A Convergence Analysis on the Efficiency of Public Job Placement Services in Japan*

Yanfei Zhou
The Japan Institute for Labour Policy and Training

I. Introduction

Public job placement services assist in "pairing together" job offers with job seekers. The aim is to mass-produce high quality jobs meeting the requirements of both parties and to help the "underdogs in the employment market" by bearing the "pairing costs," or job-searching costs of both parties. The provision of unemployment benefits is a passive policy in the labor market, while public job placement services are typically an active policy, since the government is actively involved in the labor market.

Public job placement services hold a particularly critical position among Japan's employment policies. As shown in Table 1, over 60% of expenditures for active employment measures are allocated to public job placement services in Japan. In European countries, apart from the UK, these services account for less than 20%, and in the US, the ratio is less than 30%. Unlike Canada, Denmark, Germany and the US, where the government places greater emphasis

Table 1. Ratio of public job placement services among total active employment policies (%)

Country	Period	Public job placement services	Job training	Measuers for unemployed youth	Employment assitance services	Employment measures for the disabled
Japan	2000-01	62.5	9.4	-	25.0	3.1
Australia	2000-01	44.4	4.4	15.5	24.4	11.1
Canada	2000-01	41.5	41.5	4.9	7.3	4.9
Denmark	2000	7.6	54.1	6.4	10.8	21.0
France	2000	13.7	19.1	32.1	28.2	6.9
Germany	2000	19.2	28.3	7.5	20.8	24.2
Norway	2001	15.2	7.6	1.3	1.3	74.7
UK	1999-2000	36.1	13.9	41.7	2.8	5.5
US	2000-01	26.7	26.7	20.0	6.7	20.0

Source：*OECD Employment Outlook.*

* This paper is a revised version of Zhou (2007).

on job training, Japan places greater emphasis on pubic job placement services.

As of 2004, there were as many as 477 public job placement agencies (615 including local and branch offices) in Japan.[1] These agencies provide free job introduction services to individuals residing throughout Japan (See Appendix 1 for distribution of public job placement agencies and offices). Job placement offices are managed and operated in a standardized manner by the government. And they are valued for being able to share information on employers and job seekers nation-wide and to provide free employment introduction services to a wide range of areas. If all information is shared and labor mobility costs are nonexistent, one's chances of finding a job (placement rate as a macro-economic indicator) would theoretically remain unchanged regardless of the job seeker's location. Also, companies would theoretically have the same chance of discovering a job-seeker meeting the necessary requirements (rate of filled vacancy as a macro-economic indicator) regardless of their location. However, theories do not necessarily hold due to various friction costs and external influence. If public job placement agencies functioned perfectly, the placement rate and rate of filled vacancy in each region would converge. This is because both job-seekers and companies would move to locations where there are more chances of finding employment or workers, at least in the medium to long term.

Is it possible to substantiate the convergence trend in matching efficiency rates for public job placement services based on actual data? If the convergence can be verified, one could argue that the labor matching system in Japan is by and large functioning normally. In this case, the government-led public job placement services could be valued, to an extent, in reducing inequalities in employment opportunities amid the various regions and increasing nation-wide job matching. On the other hand, if the convergence is not occurring, the imperfection most likely remains in the matching system. In this case, the root of such imperfections should be studied in detail—slow labor flow, inadequate sharing of job information, or inconsistencies in labor productivity among the various agencies, etc. and the situation should be improved.

Though the issue of matching efficiency converging has extremely important implications for government policies, as explained above, to this day it has

---

[1] Source: Official website of the Ministry of Health, Labour and Welfare, http://www.mhlw.go.jp/kyujin/hwmap.html.

almost never been studied. This may be due to a previous lack of academic interest in evaluating matching efficiency, since the job placement service market was practically monopolized by the government. Private participation was strictly limited before the Employment Security Act was revised in 1997. However, the law was, in fact, revised and further deregulation of job placement services is expected in the future. Evaluating the matching efficiency of public job placement services and making regional and public-private comparisons is, thus, a highly important and significant task.

This paper analyzes the trend in regional gaps in the matching efficiency of public job placement services based on prefectural data gathered after the second half of the 1990's, when full scale deregulation of the job placement market began. Section II explains the existing surveys and approaches of this paper, Section III states the basis for selection of indicators for matching efficiency, Section IV verifies the convergence of matching efficiency amid regional blocks, Section V compares the convergence of matching efficiency and labor flow, Section VI analyzes the causes of rigidity in matching efficiency and regional gaps, and the conclusion is summarized in Section VII.

II. Existing Studies on the Effectiveness of Job Placement Services and the Significance and Effect of Public Job Placement Services

Yavas (1994) initiatively proved the effectiveness of job placement agencies within the labor market in theory'. According to this study, both job seekers and employers constantly face two realities in the job market. One is "uncertainty." Employment is not guaranteed no matter how hard the search. The other is "externality." As job seekers exert more and more effort, their chances of finding vacancies meeting their requirements increase, thus providing a positive economic externality to employers, and vice versa. It is believed that job placement agencies bring something extra to society (benefits) by reducing this "uncertainty" and increasing the economically external action otherwise known as "job matching."

Cahuc and Zylberberg (2005) carried out a theoretical analysis on the best number of job placement agencies and the significance of public job placement services.[2] The best number of job placement agencies is determined by finding

[2] According to Cahuc and Zylberberg (2005), the costs of job placement services (TC)

Table 2. Regulation of free job placement services by country in the first half of the 1990's

Country	Regulation	Registration rate (%)
Japan	Government monopoly	73
Germany	Government monopoly	27
Belgium	Government monopoly	25
Spain	Government monopoly	19
US	Government and private	9
France	Government monopoly	28
Sweden	Government monopoly	36
UK	Government and private	33

Source: Walwei (1996, 143).

Note: Registration rate = Job offers registered at public job placement agencies/total job offers.

the point where the additional cost of establishing another agency (marginal cost) and potential added income (marginal income) are equal. If regulations placed on the participation of profit-making job placement agencies were completely removed, such agencies would continue to enter the market until the marginal profit reached zero, and would become excessive in number. It is believed that job placement agencies should be managed by the government in order to avoid overproduction of placement agencies as well as to assess the job-search efforts of unemployment benefit receivers. In fact, according to Walwei (1996), in the majority of advanced countries such as Japan, Germany and France,[3] the government monopolizes free job placement services (see Table 2). Particularly in Japan, there is a high registration rate (the ratio of job offers

can primarily be divided into fixed costs (Co) and variable costs (Cv). Co relies on the number of job placement agencies in the area while Cv relies on the number of placement cases dealt with by respective agencies. Fixed costs continue to rise as the number of agencies increase due to congestion. Variable costs increase initially in accordance with the number of placement cases, but begin decreases later on due to economy of scale.

