

WHY IS THE UNEMPLOYMENT RATE SO MUCH LOWER  
IN JAPAN THAN IN THE U.S.?

by

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Discussion Paper No. 198, January 1984

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This paper has grown out of lecture notes for a course on the Japanese Economy in the fall quarter of 1983 at the University of Minnesota. Comments and questions from students in the course were very helpful. The author is also thankful to staff members in the Bureau of Labor Statistics, in particular Joyanna Moy and John Stinson, for providing him with data, suggestions and comments. Some aspects of the working and objectives of the Japanese minimum wage committee were explained by Moriueemon Ito to the author. Any remaining errors, however, are the author's. Financial support from NSF SES-8218452 is gratefully acknowledged.

## ABSTRACT

### WHY IS THE UNEMPLOYMENT RATE SO MUCH LOWER IN JAPAN THAN IN THE U.S.?

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It is well known that the unemployment rate in Japan has been the lowest among the OECD countries. Although the U.S. and Japan differ in their statistical definitions of unemployment, this has only a minor effect on the unemployment rates. The purpose of this paper is to measure contributions of economic and sociological factors specific to the Japanese economy as opposed to the U.S. economy.

It will be shown that at least half of the U.S.-Japan difference in unemployment rates is accounted for by the differences in layoff practices, youth unemployment, and the relative shares of the agricultural sectors in the economies. One interesting finding which has not been pointed out before is the relatively large contribution of the difference in teenage participation and teenage unemployment between the two countries. About 20 to 25 % of the total difference in unemployment rates is due to differences in the behavior of teenagers in the two countries. Fewer and fewer Japanese teenagers are participating in the labor market, due to strict schooling requirements, and lower minimum wages. The unemployment rate of Japanese teenagers is also much lower than that of their American counterparts.

A hypothetical U.S. unemployment rate is constructed to adjust for the differences between the U.S. and Japan in the size of the agricultural sector, layoff practices, and teenage participation and unemployment. The hypothetical rate partially explains the differences in Okun's coefficients and the elasticity of employment with respect to GNP between the two countries.

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## 1. Introduction

The unemployment rate in Japan has been the lowest among the OECD countries. The Japanese unemployment rate has been less than 3 % during the entire post-war period. Despite the slowdown in economic growth after two oil crises in the 70's, unemployment is still surprisingly low. In 1982, the Japanese unemployment rate stood at 2.4%, while the U.S. was at 9.7% and western European countries were between 7 and 12 %. Since the Japanese definition of unemployment seems more restrictive than the American part, many researchers have tried adjusting the Japanese statistic to the U.S. concept. However, the difference due to the statistical definitions turned out to be very minor. (Moy and Sorrentino (1981), Moy (1982), Shiraishi (1982), Taira (1983), and Hamada and Kurosaka (1983).) There are some fundamental, either economic or sociological, differences beyond mere statistical problems. Many economists would suggest that lifetime employment and a larger size of the agricultural and self-employed sectors in Japan have contributed to the difference. However, no one has measured whether those factors explain the major part of, if not an entire, difference between Japan and other countries. The purpose of this paper is to measure contributions of possible factors specific to the Japanese economy as opposed to the U.S. economy. In order to do so, I will construct a hypothetical U.S. economy where both superficial and structural differences in the unemployment of the two countries are adjusted. This approach is in contrast to the usual methods of calculating the Japanese unemployment rate in the U.S. concept. Since the U.S. statistics on unemployment is usually richer than the Japanese counterpart, it is natural to calculate a hypothetical U.S. unemployment rate.

It will be shown that at least half of the U.S.-Japan difference in unemployment rates is accounted for by the differences in layoff practices, youth unemployment, and the relative shares of the agricultural sectors in the

economies. One interesting finding which has not been pointed out before is the relatively large contribution of the difference in teenage participation and teenage unemployment between the two countries. About 20 to 25 % of the total difference in unemployment rates is due to differences in the behavior of teenagers in the two countries. Fewer and fewer Japanese teenagers are participating in the labor market, due to strict schooling requirements, lower minimum wages. The unemployment rate of Japanese teenagers is also much lower than that of their American counterparts.

