

Life Cycle and Worker Flows: Regional Characteristics in Japan**

FUJIMOTO Junichi

Professor, National Graduate Institute for Policy Studies (GRIPS)

ESTEBAN-PRETEL Julen

Professor, Queens College, City University of New York

Abstract

Worker flows, which describe how workers transition in the labor market between such states as employment, unemployment, and inactivity, vary considerably by worker characteristics. This paper extends the analysis of Esteban-Pretel and Fujimoto (2020), who examine the age profiles of worker flows in Japan by gender, educational attainment, and marital status using data through 2018, by incorporating data through 2022 and analyzing regional differences. The results indicate that while the age profiles of worker flows are generally similar in shape across regions, the levels of certain flows differ markedly. In particular, the ease of transitioning from non-regular to regular employment varies significantly between regions, especially for individuals in their 40s and 50s. These findings highlight the importance of accounting for regional factors in labor market analysis.

Keywords: employment, unemployment, non-regular employment, Japan

JEL Classification: E24, J63, J64

I. Introduction

Labor market variables that tend to attract attention are stock variables such as the unemployment rate and the number of employed workers. However, in order to understand the situation of the labor market, it is valuable to analyze not only these stock variables but also the underlying worker flows, which capture how workers transition between different labor market statuses such as employment, unemployment, and out of the labor force. For example, a given unemployment rate may result from very different worker flows—for instance, when

* This article is based on a study first published in the Financial Review No. 161, pp. 51–64, Fujimoto, Junichi and Julen Esteban-Pretel, 2025, “Life Cycle and Worker Flows: Regional Characteristics in Japan” written in Japanese.

* We thank Hiroaki Miyamoto (Chief Economist, Ministry of Finance Policy Research Institute), staff of the Policy Research Institute, and other authors of this volume for valuable comments. Fujimoto acknowledges financial support from JSPS Kakenhi 22K01399 and GRIPS Policy Research Center.

many employed workers become unemployed while many unemployed workers find jobs, or when both flows are relatively small. Distinguishing among these different cases is important for examining appropriate policy responses.

Against such a backdrop, worker flows have been extensively studied across countries, including Japan, where a substantial body of research has accumulated since Mizuno (1982, 1983). In particular, many studies, including Mizuno (1992), Ohta and Teruyama (2003a, 2003b), Kuroda (2002), Sakura (2006), and Lin and Miyamoto (2012), analyze the importance of changes in different flows for variations in the unemployment rate.

Most of these studies on worker flows focus on average transition rates among all workers, which may partly reflect the labor search and matching model (e.g., Diamond (1982a, 1982b), Mortensen and Pissarides (1994)). This model, the standard tool for macroeconomic analyses of unemployment, explains unemployment based on workers' transitions between employment and unemployment, but typically does not distinguish workers by age or gender.

In contrast, some studies emphasize worker heterogeneity in terms of age, gender, and other characteristics, and analyze worker flows for different groups. Studies that adopt such an approach to analyze the Japanese labor market include Ohta and Teruyama (2003a), Esteban-Pretel, Nakajima, and Tanaka (2011), and Esteban-Pretel and Fujimoto (2020), but research on worker flows in different regions of Japan is limited.

Esteban-Pretel, Nakajima, and Tanaka (2011) compute worker flows among employment, unemployment, and out of the labor force by gender, age, and region, but they do not disaggregate workers by combinations of characteristics (e.g., age and gender, age and region). Esteban-Pretel and Fujimoto (2020) analyze age profiles of worker flows across labor market statuses, including regular and non-regular employment, by gender, education, and marital status. They do not, however, analyze them by region.¹ Worker flows may exhibit substantial regional differences reflecting differences in the industry structure and attitudes on gender roles. Understanding such regional differences is important for a deeper understanding of the regional economy.

In this paper, we extend the analysis of Esteban-Pretel and Fujimoto (2020), who use data up to 2018, by incorporating more recent data. We then show, for different regions in Japan, the age profiles of the unemployment rate, participation rate, and share of regular employees. Subsequently, we compute the underlying age profiles of worker flows by gender.

¹ Ministry of Health, Labour and Welfare (2016) presents age profiles of the participation rate and the share of regular employees among females by region, but does not conduct a worker flow analysis.

II. Data and Methodology

Our analysis uses microdata of the 1984–2022 Labour Force Survey (LFS) and the 1984–2001 LFS Special Survey, provided to us by the Statistics Bureau of the Ministry of Internal Affairs and Communications. In the LFS, each household responds to the questionnaire in the same two consecutive months in both the first and second years of the survey. By using data for two consecutive months, we can compute gross flows that describe how workers transition among different labor market statuses, from which we can obtain the corresponding transition probabilities. Let us call the transition probability from E (employment) to U (unemployment) the EU probability, from U to I (inactive or out of the labor force) the UI probability, and so on for other transition probabilities. The EU probability from month $t-1$ to t is given by $EU_t / (EE_t + EU_t + EI_t)$, where EE_t , EU_t , and EI_t denote, respectively, the numbers of workers who were employed in $t-1$ and are employed, unemployed, and inactive in t . Other transition probabilities can be computed in a similar fashion.

We use the methodology above to compute the age profiles of worker flows for males and females in six regions² in Japan, namely, Hokkaido/Tohoku, Kanto, Chubu, Kinki, Chugoku/Shikoku, and Kyushu. We then explore regional differences in worker flows.³

III. Unemployment Rate, Participation Rate, and Share of Regular Employees

Before discussing worker flows, we first explore the regional characteristics of the age profiles of the unemployment rate, participation rate, and share of regular employees (i.e., the share of regular employees⁴ among employees), which are stock variables. Note that the findings may not align with current conditions, as the analysis combines data over a long period to understand regional characteristics.⁵

² In the LFS from January 2002, which incorporates the LFS Special Survey, each household responds to the basic questionnaire in the same two consecutive months in both the first and second years of the survey, and to the special questionnaire in the second month of the second year. Since information on education can only be obtained from the special questionnaire, we merge data from the basic and special questionnaires and conduct our analysis. Nagase and Mizuoichi (2009) and Nagase (2011) compute worker flows by education using the same approach.

³ Our regional division of Japan follows the standard seven-region division, except that Hokkaido and Tohoku are combined due to limited observations.

⁴ In Japan, two distinct criteria have mainly been used to distinguish between regular and non-regular employees: whether the contract length exceeds one year and whether the worker is called a regular employee (*seishain*) in the workplace (Kambayashi (2010)). This paper adopts the latter criterion, which has been more widely used in recent years.