3 The US and UK allow the entrance of private companies, while simultaneously implementing public job placement services. Due to deregulation, there has been an accelerated trend of private companies participating in the Japanese market since the second half of the 1990's. After the Employment Security Act Enforcement Regulations were revised in 1997, all sectors in Japan became subject to private fee-based job placement services, with the exception of harbor and construction. Also many private companies that dispatch workers entered the fee-based job placement service market following the introduction of the "Temp to Perm System" in 2000.

registered at public job placement agencies/total job offers) at free job placement services and a high ratio of public job placement services.

In addition to theoretical analyses, there are many empirical studies on the effect of job placement agencies on employment. For example, based on survey data, Fougere, Pradel, and Roger (1999) confirmed that public job placement services improved placement rates for women, unskilled youth, or so-called "underdogs in the employment market" in France. Based on empirical data, Dolton and O'Neill (1996) evaluated the impact of the Restart Placement Program, which targeted the long-term unemployed in the UK, and reported that the placement rate of individuals receiving employment counseling services was four points higher than those not receiving such services. This research also confirmed that those receiving both unemployment benefits and employment counseling had higher placement rates. Furthermore, based on empirical data, Black et al. (2002) reported that counseling services provided by public job placement agencies in Kentucky have a positive impact on employment success. This data further illustrated that such services have a positive, albeit marginal impact on average salary.

In Japan, there has been almost no such quantitative analysis based on empirical data or survey data to test the impact of public job placement services on employment akin to that performed in Europe and the US. This is caused by difficulties accessing individual data. Nakamura (2002) authored a typical study analyzing the function of public job placement services that was based on available macro time-series data. The report indicates that since many of those reemployed through public job placement agencies are unemployed middle and old aged persons with low evaluation in the external labor market, they are more likely to receive lower wages than they were receiving prior to the job change. Kodama et al. (2004) reports that, statistically, the rate of wage growth for individuals regaining employment through personal connections or advertisements is significantly higher than that of individuals utilizing public job placement services, by using the aggregate data of the Survey on Employment Trends. Ueno, Kambayashi, and Murata (2004) focus on the fact that route selection, or whether or not an individual uses public job placement services, is not made at random. They discovered, based on a prefectural panel estimation, that the matching efficiency of public job placement services is higher in prefectures where there was low variation between the estimated and observed selection rates for public placement services. In other words, the

matching efficiency of public job placement services is higher in prefectures where there is an accurate forecast model of the route selection pattern of the reemployed.[4] Ueno, Kambayashi, and Murata (2004) use the "introduction success rate" instead of "placement rate" or "rate of filled vacancy" as the indicator for matching efficiency. However, the introduction success rate may not necessarily be a suitable indicator of matching efficiency as it tends to drop in agencies striving hard to introduce jobs to job seekers, as indicated in Section III. Thus, this paper uses the less problematic "placement rate" and "rate of filled vacancy" as indicators of matching efficiency. It will also include the "policies of individual public job placement agencies" (not considered in Ueno, Kambayashi, and Murata [2004]) as an explanatory variable in the matching function, followed by an analysis of its impact. Existing surveys indicate several reasons for the gap in matching efficiency, but there has been no analysis to determine whether the gap is expanding or contracting in a time-series comparison. This paper will, therefore, attempt to verify whether the gap in matching efficiency for public job placement services has been expanding or contracting in recent years, and subsequently determine the cause of such a trend.

III. Selection of Indicators

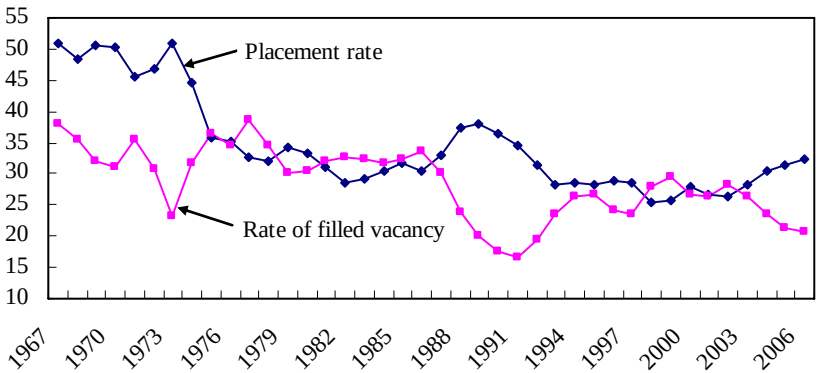
How should the matching efficiency of public job placement services be measured? Public statistics such as those detailed in the Labor Market Annual Report often use two indicators, i.e., placement rate and rate of filled vacancy. Placement rate is calculated by dividing placement cases by (new) job seekers[5] and indicates what percentage of job seekers they successfully reemployed and hence could be regarded as an index for the quantity of matching services for

---

4 The paper does not indicate the reasons. I estimate that accurate forecast of route selection means that those with high possibility to become users of public job placement services, estimated from individual attributes, do actually use the services. It is considered that public job placement agencies have higher matching efficiency as they are used to deal with a lot of specific types of job seekers or they have their own know-how of job introduction. This indicator of 'accurate forecast' is specially recalculated for each prefecture based on individual data of the employed. Such data is not made available for public and this paper does not use it for analysis.

5 Placement rate was calculated by dividing placement cases by effective job-seekers in the *Labor Market Annual Report* before 1998.

Figure 1. Time-series trend in placement rate and rate of filled vacancy (1967-2006)



Source: Created by the author based on *Labor Market Annual Report* (1967-2006).

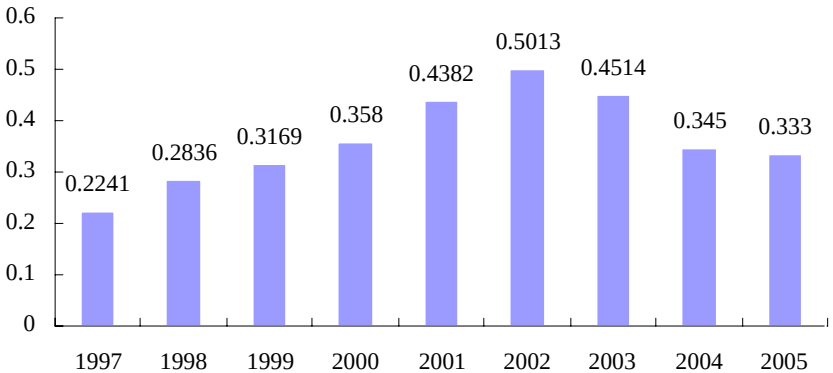
job seekers. Rate of filled vacancy, on the other hand, is calculated by dividing the number of placement cases by the number of (new) job offerings, and indicates what percentage of job-offers was filled and hence could be regarded as an index for the number of matching services for employers.

As Iwamoto (2005) noted, the placement rate and rate of filled vacancy tend to be inversely proportionate to one another due to an effective job offer-job seeker ratio. Figure 1 essentially confirms this trend. The gap between the two was exceedingly large from 1967-1974 and again from 1988-1993. Evaluation of job placement services will, therefore, differ depending upon the rate selected for the time-series data.

