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Discussion Paper No. 570

PROGRAMME EVALUATION OF UNEMPLOYMENT BENEFITS IN JAPAN: AN AVERAGE TREATMENT EFFECT APPROACH

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Programme Evaluation of Unemployment Benefits in Japan
An Average Treatment Effect Approach*)

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Abstract

Empirical results show that unemployment benefits (UB) recipients significantly change to worse job conditions with respect to wages and firm size, but change to better job conditions with respect to occupation, position, industry, and residence. While the effects for occupation are not significant, UB recipients have a significant tendency to stay the same. In other words, results of other conditions imply that they reduce the reservation wage to get better conditions with respect to occupation, industry and residence. This means strong inertia in these aspects.

JEL Classifications: J63, J64, J65

Keywords: Unemployment Benefits, Duration of Unemployment, Search Effort, Working Conditions, Nonparametric Propensity Score Matching Method, Average Treatment Effect

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1 Introduction

The unemployment rate in Japan has been rising rapidly since the 1990s and it is more than 5% after 2000. The official Labour White Paper of the Japanese Ministry of Labour in 1999 indicated that the structural and frictional unemployment rate was more than 3%, and that economic policy to counter recession could not solve this high unemployment problem, at least in the short term. Except in 1998 and 1999 when the Netherlands and the USA respectively achieved lower unemployment rates, Japan has enjoyed the lowest unemployment rate among OECD countries. In the recent period of high unemployment in Japan, the scarecity of the Employment Insurance System[1)] have been remarkable, as this was based on the previous long-term low unemployment rate. This paper focuses on the unemployment benefits (UB) among several aspects of the Employment Insurance System, and examines its effects on the search behaviour of the unemployed[2)].

Many investigations evaluate the UB effect on the behaviour of the unemployed. The elasticities of UB levels with respect to unemployment duration have been estimated to be about 0.28-0.36 in the UK (Narendrannathan, Nickell and Stern (1985)) and about 0.36 in the USA. While simple international comparisons can be misleading because of different UB systems and backgrounds[3)], these imply that the unemployment period is extended by half a week if the UB level increases by 10% (Moffitt (1985))[4)]. On the other hand, the effect of potential UB duration on unemployment duration is larger. Katz and Meyer (1990) predicts that this elasticity is twice as large as that of the UB level. Christofields and McKenna (1995) also finds that the hiring rate significantly increases in the last month of the UB period in Canada. Similar patterns are confirmed in Japan (Tachibanaki (1984)). Moreover, Ehrenberg and Oaxaca (1976) finds that the replacement rate effect on wage gains is limited: It is significant for females but not for males. Overall, these studies indicate some evidence of moral hazard in the UB recipient's behaviour.

However, even if the UB extends the duration of unemployment, it may not directry

imply the precense of the moral hazard. As the UB loosens the budget constraint of its recipients unambiguously, it should extend the duration of unemployment. The problem is whether the recipients decrease their intensity of search behaviour rather than increasing in their duration of unemployment. Even with the extended unemployed duration, if they do not lower the intensity of their search behaviour, they will receive good conditions in their new jobs and this longer unemployed duration should not be judged to be as a moral hazard. Therefore, programme evaluation for UB should be measured by the conditions of the new jobs in comparison with those of previous jobs rather than by examining the duration of unemployment or the unemployment rate.

To investigate this argument, the author attempts to incorporate conditions in the new job with exogenous UB receipt in Ohkusa (2000a) and with endogenous UB receipt in Ohkusa (2000b). This paper analyze this problem as a program evaluation to UB as in Heckman, Ichimura and Todd (1997, 1998). Of course, UB receipt is not completely a self-selection. However, if we consider what jobs they had chosen previously or when and what jobs they change to, ineligibility for UB itself seems to be endogenous. Moreover, the method of Heckman, Ichimura and Todd (1997, 1998) does not necessarily require complete endogenous self-selection about whether they select to join the programme or not. It only requires that the distribution of variances should overlap among programme participants and non-participants. Therefore, it does not seem to be irrelevant to use such a method to evaluate the UB, although it is somewhat an extreme viewpoint.

The paper is organized as follows. The next section explains the data in detail. Section 3, then, describes the model to be estimated, and the results are shown in Section 4. In Section 5, the results of the small data set are shown for a deeper evaluation. Finally, the results are summarized and suggestions for further research are mentioned.

2 Data

The following analysis uses micro-data from the Survey of Job Changers (*Tenshokusha Sougou Jittai Chosa* (in Japanese) conducted in 1998 by the Ministry of Labour. This survey contains detailed information, including characteristics of individuals, the conditions of previous and current jobs, unemployment benefits, and the unemployment duration of 10,000 regular workers. The surveyed workers had the following three characteristics:

- They were hired in the past 12 months.
- They had worked in another firm in the past 12 months before they were hired in the current firm.
- They are regular workers.

The feature of this survey is that the conditions (including wages, occupation, rank, industry, and firm size) of both the previous job and the current job are available. Information on whether they changed their place of residence due to job hunting is also available. Thus any change in working conditions is easily measured. Because the main purpose of this paper is to test the UB effect, those individuals in the sample who had not experienced unemployment are excluded from the following analysis.

