# Wage Disparities Between Regular and Non-regular Employment in Japan in the 2010s

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## Introduction

- This poster clarifies whether the wage disparity between regular and non-regular employment in Japan decreased in the 2010s, by focusing on different points on the wage distribution curve.
- The analysis also focuses on the role of regional minimum wages in reducing the wage penalty for non-regular employment during the 2010s.

- There exists a significant wage disparity between regular and non-regular employees in Japan, but whether this disparity is uniform or heterogeneous has not received sufficient attention.
- Theoretically, it follows that there is a wage premium at the top, and a wage penalty at the bottom, of the wage distribution for non-regular employment.
- As per observation from previous studies in many countries, there is no wage premium for non-regular employment, but the wage penalty for non-regular employment is greater at the lower end of the wage distribution.
- A previous study in Japan found that an increase in minimum wage raises wages for workers at the bottom of the wage distribution .
- In Japan, the government, labor unions, and employers' associations agreed to raise the minimum wage in 2008; since then, regional minimum wages have increased substantially. However, the impact of these institutional changes on wage disparity between regular and non-regular employees has not been examined.

## Method

- This study uses unconditional quantile regression analysis (RIF regression analysis) with the Recentered Influence Function (RIF) of the quantiles as the objective variable (Firpo et al. 2009).

- RIF is the Influence Function (IF) of a statistic (e.g., quantile) adjusted (decentered), such that its expected value is that statistic. The IF and RIF of the quantiles are as follows:

$$IF(Y; q_\tau, F_Y) = \frac{\tau - 1\{Y \le q_\tau\}}{f_Y(q_\tau)}$$

$$RIF(Y; q_\tau) = q_\tau + \frac{\tau - 1\{Y \le q_\tau\}}{f_Y(q_\tau)}$$

Notation:

- $Y$ is the natural logarithm of the hourly wage (the objective variable).
- $\tau$ is the quantile point;
- $q_\tau$ is the value of $Y$ at the quantile point;
- $F_Y$ denotes the distribution function of $Y$;
- $f_Y(q_\tau)$ is the density function at point $q_\tau$;
- $1\{Y \le q_\tau\}$ is a dummy variable indicating whether $Y$ is below $q_\tau$.

- RIF regression analysis is a method to model this conditional expectation of RIF, which can be estimated by OLS or logit model.

$$E\big(RIF(Y; q_\tau)\big) = X'\gamma$$

## Data

- We extracted a sample of workers, aged 20–59 years, from the "General Survey on Diversified Types of Employment," a nation-wide survey conducted by the Ministry of Health, Labor, and Welfare in Japan in 2010 and 2019.
  - Dependent variable: Logarithm of hourly wages of individual employees.
  - Focal Independent variables: Employment types (non-regular employment dummy) and logarithm of regional minimum wages
  - Control variables: years of education, years of service, squares of years of service, occupation, industry, and firm size.
- We analyzed the data separately for male and female workers.

## Data (cont'd)

- Table 1 presents the descriptive statistics.

**Table 1. Descriptive Statistics (Selected)**

| | Male Workers | | | | Female Workers | | | |
|---|---|---|---|---|---|---|---|---|
| | *2010* | | *2019* | | *2010* | | *2019* | |
| | *N* | *Mean* | *N* | *Mean* | *N* | *Mean* | *N* | *Mean* |
| Logarithm of hourly wage | 8,833 | 7.46 | 5,486 | 7.42 | 14,332 | 7.05 | 8,316 | 7.08 |
| Regular Employment | 5,315 | 60.17 | 3,012 | 54.90 | 2,698 | 18.83 | 1,707 | 20.53 |
| Non-regular Employment | 3,518 | 39.83 | 2,474 | 45.10 | 11,634 | 81.17 | 6,609 | 79.47 |
| Contract Workers | 1,408 | 15.94 | 727 | 13.25 | 2,253 | 15.72 | 1,099 | 13.22 |
| Part-time workers | 382 | 4.32 | 323 | 5.89 | 4,526 | 31.58 | 2,412 | 29.00 |
| Dispatch Worker | 653 | 7.39 | 780 | 14.22 | 2,551 | 17.80 | 1,949 | 23.44 |
| Others | 1,075 | 12.17 | 644 | 11.74 | 2,304 | 16.08 | 1,149 | 13.82 |
| Logarithm of regional minimum wages | 8,833 | 7.46 | 5,486 | 7.42 | 14,332 | 7.05 | 8,316 | 7.08 |

## Results

- Focusing on the results of the OLS Model, we find that the wage penalty for non-regular employment decreased slightly between 2010 and 2019.
  - The coefficient for the non-regular employment dummy in the male sample changed from -0.2432 (-21.6%) in 2010 to -0.2305 (-20.6%) in 2019, while that for the female sample changed from -0.3353 (-28.5%) in 2010 to -0.2683 (-23.5%) in 2019.