It is interesting to note that prefectures with a high (low) rate of filled vacancy do not necessary have a low (high) placement rate, as is indicated by cross-sectional data categorized by prefecture. As explained in Table 4 below, only Yamanashi prefecture has both a "low rate of filled vacancy and high placement rate," and no prefecture has both a "high rate of filled vacancy and low placement rate." In fact, the correlation coefficient of the rate of filled vacancy and placement rate of the prefectures surveyed is small (R=0.3376),[6] and is a positive, not negative, correlation. Figure 2 indicates that there is a

[6] It is the average of annual correlation coefficient of 1995-2005. The correlation coefficient used in this paper indicates "Pearson product-moment correlation coefficient," unless otherwise mentioned.

Figure 2. Trends in the correlation coefficient of placement rate and rate of filled vacancy based on prefectural data (1997-2005)



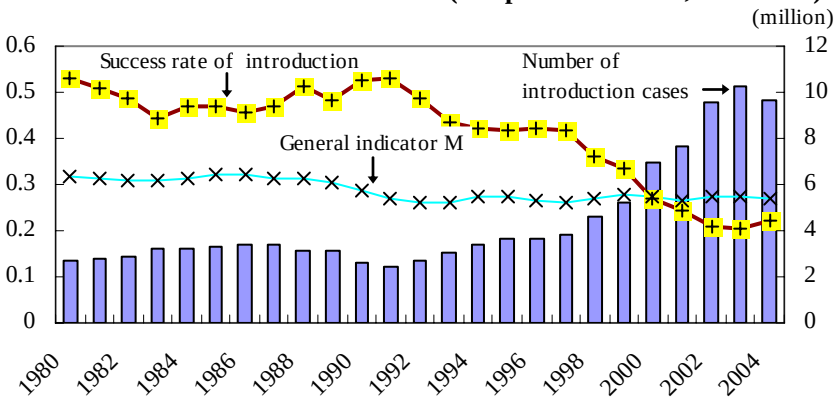
Source: Created by the author based on *Labor Market Annual Report* (1997-2005).
Note: All statistical data excludes general workers, total number of men and women, recent graduates and part-time workers.

positive correlation between placement rate and rate of filled vacancy each year, which increased from 1997-2002 and in 2002 exceeded 0.5.

What sort of mechanisms are working to produce such opposing results based on time-series and prefectural data? One possibility is collective macro-economic shock. When a macro-economy is doing well, the effective job offer-job seeker ratio increases and the placement rate improves, while the rate of filled vacancy declines.[7] Since a macro-economic shock has a reverse impact on placement rate and rate of filled vacancy, they have a negative correlation in time-series data. In fact, an effective job offer-job seeker ratio, which seems to show collective shock, has a positive and negative impact on placement rate and rate of filled vacancy, respectively, based on the estimated function of the two rates (see Table 5 for detailed results). Once could interpret

[7] In medium to long-term span of period, both placement rate and rate of filled vacancy wound improve under brisk macro-economic conditions. It is because increase in new job offers would trigger employment activity of some of those who have given up on getting a job. Increase in job offers would not increase the number of job seekers immediately as it takes time for potential job seekers to hear the news. In fact, there is a positive correlation between placement rate and rate of filled vacancy based on time-series data of 1967-2005 with two years' lag time (r=0.4834). It may be interpreted that such a lag explains the difference of correlation between cross-sectional analysis and time-series analysis.

Figure 3. Time-series trend of general matching indicator M and introduction success rate (comprehensive data, 1980-2004)



Source: Created by the author based on *Labor Market Annual Report* (1980-2004).
Note: The left axis indicates the value of general matching indicator M and introduction success rates (lines), and the right axis indicates the number of introduction cases (bars).

this to mean that macro-economic shock causes placement rate and rate of filled vacancy to move inversely proportionate to one another in time-series data. Meanwhile, it could be interpreted that the two rates within the prefectural data may have maintained the original correlation, unaffected by collective shock, due to the availability of correlation data for several prefectures during the same year.

Matching indicator (M), or a combined indicator of placement rate and rate of filled vacancy, is used in documents such as the White Paper on Labor Economy. Such an indicator[8] is problematic, however, since movement of the placement rate and rate of filled vacancy offsets each other and the reality of the gap among regions or throughout time becomes underestimated (see Figure 3). Ueno, Kambayashi, and Murata (2004) evaluated the efficiency of public job placement services using the indicator, "introduction success rate (placement cases/introduction cases)."[9] This indicator also relies largely on the number of introductions, which is used as the denominator. Its shortcomings lie

[8] If a is placement rate and b is rate of filled vacancy, M is defined as the following:
$M_{it} = \sqrt{a_{it}^2 + b_{it}^2} / \sqrt{2}$ i=1,2,…N region t=1,2,…M time point
[9] It is also called "appointment rate."

in the fact that enthusiastic agencies achieve lower success rates as they tend to introduce a large number of jobs. In fact, as is evidenced in Figure 3, the introduction success rate for total public job placement agencies largely declined after 1992, due to a sharp increase in the number of introductions.

Since both the general matching indicator and introduction success rate are inherently flawed, this paper predominantly utilizes placement rate and rate of filled vacancy to evaluate the matching efficiency of public job placement services.

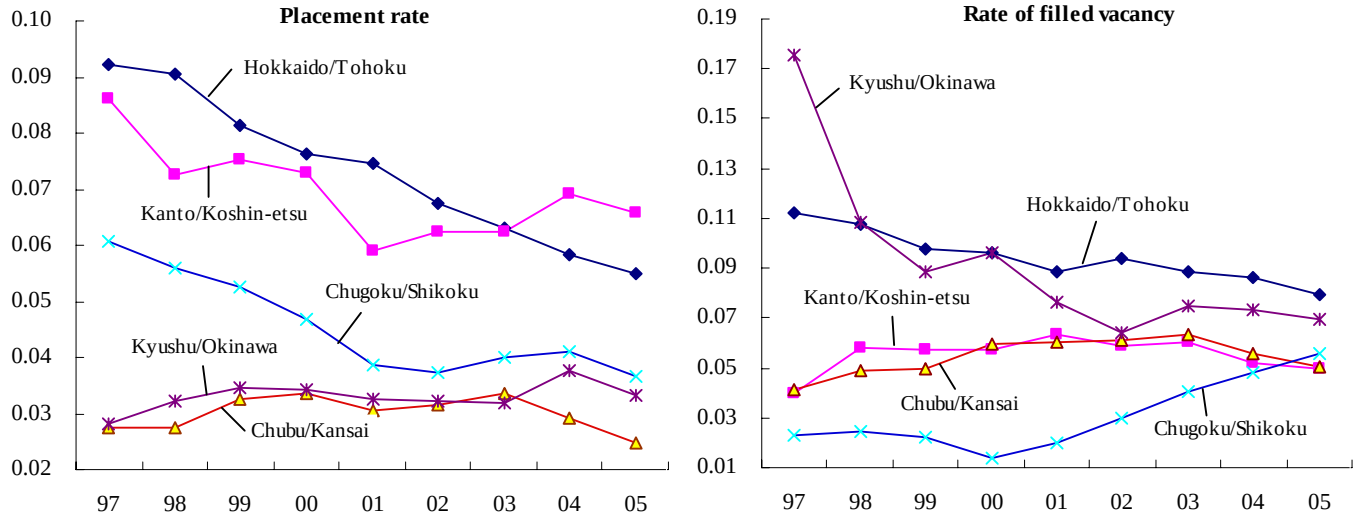
IV. Convergence of Matching Efficiency within Regional Blocks

