JOINT RESEARCH CENTER FOR PANEL STUDIES
SELECTED DISCUSSION PAPER SERIES

SDP2012-005
March, 2013

Subjective Well-being of Involuntary Non-regular Employees: Evidence from Japanese Household Panel Data*

Isamu Yamamoto*
Risa Hagiwara**

【Abstract】
This paper investigates whether non-regular employees are worse off with their employment status, by examining the subjective well-being measured by the mental health index based on the individual panel data drawn from the Keio Household Panel Survey (2004 through 2012). We find that the majority of non-regular employees intentionally choose their employment status, as involuntary non-regular employment accounted for 3.5% of the entire sample, and 16.0% of non-regular employment. We also find that once controlling for the individual fixed effects, the subjective well-being does not differ among employment status except for the involuntary non-regular employment. Specifically, non-regular employees are not necessarily worse off as far as they intentionally choose their employment status. If they involuntarily choose the non-regular employment, however, they tend to experience poor mental health and thus their subjective well-being would be lowered. These results imply the importance of the separation of non-regular employment into the voluntary and involuntary one.

* Keio University
** Keio University

Joint Research Center for Panel Studies
Keio University

Subjective Well-being of Involuntary Non-regular Employees: Evidence from Japanese Household Panel Data*

Isamu Yamamoto† and Risa Hagiwara‡

Abstract

This paper investigates whether non-regular employees are worse off with their employment status, by examining the subjective well-being measured by the mental health index based on the individual panel data drawn from the Keio Household Panel Survey (2004 through 2012). We find that the majority of non-regular employees intentionally choose their employment status, as involuntary non-regular employment accounted for 3.5% of the entire sample, and 16.0% of non-regular employment. We also find that once controlling for the individual fixed effects, the subjective well-being does not differ among employment status except for the involuntary non-regular employment. Specifically, non-regular employees are not necessarily worse off as far as they intentionally choose their employment status. If they involuntarily choose the non-regular employment, however, they tend to experience poor mental health and thus their subjective well-being would be lowered. These results imply the importance of the separation of non-regular employment into the voluntary and involuntary one.

† Keio University (E-mail: yamamoto@fbc.keio.ac.jp)
‡ Keio University (E-mail: hagi09291985@z2.keio.jp)

* The data analysed in this study consists of individual data drawn from the Keio Household Panel Survey (2004 through 2012). We thank Kotaro Tsuru, Fumio Ohtake, and Sachiko Kuroda for their valuable comments. Any errors remained in this paper are entirely the authors'.

1. Introduction

Non-regular employees now account for 30% of all employees in Japanese labor market. Non-regular employees can be defined as those who are hired by his/her employer with fixed term, part-time, and/or indirect contract. Those include part-time and temporary workers, contract employees, and dispatched workers from temporary agencies. Although non-regular employees play an important role in the firm as a buffer stock against the business cycle, their weak labor conditions such as lower wage, larger job instability, and lower coverage of social security are often regarded as a problem. Since the financial crisis in 2008 when many non-regular employees lost their job, authorities have vigorously debated whether non-regular employment should continue under the current regulations, or whether regulations should be tightened to protect their job.

By focusing on the subjective well-being of various types of employees, this paper investigates whether non-regular employees are worse off with their employment status. Even if non-regular employees face weaker labor conditions, their utility may not be lowered as far as they intentionally choose the non-regular employment status. However, if they are forced to choose that status under the demand or other constraints, their utility could be lowered, in which case the labor market policies such as tightening the regulations for the use of non-regular workers would be justified. For this reason, this paper distinguishes involuntary non-regular employment from voluntary one. Some workers engage in non-regular employment by choice but others do because they could not find regular employment or they face certain constraint that makes it difficult for him/her to choose the regular employment.

Although social and academic attention has been focused on unemployment so far, only limited interest has been focused on involuntary non-regular employment. Considering the increase in non-regular employees under growing economic uncertainty, however, the focus on the separation of voluntary and involuntary of non-regular employment might provide new insights. For example, if workers' well-being decreases with non-regular employment status because they are involuntary, then labor market policy should target not only on the unemployment but also on the involuntary non-regular employment. On the other hand, if non-regular employment would not decrease worker's well-being, then we may regard that non-regular employment could contribute to preventing the unemployment rate from rising and helping support workers' livelihoods in the time of recession.

Using the individual data drawn from the Keio Household Panel Survey (KHPS),

we investigate five employment statuses: regular employment, involuntary non-regular employment, voluntary non-regular employment, unemployment, and not in labor force. The analysis primarily contains two parts. The first part addresses the nature of involuntary non-regular employment based on the descriptive statistics and simple estimations. Previous studies that examined involuntary non-regular employment include Nagase [1997], Barrett and Doiron [2001], Wakisaka [2003] and Noda and Yamamoto [2009]. For example, Nagase [1997] points out that the wage disparity that exists between regular and part-time workers cannot be explained by the Rosen's [1974] compensating wage differentials. In addition, wage disparities might possibly occur because: (1) involuntary part-timers account for approximately 15% of all part time-workers, and (2) middle-aged or older workers, workers who possess low levels of education, and workers who work long hours, tend to become involuntary part-timers. Using Canadian data, Barrett and Doiron [2001] reveal that involuntary part-time workers receive lower wages. Furthermore, Noda and Yamamoto [2009] demonstrate that labor supply behaviours differ between voluntary and involuntary non-regular employment and the discouraged worker effect is markedly evident for voluntary non-regular employment,[1] rather than for involuntary one. In contrast to these studies, this paper comprehensively reveals the nature of involuntary non-regular employment based on individual panel data, by comparing with various types of employment status (i.e., regular employment, voluntary non-regular employment, unemployment, and not in labor force).

The second analysis in this paper explores the degrees to which the individuals' levels of utility differ for each employment status. In particular, it explores whether utility declines when individuals engage in involuntary non-regular employment. The relationship between workers' utility and employment status has been examined in several studies such as Clark and Oswald [1994], Winkelmann and Winkelmann [1998], Ohtake [2004], and Sano and Ohtake [2007]. However, most of these studies have focused on the unemployment and noted that unemployment tend to lower workers' subjective well-being. However, none of the previous studies have examined how voluntary or involuntary non-regular employment would affect worker's subjective well-being. It should be noted that in the field of epidemiological studies, a number of studies such as Virtanen et al. [2003] and Baba and Kondo [2005] have verified the relationship between the degree of subjective health and employment status. For

[1] In addition, Wakisaka [2003] indicates that many male, older workers, unmarried workers, and household breadwinners are groups among the involuntary non-regularly employed.

instance, using Finnish workers' data, Virtanen et al. [2003] demonstrate that subjective health indicators do not differ whether employment contract are fixed or not. In these studies, however, the observed individual attributes (e.g., income and assets, educational background, family structure) or unobserved individual effects are not sufficiently controlled, while much attention is paid on the risk factors related to worker's health such as smoking and obesity. Therefore, the analysis conducted in this paper attempts to differentiate itself from these previous studies.

The results of this paper can be summarized as follows. First, involuntary non-regular employment accounted for 3.5% of the entire sample, and 16.0% of non-regular employment. This indicates that the majority of employees engaged in non-regular employment are those who have voluntarily chosen that employment status. However, the number of people engaged in involuntary non-regular employment is equal to approximately 1.5 times the number of unemployed individuals. This figure cannot be ignored. Typical features of involuntary non-regular employment are single, either in their twenties, forties, of fifties, contract or temporary workers, and blue-collar workers in transportation, communications, manufacturing, construction, and maintenance industries. With respect to business cycles, the number of involuntary non-regular employees tends to increase during recessions. It is also shown that involuntary non-regular employment does not have a similarity in labor supply behaviour with voluntary non-regular employment but do with those who are unemployed.

Next, comparing subjective well-being measured by the mental health index, it becomes clear that regular employees exhibit lower mental health index than other employment statuses, especially the involuntary non-regular employment. This feature is also confirmed by the Tobit and least square estimations of mental health index, so that the mental health index of regular employees is higher than other employment statuses. However, the fixed effect estimation shows that only involuntary non-regular employment has the significant differences in mental health index from the regular employment. These results imply that once controlling for the individual fixed effect, subjective well-being as measured by the mental health index does not differ among employment status except for the involuntary non-regular employment. The important finding of this paper is that non-regular employees are not necessarily worse off as far as they intentionally choose their employment status as is the case for the majority of non-regular employees. However, if they involuntarily choose the non-regular employment, they tend to experience poor mental health and thus their subjective

well-being would drop.

