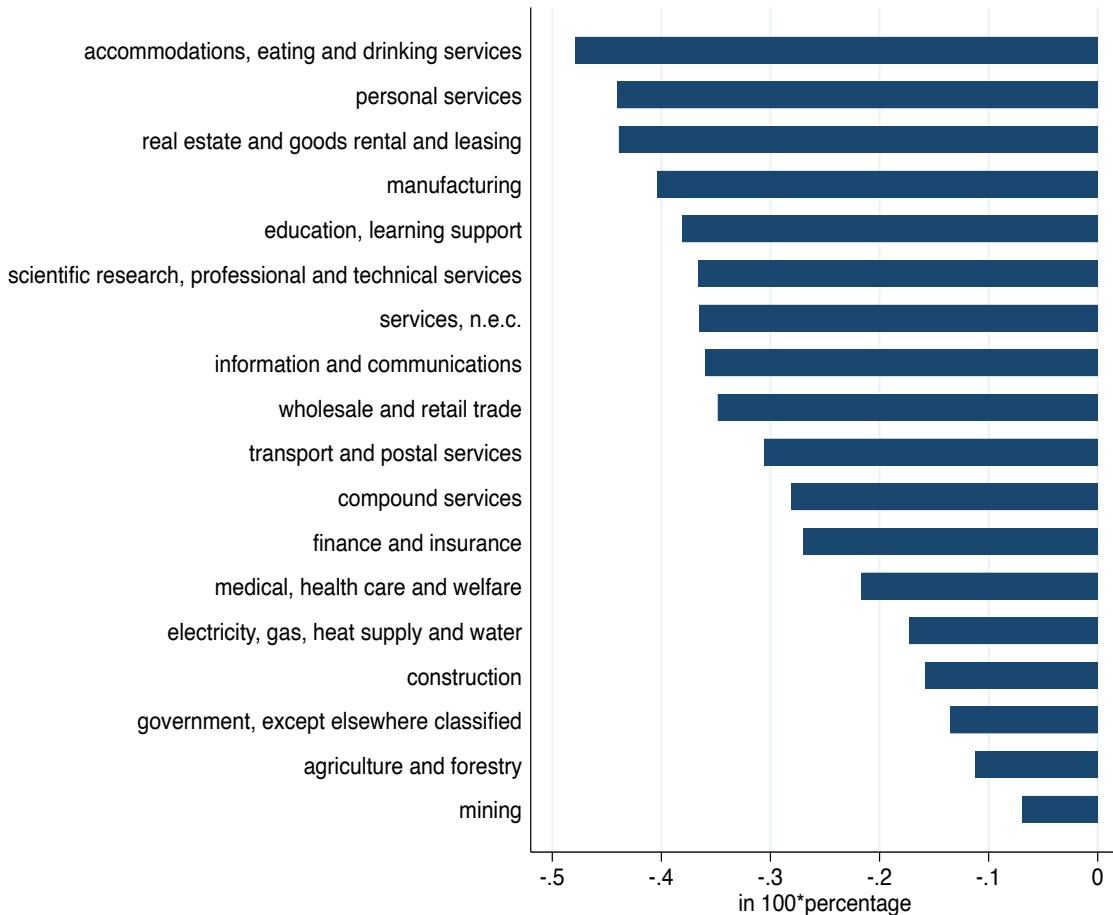
Source: ERGW (MHLW)
Notes: Numbers are year on year change.

3.2 Industry

Second, we see heterogeneity across industries. Figure 4 shows the changes in the number of job vacancy postings in April 2020 compared to April 2019. Numbers are in percentage.

The most affected are services sectors (accommodations, eating and drinking services, personal services, and real estate and goods rental and leasing). In addition, the manufacturing sector experienced a large decline (around 40%) in the number of job vacancy postings in April 2020. This is consistent with the disproportionate decline in services consumption in Japan documented by [Watanabe and Omori \(2020\)](#).

Figure 4: Changes in the number of vacancy posting by industry (yoY, April 2020)



Source: ERGW (MHLW).