Although this paper has a modest objective of measuring contributions of factors explaining the large difference between the U.S. and Japanese unemployment rates, the study has important implications for two related topics. First, it is natural to find that the coefficient of Okun's law and the slope of the Phillips curve are quite different in Japan if one uses the published data of unemployment (Hamada and Kurosaka (1983)), because the Japanese unemployment does not seem to include a part of unemployment sensitive to economic fluctuations. Our study will uncover some of factors which contributes to the difference. It is more interesting to study Okun's law in Japan (Hamada and Kurosaka (1983)), as we have a hypothetical U.S. economy to which conditional comparisons can be made. Second, the study will highlight the difference between temporary layoffs in the U.S. labor market and labor hoarding because of (implicit) lifetime employment in the Japanese labor market. When contract theory is extended to be used in comparative studies of the Japanese and U.S. labor markets, the present paper will give an estimate of the magnitude of the empirical difference that theory ought to predict.

In the next section, a controversy on statistical definitions of unemployment in Japan, in particular how to adjust the Japanese unemployment

rate to the U.S. concept, will be briefly reviewed. In the third section, our approach of constructing a hypothetical U.S. economy will be explained. An interpretation of our results and Okun's coefficient using our hypothetical U.S. unemployment will be discussed in the fourth section. The last section will summarize the results and point out further research topics.

## 2. Differences in the Definitions of Unemployment in the U.S. and in Japan

Although the Japanese labor force survey is conducted in a manner similar to its American counterpart, detailed examination reveals that the Japanese definition of unemployment is stricter than the American definition.<sup>1</sup>

Two factors which contribute to the downward biases are well known. First, the Self Defense Force is counted as employed in Japan, while the American civilian unemployment excludes the armed forces from the survey samples. (However, the United States has recently started publishing a modified unemployment rate in which the armed forces are included as employed.) Second, unpaid family workers who worked fewer than 15 hours are counted as employed in Japan, while they would be counted as "not in the labor force" in the United States.

The two factors have been adjusted by the Bureau of Labor Statistics (Moy and Sorrentino (1981), and Moy (1982)). Excluding the Self Defense Force (about 240,000 persons) and unpaid family workers working 15 or fewer hours (about 500,000 persons), the adjustment raises the Japanese unemployment only

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<sup>1</sup> Workers are defined as unemployed if they cannot find work although they are willing to work. A monthly survey of 40,000 families during the week ending on the last day of the month (except December when it is the week of the 20th -26th) determines the employed and unemployed in Japan, while 60,000 families in the U.S. are surveyed in the week including the 12th day of the month. The unemployment rate in both countries is defined as the ratio of the unemployed to the labor force (i.e., the sum of the employed and the unemployed), where employment includes self-employment as well as wage and salary earners. However, as suggested by the official name for the unemployed in Japan, literally translated as "totally unemployed", the Japanese unemployment is biased downward.

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by 0.1 or 0.2 percentage points.

In addition, there are several subtle differences in the Japanese definition of unemployment. A person in Japan is classified as "unemployed" if the person "had no job and was seeking one" during the reference week. In the U.S. definition, the worker is unemployed if (a) the person holds no jobs, but has looked for jobs (jobseeking activity test) in past 30 days (jobseeking timing test) and is currently available (availability test); (b) the person is waiting to be called back to a job from which he had been laid off (even if the person is not looking for jobs); or (c) the person is waiting to report to a new wage or salary job scheduled to start within the following 30 days (even if the person is currently not looking for jobs).<sup>2</sup> In the monthly Labor Force Survey of Japan, there are no questions to verify whether a person meets tests on jobseeking activity, timing and availability. However, there were relevant questions asked in the Special Survey conducted annually in March between 1977 and 1980. It turns out that, on the one hand, the Japanese definition of unemployment is stricter in the jobseeking timing test: even if jobseeking was done in the previous 4 weeks but not in the reference week, the person is not "unemployed" in Japan, unlike in the United States. On the other hand, the kinds of activities qualified to be "jobseeking" are broader in Japan. Hence, unemployment in Japan should be adjusted both upward and downward.

Using the data from the Special Survey, one may grasp the magnitude of the difference between the statistical definitions of the U.S. and Japanese unemployment rates. Shiraishi (1982), Taira (1983), and Hamada and Kurosaka (1983) took this avenue.