The structure of this paper is as follows. In Section 2, we explain the data employed in this paper and provide several basic facts for voluntary and involuntary non-regular employment. In Section 3, we explore whether workers' subjective well-being measured by the mental health index differs depending on their employment status. Then, in the final section, we summarise the results and provide a conclusion.

2. Basic Facts for Non-regular Employment

2.1. The distribution of involuntary non-regular employment

(1) Data

We use the individual data drawn from the Keio Household Panel Survey (hereafter referred to as "KHPS"). The KHPS, sponsored by the Japanese government, is a longitudinal survey of individuals that was initiated in 2004 and is conducted every January by Keio University. Among all such surveys in Japan, KHPS has the broadest coverage. From among the entire Japanese resident population (male and female) aged between 20 and 69, 4,000 individuals were randomly selected by using two-stage sampling.[2] Because the respondent's spouses were also surveyed, approximately 7,000 individuals were included in the 2004 KHPS data set. Consecutive surveys of the same individuals have been conducted since 2005, with a response rate of 82.7 percent from previously surveyed individuals in 2005, 86.4 percent in 2006, 91.3 percent in 2007, 90.9 percent in 2008, 92.6 percent in 2009, and 93.5 percent in 2010. The sample size was increased for the 2007 survey, when another 1,400 individuals were selected afresh. The survey questions cover a wide range of topics, including occupation, income and expenditures, and assets and liabilities. According to Kimura [2005], who conducted a detailed analysis of the KHPS sample characteristics, no significant differences are found between the distribution of major variables compiled in the KHPS survey questions and Japan's other official statistics, including the *Population Census* and the *Labor Force Survey*, both of which are conducted by the Ministry of Internal Affairs and Communications.

In the KHPS, survey respondents are asked to state their types of employment

[2] The total size of this population was 85.75 million people, which is 67.2 percent of the total Japanese population (according to population estimates made in February 2004).

and their job titles at work (employment status), by which we can classify all individuals into four employment status: regular employment, non-regular employment, unemployment, and not in labor force. Furthermore, non-regular employees are asked to choose from the following statements to describe why they work under particular forms of employment status: (1) “Although I wished to work full-time, I was unable to find employment in companies that could employ me full-time;” (2) “Because the wage/working condition/service was good;”(3) “I cannot work full-time because of personal reasons;” and (4) “Other.” Thus, in this paper, non-regular employees who chose (1) “Although I wished to work full-time, I was unable to find employment in companies that could employ me full-time;” were classified as involuntary non-regular employment. Likewise, people who chose statements (2) through (4) were classified as voluntary non-regular employment. Therefore, each individual is classified into five employment status. In the analysis, we use the subsample of individuals under the ages of 54 years excluding those who are employed by public sector.

(2) Employment status

First, the distribution of the employment status shown in Figure 1 reveals that the 2004 through 2012 averages equal 52.0% regular employment, 3.5% involuntary non-regular employment, 21.6% voluntary non-regular employment, 2.4% unemployment, and 20.6% not in labor force. The non-regular employment comprises 25.1% of all employees. Involuntary non-regular employment comprises only 3.5% of the entire sample, or 13.8% of non-regular employees. In other words, the majority of non-regular employees are engaged in self-chosen voluntary non-regular employment, and the involuntary non-regular employment can be regarded as the minority.

However, some attention should also be focused on the fact that the number of involuntary non-regular employment equals approximately 1.5 times the number of individuals who are unemployed. Moreover, Figure 1 shows that the involuntary non-regular employment increases during recession while it tends to decrease during times of economic recovery. Specifically, the percentage of involuntary non-regular employment is lowest (3.0%) during the boom period of 2007. The percentage rises to 3.9% in 2010 after the financial shock.

Figure 2 shows that the percentage of involuntary non-regular employment is higher for women, rather than for men. However, this may related with the fact that the proportion of non-regular employment is much higher for women. In fact, looking at the percentage of involuntary non-regular employment among non-regular employees, we

find that men, rather than women, had a higher percentage of involuntary non-regular employment. With respect to men, involuntary non-regular employment is high among those in their 20's, as well as for the singles. With respect to women, involuntary non-regular employment is high for those in their 20's, for the singles, and for those aged between 40 and 50 years. We could understand that single individuals have no choice other than to accept non-regular employment if only that status is available. As for women, we could infer that even if they prefer to engage in regular employment between the ages of 40 and 50 when they re-enter the labor market after giving birth to and raising children, it is less likely that they find regular employment job opportunity due to shorter labor market experience and smaller human capital.

Furthermore, Figure 3 lists the percentages of involuntary non-regular employment among non-regular employees across individual attributes such as detailed employment status, educational background, occupation, and industry. The figure shows that the percentage of involuntary non-regular employment is low among part-timers but high for contract employees as more than 30% are involuntary. It also shows that educational backgrounds have only a weak relationship with the percentage of involuntary non-regular employees. Regarding occupations, there are many involuntary non-regular employees in security jobs or blue-collar occupations (e.g., transportation, communications, manufacturing, construction, maintenance, freight, and so on). Likewise, it is shown that the percentage of involuntary non-regular employment is larger in the manufacturing, transportation, information, and communications industries.

(3) Reduced-form multinominal logit model for employment status

To understand what kind of individual attributes have an effect on the choice of employment status, we here estimate the reduced-form multinomial logit model with five employment status: regular employment, involuntary non-regular employment, voluntary non-regular employment, unemployment, and out of labor force. The individual attributes include age, educational background, family background (marital status, the number of preschool aged children, the number of people living together), and the jobs-to-applicants ratio for each residential prefecture. The descriptive statistics of each variable are listed in Table 1.

Table 2 summarises the estimation results of the multinomial logit model with the marginal effects of the selection probability for each employment status. Looking at Table 2, we find that the significant factors that have positive effects on the choice of involuntary non-regular employment include female gender, aged 40 and over,

high-school graduate, single, no preschool aged children, fewer number of people resided with respondent, and a low jobs-to-applicants ratio. Many of these factors were also confirmed in the figures discussed.

It is interesting to note that the jobs-to-applicants ratio has different effect on involuntary and voluntary non-regular employment. That is, involuntary non-regular employment increases but voluntary one does not change as the economy worsens and the regional labor market becomes less tight. Counter-cyclical feature of the involuntary non-regular employment is similar to the unemployment, and thus we may point out that involuntary non-regular employment is closer in nature to unemployment.

2.2. Similarities between involuntary non-regular employment and unemployment

The fact that involuntary non-regular employment is closer to unemployment, rather than to voluntary non-regular employment, can also be confirmed in tests that use the multinomial logit model illustrated in Table 2. If involuntary non-regular employment is very similar to voluntary one in labor supply behaviour, the coefficients in the multinominal logit model would become closer each other. To check this possibility, we conduct the Wald test, which determines whether the coefficient of each explanatory variable is significantly different among the employment status. Table 3 summarizes the chi-squared statistics for the null hypothesis that the coefficients are identical for each combination of employment status. The table indicates that the null hypothesis is rejected at 1% level for all combinations, and thus we can regard all five employment status as different categories. Furthermore, we find that the chi-squared statistics for the combination of involuntary non-regular employment and unemployment is the smallest, which implies that involuntary non-regular employment can be considered more similar to unemployment, than to voluntary non-regular employment.

The similarity between involuntary non-regular employment and unemployment can also be confirmed by observing the transition between employment statuses. Figure 4 shows the probability of engagement in regular employment for each year based on each employment status of the previous year. Although over 90% of the regular employment continued to be regular employment, the transition rate to regular employment from other employment statuses is extremely low (below 20%). However, the transition rates to regular employment from involuntary non-regular employment and unemployment are relatively high (12% and 18%, respectively).

The similarities between involuntary non-regular employment and unemployment described above can be interpreted in a number of ways. First, if the

employment opportunity derived by non-regular employment did not exist, then it is likely that those who engaged in involuntary non-regular employment would have been unemployed. Considering this point, we can state that even if some are involuntary, the increase in non-regular employment contributed to reducing unemployment under the prolonged recession in Japan. Second, if the involuntary non-employees are worse off than other employment statuses such as regular and voluntary employment, we should take care of the involuntary non-employees as we do the unemployed person. Thus, we will examine whether the subjective well-being of involuntary non-regular employees are indeed lower than other employment statuses in next section.

3. The Subjective Well-being of Involuntary Non-regular Employment

3.1. Measure for the subjective well-being

Based on KHPS individual data, we examine whether individuals' subjective well-being differs depending on their employment status. As a proxy variable for subjective well-being, we employ the mental health index that is calculated from the individuals' awareness of psychosomatic symptoms (stress) surveyed in the KHPS.