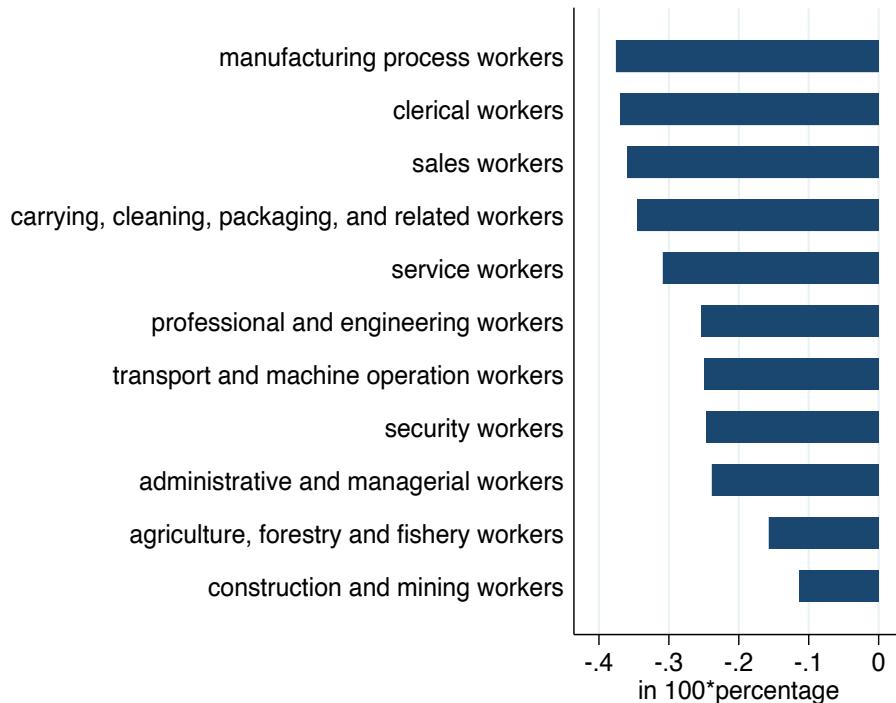
Notes: Numbers are year on year change from April 2019 to April 2020 by industry. Data include part-timers.

3.3 Occupation

Third, we see heterogeneity across occupations. Figure 5 shows the changes in the number of job vacancy postings in April 2020 compared to April 2019. Numbers are in percentage.

The most affected occupations are manufacturing process workers, clerical workers, or sales workers. These occupations have higher physical proximity and lower flexibility in terms of work-from-home as documented in [Kikuchi et al. \(2020\)](#).

Figure 5: Changes in the number of vacancy posting by occupation (yoY, April 2020)



Source: ERGW (MHLW).

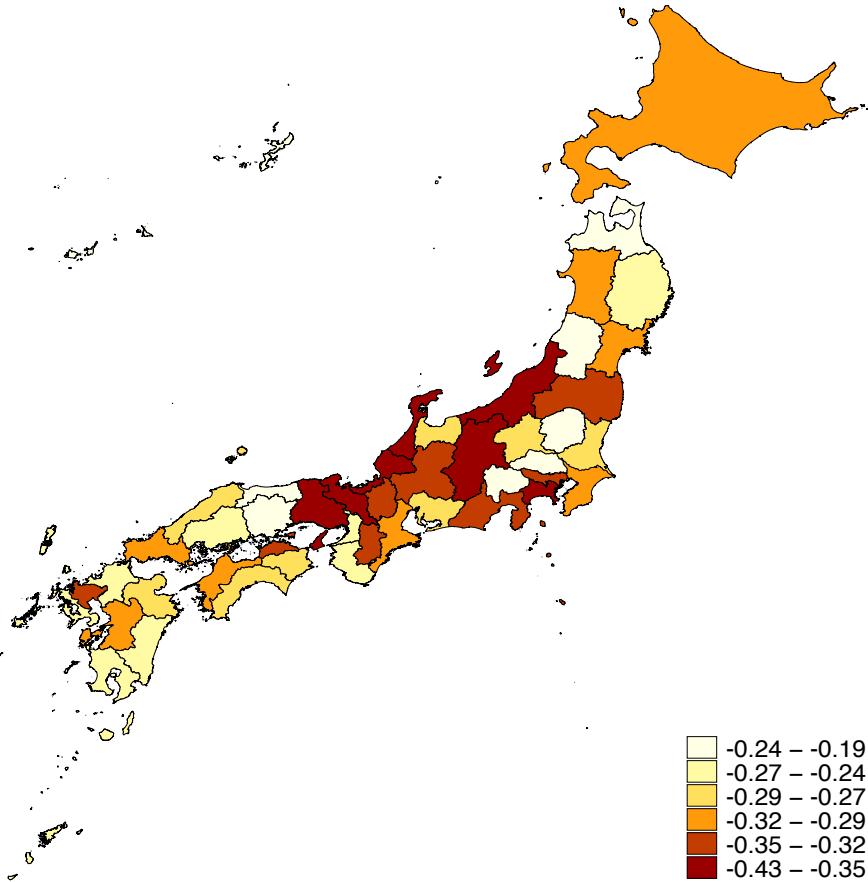
Notes: Numbers are year on year change from April 2019 to April 2020 by occupation. Data include part-timers.

