Research on the Increase in Structural-

Frictional Unemployment

(Interim Report)

(Summary)

The Japan Institute for Labour Policy and Training

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Objective of the research and survey

According to the estimate taken by the Ministry of Health, Labour and Welfare's Councilors Office , more than 80 percent of the unemployment rate is composed of structural-frictional unemployment.

The Ministry of Health, Labour and Welfare employs the U-V curve to calculate the structural-frictional unemployment rates. It has been pointed out, however, that there are a number of problems related to obtaining the structural-frictional unemployment rates by using the U-V curve. For example, the intersection between the U-V curve and the forty-five degree line is merely one of the standards for measuring the imperfection of the labor market, and there are no theoretical grounds that it can be used as an indicator of structural-frictional unemployment rates. Since shift variables of the U-V curve are not considered in the model when plotting the U-V curve, the U-V curve's shift cannot be identified. It has also been mentioned that there are problems related to the data used for calculating structural-frictional unemployment rates. The data on unemployment are taken from the Labour Force Survey, which covers the unemployed in the entire labor market. The data on vacancies, on the other hand, are based on the Employment Security Statistics and the Employment Performance Survey, which do not cover job offers of the whole labor market. This has given rise to questions about consistency of data and the validity of the obtained structural-frictional unemployment rates. Moreover, it has also been pointed out that there is difficulty in

categorizing different types of unemployment based on the causes of unemployment.

As explained above, many issues have been raised with respect to using the U-V curve in obtaining structural-frictional unemployment rates.   To address these issues, there is a need for improving the precision of the U-V curve or finding a new measure of structural-frictional unemployment rates that would replace the U-V curve.

At the request of the Ministry of Health, Labour and Welfare, the Japan Institute for Labour Policy and Training set up the Study Group on the Increase in Structural-Frictional Unemployment to improve the precision of the U-V curve as a measure of structural-frictional unemployment rates and to employ NAIRU (non-accelerating inflation rate of unemployment) as an alternative to the U-V curve. This is an interim report with a summary of results that were obtained at this stage.

Outline of research results

1. Objective of the report

There are mainly two objectives to this report. A number of issues have been raised with respect to using the U-V curve to obtain structural-frictional unemployment rates. Therefore, one of the objectives is to identify the problems related to the use of the U-V curve and if improvements can be made, to raise the precision of structural-frictional unemployment rates. It is a common practice in Japan to use the U-V curve for obtaining structural-frictional unemployment rates, but when we look at literature found in Europe and the U.S., NAIRU (non-accelerating inflation rate of unemployment) is widely used as an indicator of structural-frictional unemployment rates. Our second objective, therefore, is to take estimates of NAIRU in order to examine alternative methods to analyzing structural-frictional unemployment rates.

2. What is structural-frictional unemployment?

Unemployment in an economy is often categorized into frictional unemployment, structural unemployment, and cyclic unemployment (deficient-demand unemployment) for convenience. For all practical purposes, however, it is difficult to separate frictional unemployment and structural unemployment when calculating unemployment rates based on its causes. Therefore, frictional unemployment and structural unemployment are considered together as structural-frictional unemployment, which is used to indicate mismatch in technology, skills and locations as well as frictional unemployment during one's search for jobs.

3. Calculation of structural-frictional unemployment rates using the U-V curve

The Ministry of Health, Labour and Welfare utilizes the U-V curve to calculate structural-frictional unemployment rates. In this method, the intersection between the U-V curve and the forty-five degree line is considered the equilibrium of unemployment rate (unemployment rate when the aggregate labor demand corresponds to the aggregate labor supply), which is used as a proxy indicator of structural-frictional unemployment rate. The intersection between the U-V curve and the forty-five degree line indicates a state where the aggregate supply and demand in the labor market is equal (unemployment = vacancies), and unemployment rate at this intersection is unemployment rate when there is no demand deficiency, in other words, when there is equilibrium in the labor market. The cyclic unemployment rate (deficient-demand unemployment rate) is obtained as a difference of the actual unemployment rate and

the structural-frictional unemployment rate (equilibrium of unemployment rate).