⁵ When we divide 1984–2022 into 1984–2001 and 2002–2022 and conduct the analysis, we find that the main regional characteristics discussed below—such as strong job attachment of males and females in Chubu and low participation rates of married females in Kinki and Kanto—largely hold in both periods.

III-1. Overall Features of the Age Profiles by Region

Figures 1 and 2 use 1984–2022 data to illustrate, separately for males and females, the age profiles of the unemployment rate, participation rate, and share of regular employees in the six regions mentioned above.

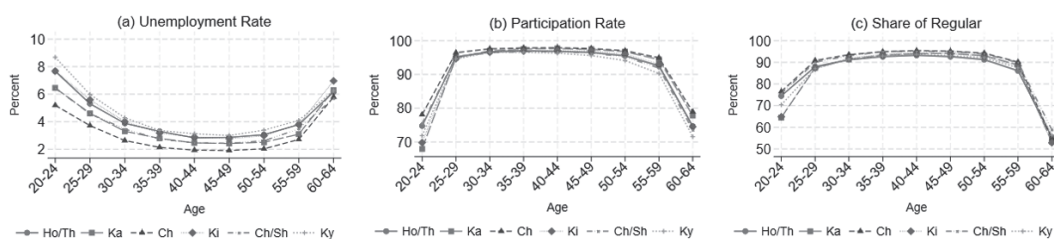
For males, the age profile of the unemployment rate is U-shaped, while the age profiles of the participation rate and the share of regular employees are inverse U-shaped. For females, the age profile of the unemployment rate is mostly downward sloping, while the participation rate exhibits a well-known M-shape, reflecting temporary exits from the labor market due to marriage, childbirth, and childrearing. The share of regular employees is high for females in their 20s but decreases in their 30s and mid-40s. It then remains flat or increases slightly with age, before declining again at ages 60–64. For both males and females, these shapes of the age profiles are mostly similar across regions.

In contrast, the levels of the unemployment rate, participation rate, and share of regular employees exhibit regional differences. For males, the unemployment rate is noticeably low in Chubu, while it is high in Kyushu, Kinki, and Hokkaido/Tohoku, with Kanto and Chugoku/Shikoku in between. Conversely, the participation rate is high in Chubu, while it is low for males in their 40s or older in Kyushu; the share of regular employees shows a similar pattern.

Regarding females, the unemployment rate is again remarkably low in Chubu, low in Chugoku/Shikoku, and high in Kyushu and Kinki—as is for males—and is similarly high in Hokkaido/Tohoku and Kanto. The participation rate is quite high for females in their late 30s or older in Chubu and Chugoku/Shikoku, while it is noticeably low in Kinki and Kanto. As with the participation rate, the share of regular employees is low in Kinki and Kanto, which likely reflects the low degree of job attachment in these regions.

Remarkably, although females in their late 30s or older have high participation rates in both Chubu and Chugoku/Shikoku, the share of regular employees is not necessarily higher in Chubu compared with other regions, whereas it is substantially higher in Chugoku/Shikoku.

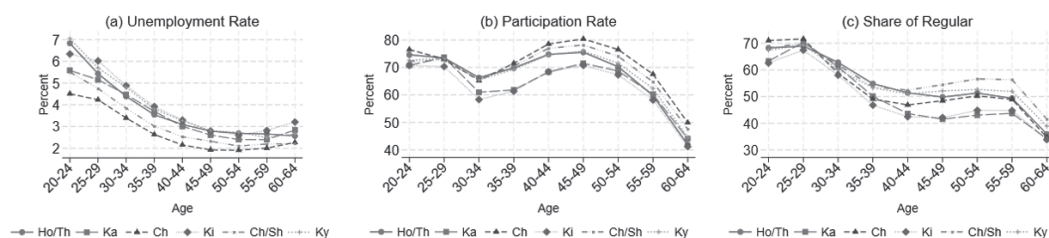
Figure 1 Unemployment Rate, Participation Rate, and Share of Regular Employees by Region (Male)



Note: The series represent (a) the unemployment rate, (b) the participation rate, and (c) the share of regular employees for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 1984–2022.

Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

Figure 2 Unemployment Rate, Participation Rate, and Share of Regular Employees by Region (Female)



Note: The series represent (a) the unemployment rate, (b) the participation rate, and (c) the share of regular employees for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 1984–2022.

Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

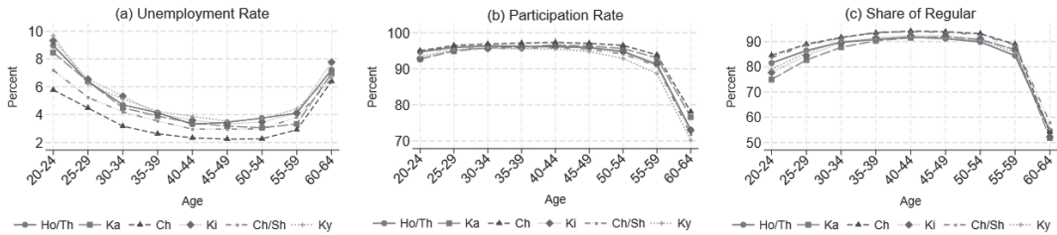
III-2. Analysis by Education

Let us next explore the results of the analysis that separates workers by educational attainment, namely, high school or less, some college, and college degree. The group with some college education consists of those who attended a 2- or 4-year college but do not have a college degree. The college degree group comprises those who graduated from a 4-year college. Since the LFS for 1984 and 1985 does not include information on education, we use 1986–2022 data for the analysis.

III-2-1. Males

Generally speaking, among Japanese males, the unemployment rate tends to be lower, whereas the participation rate and the share of regular employees tend to be higher for those

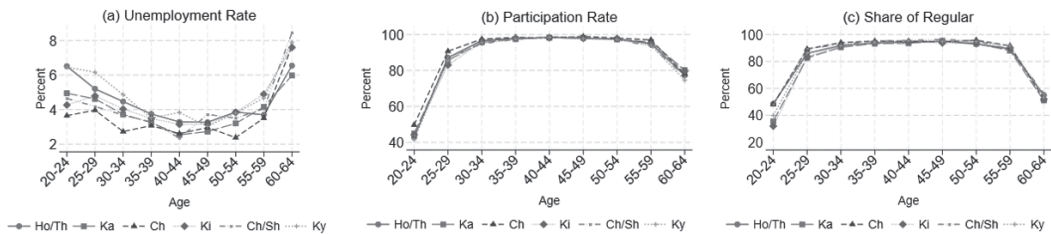
Figure 3 Unemployment Rate, Participation Rate, and Share of Regular Employees by Region (Male, High School or Less Education)



Note: The series represent (a) the unemployment rate, (b) the participation rate, and (c) the share of regular employees for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 1986–2022.

Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

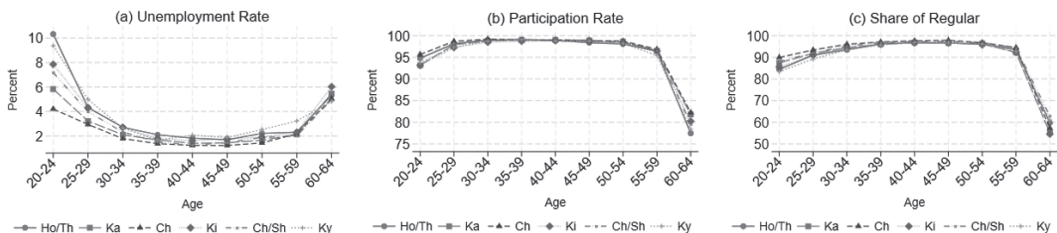
Figure 4 Unemployment Rate, Participation Rate, and Share of Regular Employees by Region (Male, Some College Education)



Note: The series represent (a) the unemployment rate, (b) the participation rate, and (c) the share of regular employees for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 1986–2022.

Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

Figure 5 Unemployment Rate, Participation Rate, and Share of Regular Employees by Region (Male, College Degree)



Note: The series represent (a) the unemployment rate, (b) the participation rate, and (c) the share of regular employees for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 1986–2022.

Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

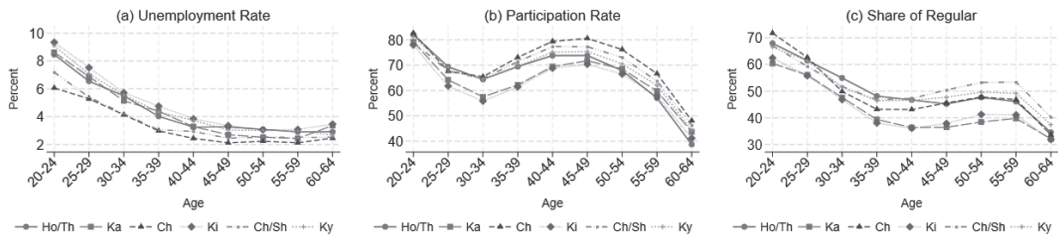
with more education (e.g., Esteban-Pretel and Fujimoto (2020)). Figures 3–5 show that this pattern is common across regions. Males with high school or less education exhibit larger regional differences in the unemployment rate, participation rate, and share of regular employees compared with their more educated counterparts. This result is in large part due to the low unemployment rate and the high participation rate and share of regular employees among males in Chubu with high school or less education. Another remarkable finding is the low participation rate of males in their 40s or older with high school or less education in Kyushu, compared with their counterparts in other regions.

III-2-2. Females

As in the case of males, the unemployment rate tends to be lower and the share of regular employees tends to be higher for females with more education. However, the relationship between education and labor force participation for females is less clear (e.g., Esteban-Pretel and Fujimoto (2020)). Figures 6–8 show that, among females aged 40–44, the participation rate is higher for those with high school or less education than for those with a college degree. Further, in Chubu, females with high school or less education have remarkably high participation rates; across all age groups from 35–39 to 55–59, their participation rates exceed those of females with a college degree.

For females, how the magnitude of regional differences in the unemployment rate, participation rate, and share of regular employees varies with education is less clear than for males. The analysis by region shows that, in Kinki and Kanto, the participation rate and share of regular employees are low for females with high school or less education across all age groups, as well as for more educated females in their late 30s or older. The high share of regular employees among females with a college degree in Hokkaido/Tohoku is also noteworthy, but we should note the low share of females with a college degree in this region. For example, during the period of analysis, the share of females aged 40–44 with a college degree is highest in Kanto (21.1%), followed by Kinki (19.6%), whereas it is only 11.5% in Hokkaido/Tohoku. These findings imply that, in Hokkaido/Tohoku, the share of females with a college degree is small, but the share of regular employees is large among such females.

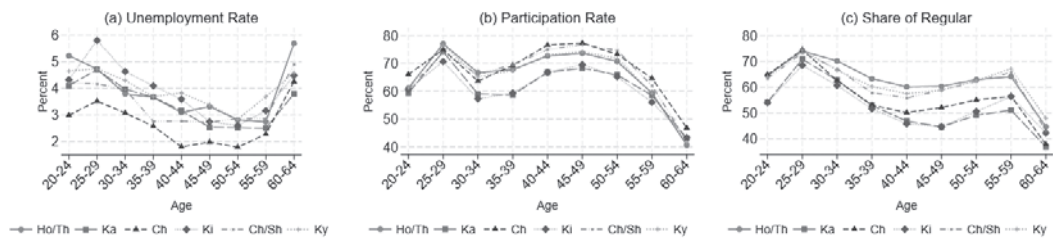
Figure 6 Unemployment Rate, Participation Rate, and Share of Regular Employees by Region (Female, High School or Less Education)



Note: The series represent (a) the unemployment rate, (b) the participation rate, and (c) the share of regular employees for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 1986–2022.

Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

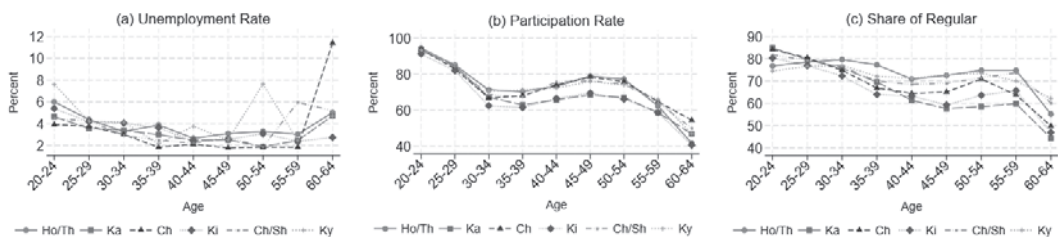
Figure 7 Unemployment Rate, Participation Rate, and Share of Regular Employees by Region (Female, Some College Education)



Note: The series represent (a) the unemployment rate, (b) the participation rate, and (c) the share of regular employees for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 1986–2022.

Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

Figure 8 Unemployment Rate, Participation Rate, and Share of Regular Employees by Region (Female, College Degree)



Note: The series represent (a) the unemployment rate, (b) the participation rate, and (c) the share of regular employees for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 1986–2022.

Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

III-3. Analysis by Marital Status

Finally, we present the results of the analysis conducted separately for never married and married individuals.⁶

III-3-1. Males

As observed from Figure 9, for never married males, the age profile of the unemployment rate is mostly upward sloping in all regions. Across regions, the unemployment rate is highest in Kyushu for all age groups from 20–24 to 50–54 and is lowest in Chubu for all age groups. Regional differences in the unemployment rate are large, ranging from around 3% to 5%. While the participation rate for all males is, as discussed in Section III-1, stable across age groups 25–29 to 54–59, it decreases with age for never married males. In particular, the participation rate of never married males in Kyushu decreases substantially with age.⁷ Finally, the age profile of the share of regular employees is inverse U-shaped for never married males, as is the case for all males. For never married males, there are relatively large differences in the share of regular employees between Chubu and Chugoku/Shikoku, where this share is high, and other regions.

As for married males, Figure 10 shows that the age profile of the unemployment rate is U-shaped in all regions, unlike for never married males. Regional characteristics of the unemployment rate, participation rate, and share of regular employees resemble those for never married males, but the regional differences are much smaller. For example, in all regions, the participation rate exceeds 98% for almost all age groups from 20–24 to 50–54. The results above indicate that the large differences in labor market behavior between never married and married males, pointed out, for example, by Esteban-Pretel and Fujimoto (2020), are also observed when regions are analyzed separately.

III-3-2. Females

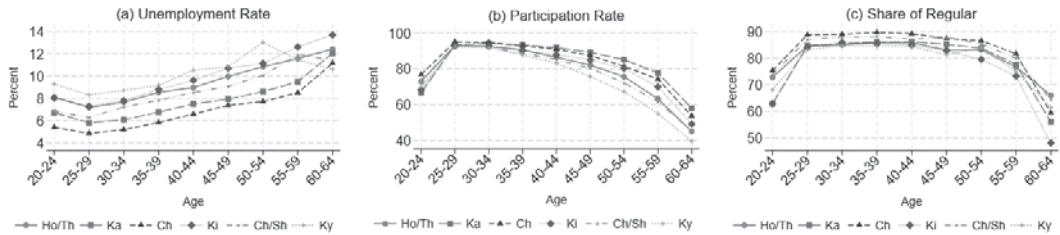
Given the disproportionate burden of housework and childrearing borne by women, it is natural that the age profiles of the unemployment rate, participation rate, and share of regular employees differ substantially between never married and married females. Figures 11 and 12 show, for example, that the participation rate peaks at ages 25–29 and decreases thereafter for never married females, while it mostly increases with age up to 45–49 for married females.

For females, the relationship between marital status and the magnitude of regional differences in the unemployment rate, participation rate, and share of regular employees is com-

⁶ Due to space constraints, we omit results for bereaved or divorced individuals.

⁷ Compared with 1984–2001, the participation rate of never married males in their 40s or older in Kyushu increased in 2002–2022. As a result, the gap with other regions narrowed, but the rate remained lower than in other regions.

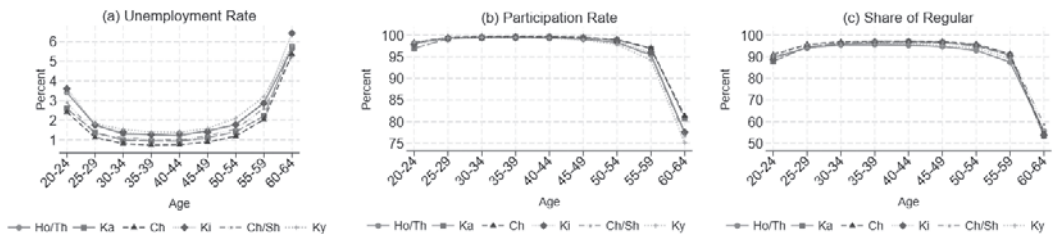
Figure 9 Unemployment Rate, Participation Rate, and Share of Regular Employees by Region (Male, Never Married)



Note: The series represent (a) the unemployment rate, (b) the participation rate, and (c) the share of regular employees for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 1984–2022.

Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

Figure 10 Unemployment Rate, Participation Rate, and Share of Regular Employees by Region (Male, Married)



Note: The series represent (a) the unemployment rate, (b) the participation rate, and (c) the share of regular employees for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 1984–2022.

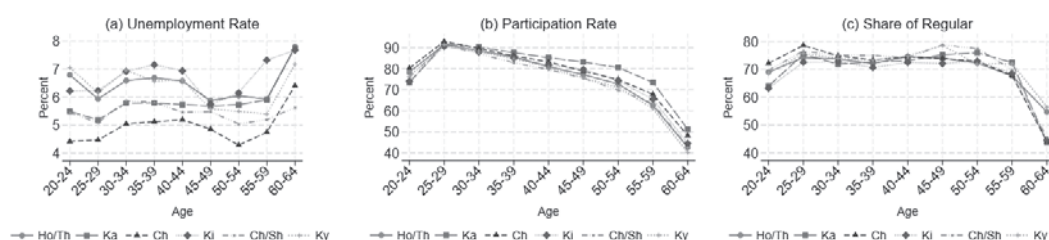
Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

plex. Figure 11 shows that, for never married females, regional differences in the unemployment rate are relatively large—at around 2 percentage points between Kinki and Chubu. In contrast, regional differences in the participation rate and share of regular employees are not very large for never married females. Remarkably, the participation rate of never married females in Kanto is higher than in other regions, implying that the low participation rate of females in their 30s or older in Kanto, discussed in Section III-1, is driven by married females, as discussed below.

Figure 12 indicates that, for married females, regional differences are relatively small for the unemployment rate but substantial for the participation rate and the share of regular employees, in contrast to the results for never married females. In particular, married females in Kinki and Kanto in their 30s have markedly lower participation rates compared with their

counterparts in other regions. For married females in Kinki and Kanto in their 40s or older, the difference in participation rates relative to other regions narrows, but the gap in the share of regular employees widens. These findings imply that the widely documented pattern—women exiting the labor market due to marriage, childbirth, and childrearing, and later reentering as non-regular employees—applies strongly in Kinki and Kanto. In contrast, in Chubu, Chugoku/Shikoku, and Kyushu, the participation rate of married females increases substantially, and the share of regular employees rises modestly, from ages 35–39 to 45–49. This result suggests that unlike in Kinki and Kanto, many married females in Chubu, Chugoku/Shikoku, and Kyushu work as regular employees after reentering the labor market.