3.4 Geography

Fourth, we see heterogeneity across geography. Figure 6 shows the changes in the number of job vacancy postings in April 2020 compared to April 2019. Numbers are in percentage.

For example, Tokyo has the largest cases of COVID-19 so far, and experienced 33.5% decrease in April 2020 compared to April 2019. Other large prefectures such as Osaka, Kyoto and Hyogo also experienced large declines in job postings by more than 30% in April 2020 compared to April 2019.

Figure 6: Changes in the number of vacancy posting by prefecture (yoY, April 2020)

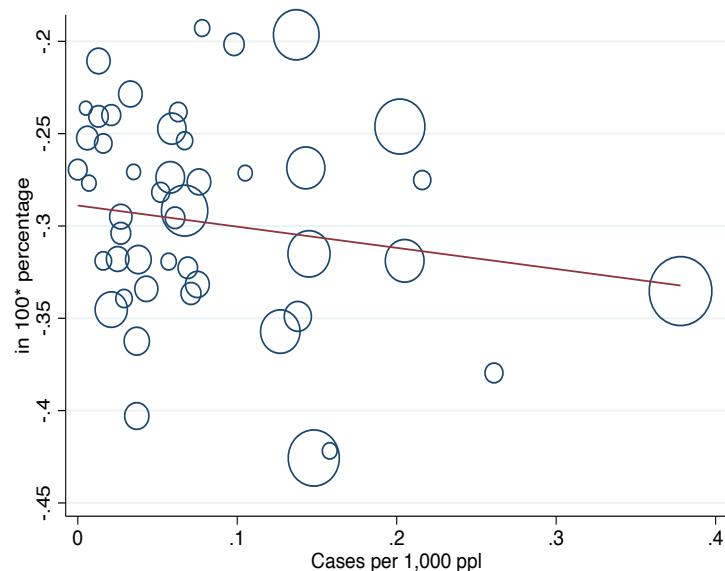


Source: ERGW (MHLW).

Notes: Numbers are year on year change from April 2019 to April 2020 by prefectures. The numbers include part-timers.

Figure 7 shows the relationship between the changes in the number of vacancy postings in April 2020 and the confirmed cases of COVID-19 by prefecture. While this is not a causation, but just a correlation, the number of job vacancy postings in the prefectures with more cases of COVID-19 so far declined more. In our ongoing work, we exploit daily data on vacancy postings as well as heterogeneity in industrial composition across prefectures.

Figure 7: Changes in the number of vacancy postings (yoY, April 2020) and COVID-19 cases per 1,000 by prefecture



Source: ERGW (MHLW) and MHLW data on COVID-19 as of May 30th 2020.