4. Issues related to assessing structural-frictional unemployment rates using the U-V curve
(1) Theoretical issues related to calculation of structural-frictional unemployment rates

The intersection between the U-V curve and the forty-five degree line is merely one of the base points for measuring the imperfection of the labor market, and there are no theoretical grounds that it can be used as an indicator of structural-frictional unemployment rates.

(2) Issues related to measurement of the U-V curve

In many cases, factors shifting the U-V curve are not included in the explanatory variables. As a result, these factors cannot be identified. Moreover, it is often pointed out that structural-frictional unemployment rates obtained from the U-V curve differ widely depending on the measurement period and the model's function types. Normally, the natural logarithms of unemployment rate and vacancy rate are used for obtaining structural-frictional unemployment rates, but there are arguments that question the appropriateness of understanding the U-V curve in a log linear form (Genda and Kondo, 2003).

(3) Statistical data on vacancies

The vacancy rate and the unemployment rate are obtained from different statistical data. While the vacancy rate is obtained from the number of vacancies at public employment security offices, it does not cover all job offers in the entire labor market. In contrast, the unemployment rate is obtained from the Labour Force Survey, which covers the unemployed in the entire labor market. Since the vacancy rate and unemployment rate are based on different statistics, there is an issue related to their consistency.

(4) Difficulty in categorizing unemployment

As Genda and Kondo (2003) pointed out, there is a difficulty in separating different types of unemployment based on its causes. For instance, the following statement was made: "When an unemployed person has not applied for a job offer, is the person in "frictional unemployment" because he can be employed if he applied or in "structural unemployment" because his skills would not match even if he applied for the job? Since we cannot make an observation, there is no way of knowing." (Genda and Kondo (2003), p. 5).

5. What is NAIRU?

When we turn to literature in Europe and the U.S., we see that NAIRU is often used as an indicator of structural-frictional unemployment rates or structural unemployment rates. NAIRU is an acronym for "non-accelerating inflation rate of unemployment." After categorizing unemployment into three types (frictional unemployment, structural unemployment, and cyclic unemployment), Gordon (1989) stated that frictional unemployment and structural unemployment constitute the "natural rate of unemployment."

6. Content of the report

In Chapter 2, **"A survey on recent discussion on the use of U-V analysis of structural-frictional unemployment rates in the White Paper on the Labour Economy, etc.,"** an outline of U-V analysis, theoretical background of U-V analysis, and movement and interpretation of the U-V curve are explained. After explicating the U-V analysis in the White Paper on the Labour Economy, in which U-V analysis is most frequently employed, and U-V analysis in other cases, the issues related to the use of the U-V analysis in the White Paper on the Labour Economy in obtaining the equilibrium of unemployment rate are identified.

A mention is also made of the inconsistency of statistics on unemployment rate and vacancy rate; the vacancy rate and the unemployment rate are obtained from different statistical data. While the vacancy rate is obtained from the number of vacancies at public employment security offices, it does not cover all job offers in the entire labor market. In contrast, the unemployment rate is obtained from the Labour Force Survey, which covers the unemployed in the entire labor market. Since the vacancy rate and unemployment rate are based on different statistics, there is an issue related to their consistency.

This is followed by an explanation on the issue of the circular movement of the U-V curve and unemployment persistence. It has been pointed out that the combination of unemployment and vacancy makes a circular movement in accordance with the business cycle. Therefore, the combination of unemployment and vacancy at the initial stages of economic recovery is close to the origin and may be underestimated. Moreover, when there is a historical effect of unemployment, a model that does not take into consideration unemployment persistence may overestimate the structural-frictional unemployment rates.

In addition to the above, there is an explanation on the possibility of deflation to

diminish the labor market's ability for adjustment and distort the U-V curve, on the need to introduce the variable factors of wages and commodity prices into U-V analysis, and on the definition of deficient-demand unemployment rates.

In Chapter 3, **"An analysis on the U-V curve,"** theoretical microeconomic interpretation is provided of the U-V curve that indicates a negative relation between the vacancy rate and unemployment rate. While the U-V curve expresses market equilibrium, the subjective equilibrium of workers and firms, which provide the microeconomic basis, is explained by respective search models. In addition, the definition of mismatch according to Jackman et al. is presented.

