Trends in Structural and Frictional Unemployment

Hirokazu Fujii
The Japan Institute for Labour Policy and Training

I. Introduction

In order to be able to accurately judge employment situation and the state of the mismatch between labor supply and demand, properly monitoring rates of structural and frictional unemployment is crucial. In this paper, I review trends in structural/frictional unemployment, together with demand-deficient unemployment, based on Fujii (2008).[1]

The main methods of estimating structural unemployment rates are UV analysis and the NAIRU.[2] Fujii (2008) uses a similar method to the UV

---

[1] Unemployment is classified into several kinds according to its causes, the main ones being: demand-deficient unemployment, structural unemployment, and frictional unemployment. (i) Demand-deficient unemployment is unemployment arising from reduced demand during economic downturns; (ii) structural unemployment is unemployment resulting from (qualitative) differences between the employee attributes sought by employers and those actually offered by job seekers (e.g., in terms of vocational skills and age), despite overall supply and demand on the labor market being in balance; and (iii) frictional unemployment is unemployment that arises from the incompleteness of the information available to employers and workers when workers change or start new jobs, and the time required for workers to move between regions. It is naturally tricky to categorize actual instances of unemployment into one or another of these categories, and the distinction between structural and frictional unemployment is particularly blurred. Normally, therefore, these two are referred to together as "structural/frictional unemployment."

[2] UV analysis consists of breaking unemployment down into demand-deficient unemployment and structural/frictional unemployment by plotting the unemployment rate (U) on the vertical axis and the vacancy rate (V) on the horizontal axis in order to explore trends in each. The intersection between the UV curve and a 45° line indicates where supply and demand coincide; the unemployment rate at this point is the rate at which there is no demand deficiency; i.e., when the labor market is in equilibrium ("equilibrium unemployment rate"). The unemployment rate at this time is called the structural/frictional unemployment rate. The demand-deficient unemployment rate is the difference between the actual unemployment rate and the structural/frictional unemployment rate.

The NAIRU (Non-Accelerating Inflation Rate of Unemployment) is the rate of unemployment that does not cause inflation rate to change (given that prices are at an acceptable level) under conditions of long-term equilibrium when, other things being equal, the expected inflation rate coincides with the actual inflation rate. If the unemployment rate exceeds the NAIRU, the inflation rate does not accelerate. If it is

analysis used in the 2005 White Paper on the Labour Economy to reestimate the UV curve and calculate the structural/frictional unemployment rate and the demand-deficient unemployment rate. According to Fujii's calculations (2008), the total unemployment rate of 3.76% in the second quarter of 2007 broke down into a structural/frictional unemployment rate of 3.49% and a demand-deficient unemployment rate of 0.27%. I also find that the rise in the unemployment rate in the late 1990s was affected by both demand-deficient and structural/frictional unemployment, and suggests that the decline in the unemployment rate during the present recovery phase since 2002 has been due in large part to demand-deficient unemployment (Figure 1). Below, I consider the fluctuations in structural/frictional unemployment, in conjunction with demand-deficient unemployment, by examining mismatch-related indices according to attribute.

II. Situation of Mismatch between Occupation

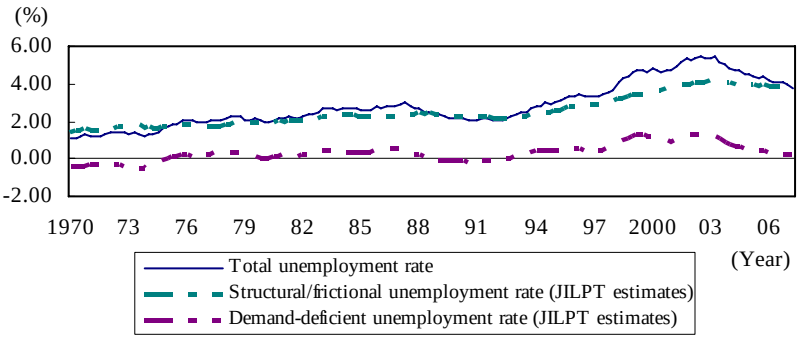
Calculating mismatch indices by occupation shows that, at the major group level, indices rose in the 1980s, before declining in the 1990s and leveling off from 2000. These indices exhibit similar trends at both the major and medium group levels of occupational classification. At the detailed group level, however, the indices are high. Although not shown in the figure, the rise in mismatch indices in the 1980s was due to the contribution of clerical and related workers etc., the decline in the 1990s was due to the contribution of manufacturing process workers, and the leveling off since 2000 has been due to the rise in the index for professional and technical workers amid the decline in the index for sales workers etc. While the index excluding part-time workers is greater, it can be seen that the mismatch is greater for full-time workers than part-timers. Broken down by job category, differences can be observed between professional and technical workers, and manufacturing process workers and laborers (Figure 2).

---

less than the NAIRU, however, the inflation rate will accelerate more rapidly than the long-term expected inflation rate. The NAIRU is a form of analysis based on the (expectations-augmented) Phillips curve.

In Japan, projections tend to be made based on UV analyses (as in the White Paper on the Labour Economy) due to the availability of statistics on vacancies according to Report on Employment Service, and NAIRU estimates are uncommon.

Figure 1. Trends in total unemployment rate, structural/frictional unemployment rate, and demand-deficient unemployment rate



Sources: Estimated based on data from Ministry of Internal Affairs and Communications (MIC), Statistics Bureau, *Labor Force Survey* and Ministry of Health, Labour and Welfare (MHLW), *Report on Employment Service*.

Notes: 1. Estimation of UV curve.

$\ln(EU) = \alpha + \beta \ln(V)$

EU: Employment/unemployment rate. V: Vacancy rate.

Estimated by the generalized least squares method.

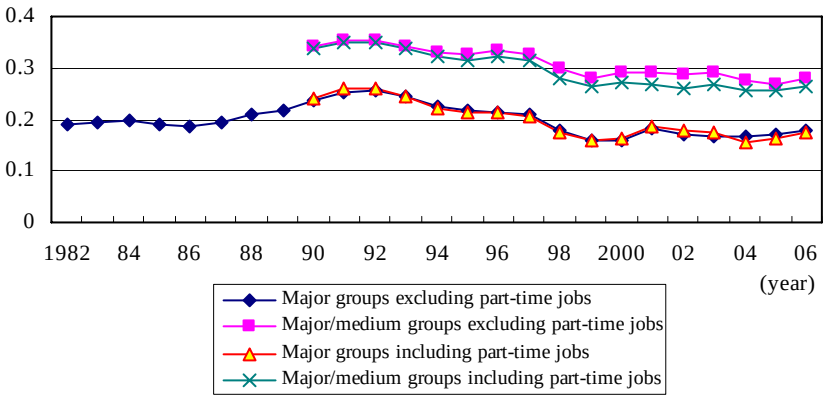
$$\text{employment/unemployment rate} = \frac{\text{number of unemployed}}{(\text{number of unemployed} + \text{number of employees})}$$

$$\text{vacancy rate} = \frac{\text{numer of active job openings} - \text{number of placements}}{(\text{number of active job openings} - \text{number of placements}) + \text{number of employees}}$$

Estimation period	α	t-value	β	t-value	Adjusted AR^2	S.E.	D.W.
(1) 1967 I～75IV	1.355	10.839	-0.556	-5.427	0.910	0.058	2.016
(2) 1883 I～89 IV	1.710	22.511	-0.515	-6.384	0.958	0.029	1.902
(3) 1990 I～93 IV	1.461	14.579	-0.401	-4.214	0.920	0.025	1.300
(4) 2001 I～06 IV	2.334	24.060	-0.569	-6.549	0.952	0.024	1.967