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2. The jobseeking activities which qualify as "looking for jobs" in the U.S. include registering at a public or private employment office; meeting with prospective employers; checking with friends or relatives; placing or answering advertisements; writing letters of application; or being on a union or professional register. (Bureau of Labor Statistics (1976))

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First, counting temporarily laid off workers who are waiting to be recalled (about 140,000 in Japan) would not change the unemployment rate very much. Second, the inactive jobseekers according to the U.S. jobseeking timing test (those waiting for the results of jobseeking which took place more than one month prior to the survey) should be deducted from the "unemployed" in Japan, and reclassified as not in the labor force. Third, some persons classified as not in the labor force in fact "wish to do any work for pay or profit" and "will take up a job immediately." They should be reclassified to be unemployed. Fourth, those who are classified as not in the labor force but are waiting to report to a job within a month should be reclassified as unemployed according to the U.S. concept.

The magnitude of these adjustments could vary depending on the details of reclassification. However, a reasonable adjustment would lead us to the following conclusion. Although there exist differences in the definitions of unemployment between the U.S. and Japan, with most of them biased toward a lower Japanese unemployment rate, the magnitude of the bias accounts for only a small portion of the difference. In particular, the increase of the adjusted Japanese unemployment rate would not exceed a mere one percentage point (Shiraishi (1982) and Hamada and Kurosaka (1983))<sup>3</sup>.

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3. Taira (1983) reports that the above-mentioned adjustments "nearly double the official unemployment rate", i.e., increases it by about two percentage points. However, his estimate contains several aspects of over-adjustment. For example, Taira (1983) reclassifies all recent graduates who are waiting to report in a month from "not in the labor force" to "unemployed." Considering that the Japanese school year ends in March and most new graduates start jobs in April, the large magnitude of these persons (about 500,000) is only seasonal. This view (Taira's overadjustment) is shared by staff members of the Bureau of Labor Statistics. The author is grateful to J. Moy and C. Sorrentino for pointing this out to him. Hamada and Kurosaka (1983) independently argued the seasonality of new graduates. They reversed a classification new graduates back to "not in the labor force" to find that the adjusted unemployment to be not more than 0.6 percentage point above the published rate.

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Finding that the statistical bias is insignificant, the difference between the two unemployment rates still begs the question of why the unemployment rate is so much lower in Japan than in the United States. In the next section, we consider several economic and sociological reasons which might explain why the Japanese unemployment rate is lower.

### 3. Factor Contributions to the Difference in Unemployment Rates

The works summarized in the preceding section adjusted the Japanese unemployment rate to the U.S. concept. The question asked there was purely a matter of statistical definition. In this section, the difference in the unemployment rate due to the industrial structure and economic institutions are measured. Since the agricultural and self-employed sectors produces few observed unemployment, Japan with the larger agricultural sector is more likely to have unemployment larger than the U.S. Teenagers are known to push up the total unemployment rate in the U.S. Both the teenage participation and unemployment rates for teenagers are higher than their Japanese counterparts. Temporary layoffs seldom occur in Japan because a decline in labor demand takes a form of shorter hours of work for everybody instead of layoffs. However, if there are any temporary layoffs, they are included in "employment (had jobs but not at work)" in the Japanese statistics. Reclassifying this small portion of laid off persons in Japan to "unemployment" is the statistical measurement problem discussed in the preceding section, while measuring the magnitude of the U.S. layoff practice is an economic problem. In order to measure a contribution of the difference in layoffs between the two countries to the difference in their unemployment rates, the U.S. layoffs should be reclassified as "employed" to construct a hypothetical U.S. economy which takes up the Japanese employment practice concerning layoffs.<sup>4</sup> An adjustment method for each factor is now explained.

### 3.1 Armed Forces Employment

The difference associated with armed forces is superficial and easily correctable. The labor force adjusted to include employment in armed forces is defined as the sum of armed forces, denoted hereafter by (A), civilian employment, (B), and the unemployed, (D). The adjusted U.S. unemployment rate is defined as the ratio of the unemployed to the adjusted labor force.

$$(3.1) \text{ Published unemployment rate} = U = (D)/((C)+(D)),$$

$$(3.2) \text{ Unemployment rate adjusted for armed forces} = (D)/((A)+(C)+(D)).$$

In 1982 for example, the adjusted rate was 9.5 %, while the published rate was 9.7%. The difference due to armed force employment is very small.