As mentioned in the introduction, job seekers would move from regions with low placement rates to those with higher placement rates if similar jobs in each region offered similar wages and there were no labor mobility costs. Companies would also transfer plants from regions with low rate of filled vacancy to those with high rate of filled vacancy if the price of production factors, including labor costs, were the same in all regions and the plant could be moved at no cost. This would allow every region to enjoy the same placement rate and rate of filled vacancy. In reality, however, there is a significant regional gap in wages and production factor costs, and in many cases labor mobility and plant transfer costs are quite high. Standardizing placement rate and rate of filled vacancy nation-wide, thus appears to be problematic. Nonetheless, labor and plant mobility costs are low when moving between regions in geographic proximity to one another and relatively active labor flow can be expected within the same regional block. Placement rate and rate of filled vacancy within the same regional block are thus expected to gradually converge.

Figure 4 indicates the standard distribution of placement rate and rate of filled vacancy for five regional blocks from 1997-2005 (47 prefectures are divided into five regional blocks).[10] The data indicates an overall diminished gap in placement rate for each region. The convergence of placement rates within the same block is most prominent in the Hokkaido/Tohoku, Kanto/

[10] Five regional blocks are used instead of 47 prefectures or 10 administrative blocks for the sake of clarity. The same trend is observed, however, even with 10 administrative blocks.

Figure 4. Standard distribution of placement rate and rate of filled vacancy by regional block (1997-2005)



Source: Created by the author based on *Labor Market Annual Report* (1997-2005).

Note: Hokkaido and Tohoku Block (Hokkaido, Aomori, Akita, Yamagata, Iwate, Miyagi and Fukushima), Kanto and Koshin-etsu Block (Saitama, Chiba, Tokyo, Kanagawa, Ibaraki, Tochigi, Gunma, Yamanashi, Nagano, Niigata, Toyama, Ishikawa and Fukui), Chubu and Kansai Block (Gifu, Shizuoka, Aichi, Mie, Shiga, Kyoto, Osaka, Hyogo, Nara and Wakayama), Chugoku and Shikoku Block (Tottori, Shimane, Okayama, Hiroshima, Yamaguchi, Kagawa, Tokushima, Ehime and Kochi) and Kyushu and Okinawa Block (Fukuoka, Saga, Nagasaki, Kumamoto, Oita, Miyazaki, Kagoshima and Okinawa)

Koshin-etsu and Chugoku/Shikoku blocks. The standard distribution of placement rates in the Kyushu/Okinawa and Chubu/Kansai blocks remain, in effect, consistent throughout the charted period. It may be because the internal disparity was low from the start. Rate of filled vacancy converge in the Kyushu/Okinawa and Hokkaido/Tohoku blocks but no clear trend can be observed in other blocks.

V. Connection between Convergence of Matching Efficiency and Labor Flow

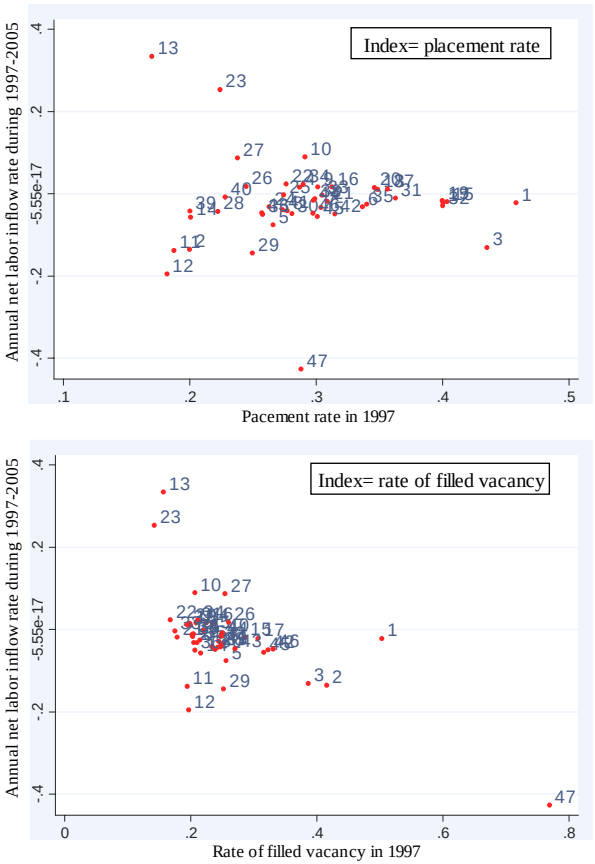
Although the convergence of placement rate and rate of filled vacancy within the same regional block was, to some extent, confirmed, can we truly claim that labor flow is the cause of this convergence?

The top chart in Figure 5 illustrates the placement rates of 47 prefectures during the benchmark year (1997) and the average annual net labor inflow rate for the following eight years (1997-2005). In general, prefectures with high placement rates in 1997 tend to have high net labor inflow rates for subsequent years, with the exception of Tokyo (No. 13), Aichi (23), Hokkaido (1) and Iwate (3). That is to say, there is a labor inflow trend in areas where the placement rate is already high. The bottom chart in Figure 5 illustrates the rate of filled vacancy during the benchmark year and net labor inflow rates for subsequent years. Although there is no clear correlation between the two, as was the case with placement rate, prefectures with high rate of filled vacancy during the benchmark year seem to have rather low net labor inflow rates in subsequent years.

A study by Barro and Sala-i-Martin (1995) explains that amenity factors such as climate, natural resources and population density have an impact on net labor inflow rates as well as salary rate and matching probability. According to their empirical analysis, which was performed in each of the 50 US states, net labor inflow rates are low in cold and highly populated areas, given other conditions constant. This implies that when other conditions remain constant, individuals prefer warm and less populated regions of the US.