2. The structural/frictional unemployment rate is calculated by the following formula based on the results for the UV curve estimated as above.
   $\ln(eu^*) = (\ln(EU) - \beta \times \ln(V)) / (1 - \beta)$
   Where eu* is the unemployment rate at which EU (employment/unemployment rate) and V (vacancy rate) are equal (equilibrium employment/unemployment rate).
   β is the coefficient of the vacancy rate in formulae (1)-(4) for the above UV curve (in practice it is ln (V)).
   In periods for which no UV curve is estimated, β is calculated as follows:
   1) 1Q 1976 to 4Q 1982: Weighted average of β in estimation formulae (1) and (2) weighted according to period.
   2) 1Q 1994 to 4Q 2000: Weighted average of β in estimation formulae (3) and (4) weighted according to period.
   3) 1Q 2007 onward: β in estimation formula (4).
   If the equilibrium number of unemployed is U*, the structural/frictional unemployment rate (equilibrium unemployment rate) for employed persons (u**) (calculated from the number of employees (EE) and the number of employed persons (E)) is:
   $U^* = EE / (100 - eu^*) \times eu^*$
   $u^{**} = U^* / (E + U^*) \times 100$ (%)
3. Demand-deficient unemployment rate = overall unemployment rate – structural/ frictional unemployment rate.

Figure 2. Occupational mismatch indices (new and regular jobs each August)



Source: MHLW, *Report on Employment Service*.

Notes: 1. Mismatch index = $1/2 \times \Sigma \mid Vi/V - Ui/U \mid$
V: Total number of job openings.
Vi: Number of job openings in category i.
U: Total number of job applicants
Ui: Number of job applicants in category i.
The number of job applicants (from 1990) is calculated excluding unclassifiable data.

2. Based on new and regular job each August.
3. The most detailed categories of jobs presented in Report on Employment Service are here called "major/medium groups." (In the statistics published in Report on Employment Service, occupations in the "manager and official worker," "agricultural, forestry and fishery worker," and "protective service worker" categories are broken down only into major groups, while other occupations are, with certain exceptions, broken down into medium groups.)
4. The occupational categories have been partially reclassified since 2000 (though not at the major group level), and this should be borne in mind when interpreting statistics at the major/medium group level.
5. The different number of occupational categories in the "major group" and "major/medium group" levels means that comparisons of levels and changes cannot be made between the two.

Regarding the mismatch by occupation, structural/frictional, and demand-deficient unemployment were estimated based on job seekers using data on job openings, job applications, and placements, by region and occupation, from public employment security offices in Otani (2007). Ohashi (2006) also breaks down the data on job openings and job applications regarding age and occupation, though by using a different method of calculation.

III. Mismatch between Ages

Looking at the UV curve by age, it is evident that both the unemployment and vacancy rates are rising in younger (15-34-year-old) age groups, with the rise particularly marked among 15-24-year-olds. This suggests that structural/frictional unemployment is rising. While the unemployment rate has fallen during the present recovery, the still high level is indicative of continuing harsh conditions (Figure 3).

In the 60-64-yeard-old age group, employment demand is low, but the unemployment rate fluctuates. During the present recovery, there has been a marked decline in the unemployment rate among 60-64-year-olds. In addition to economic factors, this may be ascribed to the effects of growing moves of continuous employment of workers in this age group in order to limit the retirement of baby-boomers when they reach the age of 60, along with institutional changes in the form of the revision of the Law Concerning Stabilization of Employment of Older Persons to phase in mandatory continued employment of workers up to the age of 65.

In the 35-44-year-old age group, the level of the employment/unemployment rate is lower than that for all ages, indicating a widening mismatch. Among 44-59-year-olds and those aged 65 and over, the employment/unemployment rate and vacancy rate are both low, and there is little variation in the UV curve.[3]

---

[3] The traditional way of calculating the ratio of active job openings to active job applications by age is to allocate the number of job openings equally to each age group in the age range concerned for each age range type for which a job opening arises (classified into 66 types according to which of 11 five-year age groups they span), aggregating the number of active job openings by age, and dividing the product by the number of active job applicants by age. (This is called the “equal allocation of job openings” method.) This method does not always properly reflect situation where, due to the increase in job openings available to all ages, it has become common for employment opportunities to be shared among job applicants belonging to different age groups. This causes the ratio of active job openings to active job applications in the 65-and-over age group, which has relatively few job applicants, to rise markedly, thus diverging more from reality. (The annual average rate rose sharply from 0.24 in 2002 to 1.09 in 2004.)
Instead of the conventional method, therefore, the Ministry of Health, Labour and Welfare calculates the number of employment opportunities per applicant for the job opening concerned by dividing the number of job openings by the total number of active job applicants in the age group concerned, and then aggregating these employment opportunities for the total number of job applicants in order to calculate the ratio of active job openings to applicants by age (referred to below as the

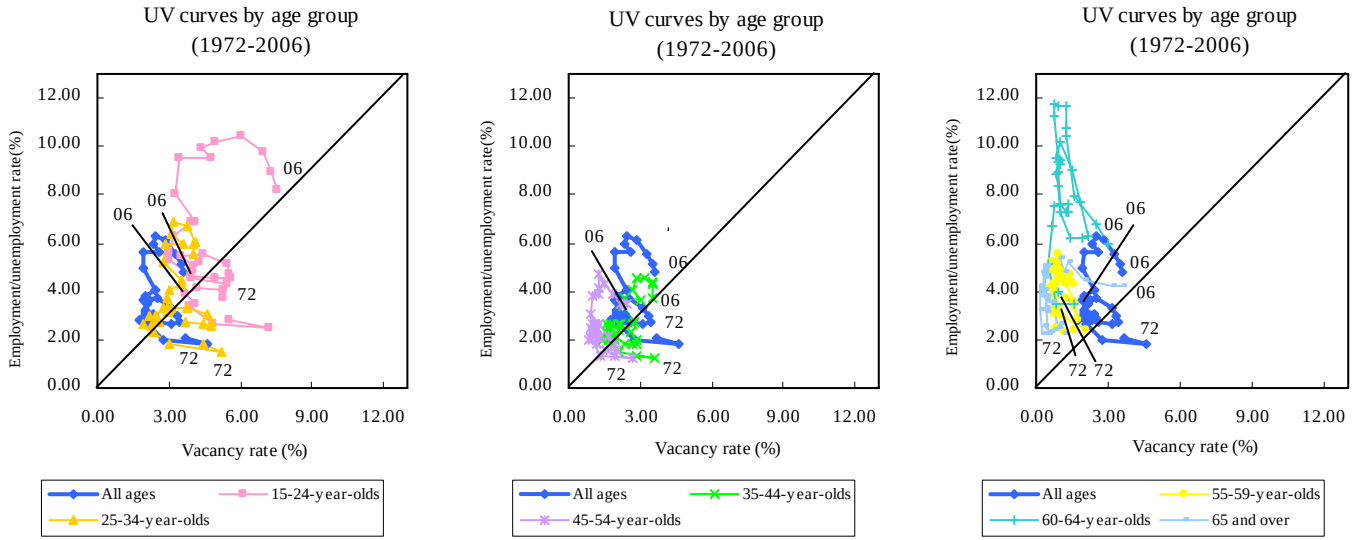
Regarding age mismatch unemployment, the situation may be examined in terms of (1) the mismatch index (the sum of the mismatch between job openings and job applicants) and (2) the difference between the ordinary equilibrium employment/unemployment rate and the equilibrium employment/unemployment rate assuming there to be no age mismatch (Figure 4). Both indices indicate that the mismatch declined during the bubble period, and rose after the collapse of the bubble. Underlying this appears to have been a combination of expanding and shrinking demand for older age groups with the tightening and easing of labor supply and demand, together with the spread of mandatory retirement at age 60 (improvement of employment conditions such as a decline in the unemployment rate for 55-59-year-olds in the latter half of 1980s), and it may be speculated that movements in the age mismatch affect fluctuations in overall structural/frictional unemployment. However, the contribution to the variation in structural/frictional unemployment is not particularly great, measuring around 0.1% points on an employment/unemployment rate basis. The small scale of the contribution of age mismatch agrees with the analysis by Sasaki (2004).