In behavioural economics, the levels of happiness and/or satisfaction are often used as subjective well-being indicators. However, as noted by Kahneman and Krueger [2006], these indicators are likely to be influenced by factors such as survey methods (e.g., question order) and environment (e.g., the weather). Thus, the use of these indicators is often criticized for having measurement errors. In contrast, psychosomatic symptom indicators or mental health index rely on detailed questions that describe symptoms related to the mind and body in straightforward ways. Therefore, those indexes can be considered as robust against survey methods or environments. In fact, in studies conducted by Kahneman and Krueger [2006] and Smith et al. [2005], strong correlations among health indicators are provided as evidence that supports the validity of subjective well-being indicators such as happiness and levels of satisfaction. However, it should be noted that because psychosomatic symptom indicators merely measure individuals' condition of mental health, these indexes solely capture a portion of each person's utility (in particular, some negative portions).

In the KHPS, respondents are asked to rate their psychosomatic symptoms by choosing qualifiers for statements such as "I often tend to feel irritated" from the following selections:"happens frequently," "happens sometimes," "hardly happens at

all," "never happens." We rate respondents based on the 11 psychosomatic symptoms[3] on a scale from 0 (never) to 3 (happens a lot). Then, the totals of all symptoms are defined as the mental health index, whose scores ranged between 0 and 33. This mental health index indicates that the higher the score is, the greater the level of psychosomatic symptoms and stress or the lower the well-being is. Because questions related to psychosomatic symptoms were not included in the KHPS surveys in 2004 and 2007, we only use seven waves: 2005, 2006, 2008, 2009, 2010, 2011, and 2012.[4]

3.2. Distribution of Mental Health Index

Figure 5 shows histograms of the mental health index by employment status, and each graph contains the histogram for regular employees for purposes of comparison. Looking at Figure 5, we first find a spike occurs at zero in each of the distributions shown in this figure, which implies that certain portion of employees reports no psychosomatic symptoms. We also find that each employment status exhibits a distribution that is positioned further to the right side than that of regular employment. Importantly, this feature is particularly noticeable for involuntary non-regular employment. Thus, it is possible to state that many involuntary employees have higher mental health index than other employment statuses, which implies that involuntary non-regular employees are worse off in terms of mental health index. In fact, comparing the mean values of the mental health index for each employment status in Figure 6, we see that the regular employment is 14.3 while involuntary non-regular employment is 16.5, voluntary non-regular employment 15.7, the unemployment 15.8, and not in labor force 15.7. These figures indicate that stress is highest for those individuals engaged in involuntary non-regular employment.

3.3. Analytical Framework

If subjective well-being index or mental health index differs across employment status,

[3] The 11 specific psychosomatic symptoms are: "There are times when I get headaches or feel dizzy;" "There are times when I get palpitations or shortness of breath;" "There are times when my stomach and bowels are irregular;" "There are times when my back, hips, or shoulders are sore;" "I tend to tire more easily;" "I tend to catch cold more easily;" "I tend to feel irritated more often;" "I have more difficulty falling sleep;" "I don't feel like seeing people now;" "I am dissatisfied with my life at the moment;" and "I feel worried about the future."

[4] In addition, samples who responded that their normal state of health was "Not good" and samples who responded that they had been hospitalized within the past two years were also eliminated from the analysis. However, even if these samples had been included in the analysis, no major difference would have occurred in this paper's analytic results.

what types of theoretical backgrounds can be related? If individuals rationally select their employment status without any constraints, it is natural to expect that subjective well-being index does not differ across employment status. However, if there exist some types of constraints in choosing individuals' employment status, then individuals' subjective well-being index would decline because of those constraints.

One possible constraint might arise for regular employees. As noted by Stewart and Swaffield [1997], Ham and Reilly [2002], and Bryan [2004], workers are often unable to change their working hours. Even though they wish to reduce their working hours, it is difficult to do so especially in Japan since long working hours are regarded as the norm. Many regular employees would prefer to cut their working hours (Kuroda and Yamamoto [2011]) but they could not in reality. This kind of work hour constraint for regular employees may reduce their subjective well-being or mental health index. The other constraint could arise for involuntary non-regular employment and unemployment, as a result of demand shortages or mismatches in demand and supply. Thus, it is easy to imagine that subjective well-being would decline due to involuntary non-regular employment or unemployment.

To illustrate these possibilities, the following is a simple model that incorporates the employment status and certain constraints in choosing employment status. Denoting individual utility as U, its optimal level as U^*, and the potential mental health index or psychosomatic symptoms as Y^*, the observed index Y can be expressed as follows:

$$Y = \begin{cases} Y^* & if \quad Y^* > c \\ 0 & if \quad Y^* \le c \end{cases} \quad where \;\; Y^* = f(U^* - U) = g(L, X),$$

where the deviation of individuals' utility level from the optimal one ($U^* - U$) is determined by the employment status L and the individual attribute X. The model assumes that the potential psychosomatic symptom (stress) Y^* increases depending on the deviation of individuals' utility, but the actual mental health index is not observed until the stress exceeds the threshold c. Using the Tobit model as well as the random-effect and fixed effect model, we estimate how the mental health index is determined depending on the employment status and other individual attributes. As a series of variables for X, we include gender dummy, household income, married dummy, pre-school age children dummy, number of people in household, savings, and debt values.

3.4. Estimation Results

The estimation results are shown in Table 4. Looking at the columns 1 to 4 in which individual attributes are not controlled, we find that involuntary non-regular employment has significantly positive effects on the mental health index regardless of estimation methods.

Comparing the results from columns 1 and 2, we can confirm that the estimated coefficients are very similar each other. Thus, we assume that a bias coming from the censoring in mental health index is negligible. Then, looking at columns 3 and 4 from random-effect and fixed-effect model, we see different coefficients and significance from those in columns 1 and 2. These differences indicate the importance to account for the unobservable individual effects. In particular, we find clear differences between the fixed-effect model and others in the coefficients of voluntary non-regular employment, unemployment, and not in labor force. These coefficients are significantly positive in columns 1 to 3, but once controlling for the unobserved individual effects in column 4 by the fixed-effect model, they become insignificant. On the other hand, column 4 shows that the involuntary non-regular employment is still significant even if we control for the unobserved fixed effects.

Next, looking at the columns 5 to 8 in which individual attributes are controlled, we see similar results. That is, the employment status has a positive correlation with mental health index, and the involuntary non-regular employment has the biggest coefficient. But once controlling for unobserved individual fixed effects, the significant differences in mental health index among employment status will disappear except for the involuntary non-regular employment. The effect of involuntary non-regular employment on the mental health index is significantly positive, even if we control for observed and unobserved individual effects.

From these estimation results, we can state that most of the employment status does not affect worker's subjective well-being measured by mental health index, but the involuntary non-regular employment does have an effect to reduce his/her subjective well-being. In other words, workers other than the involuntary non-regular employees do not face large constraints in choosing their employment status so that their subjective well-being does not differ. However, the constraint for the involuntary non-regular employees is large enough so that they are worse off by involuntarily working as non-regular employees.

It is also important to note that the mental health index for the involuntary non-regular employment is larger than that for unemployment. As noted above, many

previous studies, such as Clark and Oswald [1994], Winkelmann and Winkelmann [1998], Ohtake [2004], and Sano and Ohtake [2007] state that unemployment lowers subjective well-being. But, this paper demonstrates that the impact of involuntary non-regular employment on the subjective well-being is larger than that of unemployment, which implies the importance of a focus on the involuntary non-regular employment.[5]

4. Conclusion

This paper investigated whether non-regular employees are worse off with their employment status, by examining the subjective well-being measured by the mental health index based on the individual panel data drawn from the Keio Household Panel Survey (2004 through 2012). We focused on five employment status: regular employment, involuntary non-regular employment, voluntary non-regular employment, unemployment, and not in labor force, and derived the following findings.

First, involuntary non-regular employment accounts for 3.5% of the entire sample, and 16.0% of non-regular employment. This indicates that the majority of employees engaged in non-regular employment are those who have voluntarily chosen that employment status. However, the number of people engaged in involuntary non-regular employment is equal to approximately 1.5 times the number of unemployed individuals. This figure cannot be ignored. Typical features of involuntary non-regular employment are single, either in their twenties, forties, of fifties, contract or temporary workers, and blue-collar workers in transportation, communications, manufacturing, construction, and maintenance industries. With respect to business cycles, the number of involuntary non-regular employees tends to increase during recessions. It is also shown that involuntary non-regular employment does not have a similarity in labor supply behaviour with voluntary non-regular employment but do with those who are unemployed.