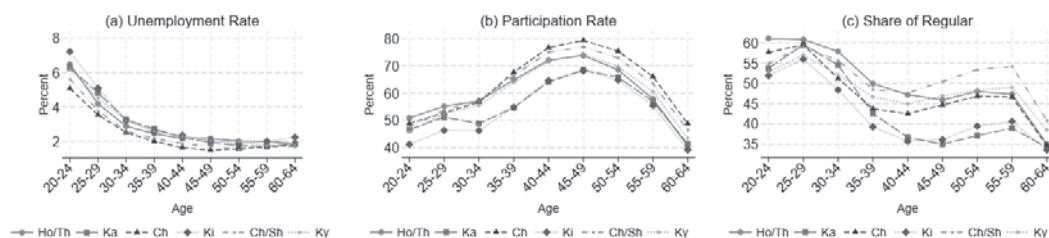
Figure 11 Unemployment Rate, Participation Rate, and Share of Regular Employees by Region (Female, Never Married)



Note: The series represent (a) the unemployment rate, (b) the participation rate, and (c) the share of regular employees for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 1984–2022.

Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

Figure 12 Unemployment Rate, Participation Rate, and Share of Regular Employees by Region (Female, Married)



Note: The series represent (a) the unemployment rate, (b) the participation rate, and (c) the share of regular employees for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 1984–2022.

Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

IV. Age Profiles of Worker Flows by Region

We now explore regional differences in worker flows, which underlie the regional differences in the unemployment rate, participation rate, and share of regular employees discussed in Section III. To do so, we express worker flows in terms of monthly transition probabilities described in Section II.

Below, we illustrate results by region separately for males and females but with all marital statuses and education levels combined. For results by marital status or education, which are not necessarily stable due to the limited number of observations, we report the values where relevant. As in Section III, we use 1984–2022 data for worker flows among employment, unemployment, and inactivity. Due to data limitations, we use 2013–2022 data for worker flows among non-regular employment, regular employment, unemployment, and inactivity.⁸

IV-1. Males

As discussed in Section III-1, the unemployment rate of males in Chubu is markedly low. Figure 13 shows that this result is due both to employed workers being likely to remain employed (i.e., high EE probability) and to unemployed workers being likely to become employed (i.e., high UE probability).⁹ Among regions with high unemployment rates, we observe that in Kyushu and Kinki, workers are both likely to transition from employment to unemployment or inactivity (i.e., low EE probability) and not very likely to transition from unemployment or inactivity to employment (low UE and IE probabilities). In contrast, in Hokkaido/Tohoku, where the unemployment rate is similarly high, the EE probability is relatively low as in Kyushu and Kinki, whereas UE and IE probabilities are relatively high, implying that workers are actively transitioning among different labor market statuses.

As also noted in Section III-1, the participation rate of males in their 40s or older is lower in Kyushu than in other regions. Figure 13 suggests that this result is mainly due to relatively few reentries of inactive workers into the labor market (i.e., low IE and IU probabilities, high II probability), rather than large outflows from the labor market (i.e., high EI and UI probabilities). For example, the IE probability of males aged 40–44 in Kyushu is 3.1%, less than

⁸ Until 2012, the question on whether employment is regular appeared in the LFS Special Survey (prior to 2002) or the LFS special questionnaire (2002 onwards), which each household answered only once; as a result, flows involving regular and non-regular employment cannot be computed. Since 2013, this question has been included in the LFS basic questionnaire, enabling such flows to be computed.

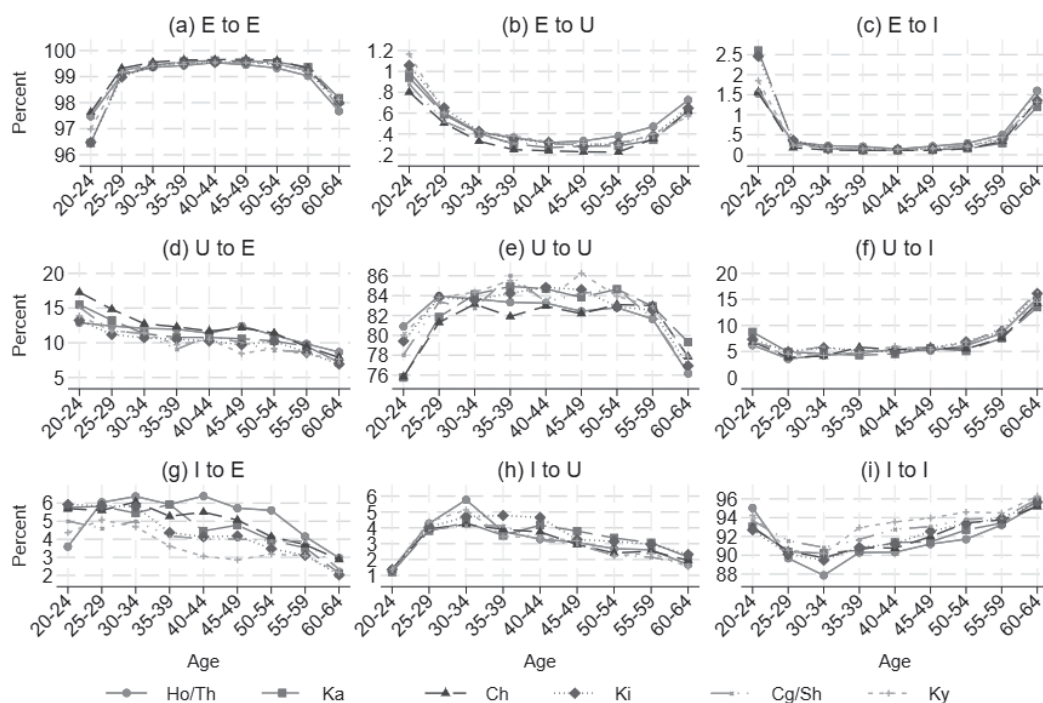
⁹ For simplicity, suppose that there are only two states, employment and unemployment, and that the EU and UE probabilities are constant over time. Then, the steady-state unemployment rate is given by $EU \text{ probability} / (EU \text{ probability} + UE \text{ probability})$. Note that this unemployment rate is decreasing in the EE and UE probabilities, since $EU \text{ probability} = 1 - EE \text{ probability}$.

half of the corresponding figure in Hokkaido/Tohoku (6.4%), where it is the highest among the six regions. While the IE probability of never married males tends to be lower than that of married males across regions, it is particularly low in Kyushu, where it is only 1.7%.