Since 2001, the mismatch index has declined dramatically, no doubt due in part to the impact of the introduction of regulations requiring that employers endeavor to ease age restrictions on recruitment and hiring. The proportion of job openings available to all ages is increasing considerably. In September 2001, job openings for all ages made up 1.6% of the total, with the great majority (95.3%) being age restricted. However, the proportion of job openings for all ages exceeded the 10% mark in 2002-2003, rose dramatically during 2004 to reach 40% in December 2004, rose further in the second half of

---

"employment opportunity summation" method), figures for which have been published since July 2006. (This method has also been applied retrospectively back to January 2005. The ratio of active job openings to active job applicants calculated by the conventional method also continues to be calculated and published for the time being.) The distribution of active job openings differs substantially between the two methods. With the employment opportunity summation method, job openings are allocated according to the distribution of job applicants, resulting in particularly sharp declines in the number of openings in the 15-19 and 65-and-over age groups, a decline also in the 40-54-year-old age group, and large increases in the 25-34-year-old age group compared with the conventional "equal allocation of job openings" method. There is also an increase among 55-59-year-olds. Regarding the UV curves by age, therefore, V (vacancies) changes, especially in the younger and 65-and-over age groups, and the combination of U and V changes (Figure 3).

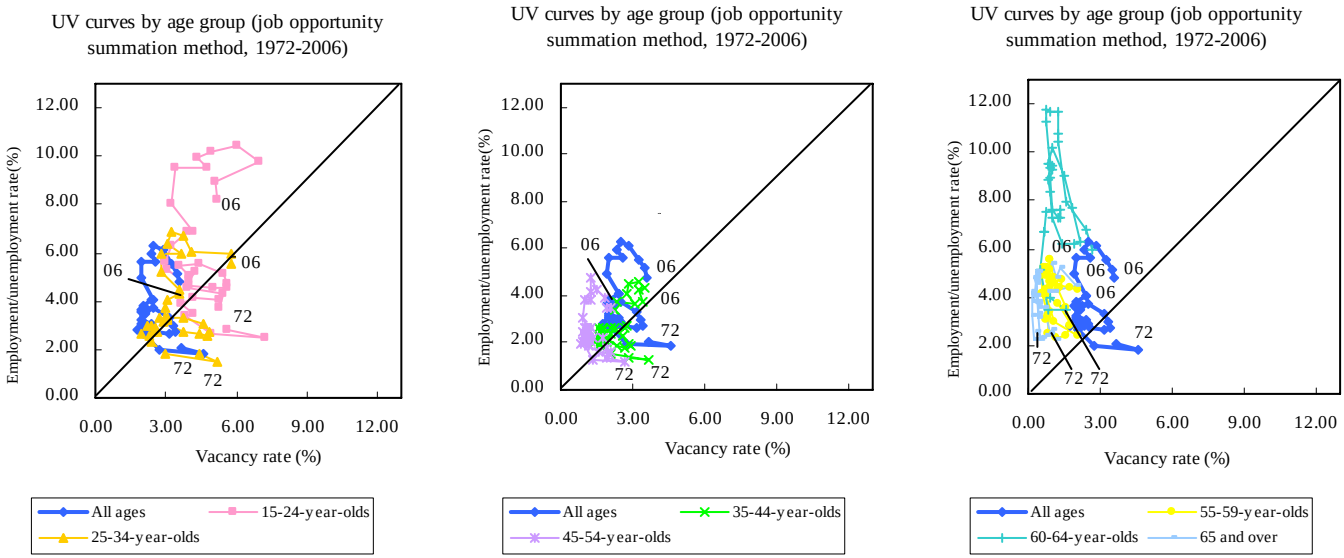
Figure 3. (1) UV curves by age group



Sources: MIC, Statistics Bureau, *Labor Force Survey* and MHLW, *Report on Employment Service*.

Note: The vacancy rate and employment/unemployment rate are defined as in Figure 1. Note that the number of vacancy (= number of active job openings – number of placements) is for regular jobs including part-time jobs each October. The number of active job openings is calculated by the conventional "equal allocation of job openings" method. Annual averages were used for the number of employees and unemployed persons.

Figure 3. (2) UV curves by age group

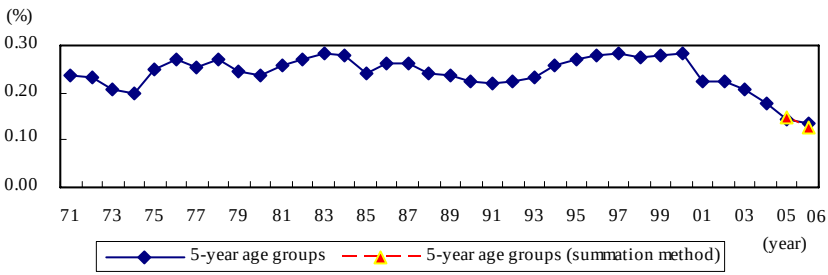


Sources: MIC, Statistics Bureau, *Labor Force Survey* and MHLW, *Report on Employment Service*.

Note: The vacancy rate and employment/unemployment rate are defined as in Figure 1. Note that the number of vacancy (= number of active job openings – number of placements) is for regular jobs including part-time jobs each October. The number of active job openings is calculated by the job opportunity summation method in 2005 and 2006, and by the conventional "equal allocation of job openings" method up to 2004. Annual averages were used for the number of employees and unemployed persons.

Figure 4. Situation of age mismatch unemployment situation

(1) Age mismatch index (active regular job openings including part-time jobs each October)

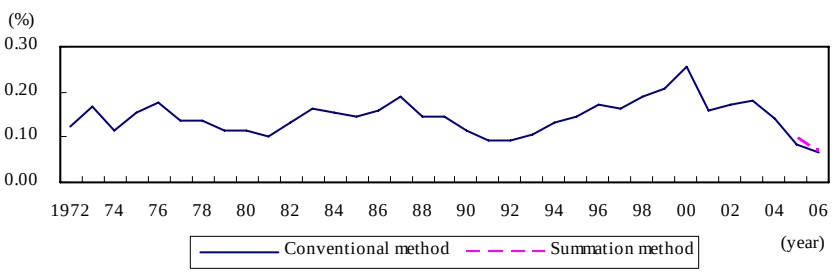


Source: MHLW, *Report on Employment Service*.

Notes: 1. The mismatch index is defined as in Figure 2 and is calculated for five-year age groups (treating ages 65 and over as one category) based on regular job openings including part-time jobs each October.

2. The number of active job openings for each age group was calculated by both the conventional "equal allocation of job openings" method and the job opportunity summation method in 2005 and 2006.

(2) Age mismatch unemployment situation



Sources: MHLW, *Report on Employment Service* and MIC, Statistics Bureau, *Labor Force Survey*.

Notes: 1. Employment/unemployment rates were broken down by age by extrapolating from the analysis in Ministry of Labour, *1999 Annual Report on Labour*.