What factors then determine labor flow in Japan? Table 3 is an estimation of the function of net labor inflow rates in Japan based on Barro and Sala-i-Martin's (1995) empirical model. Placement rate and rate of filled vacancy have positive and negative coefficients, respectively, making them

Figure 5. Matching efficiency in 1997 and average annual net labor inflow rate from 1997-2005



Code Table :

1	Hokkaido	25	Shiga
2	Aomori	26	Kyoto
3	Iwate	27	Osaka
4	Miyagi	28	Hyogo
5	Akita	29	Nara
6	Yamagata	30	Wakayama
7	Fukushima	31	Tottori
8	Ibaraki	32	Shimane
9	Tochigi	33	Okayama
10	Gunma	34	Hiroshima
11	Saitama	35	Yamaguchi
12	Chiba	36	Tokushima
13	Tokyo	37	Kagawa
14	Kanagawa	38	Ehime
15	Niigata	39	Kochi
16	Toyama	40	Fukuoka
17	Ishikawa	41	Saga
18	Fukui	42	Nagasaki
19	Yamanashi	43	Kumamoto
20	Nagano	44	Oita
21	Gifu	45	Miyazaki
22	Shizuoka	46	Kagoshima
23	Aichi	47	Okinawa
24	Mie		

Source: Created by the author based on *Labor Market Annual Report* (1997-2005).
Notes: 1. The horizontal axis shows placement rate and rate of filled vacancy of 1997. The vertical axis shows annual average net labor inflow rate in 1997-2005.
2. Net labor inflow rate = (inflow from the other prefectures – outflow to the other prefectures)/total placement cases.
3. All statistical data exclude general workers, total number of men and women, new graduates and part-time workers.

statistically significant. This indicates that subsequent net labor inflow rates are high in areas with high initial matching rates, i.e., areas with a high placement rate or low rate of filled vacancy. This result corresponds to that of Figure 5. Meanwhile, the coefficients of average temperature and sunlight

Table 3. Estimated net labor flow rates by prefecture (1997-2005)

	Coefficient	Standard error	t value	
Placement rate	0.4148269	0.2044434	2.03	**
Rate of filled vacancy	-0.6815068	0.1375842	-4.95	***
Population density (persons/km^2)	0.0000437	0.0000171	2.55	***
Average temperature	-0.0043887	0.0063655	-0.69	
Average sunlight hours	-0.0000079	0.0000637	-0.12	
Average disposable income per family of workers (yen/month)	-0.0000002	0.0000002	-1	
Constant	0.1894097	0.2063399	0.92	

Notes: 1. OLS Model (R-squared=0.5933).
2. The dependent variable is average annual net labor inflow rate between 1997-2005. All explanatory variables are values of the benchmark year (1997).

hours are not statistically significant, although both have a positive impact on net labor inflow rates. Unlike in the US, in Japan net labor inflow rates are higher in populated areas. This may be due to the perception that these areas have more readily available amenities such as transportation and cultural and entertainment facilities.

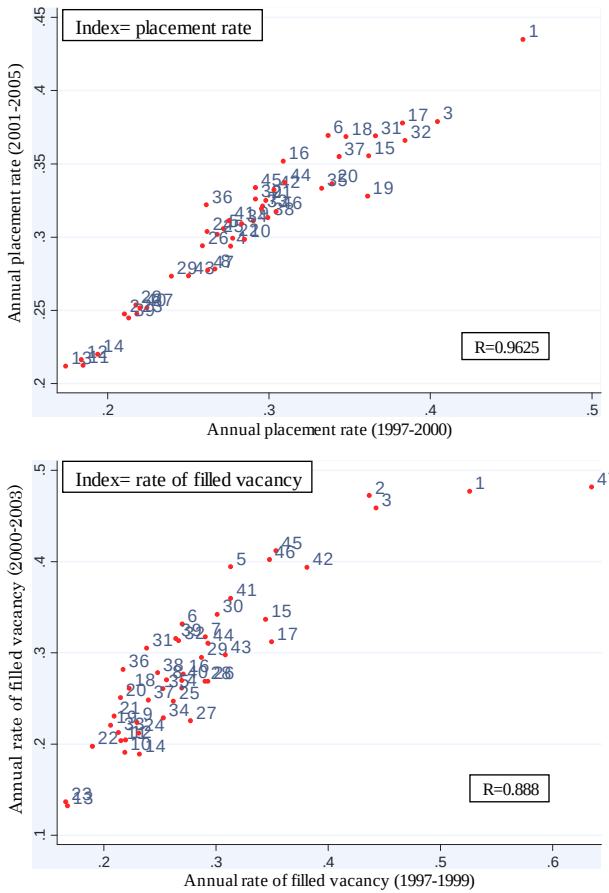
In sum, matching efficiency levels have a significant impact on labor inflow, and tend to converge within a regional block as labor moves to high matching areas (areas with a high placement rate or low rate of filled vacancy).

VI. Rigidity of Matching Efficiency and Regional Disparity

Although, to some extent, matching efficiency tends to converge, it is difficult for regional matching efficiency levels to be fully standardized due to moving costs (including amenity factors). Furthermore, while labor inflow has an impact on matching efficiency levels in each region, it takes time to gather necessary information on labor flow. Thus, it is expected that there will be a certain degree of rigidity in the matching efficiency of certain regions.

Figure 6 shows the rigidity or persistence of placement rate and rate of filled vacancy. The horizontal and vertical axes show the average placement rate (or rate of filled vacancy) during the latter half of the 1990's and first five years of the 21st century, respectively. The placement rate and rate of filled vacancy for each prefecture are plotted on the charts. There is a clear rigidity

Figure 6. Rigidity of matching efficiency by region (1997-2005)



Code Table：

1	Hokkaido	25	Shiga
2	Aomori	26	Kyoto
3	Iwate	27	Osaka
4	Miyagi	28	Hyogo
5	Akita	29	Nara
6	Yamagata	30	Wakayama
7	Fukushima	31	Tottori
8	Ibaraki	32	Shimane
9	Tochigi	33	Okayama
10	Gunma	34	Hiroshima
11	Saitama	35	Yamaguchi
12	Chiba	36	Tokushima
13	Tokyo	37	Kagawa
14	Kanagawa	38	Ehime
15	Niigata	39	Kochi
16	Toyama	40	Fukuoka
17	Ishikawa	41	Saga
18	Fukui	42	Nagasaki
19	Yamanashi	43	Kumamoto
20	Nagano	44	Oita
21	Gifu	45	Miyazaki
22	Shizuoka	46	Kagoshima
23	Aichi	47	Okinawa
24	Mie		

Source: Created by the author based on *Labor Market Annual Report* (1997-2005).
Notes: 1. The horizontal axis shows annual average of placement rate and rate of filled vacancy in 1997-2000. The vertical axis shows annual average of placement rate and rate of filled vacancy in 2001-2005.
2. All statistical data exclude general workers, total number of men and women, new graduates and part-time workers.

in both the placement rates and rate of filled vacancy. Specifically, most placement rates are distributed slightly above a 45-degree line. This indicates that placement rate for the early 2000's improved slightly in comparison to the latter half of the 1990's, but are largely affected by levels obtained in the latter of the 1999's. On the other hand, rigidity of rate of filled vacancy is not as

strong as that of placement rates. There is, however, a strong correlation between the rate of filled vacancy in the two periods (R=0.888) as is the case with the placement rates.