Regarding worker flows involving regular and non-regular employment, Figure 14 shows that regional differences in RR, RN, RU, and RI probabilities, which capture transitions from regular employment, are not very large. In particular, regional differences in these transition probabilities for married males aged 25–29 to 54–59 are very small. For example, the RR probability for married males aged 40–44 is highest in Chubu at 99.6% and lowest in Hokkaido/Tohoku at 99.4%, implying a difference of only about 0.2 percentage points.

In contrast, we observe substantial regional differences in the NR probability, which captures transitions from non-regular to regular employment, and in the NN probability, which reflects the likelihood of remaining in non-regular employment, especially for males in their 40s or older. For example, the NR probability for males aged 45–49 is 11.8% in Chugoku/Shikoku and 10.2% in Hokkaido/Tohoku—around 1.5 times the corresponding figures in

Figure 13 Worker Flows among Employment, Unemployment, and Inactivity (Out of the Labor Force) by Region (Male)

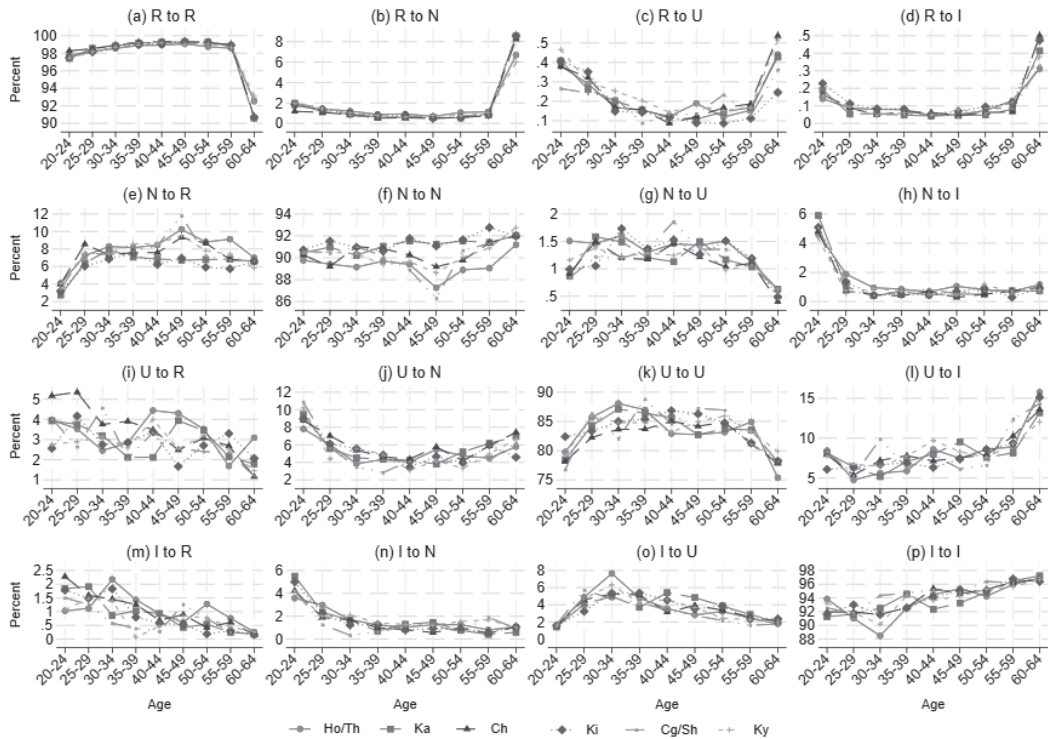


Note: The series represent worker flows among employment (E), unemployment (U), and inactivity (I) for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 1984–2022.

Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

Kanto (6.7%) and Kinki (7.0%). Noting that the NR probability of middle-aged and older workers is not necessarily low, Fujimoto and Esteban-Pretel (2022) state that “Non-regular employment is not a dead end.” This paper’s analysis indicates the need to consider regional differences in this issue.

Figure 14 Worker Flows among Regular employment, Non-regular Employment, Unemployment, and Inactivity (Out of the Labor Force) by Region (Male)



Note: The series represent worker flows among regular employment (R), non-regular employment (N), unemployment (U), and inactivity (I) for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 2013–2022.

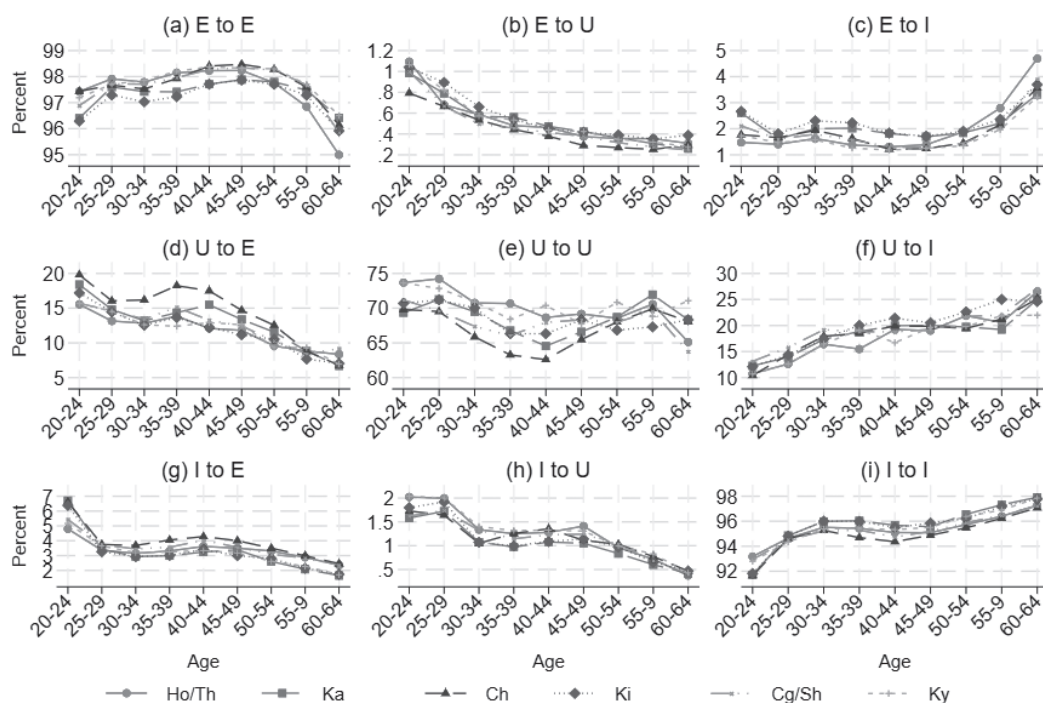
Source: Authors’ calculation based on the LFS and LFS Special Survey Microdata