2. As a substitute age mismatch index, we here use the difference between the equilibrium employment/unemployment rate for all ages (Us) and the equilibrium employment/unemployment rate (Ut) calculated from the weighted average of the equilibrium employment/unemployment rates for each five-year age group weighted by the number of employees in each age group. It should be borne in mind that the equilibrium employment/unemployment rate is calculated based on the strong assumption that the value of β for the UV curve estimated by $\ln U = \alpha + \beta \ln V$ (U: employment/unemployment rate, V: vacancy rate) is a uniform 0.55 for all ages and all age groups, based on the estimated UV curves by age group for core age groups (30-50-year-olds) (1999 White Paper on the Labour Economy).
3. The number of vacancies is for regular jobs each October, and the numbers of employees and unemployed persons are annual averages.
4. The figures for 2001 onward are affected by the entry into effect from October 2001 of the requirement that employers endeavor to relax age restrictions in recruitment and hiring.
5. Due to the change in the method of calculating the number of active job openings by age group to the job opportunity summation method, the number of job openings was calculated by both this and the conventional "equal allocation of job openings" method in 2005 and 2006.

2006, and by February 2007 stood at 50.0%. The proportion of age-restricted job openings, on the other hand, has continued to decline, falling to 37.7% as of February 2007.

To summarize, the age mismatch appears to be affected by both economic and institutional factors.

IV. Situation of Regional Mismatch

Regarding the regional mismatch unemployment situation, the regional UV curves (on an annual basis) exhibit considerable differences in shape and position according to region. Nevertheless, despite a clockwise loop, there may be discerned a rightward and upward shift over the long term, with the shift being particularly marked following the collapse of the economic bubble in the 1990s. This suggests that structural/frictional and demand-deficient unemployment are both increasing in all regions. During the present recovery phase, the employment/unemployment rate has also fallen while the vacancy rate has risen. Regional differences in the fluctuation and pace of improvement in the UV curve may be observed. Structural/frictional unemployment has increased particularly in the Kinki region. In Hokkaido, less of a shift is evident compared with other regions, and the pace of improvement is weaker and the level of the unemployment rate is higher. In the Tokai, Hokuriku, and Chugoku regions, meanwhile, the supply and demand situation on the UV curve improved to a point downward and to the right of the 45^{o} line in 2006 (Figure 5).

Drawing on the method employed by Sasaki (2004), business cycle dummy variables (based on the strong assumption that the incline of the UV curve would be constant for 30 years) were included among the explanatory variables to estimate the shift in the UV curve, suggesting that, in all regions, the UV curve shifts downward in the bubble period, and considerably upward in the 1990s after the collapse of the bubble. With this method, however, there is a large shift in the UV curve concentrated in the late 1990s (indicating a sharp rise in structural/frictional unemployment rate), and the interpretation of these results remains open to some doubt (Table 1).

Using as a mismatch index the difference between the ordinary equilibrium unemployment rate and the equilibrium unemployment rate assuming that the national UV curve and the regional UV curves estimated here have the same inclination (in the case that there is no mismatch between regions), we find

Figure 5. (1) UV curves by regional block

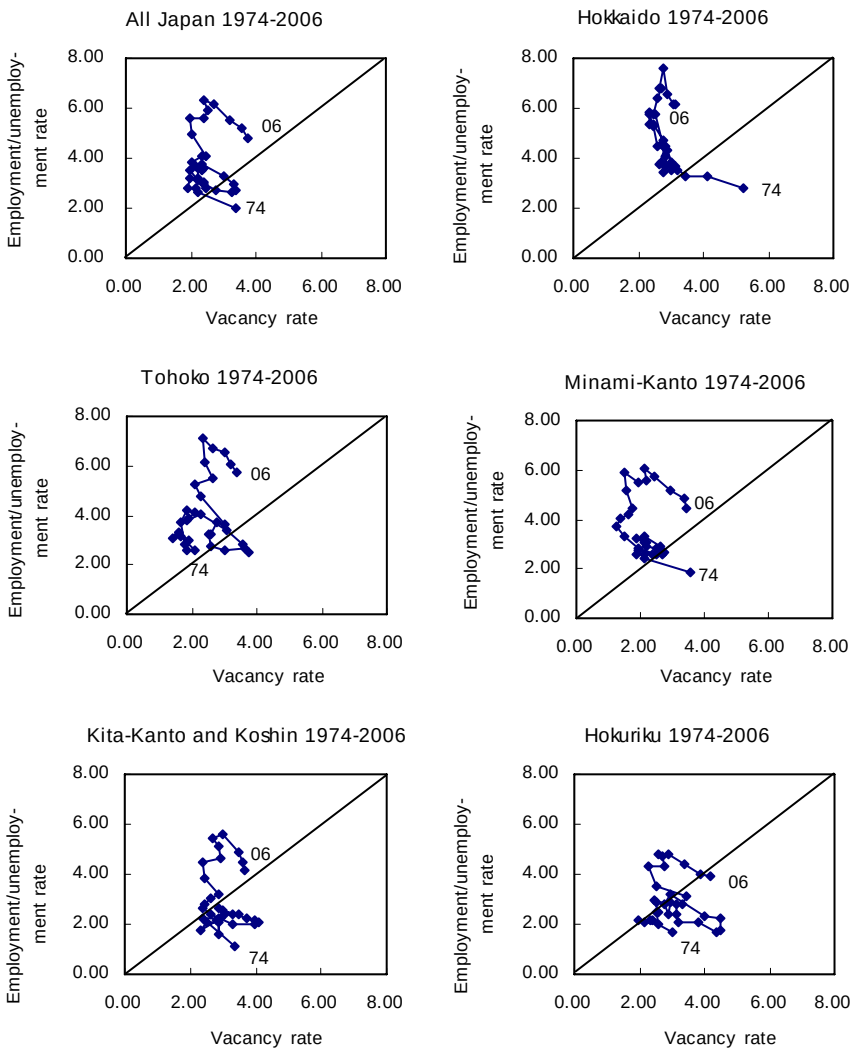
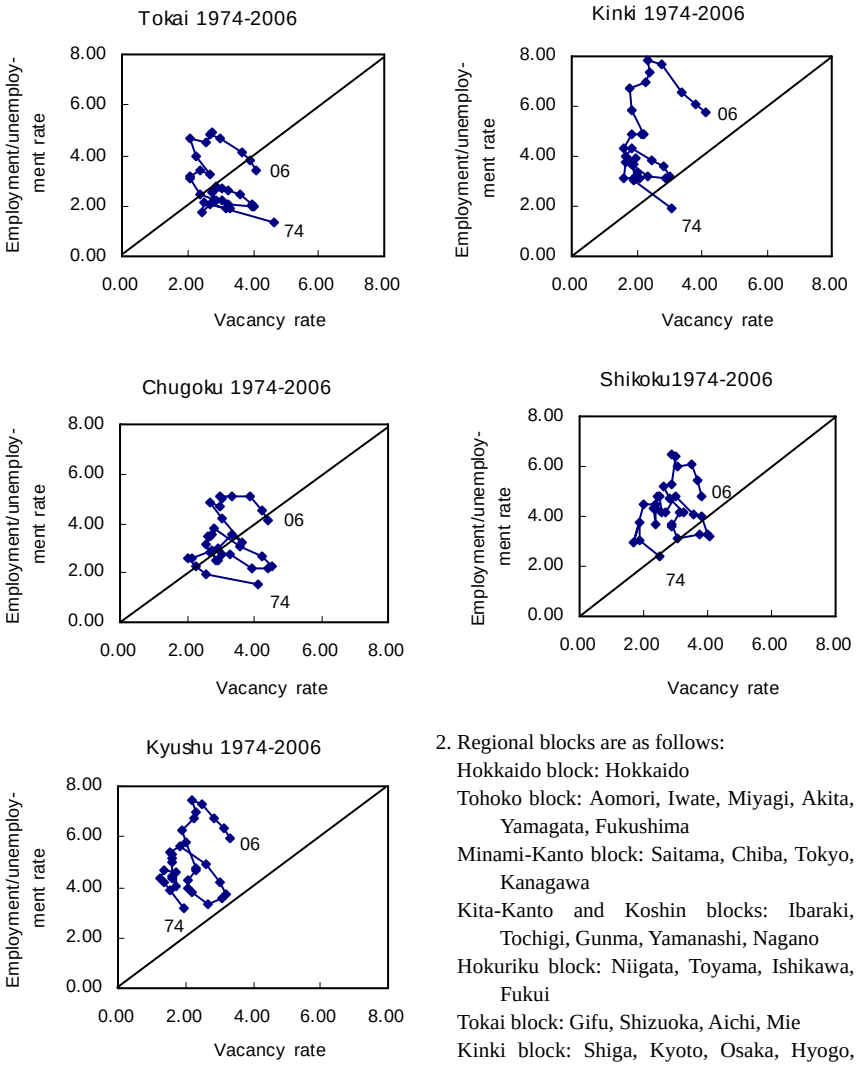


Figure 5. (2) UV curves by regional block



Sources: MIC, Statistics Bureau, *Labor Force Survey* and MHLW, *Report on Employment Service*.