It has been observed that the matching efficiency of public job placement services has a tendency to converge over the medium to long term, and that regional matching efficiency is highly rigid and persistent. Therefore, regional gaps in matching efficiency may be reduced but will never entirely disappear.

What are the attributes of regions with high matching efficiency? How did these regions achieve high matching efficiency? These issues are extremely important for policy making.

Table 4 is a comparison by prefecture of the matching efficiency of public job placement services using placement rate and rate of filled vacancy as indicators. It lists the names and values of the top 10 and bottom 10 prefectures in terms of period average for each indicator.

Hokkaido, Iwate, Ishikawa and Niigata rank highest in both rate of filled vacancy and placement rate. Hokkaido ranks highest in placement rate and second in rate of filled vacancy next to Okinawa. These prefectures have a large agricultural population and many depopulated areas. The usage of public job placement services is relatively high in these prefectures as there are few alternative job seeking measures beyond utilizing public agencies. It is believed that the matching efficiency of public job placement agencies is high given that a variety of employers and job seekers take advantage of these agencies. Especially in snowy and cold Hokkaido and Iwate, where there are many seasonal workers and those traveling to other prefectures to work in the wintertime, once a job announcement is made, it is easily filled. This may be one explanation for the high matching efficiency in these prefectures.

Prefectures with the lowest placement rate include four prefectures in the Tokyo metropolitan region (Tokyo, Saitama, Chiba and Kanagawa) and two prefectures in the Kinki region (Osaka and Hyogo). In these metropolitan areas, there are a variety of alternative measures available for job offers and job seekers, and the market share of public job placement agencies is relatively small in terms of job offers and job seekers alike. Furthermore, public job placement agencies in metropolitan areas work with many difficult-to-place individuals such as middle to old aged and unskilled workers. This is another potential reason for them to experience a low matching rate, as indicated by Nakamura (2002).

Table 4. Comparison by prefecture of the placement rate and rate of filled vacancy of public job placement services (1995 and 2005)

	Y: Placement rate (%)					Y: Rate of filled vacancy (%)			
Prefecture	1995	2005	Period average	Average annual growth	Prefecture	1995	2005	Period average	Average annual growth
(In decsending order by period average)									
Hokkaido	51.7	42.3	45.7	-0.9	Okinawa	73.5	41.6	58.0	-3.2
Iwate	46.3	40.0	40.3	-0.6	Hokkaido	51.5	43.3	49.9	-0.8
Ishikawa	42.5	39.5	38.8	-0.3	Aomori	40.8	42.2	44.5	0.1
Shimane	43.0	38.3	38.4	-0.5	Iwate	41.2	40.1	44.1	-0.1
Niigata	43.0	39.5	37.1	-0.4	Nagasaki	31.6	37.4	37.3	0.6
Tottori	38.5	39.4	37.1	0.1	Miyazaki	29.2	39.5	36.8	1.0
Fukui	35.6	41.9	35.9	0.6	Kagoshima	32.7	37.6	36.6	0.5
Kagawa	37.3	37.3	35.4	0.0	Akita	25.9	39.2	33.9	1.3
Yamanashi	40.5	34.3	35.3	-0.6	Niigata	28.6	27.7	32.9	-0.1
Yamagata	30.5	39.6	34.8	0.9	Ishikawa	31.5	25.8	32.4	-0.6
(Omission)									
Osaka	24.8	29.4	24.1	0.5	Gifu	20.1	20.9	21.5	0.1
Hyogo	23.4	29.3	23.7	0.6	Kanagawa	25.8	15.2	21.4	-1.1
Fukuoka	23.3	28.1	23.7	0.5	Yamanashi	21.9	21.9	21.3	0.0
Aichi	23.3	27.7	23.5	0.4	Chiba	20.1	18.4	20.8	-0.2
Kochi	21.8	27.1	22.7	0.5	Saitama	21.5	17.3	20.7	-0.4
Aomori	18.5	27.0	22.3	0.9	Okayama	19.6	19.0	20.7	-0.1
Kanagawa	20.3	24.8	20.8	0.5	Gunma	24.0	16.6	20.7	-0.7
Saitama	19.8	24.4	20.0	0.5	Shizuoka	18.7	19.0	19.1	0.0
Chiba	18.7	24.9	20.0	0.6	Aichi	18.8	10.8	15.3	-0.8
Tokyo	17.2	24.2	19.1	0.7	Tokyo	17.6	10.4	15.2	-0.7

Source: Estimations from *Labor Market Annual Report* (1995 and 2005).
Notes: 1. Average annual growth = (Y in 2005 – Y in 1995)/10 years.
2. All statistical data excludes general workers, total number of men and women, recent graduates and part-time workers.

What are the common attributes of regions with high matching efficiency? The contribution rate (K) or the market share of public job placement services is believed to be an important factor. As Ueno, Kambayashi, and Murata (2004) proclaim, the higher the usage rate of public job placement services, the more job offers and job seekers to use the agencies' services and the easier the matching becomes. It is also highly likely that the structure of the labor force (P), i.e., the respective share of seasonal workers, domestic migrant workers, old-aged and unskilled workers, has an impact on matching efficiency. Indicators to show the stringency (D) of labor demand, such as the

unemployment rate, effective job offer-job seeker ratio, and industrial structure (I) should also be considered.

The individual policies of public job placement agencies are also an important factor. For instance, the preceding study regarded regional specific policies as important explanatory factors in the labor market in the US because a variety of job offers and job seekers exist, and each region has its own employment and matching policies. Compared to the US, policies do not differ widely between regions in Japan. However, according to the Study on the Possibility of Renovating the Legacy System of the Job Security Administration, carried out by the Ministry of Health, Labour and Welfare in 2003, there is a certain level of regional difference at the prefectural level (Labor Bureaus) amid factors such as the existence/nonexistence of an employment promotion system, follow-up system for unfilled vacancies and an information supply system for job seekers. These differences are, therefore, included as explanatory variables in the present study.

Based on prefectural data from 1997-2003, this paper will estimate the function (first equation) of matching efficiency (M) in consideration of the above factors. Table 5 is the estimation result when controlling the regional specific policy factor (S),[11] while Table 6 is the estimation result when excluding the regional specific policy factor.

$$M_i = a_o + a_1 K_i + D\alpha + P\beta + I\varphi + S\lambda + Z\gamma + \varepsilon_i \qquad (1)$$

Table 5 indicates that none of the three dummy variables reflecting individual regional programs has any statistically significant impact on matching efficiency. Nevertheless, it would be inappropriate to assume that regional specific policies have no impact on matching efficiency simply due to a small sample size of 47 regions and the arbitrariness of evaluating the effect of these systems at the prefectural level.

While excluding the variable of regional specific programs form the estimations, Table 6 indicates[12] that the supply-demand stringency factor (the

[11] It is a dummy variable. If a prefecture has the concerned system at 1 or more public job placement agencies, it is 1 and if not, 0. It is considered that introduction of these systems would have positive impact on the matching efficiency.