Next, comparing subjective well-being measured by the mental health index, it becomes clear that regular employees exhibit lower mental health index than other employment statuses, especially the involuntary non-regular employment. This feature is also confirmed by the Tobit and least square estimations of mental health index, so

[5] This fact has also been confirmed in recent studies conducted by Tsuru et al. [2011] who find that happiness index is lower for workers engaged in involuntary non-regular employment.

that the mental health index of regular employees is higher than other employment statuses. However, the fixed effect estimation shows that only involuntary non-regular employment has the significant differences in mental health index from the regular employment. These results imply that once controlling for the individual fixed effect, subjective well-being as measured by the mental health index does not differ among employment status except for the involuntary non-regular employment. The important finding of this paper is that non-regular employees are not necessarily worse off as far as they intentionally choose their employment status as is the case for the majority of non-regular employees. However, if they involuntarily choose the non-regular employment, they tend to experience poor mental health and thus their subjective well-being would be lowered.

These results imply the importance of the separation of non-regular employment into involuntary and voluntary one when discussing policy implication. It may be the case that non-regular employees face greater instability and lower wages in their jobs. However, it is worth noting that the majority of the non-regular employees does intentionally choose their employment status, and their subjective well-being or mental health index is not lower than other employment statuses. Thus, considering a buffer stock role of non-regular employment in the firm, we could point out that the labor market policies tightening the regulations for the use of non-regular employees should be discussed carefully. Among non-regular employees, much attention and policy treatment should be focussed on those who involuntarily choose their employment status. Such a policy to promote their transition to the regular employment should be explored.

References

Barrett, Gary F. and Denise J. Doiron [2001] "Working part time: By choice or by constraint," *Canadian Journal of Economics*, Vol. 34, No. 4, pp.1042–1065.

Bryan, Mark [2004] "Free to choose? Differences in the hours determination of constrained and unconstrained workers," *Oxford Economic Papers*, Vol. 59, No. 2, pp.226–252.

Clark, Andrew E. and Andrew J. Oswald [1996] "Satisfaction and comparison income," *Journal of Public Economics*, Vol. 61, No. 3, pp.359–381.

Ham, John, C., and Kevin T. Reilly [2002] "Testing intertemporal substitution, implicit contracts, and hours restriction models of the labor market using micro data," *American Economic Review*, Vol. 92, No. 4, pp.905–927.

Kahneman, Daniel and Alan B. Krueger [2006] "Developments in the measurement of subjective well-being," *Journal of Economic Perspectives*, Vol. 20, No.1, pp.3–24.

Kuroda, Sachiko and Isamu Yamamoto [2011] "Firm's demand for work hours: Evidence from multi-country and matched firm-worker data," RIETI Discussion Paper Series, 11-E-024.

Rosen, Sherwin [1974] "Hedonic prices and implicit markets: Product differentiation in pure competition," *Journal of Political Economy*, Vol. 82, No. 1, pp.34–55.

Smith, Dylan M., Kenneth M. Langa, Mohammed U. Kabeto, and Peter A. Ubel [2005] "Health, wealth, and happiness: financial resources buffer subjective well-being after the onset of a disability," *Psychological Science*, Vol.16, No.9, pp.663–666.

Stewart, Mark B. and Joanna K. Swaffield [1997] "Constraints on the desired hours of work of British men," *Economic Journal*, Vol.107, pp.520–35.

Virtanen P., V. Liukkonen, J. Vahtera, M. Kivimäki, and M. Koskenvuo [2003] "Health inequalities in the workforce: The labour market core-periphery structure," *International Journal of Epidemiology*, Vol.32, pp.1015–1021.

Winkelmann, Liliana and Rainer Winkelmann [1998] "Why are the unemployed so unhappy?: Evidence from panel data," *Economica*, Vol.65, pp.1–15.

(Japanese References)

Baba, Yasuhiko and Katsunori Kondo [2005] "Josei no Rodo to Shukanteki Kenkokan - Shugyo Keitai/Jyokyo Betsu Bunseki" (Female workers and the subjective sense of well-being - Analysis on a type of employment and situation basis),

Quarterly Journal of the Institute for Research on Household Economics, No. 65, pp. 51–59.

Kimura, Masakazu [2005] "Keio Gijuku Kakei Paneru Chousa no Hyohon Tokusei" (Keio Household Panel Survey sample properties), Higuchi, Yoshio/Keio Joint Center of Excellence Program (ed.), *Dynamism of Household Behavior in Japan*, *Keio University Press.*

Nagase, Nobuko [1997] "Josei no Shugyo Sentaku: Kateinai Seisan to Rodo Kyokyu" (Womens' employment choices: Household production and labor supply), Hiroyuki Chuma and Terukazu Suruga (eds.), *Changing Employment Practices and Female Labor Force*, *Toyo Keizai Inc.*

Noda, Akihiko and Isamu Yamamoto [2009] "Fuhoni Shugyo wo Koryo Shita Rodo Kyokyu Kodo no Suitei - Rodo Kyokyu no Shita ha Kojyo Suru Ka" (Estimate of labor supply behaviour taking involuntary employment into account - Will the quality of the labor supply improve?), Yoshio Higuchi, Miki Seko, Hiroshi Teruyama, / Keio Kyoto Joint Center of Excellence Program (eds.), *Dynamism of Household Behavior in Japan V: Raising Labor Market Quality And Employment* behavior *Keio University Press.*

Ohtake, Fumio [2004] "The effects of unemployment on happiness," *The Japanese Journal of Labour Studies*, No. 528, pp. 59–68.

Sano, Shinpei and Fumio Ohtake [2007] "Working condition and happiness," *The Japanese Journal of Labour Studies*, No. 558, pp. 5–18.

Wakisaka, Akira [2003] "Paato Taima no Seishain e no Henko Kibo," (Part timers wish to change to regular employees), The Japan Institute for Labour Policy and Training (ed.), *Hitennkei Koyo Rodosha No Tayo Na Shugyo Jiitai (The Diverse Employment Situation for Workers in Atypical Employment),* The Japan Institute for Labour Policy and Training.