Notes: 1. The employment/unemployment rate and vacancy rate (%) are defined as in Figure 1.

2. Regional blocks are as follows:
Hokkaido block: Hokkaido
Tohoko block: Aomori, Iwate, Miyagi, Akita, Yamagata, Fukushima
Minami-Kanto block: Saitama, Chiba, Tokyo, Kanagawa
Kita-Kanto and Koshin blocks: Ibaraki, Tochigi, Gunma, Yamanashi, Nagano
Hokuriku block: Niigata, Toyama, Ishikawa, Fukui
Tokai block: Gifu, Shizuoka, Aichi, Mie
Kinki block: Shiga, Kyoto, Osaka, Hyogo, Nara, Wakayama
Chugoku block: Tottori, Shimane, Okayama, Hiroshima, Yamaguchi
Shikoku block: Tokushima, Kagawa, Ehime, Kochi
Kyushu block: Fukuoka, Saga, Nagasaki, kumamoto, Oita, Miyazaki, Kagoshima, Okinawa

Table 1. Example estimates of UV curves by regional block (For reference)

Estimation formula: InEU = a + b1D1+…b13D13+clnV (annual data for 1974-2006)

	Hokkaido		Tohoku		Minami-Kanto		Kita-Kanto & Koshin		Hokuriku		Tokai		Kinki		Chugoku		Shikoku		Kyushu	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Constant term	2.456	4.826	1.432	10.615	1.205	9.841	0.692	3.392	1.186	6.874	1.200	6.961	1.035	7.397	1.341	5.483	1.383	6.874	1.476	15.415
D1	-0.130	-0.861	0.051	0.451	0.065	0.779	0.568	5.123	0.129	1.151	0.143	1.424	0.310	3.156	-0.046	-0.318	0.188	1.568	0.094	1.070
D2	-0.158	-0.755	-0.082	-0.606	0.030	0.306	0.291	2.193	-0.004	-0.033	-0.126	-1.069	0.263	2.190	0.064	0.362	0.017	0.117	0.093	0.875
D3	-0.171	-0.797	0.059	0.533	0.131	1.589	0.500	4.540	0.065	0.577	0.120	1.216	0.445	4.437	0.240	1.672	0.552	5.106	0.268	3.095
D4	-0.132	-0.586	0.015	0.146	0.242	3.266	0.482	4.740	0.347	3.318	0.201	2.230	0.397	4.324	0.283	2.274	0.503	5.056	0.221	2.765
D5	0.006	0.022	0.425	3.917	0.293	3.540	0.749	7.140	0.496	4.579	0.384	3.963	0.533	5.378	0.481	3.536	0.699	6.679	0.404	4.743
D6	-0.007	-0.027	0.315	2.889	0.266	3.110	0.751	7.109	0.402	3.721	0.408	4.292	0.520	5.085	0.532	3.935	0.588	5.585	0.390	4.544
D7	-0.105	-0.493	0.427	3.778	0.278	3.940	0.723	7.464	0.498	4.804	0.388	4.781	0.603	7.666	0.569	5.302	0.722	6.002	0.509	6.311
D8	-0.268	-1.348	0.263	2.283	0.162	1.918	0.614	6.206	0.290	2.753	0.234	2.634	0.461	5.503	0.381	3.459	0.506	4.077	0.270	3.238
D9	-0.213	-0.949	0.399	3.738	0.345	3.358	0.768	7.066	0.517	5.089	0.431	3.882	0.727	7.617	0.511	4.317	0.575	5.485	0.356	4.540
D10	-0.001	-0.003	0.612	5.424	0.588	6.070	1.012	9.139	0.678	6.303	0.608	5.699	0.887	9.388	0.725	5.980	0.730	6.540	0.550	6.622
D11	0.136	0.547	0.798	7.274	0.785	8.357	1.284	11.573	0.840	7.603	0.819	7.399	1.133	11.921	0.889	6.837	0.850	7.975	0.748	9.032
D12	0.301	1.250	0.936	7.414	0.888	9.773	1.438	11.681	0.968	7.722	0.992	8.958	1.269	12.800	0.978	6.876	1.104	8.694	0.864	8.945
D13	0.341	1.647	1.105	10.311	0.930	14.048	1.449	15.442	1.033	10.650	0.936	11.479	1.342	15.754	1.063	10.115	1.048	9.423	0.926	11.349
InV	-0.855	-2.831	-0.638	-4.591	-0.468	-5.506	-0.468	-3.046	-0.617	-4.620	-0.588	-5.724	-0.352	-3.235	-0.636	-3.986	-0.566	-2.830	-0.488	-4.839
Adjusted R^2		0.878		0.923		0.967		0.951		0.924		0.960		0.959		0.906		0.870		0.915
Standard error		0.092		0.088		0.058		0.086		0.088		0.068		0.067		0.095		0.085		0.067
DW value		2.813		2.563		2.390		2.540		2.182		2.460		2.855		2.757		2.466		2.818
(Coefficient difference)																				
D0→D1	-0.130		0.051		0.065		0.568		0.129		0.143		0.310		-0.046		0.188		0.094	
D1→D2	-0.029		-0.133		-0.035		-0.277		-0.134		-0.269		-0.047		0.110		-0.171		-0.001	
D2→D3	-0.012		0.141		0.101		0.209		0.070		0.245		0.182		0.176		0.535		0.175	
D3→D4	0.038		-0.044		0.111		-0.017		0.281		0.081		-0.047		0.044		-0.049		-0.047	
D4→D5	0.138		0.410		0.051		0.267		0.150		0.183		0.135		0.198		0.196		0.183	
D5→D6	-0.013		-0.110		-0.027		0.002		-0.094		0.024		-0.013		0.050		-0.111		-0.014	
D6→D7	-0.098		0.112		0.012		-0.028		0.097		-0.020		0.083		0.037		0.134		0.119	
D7→D8	-0.163		-0.164		-0.116		-0.109		-0.208		-0.154		-0.143		-0.187		-0.216		-0.239	
D8→D9	0.055		0.136		0.183		0.154		0.227		0.197		0.266		0.130		0.069		0.086	
D9→D10	0.212		0.212		0.243		0.243		0.161		0.177		0.160		0.214		0.154		0.194	
D10→D11	0.137		0.186		0.197		0.272		0.161		0.211		0.246		0.163		0.120		0.197	
D11→D12	0.165		0.139		0.103		0.154		0.128		0.172		0.136		0.089		0.254		0.116	
D12→D13	0.040		0.168		0.042		0.011		0.065		-0.055		0.073		0.085		-0.057		0.062	

D0: 1974 (Recession) D1: 1975-76 (Boom) D2: 1977 (Recession) D3: 1978-79 (Boom) D4: 1980-82 (Recession)
D5: 1983-84 (Boom) D6: 1985-86 (Recession) D7: 1987-90 (Boom) D8: 1991-93 (Recession) D9: 1994-96 (Boom)
D10: 1997-98 (Recession) D11: 1999-2000 (Boom) D12: 2001 (Recession) D13: 2002-06 (Boom)

Sources: MIC, Statistics Bureau, *Labor Force Survey* and MHLW, *Report on Employment Service*.