These data automatically show that the unemployed who does not obey the rule of UB receipt. For example, many persons seem to be eligible for UB receipt by the observable data, in terms of age, tenure, occupation, and firm size in the previous job, and the reason for the turnover, but they do not necessarily enjoy UB. In fact, this proportion is about 50%. The reason they forfeited their eligibility cannot be seen directly because we have no information on their eligibility. However, we can judge that the unemployed decide endogenously whether or not to apply their eligibility. Of course, many people are ineligible because of their previous jobs. In this sense, their eligibility was determined when they got their previous job, and therefore, it seems to be predetermined for their current

unemployment. But if their characteristics, such as age, education level, skills etc., heavily affect the conditions of the previous job, the UB eligibility determined by the previous job also seems to be endogenous. Thus, it is obvious that whether or not they are receiving UB reflects, at least partly, the decision of the unemployed, and thus we should acknowledge this endogeneity and take it into account.

The sample size, which includes those who had less than one month unemployed period, is 7370. The summary statistics are shown in Table 1. The index of changes in conditions between the previous and current job is defined as follows. Concerning rank and firm size, it is set as 3 if the new job has better conditions, 2 if there is no change in conditions and 1 if otherwise. Better conditions mean larger firm scale and higher ranking. Concerning occupation and industry, since there is no clear definition of good or bad occupations (industries), the index is defined to be 1 if the unemployed change occupation (industry) and 0 otherwise. This is because experiences in the previous job is more useful in the same occupation (industry) than in another. Concerning residence, the index is defined to be 1 if they experience a changes in residence due to searching for a new job, and 0 otherwise.

Needless to say, changing residence implies a bad condition. Note that "better conditions" refers to a defined lower value in spite of a larger value in wages, firm size and rank.

3 The Testing Hypothesis

The testable hypothesis is simply whether the UB reduces intensity of job search. The main problem with testing this is that intensity of search cannot directly be observed. If intensity of search could be observed, there would be no room for moral hazard. Thus, it has to be investigated indirectly in the following manner.

As the UB reduces the budget constraints of the recipients and reduces the disutility from the extended duration of unemployment, the duration of unemployment by recipients

should increase unambiguously. If there is no moral hazard, the recipients seek a job with better conditions. Conversely, because non-recipients cannot enjoy sucu a benefit, they may accept a job with worse conditions so as to shorten the duration of unemployment. Therefore, the recipients should be able to get better jobs than the non-recipients.

If there is moral hazard, then, as the recipients decrease their intensity of search, the difference between the new job conditions for recipients and non-recipients decreases in comparison with the no moral hazard case. In the extreme case, if there is no difference between the new job conditions for recipients and non-recipients, the intensity of search would have been greatly reduced to cancel out any effect of extended unemployment duration. In the worst case, if the conditions in the new job for recipients are worse than for non-recipients, there is strong evidence of moral hazard.

Therefore, controlling for the endogeneity of UB receipt and unemployment duration, moral hazard is defined as the change in conditions between a previous and current job which characterises the outcome of search behaviour, .

4 The Empirical Model

In the case of the endogeneity of UB recipients, the effect of the UB on the effort of job search and/or for better conditions of new jobs could be recognized as a measure for the programming evaluation. The gold standard for programme evaluation is the randomized experiment, used in fields such as medicine and natural science in which other conditions can be controled properly. However, in the field of economics, because such randomized experiments need considerable time and money, and have serious ethical problems, it is very difficult to utilize them.

If we cannot perform a randomized experiment, the programme evaluation needs to be by the analysis of observational data where programme participation is selected endogenously. In this case, the propensity score method (Rosenbaum and Rubin (1983)) was used in the

analysis. This method has now been improved greatly as the Nonparametric Propensity Score Matching Method (see Heckman, Ichimura and Todd (1997, 1998)) and has been applied to several fields, including medical science. For example, Heckman, Ichimura and Todd (1997) and Dehejia and Waha (1999) applied it to a job-training programme, Ginther (2000) applied it to education, Jalan and Ravallion (2000) and Todd, Behrman and Cheng (2000) applied it to aid programmes of international institutions, and Frölich (2000) applied it to a rehabilitation programme.

The idea of the propensity score method is very simple: Comparison between the most similar programme participant and non-participant in terms of characteristics other than programme participation behavior. However, other characteristics have many dimensions and thus simple comparison cannot, in general, be performed. The propensity score method solves this problem by using the estimated probability of the programme participation to define the narrowness among participants and non-participants. The method of Rosenbaum and Rubin (1983) compares them by strata, but the Nonparametric Propensity Score Matching Method matches them by using the kernel function nonparametrically.