Figure 1. Employment Status across Years

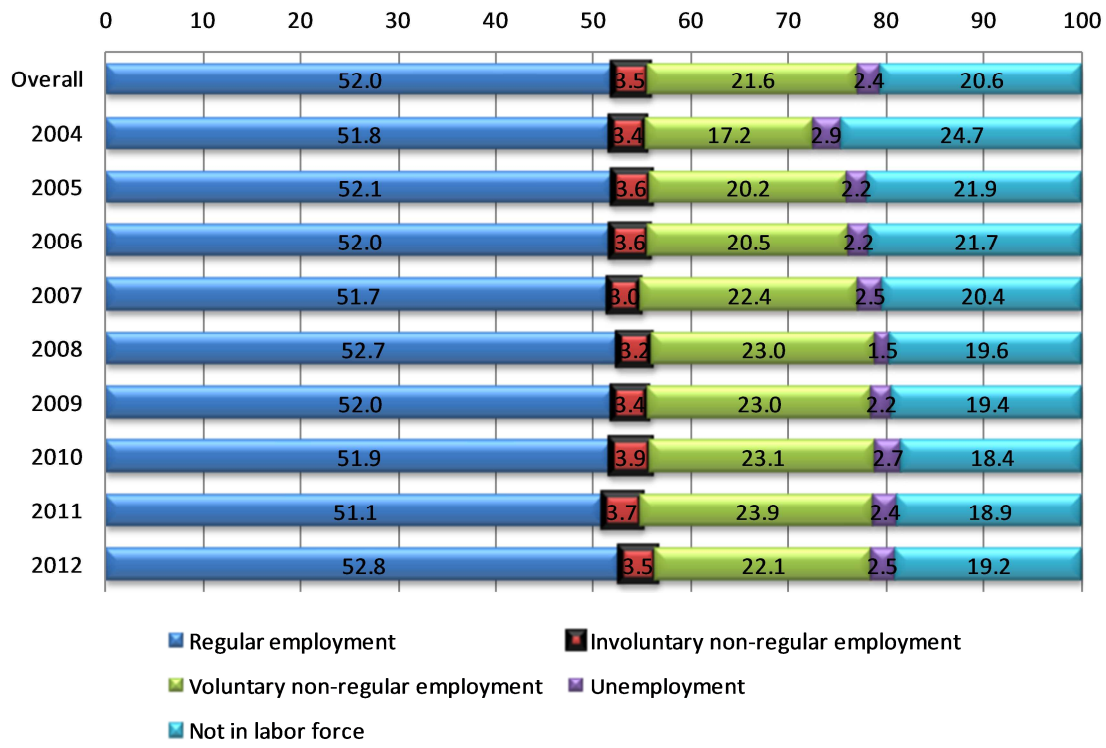
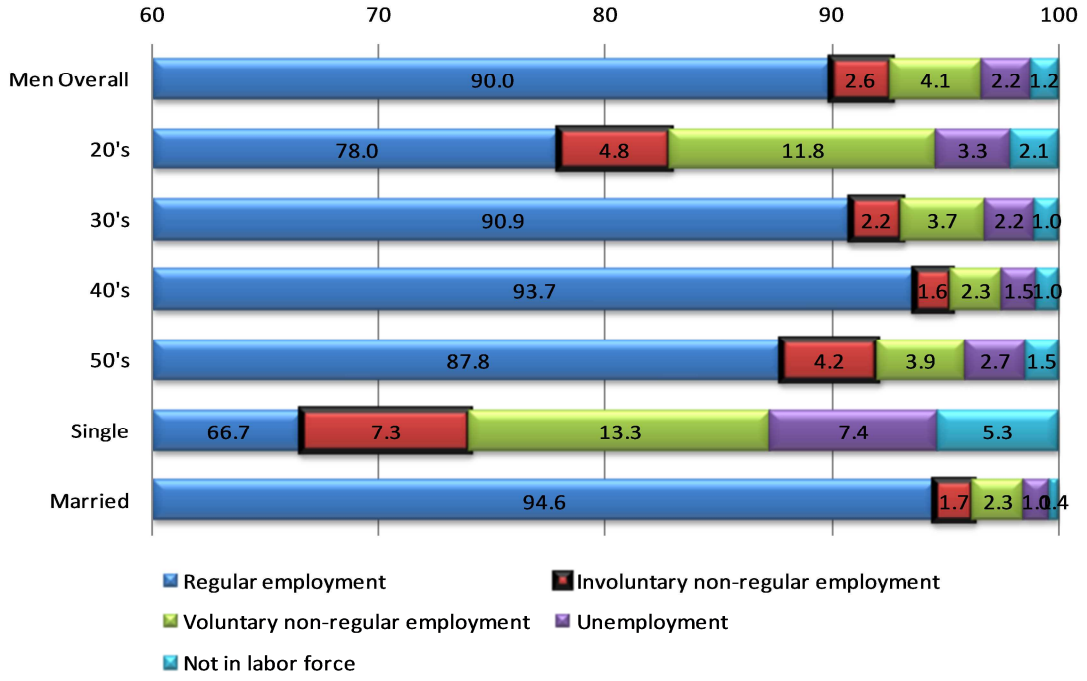


Figure 2.Employment Status Based on Gender, Age, and Marital Status.

(1) Men



(2) Women

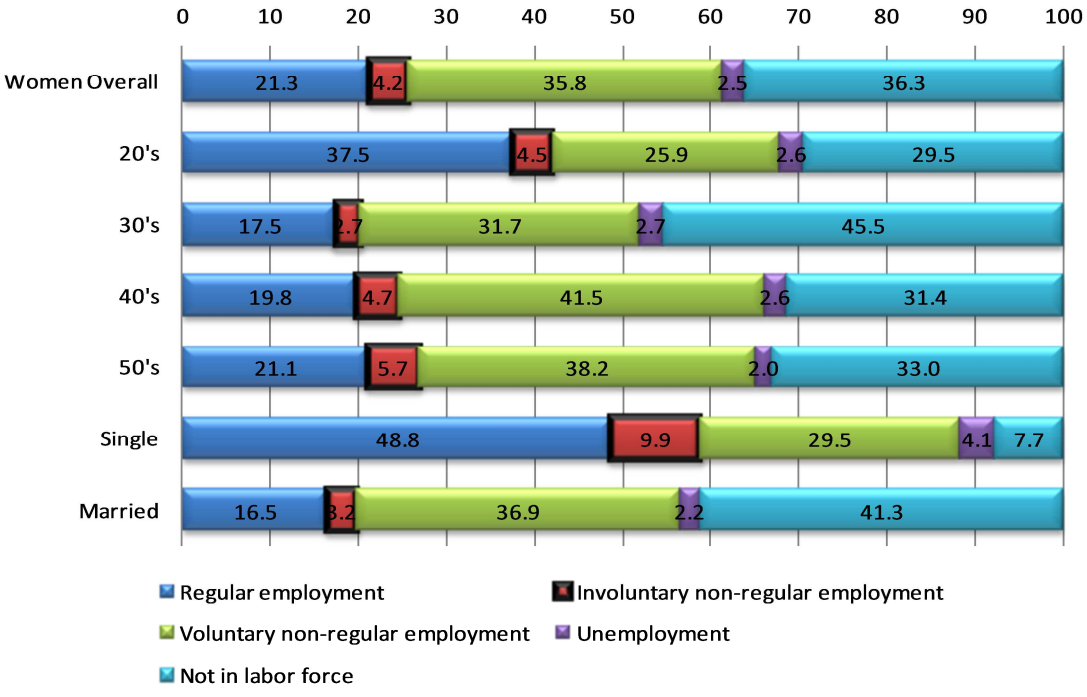
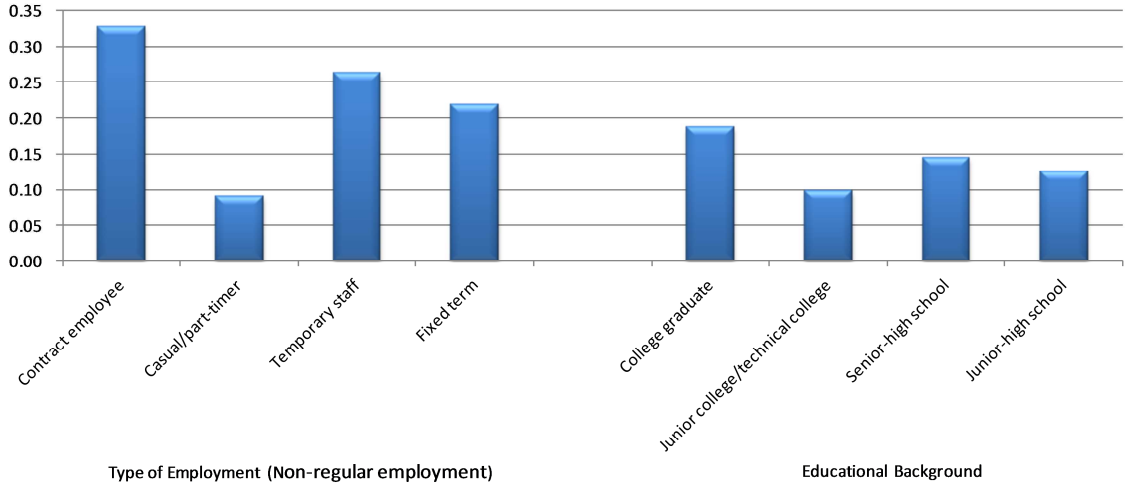
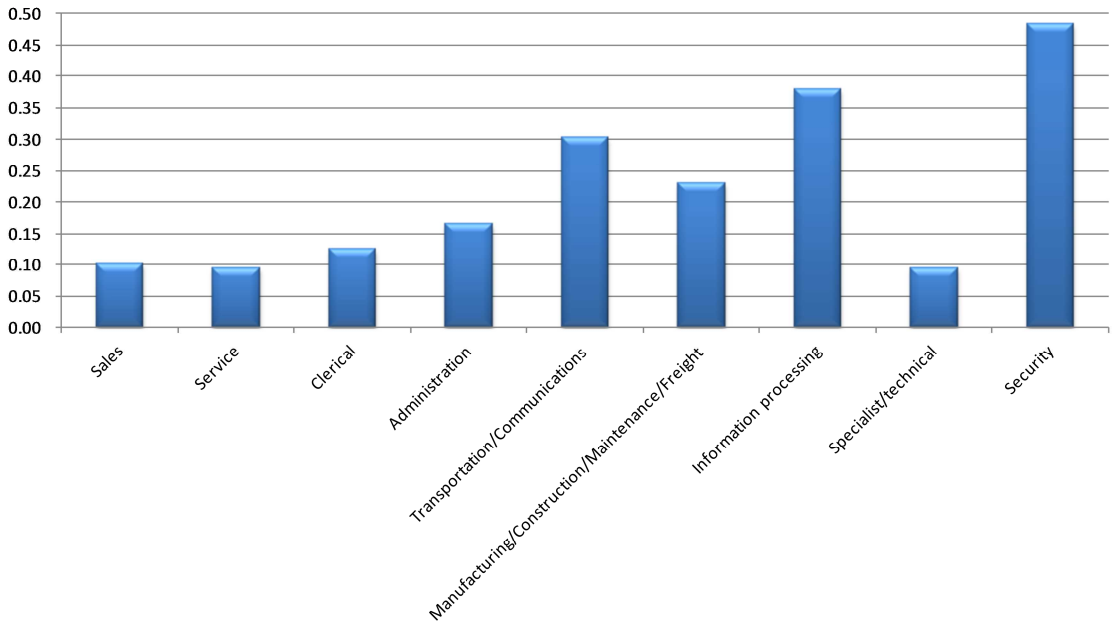


Figure 3. Percentage of Involuntary Non-regular Employmees

(1) Type of non-regular employment and educational background



(2) Occupation.