In the second section, the U-V curve is estimated by using regional panel data. The advantage of using regional panel data is that the U-V curve shift can be grasped by introducing dummy variables on time points. The U-V curve shift occurs when there is interindustry reallocation of labor brought about by technological innovation or when there is institutional change in the labor market. This U-V curve shift must be strictly distinguished from the shift in unemployment rate and vacancy rate, which fluctuate along the U-V curve with the business cycle. When estimation of the U-V curve is taken without considering the U-V curve shift at a time of economic recession and the U-V curve is shifting outwards, the estimation in absolute values will be overestimated. Similarly, if the U-V curve is shifting inwards, the estimation in absolute values will be underestimated. At the time of economic expansion, the results will be the opposite.

From the estimation results, it is now understood that ignoring the U-V curve shift will result in underestimating the coefficient of vacancies, regardless of the estimation period, and that the problem of endogeneity of vacancies and unemployment will result in overestimating the coefficient of vacancies.

In Chapter 4, **"Flow data analysis of structural unemployment and unemployment period,"** problems related to obtaining structural unemployment rates from the U-V curve are mentioned, and the difficulty of understanding unemployment structure through the use of the U-V curve and of avoiding bias is confirmed. In this report, in place of U-V analysis, flow data are used to conduct an analysis of unemployment period as a means to grasping the unemployment structure.

The employment probability function estimated in this report can be considered as an extremely simplified matching function. In our analysis, we made an assumption that the matching structure of a group of unemployed having the same level of skills is invariable, and confirmed by simulation how matching efficiency (unemployment period), in terms of tabulated volume, changes in response to changes in the composition ratio of groups of unemployed with different levels of skills.

The results showed that an increase in the percentage of groups with low probability of reemployment led to an increase in the average unemployment (job search) period and to an increase in unemployment rate. In particular, the employment probability of senior unemployed persons was relative low, and it was suggested that an increase in the number of senior unemployed persons, as a result of the aging of the population, brought about a rise in the number of unemployed persons belonging to groups that required a long period of unemployment (job search) and expanded structural unemployment.

In Chapter 5, **"Measurement of NAIRU by wage function and commodity price function,"** we estimated the wage function and commodity price function, and obtained NAIRU based on the assumption that expected price inflation and actual price inflation will be consistent when there is long-term equilibrium. We used the same formulation as in the *White Paper on Labour 1999*, and extended the analysis of the white paper to year 2003. The data were quarterly data. The estimate of NAIRU from after 1972 to 2003 was around 2.6 to 3.5 percent. On the other hand, the estimate of NAIRU after 1980 was around 2.4 to 6 percent. These results suggest the possibility of NAIRU rising after the 1990s.

In Chapter 6, **"Estimation of NAIRU in Japan,"** an explanation is first given on the definition of NAIRU. This is followed by estimation of constant NAIRU. Constant NAIRU is a method of estimation that is based on the assumption that the value of NAIRU will not change during a period of observation. Estimation of linear NAIRU showed that the value of NAIRU is about 4 percent using either quarterly data or monthly data. In the case of non-linear NAIRU, the constant NAIRU obtained from quarterly data and monthly data were 3.8 percent and 3.6 percent, respectively.

Secondly, estimation of time-varying NAIRU is made. First, a Hodrick-Prescott (HP) filter is used to determine the possible range of the values of NAIRU by interval estimate. It was confirmed that the possible range of NAIRU (the range between the estimated upper value and lower value) was wide.

Lastly, to supplement the shortcomings of the HP filter, the state space model is used to estimate NAIRU. It was pointed out that since the estimates of NAIRU were above the actual unemployment rates in many cases, there were problems in using NAIRU as an alternative index of structural-frictional unemployment rates.

Reference materials

Yuji Genda and Ayako Kondo (2003), "What is Structural Unemployment?", *The Japanese Journal of Labour Studies*, No. 516.

R. J. Gordon (1989), *Gendai Macroeconomics 4th Edition* (translated by Susumu Nagai), Taga Shuppan.　(Gordon, Robert J. (1987), *Macroeconomics*, 4th Edition, Boston: Little, Brown and Company, U.S.A.)