IV-2. Females

Figure 15 shows that the remarkably low unemployment rate of females in Chubu, discussed in Section III-1, is—like that of males—due both to the high likelihood that employed workers remain employed and that unemployed workers become employed. The fact that females in Kyushu and Kinki, where the unemployment rate is relatively high, are likely to transition from employment to unemployment or inactivity and are not very likely to transition from unemployment or inactivity to employment is also similar to the case for males.

As observed in Section III-1, the participation rate is markedly low for females in Kinki and Kanto. Figure 15 shows that females in these two regions are likely to transition from employment to inactivity (i.e., high EI probability) and are likely to remain inactive (i.e., high II probability). In contrast, females in Chubu are less likely to transition from employment to inactivity (i.e., low EI probability) and are more likely to transition from inactivity to employment (i.e., high IE probability) than females in other regions, further confirming

Figure 15 Worker Flows among Employment, Unemployment, and Inactivity (Out of the Labor Force) by Region (Female)



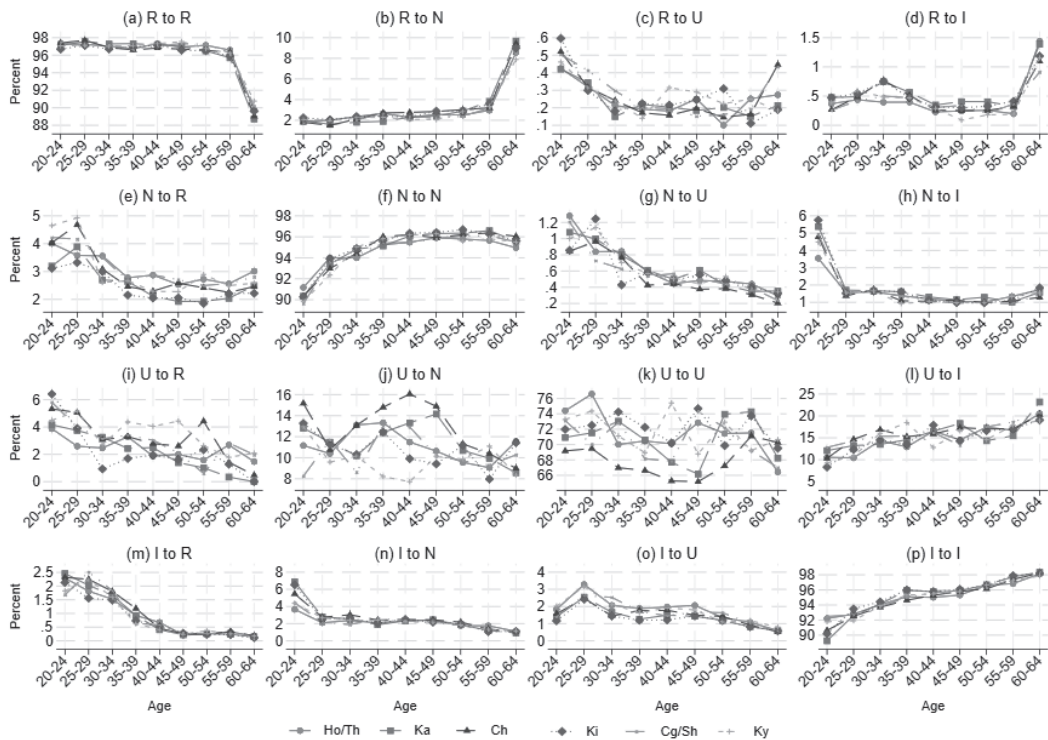
Note: The series represent worker flows among employment (E), unemployment (U), and inactivity (I) for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 1984–2022.

Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

the strong job attachment of both males and females in Chubu. As expected, such regional differences in the EI and II probabilities are mostly driven by married females and are small for never married females. For example, the EI probability of married females aged 25–29 is highest in Kinki at 3.8% and lowest in Hokkaido/Tohoku at 2.7%, with a difference exceeding 1 percentage point. In contrast, the EI probability of never married females aged 25–29 to 50–54 is below 1% across regions, with regional differences of at most about 0.4 percentage points.

Finally, let us turn to worker flows involving regular and non-regular employment. Figure 16 shows that, for females—as is the case for males—there are no large regional differences in RR, RN, RU, and RI probabilities, which capture transitions from regular employment. As expected, compared with married females, the RR probability of never married females is higher in all regions and shows smaller regional differences for most age groups. On the other hand, we observe regional differences in the NR and IR probabilities, which capture

Figure 16 Worker Flows among Regular employment, Non-regular Employment, Unemployment, and Inactivity (Out of the Labor Force) by Region (Female)



Note: The series represent worker flows among regular employment (R), non-regular employment (N), unemployment (U), and inactivity (I) for the following regions: Hokkaido/Tohoku (Ho/Th), Kanto (Ka), Chubu (Ch), Kinki (Ki), Chugoku/Shikoku (Ch/Sh), and Kyushu (Ky). The data span 2013–2022.

Source: Authors' calculation based on the LFS and LFS Special Survey Microdata

transitions from non-regular employment or inactivity to regular employment. In particular, females in Kinki and Kanto have low NR and IR probabilities, leading to their low shares of regular employment. The NR probability tends to be low for both married and never married females in Kinki and Kanto, with one of these regions having the lowest value across regions for all age groups of never married females.

V. Conclusion

In this paper, we use microdata of the LFS and LFS Special Survey to analyze regional labor markets in Japan. More precisely, we divide Japan into six regions, namely, Hokkaido/Tohoku, Kanto, Chubu, Kinki, Chugoku/Shikoku, and Kyushu, and analyze the regional characteristics of the age profiles of the unemployment rate, participation rate, and share of regular employees as well as the underlying worker flows.