(3) Industry.

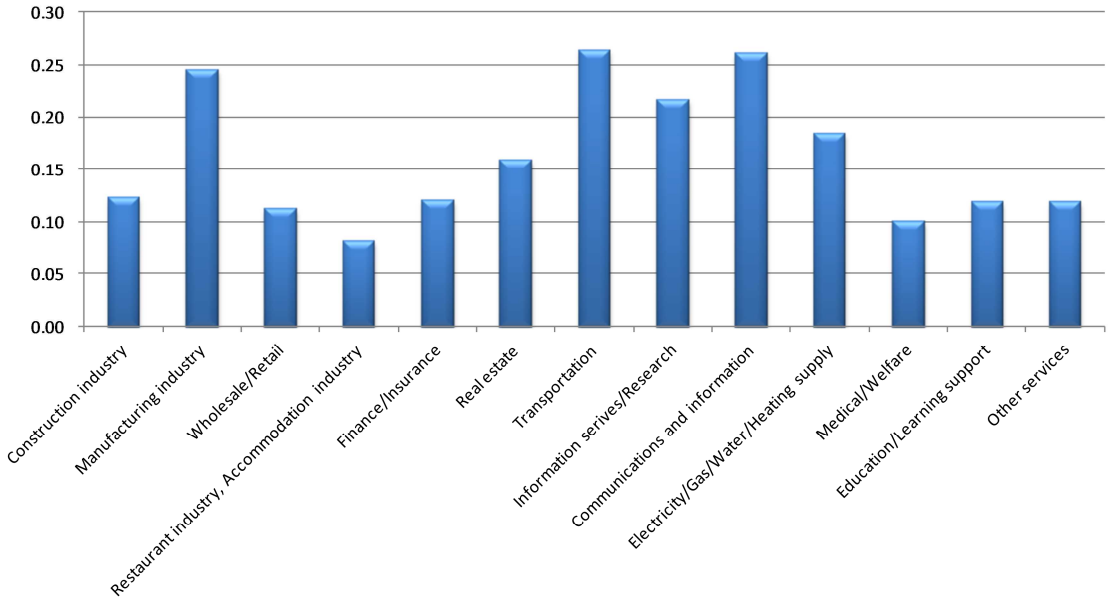
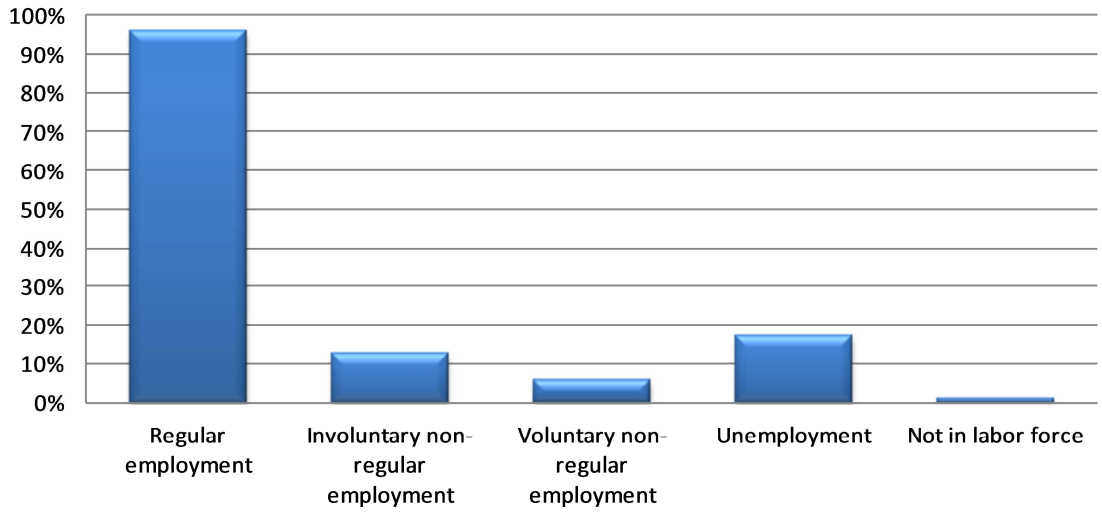

0.30
0.25
0.20
0.15
0.10
0.05
0.00
Construction industry
Manufacturing industry
Wholesale/Retail
Restaurant industry, Accommodation industry
Finance/Insurance
Real estate
Transportation
Information serives/Research
Communications and information
Electricity/Gas/Water/Heating supply
Medical/Welfare
Education/Learning support
Other services

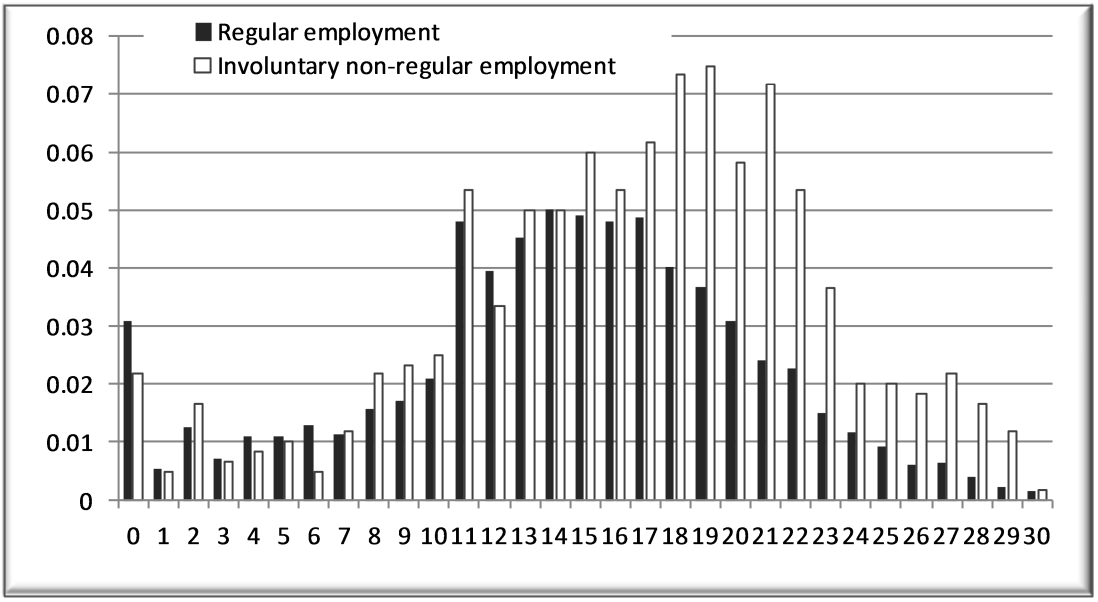
Figure 4. Transition Rates to Regular Employment.