Let the subscript i denote for programme participants and j for non-participants, and define the characteristic of these two groups as X_i and X_j, the outcome of the programme as Y_i and Y_j, and the estimated probability of the first step estimation for programme participation as $P(X_i)$ and $P(X_j)$, respectively. In this case, the programme evaluation is summarized by the following statistics

$$\frac{\sum_i \{Y_i - \frac{\sum_j Y_j K[(P(X_i)-P(X_j))/h]}{\sum_j K[(P(X_i)-P(X_j))/h]}\}}{N}. \tag{1}$$

where $K[\cdot]$ is a kernel function such as the Biweight kernel, which is widely used (Silverman (1992),Todd, Behrman and Cheng (2000)); and h is bandwidth and its optimal value is $h = 0.9\sigma_{P(X_j)}N^{-0.2}$, where $\sigma_{P(X_j)}$ is the standard deviation of $P(X_j)$. This method is called Kernel Matching.

Heckman, Ichimura and Todd (1997) suggest the local linear matching rather than Kernel Matching because of its efficiency. local linear matching method evaluates the programme according to the following statistics.

$$\frac{\sum_i \{Y_i - \frac{\sum_j Y_j \{K_{ij} \sum_k K_{ik}(P(X_i)-P(X_k))^2 - K_{ij}(P(X_i)-P(X_j)) \sum_k K_{ik}(P(X_i)-P(X_j))\}}{\sum_j K_{ij} \sum_k K_{ik}(P(X_i)-P(X_k))^2 - (\sum_k K_{ik}(P(X_i)-P(X_k))^2}\}}{N} \tag{2}$$

where $K_{ij} = K[(P(X_i) - P(X_j))/h]$. The subscript k means the summation among the programme participants only. Both methods evaluate the programme according to the average treatment effect[5)].

It is obvious that these statistics do not specify their distributions, and therefore, restrictive assumptions should be avoided. Thus, its confidence interval is calculated by bootstrapping procedures, as outlined by Todd, Behrman and Cheng (2000), in which the bias is corrected (Efron and Tibshirani (1998)). The number of replications is 1000.

The first step is the probit estimation for UB receipt. The dependent variable r_i is 1 if the ith unemployed person enjoys UB and 0 otherwise. The estimation equation is

$$\begin{aligned} r_i^* &= \alpha_0 + Z_i\alpha + W_i\beta + \varepsilon_i \\ r_i &= \begin{cases} 1 & \text{if } r_i^* > 0 \\ 0 & \text{otherwise} \end{cases} \end{aligned} \tag{3}$$

where Z_i is the vector of the information about the ith unemployed and their previous jobs, and W_i includes the duration of the on-the-job search and the dummy for whether they voluntarily quit or not.

In particular, Z_i includes: gender, the cubic function of age and tenure, education level, occupation, position, industry, scale of firm, a dummy for any licenses, a dummy for regular workers, and regional dummies. Needless to say, tenure, occupation, position, industry, a dummy for regular workers, and scale of firm apply to the previous job.

Tenure, a dummy for regular workers, industry, and firm scale determine UB eligibility. Other variables in Z_i affect UB receipt through the conditions of the previous job.

Moreover, in the case of voluntary quitting, eligibility is prolonged for three months. The duration of the on-the-job search implies heterogeneity in the preparation for job search before unemployment.

Needless to say, the goodness of fit in this first step is the most important for the propensity score method. Hence, a more extended specification, which includes the interaction terms of gender, age, on-the-job search, and the voluntary quitting dummy, is estimated in the first step to check its robustness.

5 Empirical Results

The empirical results for UB receipt are shown in Table 2.

It means that the unemployed who is older, less tenured (but its effect decreasing), vocational school or two years college graduates compared with junior high school graduates, and has longer OTJ search is likely enjoy UB recipients.

Moreover, the unemployed who worked as regular worker, and whose previous job was manager, officials, or clerical comparison with profesional or technical worker in occupation, specialist or routine worker comparison with executive in position also have higher probability of being UB recipient.

Conversely, the unemployed whose previous occupation was other worker compared with profesional or technical worker, who quit voluntary[5)], and who was employed at small firm which employees less than 30, tend to have lower probability of being UB recipient.

Note the effects the duration of the on-the-job search and the voluntary quitting dummy. These marginal effects means that the probability of UB receipt increase by 0.6% point due to every one month longer in OTC job search, and voluntary quitter are suffered 4.2% lower probability.

On the other hand, regular workers in previous jobs, significantly enjoy the 20% point higher receipt of UB, which reflects institutional background.

Next, the empirical results for average treatment effects are summarized in Table 3, which includes four panels–whether simple, included the interaction terms in the first step, whether kernel matching or local linear matching were involved. Note that a positive average treatment effect means that receipt of UB helps individuals enjoy better jobs with respect to wages, firm scale, and ranks. Conversely, a negative average treatment effect means that receipt of UB helps individuals enjoy better jobs with respect to occupation, industry, and residence.

Four panels in the table share common results. Namely, UB with worse job conditions with respect to wage and firm scale and, conversely, UB with better conditions with respect to rank, residence and industries. However, industries is not significant in Kernel Matching. Not all panels about occupation show significant effects. The effects are not significant in kernel matching, but in local linear matching UB helps recipients get better jobs.