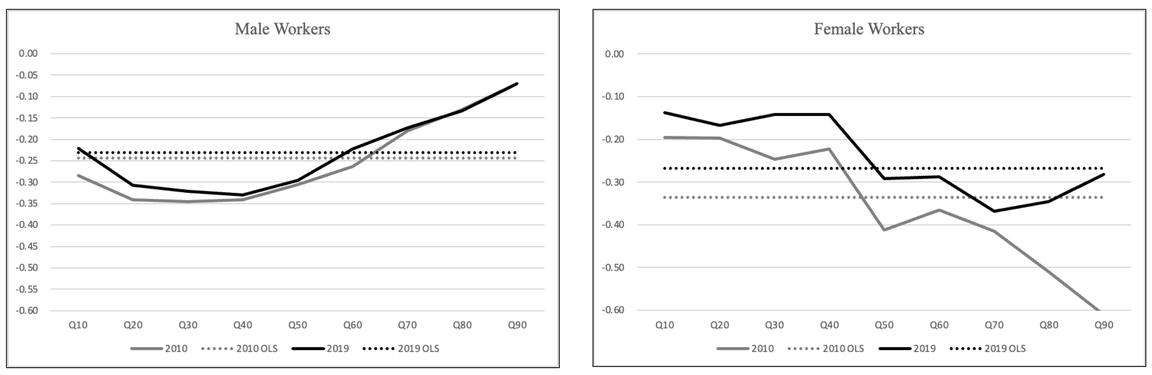


**Figure 1. Wage Penalty of Non-regular Employment**

- The results of the unconditional quantile regression indicate that the wage penalty is not uniform, depending on the location of the wage distribution.
  - For male workers, the wage disparity between regular and non-regular employment is sizeable at the bottom and small at the top of the wage distribution curve.
  - The wage disparity for female workers is small for those receiving lower wages and sizeable for those with higher remuneration.
  - For female workers, the wage penalty for non-regular employment decreased across the entire wage distribution between 2010 and 2019.
- Additionally, regional minimum wages was found to increase the remuneration of low-wage workers to a larger extent in non-regular than in regular employment.

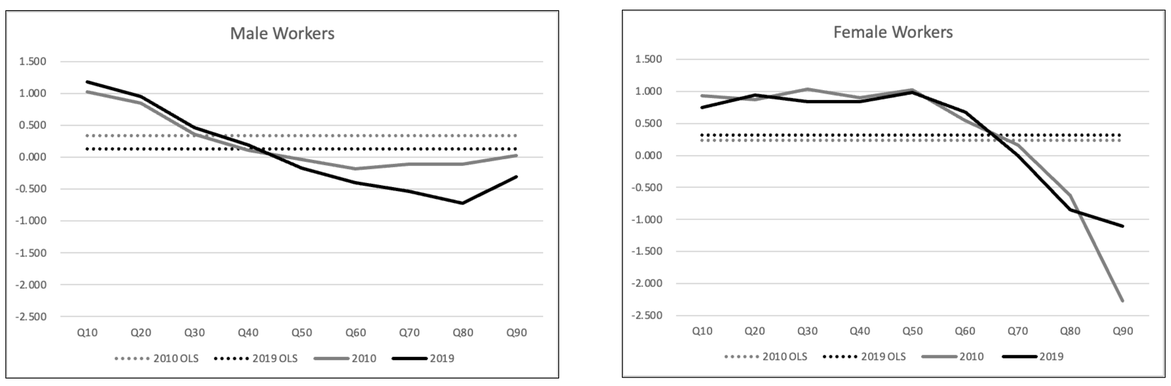


**Figure 2. Interaction Effect of Non-regular Dummy and Log Regional Minimum Wages**

## Conclusion and Implication

- The wage penalty for non-regular employment decreased during the 2010s. The extent of the decline was greater for female than for male workers and was observed over a wide range of incomes among the former.
- Higher regional minimum wages reduce the wage penalty for non-regular employment at the lower end of the wage distribution. This result suggests that policies to increase minimum wages are effective in reducing the wage gap between regular and non-regular employment.

**Reference**: Firpo, Sergio, Nicole Fortin, and Thomas Lemieux, 2009, "Unconditional Quantile Regressions," *Econometrica*, 77(3): 953-73.

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