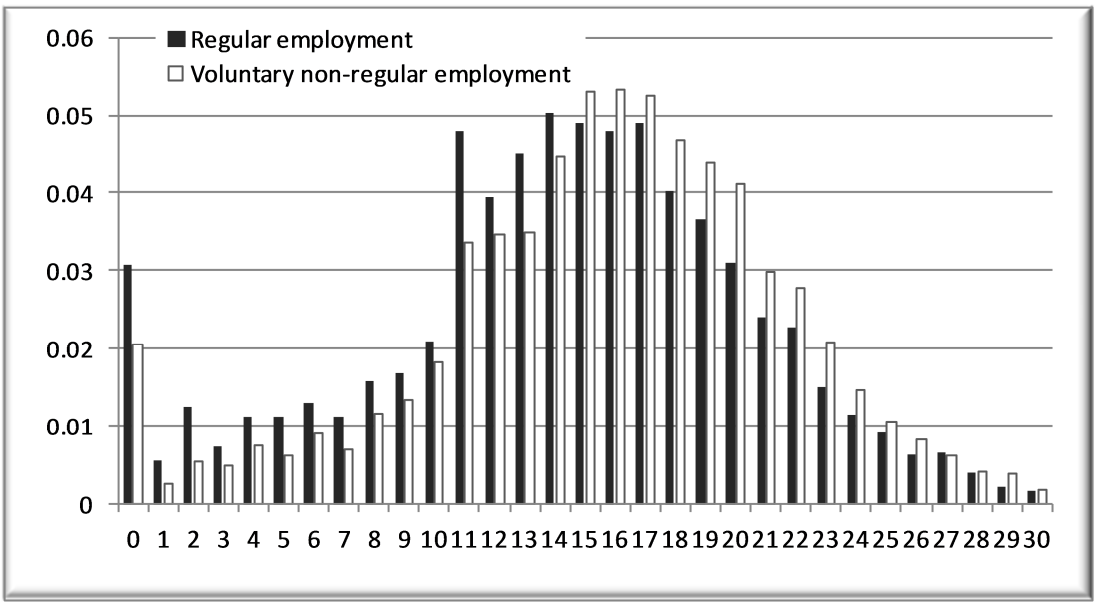
Note: The probability of transitions to regular employment during the following year has been calculated for each type of employment for the previous year.

Figure 5. Distribution of Mental Health Indexes

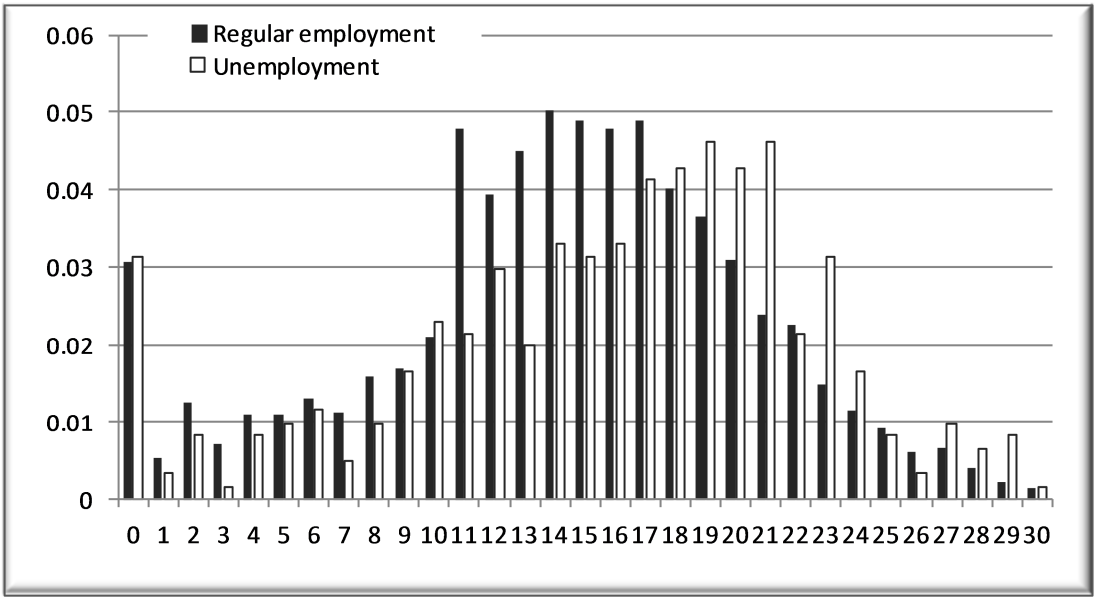
(1) Involuntary non-regular employment



(2) Voluntary non-regular employment



(3) Unemployment.