Notes: 1.Estimated using the same method of Sasaki (2004).

2. Note that this approach is tentatively offered as just one possible method of calculation, and the numerical results should be interpreted with caution.

3. The employment/unemployment rate (EU) and vacancy rate (V) are defined as in Figure 1. D0-D13 are economic dummy variables.

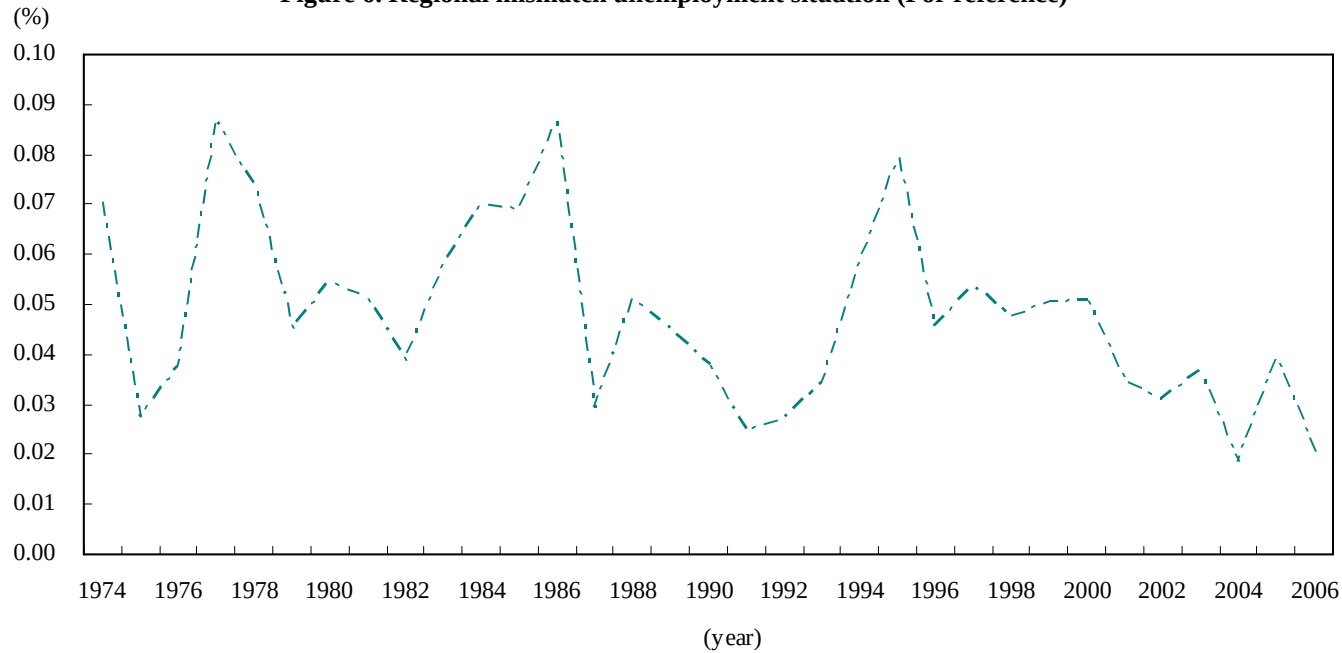
that the contribution of regional mismatch unemployment to fluctuations in structural/frictional unemployment at the national level is considerably smaller, and smaller more recently (Figure 6). Possible reasons for this include not only the inaccuracy of assuming UV curves are the same as at the national level, but also the absence of much long-term variation in unemployment patterns between regions, and the decline in variation itself over the long term.

Estimating the mismatch index for job openings and applications or the coefficient of variation of the unemployment rate and ratio of job openings to applicants for each region, we find that although variation was declining, it has increased during the present period of economic recovery (Figure 7). Although regional variation tended to widen during recovery phases in the past (particularly during periods of export-led recovery), the present recovery has been distinguished by a continuing widening of variation (according to data up to 2006).

V. Mismatch Situation According to Employment Status

One recent employment issue has been the widening gap between regular staff and non-regular staff workers. The ratio of active job openings to active job applicants for regular staff employees is considerably less than 1. On this point, then, let us examine the state of vacancies and unemployment according to employment status (type of work sought). (As the number of vacancies for regular staff/non-regular staff employees can only be determined for the most recent period, however, long-term estimates can serve as a reference only.) Combining U and V shows that the unemployment rate rose considerably in the late 1990s, though it needs to be borne in mind that, due in part to the fact that the Report on Employment Service defines "regular" as employment for a term of at least four months, unlike the Labor Force Survey, which defines it as "one year or more," job openings for regular staff employees account for around 70% of regular job openings, which differs considerably from the level of the vacancy rate. Furthermore, there appears to have occurred an upward shift in the UV curve for both regular staff and non-regular staff workers, providing evidence of an increase in mismatch unemployment, with the mismatch regarding non-regular staff workers being particularly noticeable (Figure 8).

Figure 6. Regional mismatch unemployment situation (For reference)



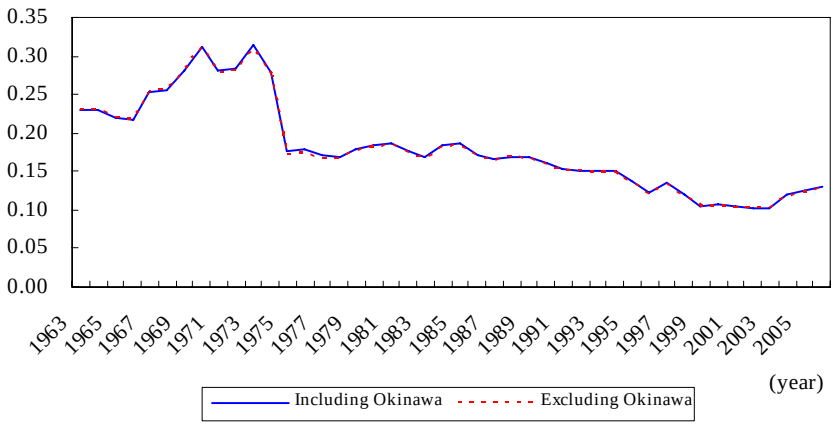
Sources: MIC, Statistics Bureau, *Labor Force Survey* and MHLW, *Report on Employment Service*.

Notes: 1. As a substitute regional mismatch index, I here use the difference between the equilibrium employment/unemployment rate for all Japan (Us) and the equilibrium employment/unemployment rate (Ut) calculated from the weighted average of the equilibrium employment/unemployment rates for each regional block weighted by the number of employees (employees + unemployed) in each block.