[12] The following explanation is based on the estimation results of Table 6 (seven year-data of 1997-2003), unless otherwise mentioned. In comparison to Table 5, Table 6 has higher degree of freedom and can lead to more robust results.

Table 5. Determinants of matching efficiency (2003, OLS)

	Y : Placement rate			Y : Rate of filled vacancy		
	Coefficient	Standard error		Coefficient	Standard error	
Contribution rate of public job placement agencies	0.1740	0.0401	***	0.1219	0.0509	**
Supply/demand indicators						
Effective job offer-job seeker ratio	0.0882	0.0518	*	-0.2770	0.0613	***
Unplacement rate	-0.0131	0.0090		0.0019	0.0106	
ln (Effective job seekers)						
ln (Effective job offers)						
Labor structure						
Ratio of women	-0.0260	0.1020		-0.1012	0.1445	***
Ratio of junior and senior high school graduates	0.3115	0.1018	***	0.4108	0.1270	***
Ratio of graduates of specialized training colleges	-0.2559	0.3077		-0.0830	0.3917	
Ratio of graduates of technical and junior colleges	-0.1285	0.2044		-0.1686	0.2978	
Ratio of turnovers	0.1494	0.1378		0.0911	0.2154	
Ratio of newly employed	0.1257	0.1716		0.0336	0.2714	
Ratio of youths: Ages 20-29	0.0749	0.0761		0.1539	0.1207	
Ratio of middle aged persons: Ages 45-54	0.1436	0.2155		0.4374	0.2991	
Ratio of seniors over 55	0.1810	0.2048		0.1548	0.2808	
Industrial structure						
Ratio of placement in the service sector	-0.0899	0.0697		-0.0251	0.0913	
Ratio of placement in the manufacturing sector	-0.3027	0.1066	***	-0.2277	0.1235	*
Ratio of placement in micro enterprises	0.0730	0.0813		0.0663	0.0938	
Ratio of placement in small enterprises	0.0363	0.0928		0.1347	0.0863	
Ratio of placement in medium-sized companies	0.0943	0.0785		0.0966	0.0899	
Regional specific systems (S)						
Employment promotion dummy	0.0178	0.0198		0.0247	0.0239	
Follow-up on unfilled vacancy dummy	0.0005	0.0175		0.0104	0.0225	
Information supply for job seekers dummy	0.0105	0.0123		-0.0145	0.0164	
Constant	0.0246	0.1892		0.1623	0.2930	
R-squared	0.7353			0.8512		

Notes: 1. Sample size: 47 prefectures.
2. Micro enterprises: 5-29 permanent employees, small companies: 30-99 permanent employees, medium-sized companies: 100-299 permanent employees.
3. Contribution rate of public job placement agencies = placement cases through public job placement agencies/(total placement cases – placement cases of recent graduates)
4. ***, ** and * indicate that the coefficient is not zero at a significant level of 1%, 5% and 10%, respectively.

contribution rate of public job placement agencies, effective job offer-job seeker ratio, effective numbers of job offers and job seekers, etc.), the labor structure factor (ratio of junior and senior high school graduates, ratio of middle and old aged persons, etc.) and industrial structure factor (ratio of placement in the manufacturing sector and ratio of micro and small enterprises) all have a statistically significant impact on matching efficiency.

Firstly, the coefficient of the contribution rate of public job placement agencies is positive in all cases and is thus statistically significant. That is to say, the higher the contribution rate of the agency, the higher the matching efficiency, measured by both placement rate and rate of filled vacancy. The gap in matching efficiency between cities (Tokyo metropolitan and Kinki areas) and provinces (Hokkaido and Iwate, etc), as analyzed in the previous section, appears to stem primarily from the contribution rate of agencies. In cities, there are many private job placement services and job advertisements, rendering the market share of public agencies relatively small. In provinces, public agencies have a relatively high market share, as there are few other alternatives for job seekers.

Secondly, the higher the employment rate of recent junior and senior high school graduates, the higher the matching efficiency measured under both indexes—placement rate and rate of filled vacancy increase. On a personal level, one would consider it only natural for a less educated individual to have greater difficulty finding a job, thus leading to a lower matching rate, assuming other conditions remain constant. However, prefectures with many market underdogs actually have a higher matching rate. This may be due to an ease in finding simple work in construction or the security business.[13] Prefectures with a higher ratio of placement in the manufacturing sector have lower placement rate and rate of filled vacancy. This may be because matching is more difficult in the manufacturing sector than in the service sector.

An effective job offer-job seeker ratio and ratio of placement in micro and small enterprises has had a significant impact on both placement rate and rate of filled vacancy. That is to say, prefectures with a higher effective job offer-job seeker ratio have higher placement rate and lower rate of filled vacancy. The prefectural level correlation analysis in the previous section concluded that there was either no correlation or a positive correlation

[13] Special mention to Koichi Koyama for indicating this point.

Table 6. Determinants of rate of filled vacancy and placement rate (1997-2003)

	Y : Placement rate			Y : Rate of filled vacancy		
	Coefficient	Standard error		Coefficient	Standard error	
Route rate of public job placement agencies	0.2180	0.0185	***	0.2398	0.0231	***
Supply/demand indicators						
Effective job offer-job seeker ratio	0.1499	0.0152	***	-0.1866	0.0246	***
Unplacement rate	-0.0117	0.0032	***	0.0064	0.0059	
ln (Effective job seekers)						
ln (Effective job offers)						
Labor structure						
Ratio of women	0.0353	0.0321		0.0518	0.0445	
Ratio of junior and senior high school graduates	0.1262	0.0399	***	0.1811	0.0579	***
Ratio of graduates of specialized training colleges	0.0025	0.0962		0.1692	0.1801	
Ratio of graduates of technical and junior colleges	-0.1199	0.0825		-0.2272	0.1799	
Ratio of turnovers	0.2226	0.0468	***	0.4177	0.0728	***
Ratio of newly employed	0.1792	0.0561	***	0.3452	0.0931	***
Ratio of youths: Ages 20-29	0.0466	0.0336		0.0315	0.0523	
Ratio of middle aged: Ages 45-54	0.0262	0.0787		0.0115	0.1238	
Ratio of seniors over 55	0.0822	0.0882		-0.1031	0.1087	
Regional specific structure						
Ratio of placement in the service sector	-0.0529	0.0245	**	-0.0561	0.0366	
Ratio of placement in the manufacturing sector	-0.2436	0.0343	***	-0.2955	0.0423	***
Ratio of placement in micro enterprises	0.0482	0.0224	**	0.0626	0.0351	*
Ratio of placement in small enterprises	0.0470	0.0229	**	0.0915	0.0364	***
Ratio of placement in medium-sized companies	0.0393	0.0277		0.0364	0.0431	
1998	0.0098	0.0081		-0.0162	0.0138	
1999	0.0247	0.0082	***	-0.0192	0.0138	
2000	0.0224	0.0089	***	-0.0277	0.0153	*
2001	0.0162	0.0092	*	-0.0288	0.0172	*
2002	0.0112	0.0104		-0.0479	0.0184	***
2003	0.0180	0.0106	*	-0.0329	0.0185	*
Constant	-0.0867	0.0496	*	-0.0911	0.0832	
R-squared	0.6408			0.6632		

Notes: 1. Sample size: 329 (47 prefectures over a period of seven years), OLS model.
2. 1997 is the benchmark for year dummies.

between placement rate and rate of filled vacancy. However, it has been discovered that when other factors are the same, a negative correlation also exists due to an effective job offer-job seeker ratio. Prefectures with an industrial structure that have a high concentration of micro and small enterprises also have high placement rate and rate of filled vacancy.