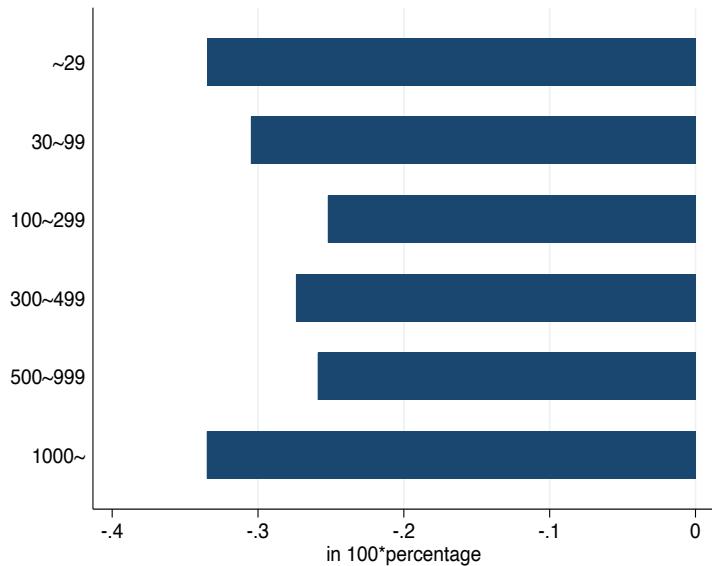
Notes: y-axis: Numbers are year on year change from April 2019 to April 2020 by prefectures. The numbers include part-timers. x-axis: Numbers of cumulative confirmed cases per 1,000 people by prefecture as of May 31st 2020. Markers and the fitted line are weighted by the population size of prefectures.

3.5 Establishment Size

Fifth, we see heterogeneity across establishment size. Figure 8 shows the changes in the number of job vacancy postings in April 2020 compared to April 2019. Units are in percentage.

The largest and the smaller establishments decrease the number of vacancy postings more than the middle-size establishments.

Figure 8: Changes in the number of vacancy posting by establishment size (yoY, April 2020)



Source: ERGW (MHLW).

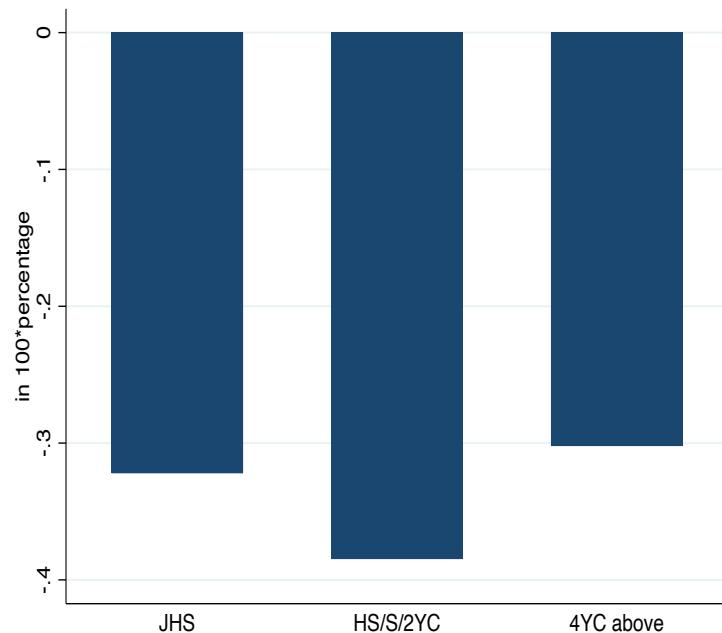
Notes: Numbers are year on year change from April 2019 to April 2020 by establishment size. The numbers include part-timers.

3.6 Workers' Skill

Finally, we see heterogeneity across workers' skills. Figure 9 shows the changes in the number of job vacancy postings in April 2020 compared to April 2019. We have three categories; JHS denotes postings which require less than or equal to junior high school degrees. HS/s/2YC denotes those require degrees from high school, specialty school, or 2-year college. 4YC above denotes those require 4-year college degrees or above. Numbers are in percentage.