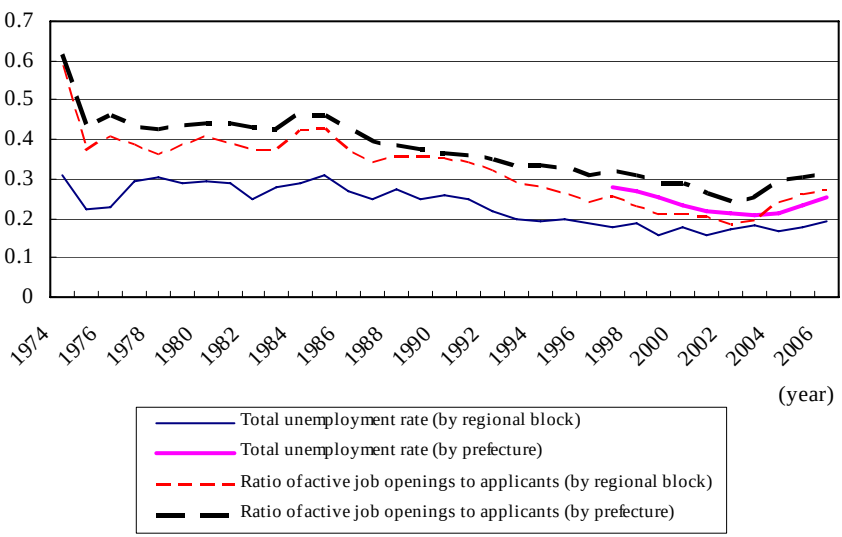
2. It should be borne in mind that the equilibrium employment/unemployment rate is calculated based on the strong assumption that the value of β for the UV curve estimated by $\ln U = \alpha + \beta \ln V$ (U: employment/unemployment rate, V: vacancy rate) is the same for all regions and Japan as a whole. (The employment/unemployment rate and vacancy rate are defined as in Figure 1.)

Figure 7. Regional mismatch-related indices (state of variation)

(1) Mismatch indices by prefecture (active job each year)



(2) Coefficient of variation of total unemployment rate and ratio of active job openings to applicants by region (unweighted)

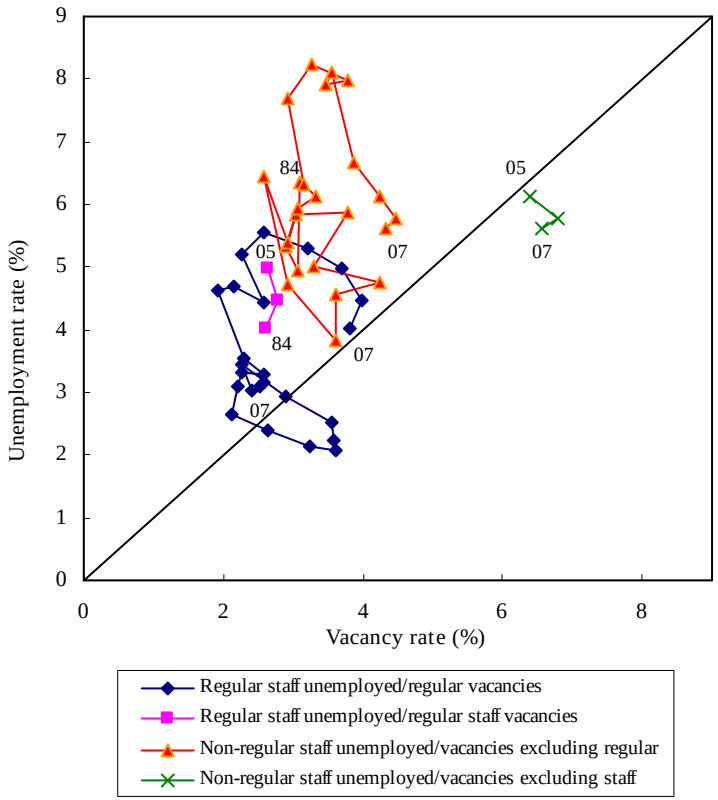


Sources: MIC, Statistics Bureau, *Labor Force Survey* and MHLW, *Report on Employment Service*.

Notes: 1. The mismatch index is calculated as described in Figure 2, based on annual average active job.

2. Regional blocks are classified as described in Figure 5.

Figure 8. Unemployment and vacancy rates by form of employment sought (Feb. 1984 to Jan.-Mar. 2007)



Sources: MIC Statistics Bureau, *Special Survey of the Labor Force Survey* (Feb. 1984 to Feb. 2001), *Labor Force Survey Detailed Tabulation* (January-March 2002 to January-March 2007); MHLW, *Report on Employment Service*.

Notes: 1. Regular staff (non-regular staff) unemployment rate = number of unemployed persons seeking regular staff (non-regular staff) employment / (number of unemployed persons seeking regular staff (non-regular staff) employment + number of regular staff (non-regular staff) employees)

2. Regular staff (non-regular staff) vacancy rate = regular staff (non-regular staff) employee vacancies / (regular staff (non-regular staff) employee vacancies + regular staff (non-regular staff) employees).
   Vacancies = number of active job openings – number of placements
   It is necessary note that Report on Employment Service presents no statistics on regular staff employees up to January-March 2005. For the purpose of long-term comparison, therefore, vacancies of regular excluding part-time are treated as regular staff employee vacancies, and other vacancies are used as a substitute measure of vacancies other than regular staff employee vacancies.
   Regarding the statistics cited from Report on Employment Service, original figures for February are used for 1984-2001, and for January-March for 2002-2007.

VI. Trends among Unemployed in Terms of Reasons for Being Unable to take up Jabs

As Genda and Kondo (2003) observe, the state of demand deficiency and mismatch unemployment may also be inferred from a breakdown of unemployment according to reason for being unable to take up job. Following Genda and Kondo (2003), I divide unemployment into the following broad categories: unemployment due to "unfavorable job" ("unfavorable working conditions," "limited age," or "need more skill or knowledge"), i.e., forms of unemployment corresponding to mismatch unemployment; unemployment due to "wish to have any kind of work but it is not available," i.e., unemployment corresponding to demand deficiency; and unemployment due to "preferable kind of job is not available," i.e., unemployment corresponding to a combination of demand deficiency and mismatch (these two are treated together as "job is not available"). While data are only available from 1999, it is apparent that "unfavorable job" unemployment increased slightly up until around 2002 (age, working hours), as did the demand deficiency-related "no work" unemployment. During the present recovery, "no work" unemployment and "unsuitable work" unemployment have both fallen considerably. To summarize, the evidence indicates that both demand-deficient unemployment and mismatch unemployment are declining (Table 2).

Within the "unfavorable job" category, the decline in "limited age" unemployment suggests that policies to ease age requirements and the revision of the Law Concerning Stabilization of Employment of Older Persons are having an impact. Also noteworthy, however, is the fact that there has been hardly any decline in mismatch unemployment in relation to working hours, which is indicative of the difficulty of choosing suitably flexible working hours.

Looking at trends in the number of unemployed by reason for seeking a job, the large decline in the number of unemployed persons who quitted a job involuntarily, which soared from the end of the 1990s, suggests that demand-deficient unemployment is declining.

Table 2. Number of unemployed by reason for being unable to take up jobs

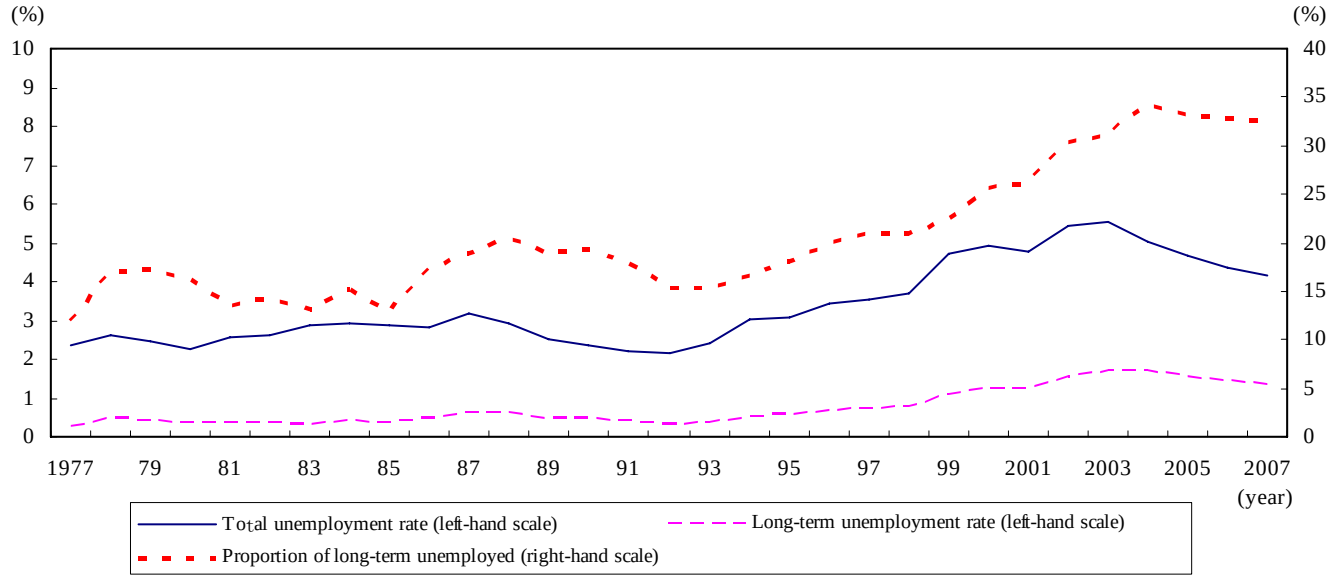
(10,000 persons, %)