Results for wages and residence are the same, but there are some inconsistencies with Ohkusa (2000a, b). For firm scale, although it is not significant in Ohkusa (2000b), the results in this paper mean that UB lead to worse conditions, as in Ohkusa (2000a). For occupation, although Ohkusa (2000a) finds UB worsened and Ohkusa (2000b) finds UB helped to get better jobs, our results are not significant. Conversely for industry, although Ohkusa (2000b) finds UB led to worse job conditions, our results imply that UB helps to get a better job, as indicated by Ohkusa (2000a). Finally, for occupation, Ohkusa (2000b) finds that UB worsens job conditions but our results are not significant.

6 Empirical Results for the Split Samples

Tables 4 to 11 show the empirical results of the sample data split according to their characteristics: namely, Table 4 contains the results for those who experienced unemployment for more than one or three month(s); Table 5 for those whose age is more or less than 45; Table 6 for those who were employed in firms in the previous job with more or fewer

than 100 employees; and Table 7 for those who were regular or not regular workers in their previous jobs. The values, of 45 years old and 100 employees, are chosen so as to split the sample almost by half.

Splitting the sample by unemployment duration is for the sake of excluding miss- reporting and to clarify the differences between eligibility and receipt of UB. Whether or not the unemployed were regular workers in their previous jobs may also heavily affect eligibility for UB. The split by age can demonstrate the effect of age discrimination in the hiring of workers in Japan, which has become an important social issue. The split by previous firm size also can capture mobility of workers in changing jobs according to firm size.

All tables share the same features and are consistent with Table 3. In particular, the wage reduction due to UB receipt is very clear, and UB encourages good jobs in the sense of rank or residence except for irregular workers in previous jobs. On the other hand, there are some counter-intuitive results. For example, in Tables 4, the differences between UB recipients and non-recipients are larger in the sample of those whose unemployment duration is more than one month than those in the sample whose unemployment duration is more than three months, namely -.11 vs -.10 in Kernel matching or-.12 vs -.11 in local linear matching. Thus, it seems that longer unemployment duration reduces wages in new jobs as much as UB receipt does, athough such a difference is not significant.

Concerning occupation, most estimates are not significant except in Table 5 and the Local Linear Matching case in Table 4. On the other hand, UB encourages staying in the same industry, regardless of the unemployment duration, for those who were older than 45 and employed in previous jobs in firms with less than 100 employees, but these are insignificant in other cases. Moreover, UB encourages individuals to move to smaller firms for the same group of the unemployed (and regular worker in previous jobs).

In summary, the effect of UB on wages, rank and residence are confirmed to be robust, even if the sample is split. The most interesting case is irregular workers in previous jobs, indicated in Table 7. They do not suffer from UB receipts, except for wages. Since regular

workers share the all tendencies in Table 3, inertia in residence due to UB is specified only for regular workers.

7 Concluding Remarks

This paper examines how the UB affects intensity or search efforts of the unemployed, measured by the working conditions of new jobs, being the outcome of search behaviour, taking into account of the endogeneity of UB receipts by using a Nonparametric Propensity Score Matching Method.

Empirical results show that the UB recipients significantly change to worse job conditions in terms of wages and firm size, but change to better job conditions with respect to occupation, position, industry, and residence. While the effect for occupation is not significant, UB recipients have a significant tendency not to change. In other words, the results of other conditions imply that they reduce the reservation wage so as to get better conditions with respect to occupation, industry, and residence. This implies that there is strong inertia in these aspects.

This paper focuses on programme evaluation for UB at the individual level. Needless to say, individual should maximize their utility under their given condition. However, if our interest extended to the social efficiency, individual maximizing behavior does not necessariy yields social efficiency. In the case of UB system, such inertia would imply social inefficiency in the sense of misallocation or discourage the movement in labor.

Policy implication from this research is obvious. Since UB discourage labor movement in the sense of industry or region, the system of UB should be reform to penalize such a inertia or encourage to move. To do so, UB should pay additionally if the unemployed decide to move, or the unemployed ought to apply to at least one firm within a week like in the U.S.A. These reform should rise intensity of job search, shorten the duration of unemployment, and then the total payment might be reduced. It means to rise social

efficiency by reducing individual moral hazard, even though moral hazard is not analyzed in the main text.

Finally, we make some remarks about further research. First of all, the sample in this paper excludes those who are non-regular workers and not currently in the labour force. Because outflows to non-regular workers in the labour market and outflows to the outside labour market are very important aspects of the unemployment situation and the functioning of the UB, it is necessary to consider this effect in evaluation of the UB scheme. Secondly, further research should control for the omitted variables in this analysis, such as household assets, income from other members of the household, and household structure, which are not available in this data set.

Moreover, to evaluate more directly the inertia in required wages, occupation, etc., a panel analysis of the effects of these variables on unemployment duration would be very important.

Footnotes

*) The author has permission to use and analyze the micro data of the Survey of Job Changers (*Tenshokusha Sougou Jittai Chosa*. This paper was presented at the Labour Study Group Meeting in 2000. I thank the participants of this meeting, especially Prof. Inoki at Osaka University, Prof. Tachibanaki at Kyoto University, Prof. Muramatsu at Nanzan University and Prof. Ohta at Nagoya University for their support and useful discussion. Finally, I thank Ms. Kazuko Matsumoto for her helpful support of my research. Needless to say, any remaining errors are mine.