The analysis of the unemployment rate, participation rate, and share of regular employees reveals that, for males, regional differences are most pronounced for those with high school or less education, and those who have never married. For females, the way in which regional differences in the unemployment rate, participation rate, and share of regular employees relate to educational attainment is less straightforward than for males. Further, while never married females exhibit substantial regional differences in the unemployment rate, married females demonstrate large regional differences in the participation rate and share of regular employees.

Worker flow analysis shows that, for males in Kyushu and Kinki—where the unemployment rate is relatively high—transitions from employment to unemployment or out of the labor force are more frequent, while transitions from unemployment or out of the labor force to employment are less frequent, than for males in other regions. Further, the chances of transitioning from non-regular to regular employment show substantial regional differences for males in their 40s or older. These findings for males also largely apply to females. The results further suggest that the low participation rates of females in Kinki and Kanto are due to relatively high probabilities of both transitioning from employment to inactivity and remaining inactive. Finally, the overall analysis reveals strong job attachment among males and females in Chubu.

This paper's analysis identifies various regional characteristics of the Japanese labor market. Understanding these characteristics is important not only for achieving stable employment but also for promoting smooth family formation.

References

- Diamond, P. A. (1982a): “Aggregate Demand Management in Search Equilibrium,” *Journal of Political Economy*, Vol. 90(5), pp. 881–894.
- (1982b): “Wage Determination and Efficiency in Search Equilibrium,” *The Review of Economic Studies*, 49(2), pp. 217–227.
- Esteban-Pretel, J., and J. Fujimoto (2020): “Non-Regular Employment over the Life-cycle: Worker Flow Analysis for Japan,” *Journal of the Japanese and International Economies*, 57, 101088.
- (2022): “How Do Marital Formation and Dissolution Differ across Employment Statuses? Analysis of Japanese Non-Regular Employees,” *Pacific Economic Review*, 27(5), pp. 425–461.
- Esteban-Pretel, J., R. Nakajima, and R. Tanaka (2011): “Changes in Japan’s Labor Market Flows due to the Lost Decade,” RIETI Discussion Paper Series 11-E-039.
- Fujimoto, J., and Esteban-Pretel, J. (2022): “Nihon no Rodoryoku Flow no Jittai: Rodosha no Zokusei-betsu Flow no Tokucho to Seiki Hiseiki Koyo wo Meguru Kinnen no Doko (Empirical Facts on Worker Flows in Japan: Key Features of Flows by Worker Characteristics and the Recent Situation regarding Regular and Non-regular Employment),” *Nihon Rodo Kenkyu Zasshi (Japanese Journal of Labour Studies)*, 64(1), pp. 4–13.
- (2025): “Life Cycle to Rodoryoku Flow: Nihon no Chiiki-betsu no Tokuchou ni Tsuite (Life Cycle and Worker Flows: Regional Characteristics in Japan),” *Financial Review*, 161, pp. 51–64.
- Kambayashi, R. (2010): “Joyo Hiseiki Rodosha no Shosou (Several Aspects on Non-regular Employees in Recent Japan),” Global COE Hi-Stat Discussion Paper Series 120.
- Kuroda, S. (2002), “Waga Kuni Shitsugyoritsu no Hendo ni tsuite—Flow Tokei Kara no Approach— (Analysis of Changes in Japan's Unemployment Rate Using Gross Flow Data),” *Kinyu Kenkyu (Monetary and Economic Studies)*, 21(4), pp. 153–201.
- Lin, C.-Y., and H. Miyamoto (2012): “Gross Worker Flows and Unemployment Dynamics in Japan,” *Journal of the Japanese and International Economies*, 26(1), pp. 44–61.
- Ministry of Health, Labour and Welfare (2016): Heisei 28-nen-ban Hataraku Josei no Jitsujō Dai 2-sho Chiiki-betsu ni Mita Josei no Shugyo Jokyō (2016 Edition of the Actual Status of Working Women, Chapter 2 Women’s Employment Status by Region).
- Mizuno, A. (1982): “Flow kara Mita Nihon no Shitsugyo Kodo (An Insight into Behaviour of Unemployment in Japan),” *Kikan Gendai Keizai (Contemporary Economics)*, 51, pp. 4–19.
- (1983): “Koyo Shitsugyo oyobi Rodo Shijo no Dotai (Dynamics of Employment, Unemployment, and the Labor Market),” *Keizaigaku Ronsan (Journal of Economics)*, 24(1),

pp. 37–61.

- (1992): *Nihon no Shitsugyo Kodo* (Unemployment Behavior in Japan), Chuo University Press.
- Mortensen, D., and C. Pissarides (1994): “Job Creation and Job Destruction in the Theory of Unemployment,” *The Review of Economic Studies*, 61(3), pp. 397–415.
- Nagase, N. (2011): “2000-nen igo no Danjo no Shitsugyo Kozo no Bunseki—Rodoryoku Chosa no Panel Kozo wo Mochiite Kozo Henka wo Bunseki Suru— (Worker Inflows and Outflow Dynamics and Gender Difference in Japan in the 2000’s using the Panel Structure of Monthly Labor Force Survey),” *Tokei to Nihon Keizai (Statistical Evidence and the Japanese Economy)*, 1(1), pp. 91–111.
- Nagase, N. and M. Mizuochi (2009): “Rodoryoku Chosa no Panel Kozo wo Mochiita Shitsugyo Shugyo kara no Suii Bunseki (Employment Transition in Japan using Panel Structure of Labor Force Survey),” Ministry of Internal Affairs and Communications Statistical Research and Training Institute Research Paper.
- Ohta, S., and Teruyama, H. (2003a): “Flow Data kara Mita Nihon no Shitsugyo—1980~2000 (Japanese Unemployment by Using Flow Data—1980–2000),” *Nihon Rodo Kenkyu Zasshi (Monthly Journal of the Japan Institute of Labour)*, 45(7), pp. 24–41.
- (2003b): “Rodoryoku Flow Data ni yoru Shugyo oyobi Shitsugyo no Bunseki (Analysis on Employment and Unemployment Based on Workforce Flow Data),” *Keizai Bunseki (Economic Analysis)*, 168, pp. 125–189.
- Sakura, K. (2006): “Flow Data ni yoru Waga Kuni Rodo Shijo no Bunseki (Analysis of the Japanese Labor Market by Using Flow Data),” Bank of Japan Working Paper Series No06-J-20.