### 3.2 Layoffs

Whether layoffs are included as unemployment reflects a structural difference as well as a statistical problem. First of all, regular workers in large Japanese firms are seldom laid off, and even if they are laid off, they would not be counted as "unemployed" by the definition in Japan. The relatively flexible annual wage adjustment is possible due to bonus payments. The synchronized one-year contract negotiations, "shunto", are in sharp contrast to American staggered multi-year contract negotiations. Both bonuses and annual recontracting are supposed to have reduced temporary layoffs. The above contrast is pointed out and emphasized in Gordon (1982), Grossman and Haraf (1983), Hashimoto (1979), Moy and Sorrentino (1981), Sachs (1979), and

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<sup>4</sup> Since the Japanese statistics of persons who would be laid off should the Japanese firms be operated in the American manner are not available, it is natural to calculate the U.S. unemployment rate adjusted to the Japanese institutions instead of calculating the adjusted Japanese unemployment rate. The use of counterfactual hypotheses is frequently adopted in the new quantitative economic history, cliometrics. The present paper applies the technique to a cross-sectional study.

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Economic Planning Agency (1983; ch. 1). Moreover, (implicit) labor contracts in Japan are believed to guarantee lifetime employment in return for low wages in the early stages of their tenure.<sup>5</sup> Thus reduced labor demand beyond wage adjustment takes the form of reduced work hours. Although there is some evidence that long-term tenure in the U.S. is as common as in Japan (Hall (1982)), layoffs are definitely rare in Japan. Let us calculate the hypothetical U.S. unemployment rate which would be observed had the U.S. labor market adopted the Japanese method of labor force adjustment in recessions. The statistic, unemployment by reason, is available in the U.S. The ratio of job losers on layoff, denoted hereafter by (L), is used to calculate unemployment excluding layoffs. In 1982, for example, 20.1 % of the unemployed were laid off. We reduce the U.S. unemployment rate by that ratio to calculate the hypothetical rate adjusted to the layoff practice. In 1982, (3.3) the layoff-adjusted unemployment rate =  $(1-L)U = 7.7 \%$

The hypothetical unemployment rate differs from the published unemployment rate by 2.0 percentage points. That is, other things being equal, the U.S. unemployment rate would be reduced by that magnitude if the U.S. layoffs were as infrequent as Japan. As seen from this magnitude, layoffs alone cannot be the main reason of the difference between the two countries, contrary to a conjecture of Economic Planning Agency (1983). In fact, if temporary layoffs were the main difference between the two countries, then in a boom year, the difference would be a trivial amount. However, the difference is persistent throughout the business cycle.

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<sup>5</sup>. The share of workers protected by lifetime employment is probably about 30 % of all wage and salary earners. Part-time and seasonal employees are subject to frequent firings. Subcontractors to large manufacturing firms do not have lifetime employment practices.

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### 3.3 Agricultural sectors

Agricultural and self-employed sectors are known to adjust the size of the labor force without causing unemployment. In other words, unemployment in the agriculture sector is "disguised." It is only natural that if the economy has a larger agricultural sector, unemployment is less commonly observed. Japan has an agricultural sector larger than the U.S., which reduces to some extent the Japanese unemployment rate. In 1982, for example, the U.S. had 3.4% of its employed persons in the agricultural sector, while Japan had 8.6% in the agricultural sector. Employment in the agricultural sector in Japan is still declining very fast. The employment share was more than 10% before 1979. However, the unemployment rate of Italy, which has a larger agricultural sector than Japan, is higher than that of Japan. Thus, the influence of agriculture on the unemployment rate has to be measured to argue its significance.

Let us calculate the hypothetical U.S. unemployment rate for the case that the U.S. economy had the agricultural sector as large as Japan. As a first approximation, it can be assumed that unemployment does not occur in the agricultural sector. The agricultural employment in Japan, denoted by  $(CA_j)$ , as a ratio to the total labor force in Japan,  $(B_j)$ . Let us adopt a counterfactual hypothesis that the United States in 1982 had the same agricultural employment ratio as Japan. The non-agricultural employment,  $(CN)$ , and unemployment would be reduced without changing the unemployment rate in the non-agricultural sector. Note that the total size of the labor force, the sum of agricultural and non-agricultural, is kept constant in this experiment. Therefore, the hypothetical U.S. unemployment rate in this case can be calculated by multiplying the published rate by the ratio of the hypothetical size of the non-agricultural labor force to the actual size of the non-agricultural labor force.

(3.4) Multiplier of agricultural adjustment =  $[(1-(CA_j/B_j))B_j]/(D+CN) \equiv M.$

(3.5) Hypothetical U.S. unemployment rate adjusted for the agricultural sector  
=  $(U)(M) = 9.16\%$ , in 1982.