1) In Japan, unemployment insurance, called the Employment Insurance System, includes not only unemployment benefits but also subsidies for temporarily declining industries, training costs for certain occupations, payment for childcare leave, etc.

2) Yashiro and Futagami (1998) discusses aspects of the Employment Insurance System other than UB.

3) Atkinson and Micklewright (1991) is a good survey of this field.

4) Recently, Kohara (2000) has analyzed this issue by using micro data.

5) The word "treatment effect" is very common in applied econometric analysis as appeared in Greene(2000) and it means how endogenous choice (such as education attainment) affect outcome (such as wage or income). Nonparametric Propensity Score Matching Method, which is adopted in this research, is the one of the latest method to evaluate treatment effect. The word of average in "average treatment effect" implies that the estimated treatment effect by Nonparametric Propensity Score Matching Method does not depend on individual conditions, but depend on the average of overall distribution of individuals.

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6) In Japan, unlike in the USA, voluntary quitter also can receive UB with some penalty.

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Table : Summary Statistics

	All Sample		Over One Month Sample	
	Mean	Stand. Dev.	Mean	Stand. Dev.
Duration of Unemployment(in Month)	3.221627	3.554212	4.832398	3.623592
Duration of Job Search(in Month)	5.922759	6.392643	7.901101	6.831902
Female Dummy	.3887458	.4874984	.4070796	.491343
Age	33.20393	10.36404	33.44356	10.56373
Tenure (previous)(in Year)	4.362305	3.909859	4.606842	4.010689
Duration of OTJ Search(in Month)	2.700868	4.44971	3.067588	4.826769
High School Graduate	.4794576	.4996117	.49169	.4999849
Vocational School Graduate	.1355932	.3423793	.1372761	.3441757
Two Year College Graduate	.0997966	.2997489	.1014461	.3019512
University Graduate	.2244068	.4172193	.2089359	.4065924
Number of Turnover	2.407493	1.641039	2.388637	1.607825
Occupation (Previous)				
Managers and Officials	.0310508	.1734669	.030218	.1712051
Clerical and Related Workers	.2417627	.4281803	.2540471	.4353712
Sales Workers	.1137627	.3175444	.1165551	.3209241
Service Workers	.0978983	.2971972	.0949709	.2932063
Protective Service Workers	.0143729	.1190303	.0159724	.125382
Workers in Transport and Communications Occupations	.0527458	.2235407	.0509389	.2198967
Craftsmen, Mining, Production Process and Construction Workers	.3049492	.4604171	.3121088	.463404
Others Workers	.0035254	.0592745	.0034535	.0586711
Occupation (Current)				
Managers and Officials	.0387797	.1930825	.0438161	.2047078
Clerical and Related Workers	.2306441	.4212736	.2430391	.4289648
Sales Workers	.1427797	.3498717	.146989	.3541332
Service Workers	.1172881	.3217851	.1137492	.3175407
Protective Service Workers	.0115254	.1067433	.0107921	.1033343
Workers in Transport and Communications Occupations	.0610169	.2393776	.056335	.2305924
Craftsmen, Mining, Production Process and Construction Workers	.2526102	.4345387	.2559896	.4364631
Others Workers	.0069153	.0828756	.0064753	.0802169

(Table 1: continue)

(Table 1: continue)

Position (Previous)				
Heads of Departments	.0158666	.1249677	.0153282	.1228676
Heads of Sections	.0322756	.176743	.0284974	.166407
Subsection Chiefs	.0197993	.1393195	.0170553	.1294913
Managers	.0343097	.1820359	.0328152	.1781719
Specialists	.1212368	.3264244	.1068653	.3089753
Routine Workers	.7732574	.4187531	.7979275	.4015894
Position (Current)				
Heads of Departments	.018315	.134097	.0198661	.1395552
Heads of Sections	.043549	.2041033	.0483697	.2145693
Subsection Chiefs	.0356804	.1855046	.0347657	.1832056
Managers	.0610501	.2394384	.0639171	.2446316
Specialists	.1226428	.328049	.1086158	.3111902
Routine Workers	.7073667	.4550023	.7123731	.4527051
Regular Worker (Previous)	.8253559	.3796881	.8443773	.3625364
Industries(Previous)				
Mining	.0051546	.0716154	.0060462	.0775303
Construction	.0866793	.2813837	.0839991	.2774165
Manufacturing	.289745	.4536747	.2902181	.4539119
Gas and Electric Power	.0204829	.1416548	.0209458	.1432184
Trans. and Comm.	.0680955	.2519268	.0673721	.2506923
Wholesale and Retail	.1517906	.3588421	.1591449	.3658507
Bank and Insurance	.0411015	.1985384	.0442669	.2057097
Real Estate	.0113945	.1061422	.0127402	.1121634
Service industry	.2858112	.4518305	.2785575	.4483376
Government	.0321487	.1764068	.0295832	.1694529
Industries(Current)				
Construction	.0367458	.1881497	.0351824	.1842605
Manufacturing	.4005424	.4900416	.4077272	.491465
Gas and Electric Power	.015322	.1228386	.015109	.1219997
Trans. and Comm.	.0401356	.1962905	.0375567	.1901419
Wholesale and Retail	.1895593	.3919789	.1936111	.3951702
Bank and Insurance	.0143729	.1190303	.0159724	.125382
Real Estate	.0157288	.1244328	.0170516	.1294776
Service Industry	.2672542	.4425562	.2570689	.4370649
Firm Size (Previous)				
500999	.0629153	.2428269	.0638895	.2445824
300499	.067661	.2511803	.0671271	.2502691
100299	.1783051	.3827953	.1877833	.3905812
3099	.2324068	.4223956	.2346212	.4238076
529	.2485424	.4321972	.2443341	.4297381
4	.0458305	.2091315	.0403626	.1968295