(4) Not in labor force

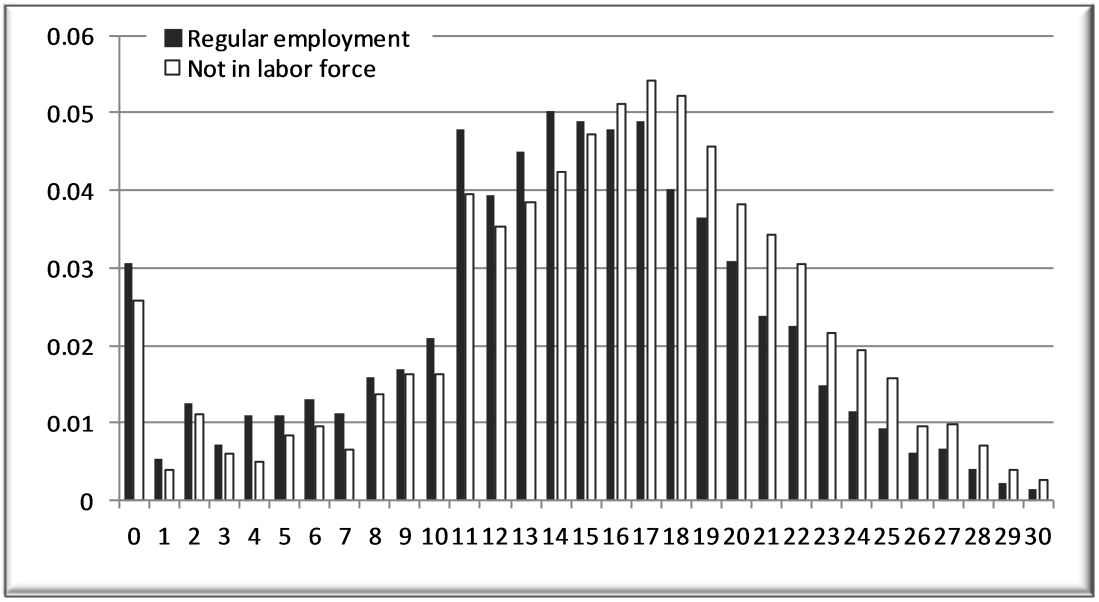


Figure 6. Differences in Mental Health Indexes

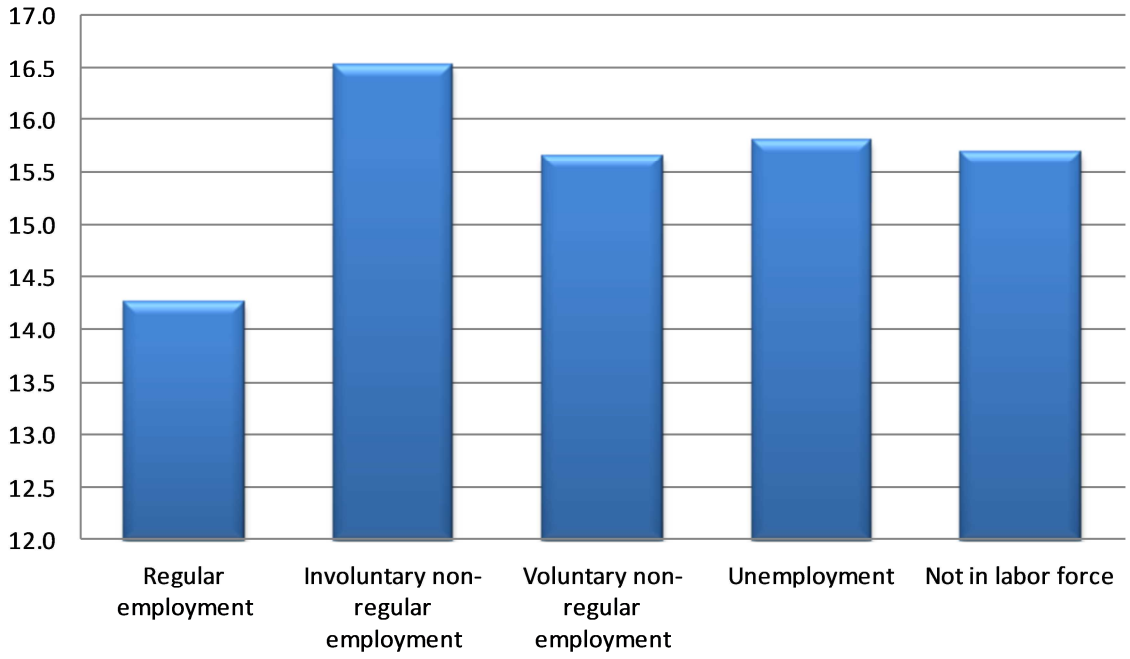


Table 1. Descriptive Statistics

	Regular employment	Involuntary non-regular employment	Voluntary non-regular employment	Unemployment	Not in labor force
Men dummy	0.77	0.34	0.08	0.41	0.03
	(0.42)	(0.47)	(0.28)	(0.49)	(0.16)
Age dummy (Base = 20's)					
30's	0.31	0.23	0.30	0.35	0.42
	(0.46)	(0.42)	(0.46)	(0.48)	(0.49)
40's	0.39	0.36	0.41	0.34	0.32
	(0.49)	(0.48)	(0.49)	(0.47)	(0.47)
50's	0.18	0.26	0.19	0.18	0.16
	(0.39)	(0.44)	(0.39)	(0.38)	(0.37)
Educational background dummy values (Base = Junior college/technical college graduate)					
College graduate	0.33	0.18	0.12	0.18	0.15
	(0.47)	(0.38)	(0.33)	(0.38)	(0.36)
Senior-high school graduate	0.41	0.51	0.48	0.46	0.41
	(0.49)	(0.50)	(0.50)	(0.50)	(0.49)
Junior-high school graduate	0.07	0.08	0.09	0.13	0.09
	(0.26)	(0.28)	(0.29)	(0.33)	(0.29)
Family structure					
Married dummy	0.83	0.61	0.84	0.62	0.95
	(0.38)	(0.49)	(0.37)	(0.48)	(0.22)
Pre-school age children dummy	0.22	0.08	0.13	0.14	0.40
	(0.41)	(0.26)	(0.34)	(0.34)	(0.49)
No. of people in household	3.83	3.50	3.94	3.55	3.95
	(1.41)	(1.41)	(1.36)	(1.40)	(1.23)
Jobs-to-applicants ratio on prefectural basis	0.85	0.81	0.85	0.82	0.84
	(0.33)	(0.32)	(0.33)	(0.31)	(0.32)
Sample size	12,594	838	5,223	570	4,981

Note: Figures in brackets represent standard deviation.

Table 2. Reduced Form Multinomial Logit Model for Employment Status

	Regular employment	Involuntary non-regular employment	Voluntary non-regular employment	Unemployment	Not in labor force
Men dummy	0.682***	−0.0116***	−0.321***	−0.00180	−0.348***
	(0.00491)	(0.00215)	(0.00517)	(0.00193)	(0.00464)
Age dummy (Base = 20's)					
30's	−0.0683***	−0.000436	0.0234*	0.0131**	0.0323***
	(0.0171)	(0.00496)	(0.0125)	(0.00509)	(0.00730)
40's	−0.0554***	0.0101*	0.0136	0.00783	0.0238***
	(0.0177)	(0.00539)	(0.0127)	(0.00511)	(0.00767)
50's	−0.0930***	0.0314***	0.00538	0.0102	0.0460***
	(0.0203)	(0.00785)	(0.0138)	(0.00632)	(0.0101)
Educational background dummy values (Base = Junior college/technical college graduate)					
College graduate	0.0339***	−0.00458	−0.0326***	−0.00813**	0.0114*
	(0.0127)	(0.00442)	(0.00928)	(0.00361)	(0.00593)
Senior-high school graduate	−0.0471***	0.0114***	0.0364***	0.00303	−0.00378
	(0.0104)	(0.00383)	(0.00746)	(0.00345)	(0.00413)
Junior-high school graduate	−0.0291*	0.000704	0.0198	0.0138**	−0.00520
	(0.0173)	(0.00579)	(0.0125)	(0.00617)	(0.00645)
Family structure					
Married dummy	−0.0185	−0.0667***	0.0470***	−0.0470***	0.0852***
	(0.0147)	(0.00771)	(0.00924)	(0.00703)	(0.00367)
Pre-school age children dummy	−0.0710***	−0.0181***	−0.0675***	−0.00437	0.161***
	(0.0124)	(0.00433)	(0.00785)	(0.00414)	(0.00903)
No. of people in household	0.00481	−0.00246**	0.00678***	−0.00149	−0.00763***
	(0.00338)	(0.00114)	(0.00240)	(0.00101)	(0.00145)
Jobs-to-applicants ratio on prefectural basis	0.00975	−0.0132***	0.0144	−0.00907**	−0.00190
	(0.0125)	(0.00450)	(0.00934)	(0.00409)	(0.00543)

Notes: 1. Marginal effects of the selection probability for each type of employment. Figures in brackets represent standard errors (white robust standard errors).
2. Sample size equals 24,206. The pseudo-coefficient of determination equals 0.2775. The log likelihood is -21002.
3. ***, **, and * indicate that these are at statistically significant levels of 1, 5, and 10%, respectively.

Table 3. Similarities between Employment Statuses

	Regular employment	Involuntary non-regular employment	Voluntary non-regular employment	Unemployment	Not in labor force
Regular employment	–	960.7	4,615.7	613.8	2,813.4
Involuntary non-regular employment	4,615.7	–	551.5	53.2	1,038.3
Voluntary non-regular employment	960.7	551.5	–	473.5	1,121.0
Unemployment	4,615.7	53.2	473.5	–	844.0
Not in labor force	2,813.4	1,038.3	1,121.0	844.0	–

Note: Chi-squared test statistics for the null hypothesis that the coefficients in the multinomial logit model in Table 2 are identical for each combination of employment status is reported. The null hypothesis is rejected at the 1% level significance for all combinations.

Table 4. Estimation Results for Mental Health Index

	Without Individual Attributes				With Individual Attributes			
	(1) Tobit model	(2) Least-squares estimation	(3) Random-effect estimation	(4) Fixed-effect estimation	(5) Tobit model	(6) Least-squares estimation	(7) Random-effect estimation	(8) Fixed-effect estimation
Type of employment (Base = Regular employment)								
Involuntary non-regular employment	2.343***	2.284***	1.257***	0.582*	1.382***	1.340***	0.713***	0.569*
	(0.279)	(0.272)	(0.256)	(0.324)	(0.286)	(0.279)	(0.266)	(0.324)
Voluntary non-regular employment	1.444***	1.407***	0.847***	0.0300	0.133	0.125	0.116	0.0181
	(0.124)	(0.119)	(0.154)	(0.254)	(0.163)	(0.157)	(0.183)	(0.255)
Unemployment	1.552***	1.554***	0.700**	-0.101	0.853**	0.867**	0.233	-0.0981
	(0.377)	(0.361)	(0.308)	(0.368)	(0.379)	(0.362)	(0.315)	(0.369)
Not in labor force	1.471***	1.441***	0.860***	-0.241	0.196	0.196	0.0962	-0.208
	(0.135)	(0.130)	(0.177)	(0.301)	(0.181)	(0.175)	(0.213)	(0.303)
Household income (million yen)					-0.0656***	-0.0651***	-0.0250	-0.00456
					(0.0190)	(0.0182)	(0.0166)	(0.0200)
Married dummy					-0.610***	-0.623***	-0.408*	-0.114
					(0.179)	(0.172)	(0.236)	(0.435)
Pre-school age children dummy					-0.00635	-0.0111	-0.0528	-0.229
					(0.150)	(0.144)	(0.140)	(0.160)
No. of people in household					0.0333	0.0371	0.0400	0.0612
					(0.0412)	(0.0392)	(0.0530)	(0.0828)
Savings (million yen)					-0.0218***	-0.0217***	-0.00776	0.00408
					(0.00716)	(0.00706)	(0.00712)	(0.0102)
Debt (million yen)					0.00678	0.00613	0.00395	0.00417
					(0.00422)	(0.00412)	(0.00370)	(0.00416)
Men dummy					-1.780***	-1.740***	-1.679***	
					(0.147)	(0.142)	(0.201)	
Age dummy (Base = 20's)								
30's					1.413***	1.388***	0.816***	
					(0.208)	(0.199)	(0.210)	
40's					2.021***	1.972***	1.385***	
					(0.217)	(0.207)	(0.230)	
50's					2.282***	2.210***	1.721***	
					(0.233)	(0.224)	(0.247)	
Constants	14.15***	14.25***	14.48***	14.99***	14.43***	14.54***	14.71***	14.86***
	(0.0714)	(0.0682)	(0.106)	(0.122)	(0.259)	(0.247)	(0.322)	(0.480)
Log likelihood	-55192	-55809		-44133	-55038	-55650		-44127
Within R-squared			0.0001	0.0007			0.003	0.0011
Between R-squared			0.0137	0.001			0.0312	0.000
Overall R-squared			0.014	0.000			0.03	0.0004
Sample size	17,070	17,070	17,070	17,070	17,069	17,069	17,069	17,069

Notes: 1. Figures in brackets represent standard errors (white robust standard errors).
2. ***, **, and * indicate that these are at statistically significant levels of 1, 5, and 10%, respectively.