In summation, it has been discovered that region specific programs in general do not impact the matching efficiency of public job placement services. However, it has also been found that the labor supply-demand environmental factor (the contribution rate of public job placement agencies, effective job offer-job seeker ratio, effective number of job offers and job seekers, etc.), the distribution of job finders by educational background and age group as well as the industry classification for jobs obtained by job seekers, all have a significant impact on the matching efficiency of public job placing services.

VII. Conclusion

There has been growing interest in the matching efficiency of public job placement agencies following the deregulation of job placement services in Japan in recent years. This paper analyzed the regional gap and its trend in the matching efficiency of public job placement services based on prefectural data following the second half of the 1990's, when full scale deregulation of job placement services began. The findings of the study are as follows:

(i) Firstly, it has been discovered that in recent years the difference in placement rate and rate of filled vacancy within a single regional block have been diminishing and matching efficiency converging. It is believed that inter-regional labor flow contributes to the convergence of matching efficiency within a single regional block, since regions with higher matching efficiency that enjoy either a high placement rate or low rate of filled vacancy subsequently have a higher net labor inflow rate. Since there are strong rigidity in regional placement rate and rate of filled vacancy, the regional gap in matching efficiency will never entirely disappear.

(ii) Secondly, provinces such as Hokkaido and Iwate were identified as having both a high rate of filled vacancy and high placement rate based on prefectural comparison. Cities such as Tokyo and Osaka have relatively low matching efficiency. Based on aggregate time-series data, rate of filled vacancy and placement rate tend to move inversely proportionate to one another owing to an effective job offer-job seeker ratio. These two indexes, however, have a positive correlation at the prefectural level with many prefectures enjoying both high placement rate and high rate of filled vacancy.

(iii) Lastly, factors for regional disparities in matching efficiency were examined. Independent regional policies do not have a clear impact, but

regions where public job placement agencies have a high market share, that also have a high share of junior and senior high school graduates among the job finders and a low share of placements in the manufacturing sector, tend to have high matching efficiency. Regions with high concentrations of micro and small enterprises were also found to enjoy high placement rate and rate of filled vacancy.

From the results obtained in part (i), one might argue that the removal of labor flow obstacles would enhance inter-regional labor flow, increase the matching efficiency of public job placement agencies and dissolve regional disparities. Such measures would include a subsidy for moving costs, housing assistance in the new location and employment assistance for spouses. Part (ii) above indicates that a clear disparity in matching efficiency exists between cities and provinces. Explanatory factors for such a disparity are rooted in the market share of public job placement agencies, the nature of supply and demand in the labor market, industrial structure and the structure of the labor force, and not in regional specific policies (according to part [iii] results). It would, therefore, be unfair to evaluate the achievement of public job placement agencies based on these indicators without also focusing on the above points.

Appendix: Geographic distribution of public job placement agencies in 2004

Note: Boundary lines indicate areas of jurisdiction under each public job placement agency.

References

All Labour Ministry's Workers Union. 2004. Ima naze koteki shokugyo shokai ka [Public job placement services—why now?]. http://www.zenrodo.com/min/min_shu/20050210.htm.

Barro, Robert J., and Xavier Sala-i-Martin. 1995. *Economic growth*. New York: McGraw-Hill.

Black, Dan A., Jeffrey A. Smith, Mark C. Berger, and Brett J. Noel. 2002. Is the threat of reemployment services more effective than the services themselves? Experimental evidence from the UI system. NBER Working Paper no.8825, National Bureau of Economic Research, Cambridge, MA.

Cahuc, Pierre, and André Zylberberg. 2004. Labor market policies. In *Labor economics,* 635-87. Cambridge, MA: MIT Press.

Dolton, Peter, and Donal O'Neill. 1996. Unemployment duration and the restart effect: Some experimental evidence. *Economic Journal* 106 (435):387-400.

Fougere, Denis, Jacqueline Pradel, and Muriel Roger. 1998. The influence of the state employment service on the search effort and on the probability of leaving unemployment., CREST-INSEE Working Paper no.9904, Institut National de la Statistique et des Etudes Economiques, Paris.

Iwamoto, Toshiya. 2005. Matchingu shihyo de mita haro waku no shokugyo shokai [Evaluation of public job placement services in Japan using matching indicators]. Unpublished manuscript.

Kodama, Toshihiro, Yoshio Higuchi, Masahiro Abe, and Mitsuru Sunada. 2004. Nyushoku keiro ga tenshoku ni motarasu koka [The impact of route selection on successful career changes when reentering the job market]. RIETI Discussion Paper 04-J-035, Research Institute of Economy, Trade and Industry, Tokyo.

Nakamura, Jiro. 2002. Tenshoku shien shisutemu to shiteno koteki shokugyo shokai kino [The function of public job placement services as a system to assist career changes]. *The Japanese Journal of Labour Studies* 44, no.9:26-37.

Ueno, Yuko, Ryo Kambayashi, and Keiko Murata. 2004. Matchingu no gijutsuteki koritsusei to nyushoku keiro sentaku kodo [The technical efficiency of matching and route selection when entering the job market]. ESRI Discussion Paper Series no.106, Economic and Social Research Institute, Cabinet Office, Government of Japan, Tokyo.

Walwei, Ulrich. 1996. Improving job-matching through placement services. In *International handbook of labour market policy and evaluation*, ed. Gūnther Schmid, Jacqueline O'Reilly, and Klaus Schōmann, 402-30. Cheltenham, UK;

Brookfield, US: Edward Elgar.

Yavas, Abdullah. 1994. Middlemen in bilateral search markets. *Journal of Labor Economics* 12 (3): 406-29.

Zhou, Yanfei. 2007. Koteki shokugyo shokai ni okeru macchingu koritsu no shurensei [The regional gap on the efficiency of public job placement agencies]. In Chiiki Koyo Soshutsu no Shinchoryu: Tokei Bunseki to Jittai Chosa kara Mietekuru Chiiki no Jittai [*New trend in employment creation in regions: Realities of regions through statistical analysis and survey*], JILPT Project Research Series, no.1:142-61. Tokyo: The Japan Institute for Labour Policy and Training.