(Table 1: continue)

(Table 1: continue)

Firm Size (Current)	189.4168	566.1266	165.8642	455.567
Dummy for UB Recipient	.2723081	.4451778	.412133	.492272
Dummy of UB Receive	24.33789	52.22899	38.61213	61.67502
Dummy for Voluntary Quitters	.8375593	.3688796	.8031513	.3976599
Expiration month in UB	.0576271	.2330528	.087848	.2831043
Dummy for License Holder	.3955254	.4889964	.3850637	.4866629
Rate of Change in Wage	-.0213966	.1689799	-.040880	.1690209
Dummy for Change in Occupation	.3758644	.4843781	.3865746	.4870173
Dummy for Change in Industry	.5659661	.495663	.5786747	.4938248
Change in Firm Size	1.879458	.8525586	1.848478	.8513973
Change in Position	2.075034	.4682201	2.099136	.4702184
Change in Residence	.1909153	.3930491	.1720268	.3774444

Note: The sample size was 7370 in the full sample and 4623 in the restricted sample. This table omits junior high school graduates from the education background, professional and technical workers in Occupation, executives in position, agriculture in industry (previous), mining in industry (current) in the industry and those firms with over 1000 employees in firm size. Change in firm size is 3 if firm size in the current job is larger than in the previous job, 2 if firm size in the current job is the same as in the previous job, and 0 otherwise. Change in position is 3 if position in the current job is higher than in the previous job, 2 if position in the current job is the same as in the previous job, and 0 otherwise.

Table 2: Empirical Results for UB Recipients

	Estimated Coef.	z value	p-value	Marginal Effect
Female Dummy	.1033511	1.480	0.139	.02468295
Age	.0427905	1.966	0.050	.01021948
Age^2	-.0004198	-1.307	0.191	-.00010026
Tenure	.1398075	3.977	0.000	.03338969
Tenure^2	-.009176	-3.465	0.001	-.00219146
Age·Tenure	.0009248	0.906	0.365	.00022086
High School Graduate	.1404616	1.135	0.257	.0335459
Vocational School Graduate	.3932996	2.731	0.006	.09393022
Two Year College Graduate	.2765836	1.839	0.066	.06605539
University Graduate	.1480349	1.020	0.308	.03535459
Duration of OTJ Search (in Month)	.0234708	3.833	0.000	.00560545
Occupation (Previous)				
Managers and Officials	.4799452	2.572	0.010	.11462344
Clerical and Related Workers	.4655627	4.270	0.000	.11118852
Sales Workers	.0811426	0.679	0.498	.01937898
Service Workers	.1331698	1.060	0.290	.03180442
Protective Service Workers	.0656015	0.260	0.795	.01566736
Workers in Transport and Communications Occupations	.0936347	0.578	0.563	.02236242
Craftsmen, Mining, Production Process and Construction Workers	.0627703	0.548	0.584	.01499118
Others Workers	-.6649962	-2.287	0.022	-.15881847
Position (Previous)				
Heads of Departments	.376913	0.915	0.361	.09001669
Heads of Sections	.2271761	0.600	0.548	.05425559
Subsection Chiefs	.5413576	1.294	0.196	.12929033
Managers	.5561739	1.442	0.150	.13282886
Specialists	.8646002	2.323	0.020	.2064891
Routine Workers	.6969472	1.920	0.055	.16644919
Regular Worker (Previous)	.8509191	8.483	0.000	.20322171
Industries(Previous)				
Mining	.8499619	2.195	0.028	.20299311
Construction	-.2630254	-0.932	0.352	-.06281734
Manufacturing	-.106026	-0.400	0.689	-.02532178
Gas and Electric Power	-.1158004	-0.362	0.717	-.02765616

(Table 2: continue)

(Table 2:continue)