		Total	Unfavorable job	Unfavorable working conditions	Not satisfied with the salary or available job	Unfavorable working hours and days	Limited age	Need more skill or knowledge	Available job is not necessary to use acquired skill or knowledge	Need more skill or knowledge	Job is not available	Preferable kind of job is not available	Preferable kind of job is not available	Status in employment of available job is different from the wished one	Wish to have any kind of job but it is no to available	Other	Work place is not nearby	Other
Actual number	Feb. 1999	313	146	48	26	22	71	27	19	8	123	90	59	31	33	43	11	32
	Feb. 2000	327	141	48	26	22	67	26	18	8	132	94	67	27	38	52	14	38
	Feb. 2001	318	140	47	25	22	69	24	17	7	125	93	66	27	32	50	12	38
	Jan.-Mar. 2002	360	153	60	31	29	74	19			141	102			39	45		
	Jan.-Mar. 2003	363	162	53	25	28	83	26			150	109			41	49		
	Jan.-Mar. 2004	329	140	46	23	23	74	20			148	109			39	40		
	Jan.-Mar. 2005	305	131	47	21	26	60	24			120	94			26	53		
	Jan.-Mar. 2006	286	121	50	24	26	54	17			113	92			21	50		
	Jan.-Mar. 2007	272	117	51	24	27	51	15			103	82			21	47		
Percentage of total	Feb. 1999	100.0	46.6	15.3	8.3	7.0	22.7	8.6	6.1	2.6	39.3	28.8	18.8	9.9	10.5	13.7	3.5	10.2
	Feb. 2000	100.0	43.1	14.7	8.0	6.7	20.5	8.0	5.5	2.4	40.4	28.7	20.5	8.3	11.6	15.9	4.3	11.6
	Feb. 2001	100.0	44.0	14.8	7.9	6.9	21.7	7.5	5.3	2.2	39.3	29.2	20.8	8.5	10.1	15.7	3.8	11.9
	Jan.-Mar. 2002	100.0	42.5	16.7	8.6	8.1	20.6	5.3			39.2	28.3			10.8	12.5		
	Jan.-Mar. 2003	100.0	44.6	14.6	6.9	7.7	22.9	7.2			41.3	30.0			11.3	13.5		
	Jan.-Mar. 2004	100.0	42.6	14.0	7.0	7.0	22.5	6.1			45.0	33.1			11.9	12.2		
	Jan.-Mar. 2005	100.0	43.0	15.4	6.9	8.5	19.7	7.9			39.3	30.8			8.5	17.4		
	Jan.-Mar. 2006	100.0	42.3	17.5	8.4	9.1	18.9	5.9			39.5	32.2			7.3	17.5		
	Jan.-Mar. 2007	100.0	43.0	18.8	8.8	9.9	18.8	5.5			37.9	30.1			7.7	17.3		

Sources: MIC, Statistics Bureau, *Special Survey of the Labor Force Survey* (Feb. 1999 to Feb. 2001) and *Labor Force Survey Detailed Tabulation* (January-March 2002 to January-March 2007).

Note: The choices of reasons for being unable to take up jobs offered to survey respondents were different up to February 2001.

Figure 9. Total unemployment rate, long-term unemployment rate, and proportion of long-term unemployed



Sources: MIC, Statistics Bureau, *Labor Force Survey*, *Special Survey of the Labor Force Survey* (1977-2001) and *Labor Force Survey Detailed Tabulation* (2002-2007).

Notes: 1. Long-term unemployment rate = persons unemployed for 1 year or more / labor force.

2. Proportion of long-term unemployed = proportion of persons unemployed for 1 year or more among unemployed (excluding persons unemployed for indeterminate period).

3. Figures are actual numbers for each March up to 1982, each February from 1983 to 2001, and each January-March from 2002 to 2007.

4. The long-term unemployment rate and proportion of long-term unemployed in 1983 are for mainly job seekers.

VII. Trends among Long-term Unemployed

Among the unemployed, the long-term unemployed (defined as persons who have been unemployed for one or more years) constituted a strongly growing presence, both in absolute number and as a percentage of the total, from the end of the 1990s to the beginning of the present decade, and the level of long-term unemployment has subsequently remained high. This suggests that mismatch and other forms of structural unemployment stubbornly refuse to disappear (or it may suggest that the absorption capacity of employment is still weak) (Figure 9).

Looking at movements in the above indices suggests that demand-deficient unemployment rose in the latter half of the 1990s, and is declining during the present recovery phase. Structural/frictional unemployment appears to have risen in the latter half of the 1990s, despite some differences between individual indices, but no clear trend is discernible during the present decade.

References

Fujii, Hirokazu. 2008. Saikin no kozoteki/masatsuteki shitsugyoritsu no suikei, shitsugyoritsu no hendo jokyo ni tsuite [Estimates of recent structural and frictional unemployment rates and the state of fluctuations in unemployment rates]. In Shitsugyoritsu no Rironteki Bunseki ni kanasuru Kenkyu: Interim Report, Research Reports no. 95, the Japan Institute for Labour Policy and Training, Tokyo.

Genda, Yuji and Ayako Kondo. 2003a. Kozoteki shitsugyo no saikento: Shitsugyoritsu josho no haikei [A reexamination of structural unemployment: The background to rising unemployment rate]. ESRI Discussion Paper Series no. 53, Economic and Social Research Institute, Tokyo.

———. 2003b. Kozoteki shitsugyo to ha nanika [What is structural unemployment?]. *The Japanese Journal of Labour Studies* 45, no. 7.

Ohashi, Isao. 2006. Misumacchi kara mita Nihon no rodo shijo [The Japanese labor market from the point of mismatches]. In Koyo Misumacchi no Bunseki to Shokadai: Rodo Shijo no Macchingu Kino Kyoka ni kansuru Kenkyu Hokokusho [Analyses and issues in employment mismatches: A study on enhancing the matching functions of the labor market]. Issued by Research Institute for Advancement of Living Standards.

Otani, Go. 2007. Shokuan ni okeru shitsugyo yoin no bunkai to seisakuteki giron—Chiiki burokku betsu bunseki wo chushin to shite [A breakdown of causes

of unemployment according to public employment exchange statistics and policy discussion with a focus on an analysis by regional block]. JILPT Discussion Paper Series 07-03, the Japan Institute for Labour Policy and Training, Tokyo.

Sasaki, Masaru. 2004. Nenrei kaikyu kan misumacchi ni yoru UV kyokusen no shifuto henka to shitsugyoritsu [Shifts in the UV curve due to mismatches between age groups and unemployment rates]. *The Japanese Journal of Labour Studies* 46, no. 2-3.