As we see in the figure, there were larger decrease in the jobs for less-skilled workers. This contrasts with the result of downskilling in the US under the COVID-19 shock as documented by [Campello et al. \(2020\)](#).¹

Figure 9: Changes in the number of vacancy posting by education levels (yoY, April 2020)



Source: HRog (Goalist)

Notes: Numbers are year on year change from April 2019 to April 2020 by education degrees required for postings. JHS denotes postings which require less than or equal to junior high school degrees. HS/s/2YC denotes those require degrees from high school, specialty school, or 2-year college. 4YC above denotes those require 4-year college degrees or above. Data include part-timers.

¹[Hershbein and Kahn \(2018\)](#) documents the evidence of upskilling after the financial crisis in the US.

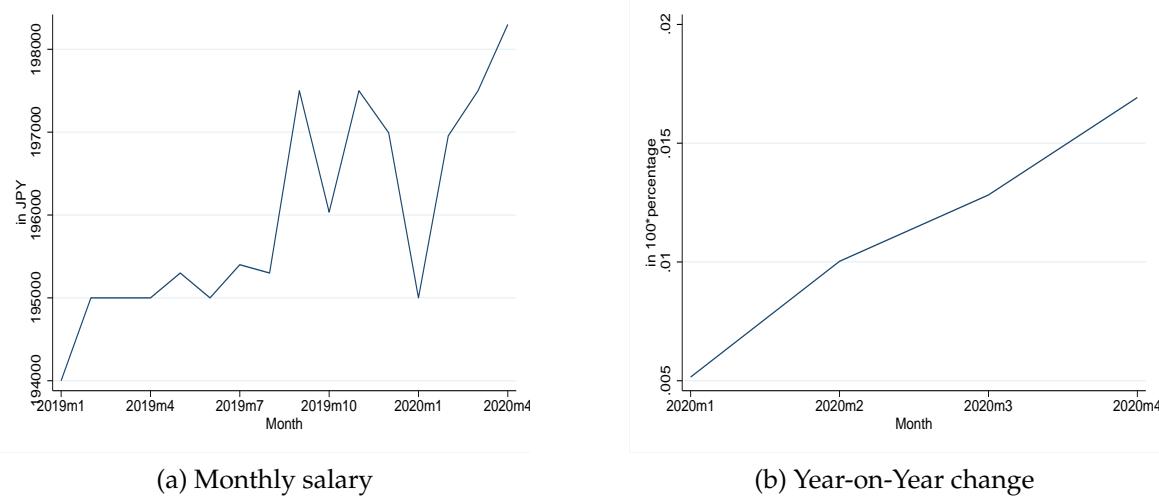
4 Posting Wage

In this section, we see how posting wages changed during the COVID-19 crisis. To the best of our knowledge, this is the first paper to document evidence on posting wages in Japan using a representative, microdata.

4.1 Aggregate Posting Wage

Figure 10 shows the changes in median wage for vacancy postings of full-time workers. Figure 10a shows the changes in median monthly salary in JPY. Figure 10b shows the changes in median monthly salary in year-on-year change. In April 2020, there is an increase in median posting wage by more than 1.5% compared to April 2019. These figures show that the median posting wage did not fall in April 2020 for full-time workers.²

Figure 10: Median posting wage for full-time workers



Source: HRog (Goalist)
Notes: Data is not seasonally adjusted.

4.2 Changes in wages by establishment and by occupation

Table 2 shows month-on-month wage growth at job level. We define a job as the posting from the same establishment by the exactly same occupational description. On average, while 54% of jobs are posted at the same wage levels, 46% of jobs are posted by decreasing or increasing wages. For example, comparing the same jobs posted on March 2020 and April 2020, on average, 52% of the jobs are posted with the same wages, 23.8% of the jobs are posting with lower wages, and 24% of the jobs are posted with higher wages. In addition, there is no asymmetry in whether to increase or decrease wages, and these numbers are roughly the same.

²For part-time workers, median hourly wage has been 1000 JPY since September 2019. Since this is not as informative as data for full-time workers, we focus on full-time workers in the current version.