Trans. and Comm.	-.2310791	-0.824	0.410	-.05518773
Wholesale and Retail	-.0962391	-0.355	0.723	-.0229844
Bank and Insurance	.0090034	0.031	0.975	.00215024
Real Estate	-.0275391	-0.072	0.943	-.00657706
Service Industry	-.1683352	-0.632	0.528	-.04020285
Government	-.8580665	-2.519	0.012	-.20492871
Firm Size (Previous)				
500999	-.0623052	-0.495	0.621	-.0148801
300499	.1160791	0.904	0.366	.02772272
100299	.0899564	0.835	0.404	.02148393
3099	-.0611228	-0.569	0.569	-.01459772
529	-.1851506	-1.707	0.088	-.0442188
4	-1.05897	-5.656	0.000	-.25290981
Dummy for Voluntary Quitters	-1.859075	-22.030	0.000	-.04217394
Dummy for License Holder	.0256568	0.418	0.676	-.44399574
constant	-2.025143	-3.448	0.001	

Note: Sample size is 7310. This table shows empirical results for UB recipients by using probit estimation. Prefecture dummies are also included as explanatory variables. The null hypothesis that all coefficients are 0 is rejected at the 10% significance level.

Table 3: Average Treatment Effect and Its Confidence Interval by Bootstrapping

	Average Treatment Effect	90%CI lower	90%CI upper
No Interaction			
Kernel Matching			
Wage	-.1207386	-.1351641	-1063906
Occupation	.0118148	-.0076405	0279211
Rank	.0905997	.074681	1068482
Industry	-.0146201	-.0338939	0036617
Firm Scale	-.0199196	-.0353807	-0024914
Residence	-.0670513	-.080422	-0541712
With Interaction			
Kernel Matching			
Wage	-.1183801	-.1330591	-.1033543
Occupation	.0116793	-.005846	.0286982
Rank	.0597894	.0449035	.0744988
Industry	-.0145074	-.0327647	.0033123
Firm Scale	-.043931	-.0589261	-.024844
Residence	-.0558737	-.068305	-.0429952
No Interaction			
Local Linear Matching			
Wage	-.1271544	-.1428883	-.111003
Occupation	-.0041727	-.0226321	.0134351
Rank	.086987	.0719774	.1031
Industry	-.0259407	-.0447944	-.0059745
Firm Scale	-.0303182	-.0473537	-.0146783
Residence	-.0722286	-.083559	-.0584522

(to be continued)

(continue)

With Interaction			
Local Linear Matching			
Wage	-.1203179	-.1350401	-.1057044
Occupation	-.0032718	-.0192442	.0150087
Rank	.0777409	.0618881	.0930488
Industry	-.0361646	-.0560212	-.0179846
Firm Scale	-.0701612	-.0874401	-.0545452
Residence	-.0412021	-.0551658	-.0291145

Note: By definition, a positive average treatment effect means UB helps recipients with achieving better jobs in terms of wages, firm scale and rank, and conversely a negative average treatment effect means UB helps recipients with achieving better jobs in terms of occupations, industry and residence.

Table 4 Estimation Result in the Splitted Sample by Unemployment Duration

	Estimator	Lower Bound for 90% CI	Upper Bound for 90% CI
More than One Month Unemployment Sample			
Kernel Matching			
Wage	-.1115027	-.1269561	-.0946632
Occupation	-.0204067	-.0368657	.000601
Rank	.1047996	.0885575	.1199356
Industry	-.0529049	-.0713551	-.0329963
Firm Scale	-.0491676	-.0669497	-.032832
Residence	-.0496566	-.0616096	-.0366904
Local Linear Matching			
Wage	-.1248564	-.1416191	-.1104166
Occupation	-.0686503	-.0890456	-.0477804
Rank	.0684267	.0524902	.087909
Industry	-.1600161	-.1890808	-.1338078
Firm Scale	-.0375092	-.0542346	-.0201803
Residence	-.0261743	-.0398498	-.0117546
More than Three Month Unemployment Sample			
Kernel Matching			
Wage	-.1028942	-.1191996	-.0845015
Occupation	-.0288884	-.0498468	-.0093902
Rank	.1226006	.1043407	.1386159
Industry	-.0677806	-.0892333	-.0473856
Firm Scale	-.052914	-.0719727	-.0335174
Residence	-.0420476	-.0561187	-.0245391
Local Linear Matching			
Wage	-.1071367	-.1236404	-.0897795
Occupation	-.0297708	-.0488186	-.0103706
Rank	.1228667	.1045702	.1405451
Industry	-.067302	-.0880723	-.0472635
Firm Scale	-.0538154	-.0701077	-.033735
Residence	-.0409192	-.0553418	-.0270301

Note: In More than One Month Unemployment Sample, sample size is 4627 and the percentage of UB recipients is 41%.In More than Three Month Unemployment Sample , sample size is 3263 and the percentage of UB recipients is 51%.

Table 5 Estimation Result in the Splitted Sample by Age

	Estimator	Lower Bound for 90% CI	Upper Bound for 90% CI
More than 45 Years Sample			
Kernel Matching			
Wage	-.1944965	-.2173423	-.1701821
Occupation	-.0085647	-.0414773	.0239505
Rank	.1562482	.1224806	.185368
Industry	-.0336564	-.0697993	-.0009314
Firm Scale	-.1232025	-.1527872	-.091062
Residence	-.0503855	-.0692953	-.0266118
Local Linear Matching			
Wage	-.1979113	-.2211324	-.1741766
Occupation	-.0115803	-.040787	.0230907
Rank	.1541782	.1231887	.1872306
Industry	-.035558	-.0696653	-.0031441
Firm Scale	-.1230316	-.1525212	-.0938073
Residence	-.0495422	-.0703003	-.02793
Less than 45 Years Sample			
Kernel Matching			
Wage	-.091088	-.10885	-.0706583
Occupation	.0169211	-.0066959	.0366123
Rank	.051688	.0358279	.0705987
Industry	.0044001	-.0172234	.0274197
Firm Scale	-.0026244	-.0227705	.0157952
Residence	-.0679417	-.0831107	-.0517283
Local Linear Matching			
Wage	-.0901019	-.1102385	-.0704417
Occupation	.0179212	-.0018857	.0394696
Rank	.0504438	.0335157	.0665741
Industry	.0046965	-.01733	.0268647
Firm Scale	-.001986	-.0223087	.0171606
Residence	-.068315	-.0836235	-.0516054

Note: In More than 45 Years Sample, sample size is 1334 and the percentage of UB recipients is 44%. In Less than 45 Years Sample, sample size is 6012 and the percentage of UB recipients is 23%.

Table 6 Estimation Result in the Splitted Sample by Firm Size in Previous Job Sample

	Estimator	Lower Bound for 90% CI	Upper Bound for 90% CI
More than 100 Employees in Previous Job Sample			
Kernel Matching			
Wage	-.1363235	-.1564063	-.1153728
Occupation	.0178089	-.0087679	.0434965
Rank	.0861658	.0652924	.1087946
Industry	-.0117147	-.0381918	.0143584
Firm Scale	-.0001705	-.0137233	.0144713
Residence	-.0620181	-.0816955	-.0412086
Local Linear Matching			
Wage	-.13684	-.1564934	-.1177347
Occupation	.016531	-.0101049	.0418499
Rank	.0839548	.0638462	.1077595
Industry	-.0075672	-.0325977	.0194717
Firm Scale	-.0009982	-.013461	.0132123
Residence	-.0645327	-.0846222	-.0452113
Less than 100 Employees in Previous Job Sample			
Kernel Matching			
Wage	-.1144999	-.1350622	-.0898757
Occupation	-.0035074	-.0279101	.0228596
Rank	.0981287	.0780418	.120901
Industry	-.0297036	-.0559166	-.005473
Firm Scale	-.0327644	-.0596712	-.0073055
Residence	-.0711465	-.0858628	-.0538036
Local Linear Matching			
Wage	-.1122654	-.1347402	-.0906852
Occupation	-.0059592	-.0291131	.0189247
Rank	.0969692	.0751396	.1180688
Industry	-.0299694	-.0566145	-.0033964
Firm Scale	-.0323813	-.0573174	-.004843
Residence	-.0697749	-.0855837	-.0546411

Note: In More than 100 Employees in Previous Job Sample ,sample size is 3485 and the percentage of UB recipients is 28%. In Less than 100 Employees in Previous Job Sample, sample size is 3862 and the percentage of UB recipients is 25%.

Table 7 Estimation Result in the Splitted Sample by Job Status in Previous Job

	Estimator	Lower Bound for 90% CI	Upper Bound for 90% CI
Regular Worker in Previous Job Sample			
Kernel Matching			
Wage	-.1219047	-.1375898	-.106063
Occupation	.0074471	-.0116001	.0263402
Rank	.1016683	.0837323	.1163091
Industry	-.0163823	-.0355157	.0021391
Firm Scale	-.0533206	-.0704582	-.0347349
Residence	-.0735032	-.0878678	-.0598672
Local Linear Matching			
Wage	-.1212025	-.1368945	-.1053958
Occupation	.0085217	-.0107216	.0272051
Rank	.1023505	.0844658	.1170635
Industry	-.0176213	-.0363111	.0009061
Firm Scale	-.0522616	-.0692059	-.0335318
Residence	-.072044	-.0863941	-.0584397
Irregular Worker in Previous Job Sample			
Kernel Matching			
Wage	-.1069177	-.1648101	-.0512639
Occupation	-.0066984	-.0609486	.0473442
Rank	.0025267	-.0299082	.0348285
Industry	-.0295545	-.0842828	.0297468
Firm Scale	.019457	-.0295889	.0651243
Residence	-.0225304	-.0533212	.0116156
Local Linear Matching			
Wage	-.103123	-.1559213	-.0437966
Occupation	-.0104438	-.0656403	.0462753
Rank	.0039437	-.0275749	.0376985
Industry	-.0285056	-.0816535	.0263088
Firm Scale	.020011	-.026652	.0693924
Residence	-.0195379	-.0527682	.0153035

Note: In Regular Worker in Previous Job Sample, sample size is 6064 and the percentage of UB recipients is 29%. In Irregular Worker in Previous Job Sample, sample size is 1283 and the percentage of UB recipients is 17%.