Table 2: Monthly wage growth at a job level

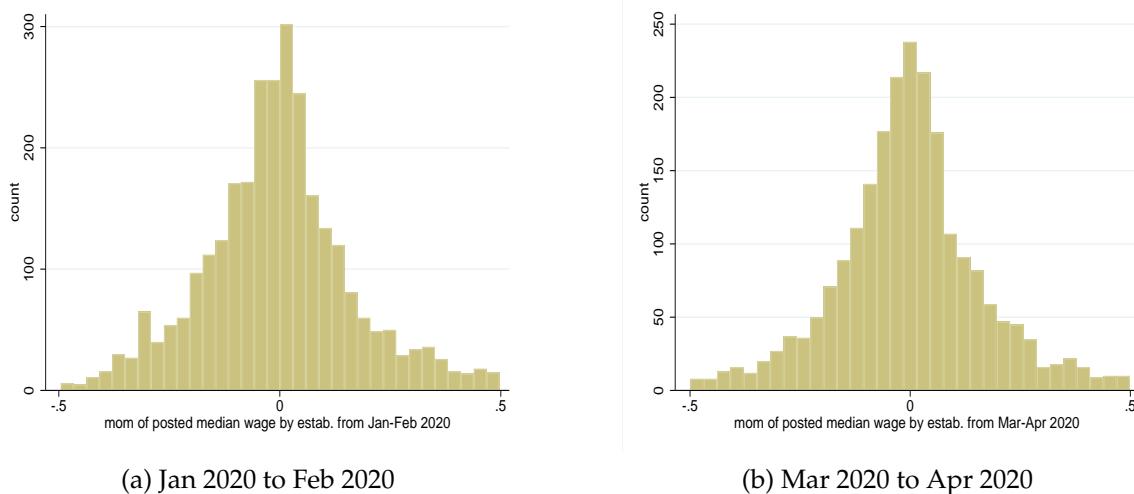
	Jan-Feb 2020	Feb-Mar 2020	Mar-Apr 2020	Average
Decrease	22.90	22.44	23.77	22.98
Zero Growth	54.92	54.22	52.01	53.88
Increase	22.18	23.33	24.02	23.14
Total	100.00	100.00	100.00	100.00

Source: HRog (Goalist)

Notes: This table summarizes the distribution of the growth of posting wages. A job is an establishment by exact occupational description. Data are only for full-time workers. Posting wages are measured as the posted lower-bound wages.

Figure 11 shows the distribution of wage growth at job level, excluding zero growth. Figure 11a shows the distribution of changes from January 2020 to February 2020, and Figure 11b shows the distribution of changes from March 2020 to April 2020. These figures confirm that the wage growth for new hires is, in fact, almost symmetric, and this result contrasts with the evidence of downward nominal wage rigidity for new hires in the US shown in Hazell and Taska (2019).

Figure 11: Distribution of wage growth at job level, excluding zero growth



Source: HRog (Goalist)

Notes: Data is not seasonally adjusted. This graph is the distribution of the month-on-month growth of posting wages, excluding zero growth. A job is an establishment by exact occupational description. Truncated at $\pm 50\%$. Data are only for full-time workers.

5 Conclusion and Next Steps

This paper provides an early account of the labor market effects of the COVID-19 shock in Japan, based on a new, unique job-level vacancy posting data. We show that the declines in vacancy postings behaviors are different across employment type, industry, occupation, geography, establishment size, workers' skill. This evidence suggests that the COVID-19 shock may further exacerbate inequality in multiple dimensions. In addition, we document changes in posting wages and find that the wages did not fall after the shock. Furthermore, we provide suggestive evidence that we do not observe downward nominal wage rigidity for new hires in Japan, which contrasts with the findings in the US.

In our ongoing project, we plan to continue tracking the effects of the COVID-19 crisis on firms' hiring and to expand our scopes for larger datasets, including new graduates or job changers. Moreover, we plan to provide empirical and theoretical foundations on changes in job postings and wages incorporating rich heterogeneity across many dimensions, including establishment size, geography, and workers' skills.

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