The difference between this rate and the published rate, .53 percentage points, is the contribution of agriculture. About one-half percentage point out of a total difference of 7.33 percentage points between the U.S. and Japan is due to the difference in the size of the agricultural sectors. The agriculture alone is not a major cause of the difference, either.

The agricultural sector usually has a larger participation rate without causing unemployment, because agriculture employs family members quite easily. Therefore our counterfactual hypothesis, that the total size of the labor force in an economy is kept constant, has a tendency to underestimate the agricultural contribution to the U.S.-Japan difference.

### 3.4 Teenage unemployment

Youth unemployment is one of the critical problems in the U.S. labor market. In 1982, more than 53% of teenagers (16-19 years old) participated in the labor market but 23% of them could not find jobs. The significance of youth unemployment is well summarized in the Economic Report of the President (1983; pp.42-43). Youth unemployment is not as serious as unemployment among heads of households with children, since "many unemployed youth are in school and looking for part-time work. ... Youth unemployment is nevertheless a critical economic problem," since certain teenagers who suffer extensive unemployment earn lower wages later in life. The Job Training Partnership Act, Youth Minimum wages, and the targeted jobs tax credit have been proposed and adopted to correct high youth unemployment.

The participation rate among teenagers is significantly lower in Japan than in the U.S. Only 17.6 % of Japanese teenagers (15-19 years old)

participated in the market with a 5.4 % unemployment rate in 1982. In Japan, youth unemployment is not recognized as an economic problem at all. For example, there is no mention of youth unemployment in the White Paper on the Economy, the Japanese equivalent of the Economic Report of the President.

There are four main socio-economic reasons and one technical reason for the marked differences in youth unemployment between Japan and the U.S. First, the lower minimum wage in Japan discourages the youth from entering the labor market, and keeps the unemployment rate low.<sup>6</sup> Second, schooling in Japan until college entrance examinations is very rigorous and important for one's career. Therefore, students are reluctant to reduce their study time, and high schools and parents discourage students who want to go to college from taking up jobs even during summer vacation. The school days in a year are about a third more than the U.S., making the summer job opportunities less available. Japanese pre-college students prefer having private tutoring and going to cram schools rather than taking part-time or summer jobs. The percentage of young people attending high school in Japan is as high as in the U.S., but their behavior with respect to labor market participation is different. Third, it is quite common in Japan that parents financially support their children through college, probably because of family tradition. Therefore, there is no acute financial need among students to seek jobs. Fourth, private "tutoring" for high school and elementary school children is

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<sup>6</sup> There are some evidence that the minimum wage was causing youth unemployment in the U.S. (See Brown, Gilroy and Kohen (1982), and recall the arguments which led to institute the youth minimum wage.) The Japanese minimum wages are set differently not only for different districts (48 districts in the nation) but also for different industries. A national average for the minimum wage for the fiscal year 1982 was 380 yen (= \$1.65) an hour, about a half of the U.S. level. A district committee which decides the minimum wages is said to keep full employment. The workers earning minimum wages are best characterized as part-time female workers rather than teenagers. (For the last point, see Shinotsuka (1983).)

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one of the most popular part-time job for college students. Tutorings do not show up in the employment statistics. Lastly, note that people 15 years of age are included in Japan and excluded in the U.S, which tends to depress the participation rate for Japan. These reasons more than offset the difference in schooling rate for college students. About 55 % of the U.S. students at age 18 go to college, while only 35% of Japanese students do. This should act as an increasing factor for the participation rate in Japan. However, the Japanese situation is approximated by a description that those who go to school, 100 % of the high school-age (15-17 years old) and 35% of the college-age (18-19 years old) population, do not participate in the labor market while most others do. This would approximately equal the participation rate of Japanese youth. Table 1A shows the results of an occupational survey which shows the characteristics of Japanese teenagers, i.e., they do not participate in the labor market.

It is difficult to compare the U.S. and Japanese unemployment rate taking into account the difference in the educational system, minimum wage, and youth preference. We propose to use a counterfactual hypothesis to calculate the comparable unemployment rate. First, we calculate how much the American unemployment rate would have been if their educational system and social structure was like the Japanese. Basically, we take the Japanese youth participation rate, denoted by  $(S_j)$ , and youth unemployment rate,  $(U_j)$ , and multiply these by the U.S. population between the ages of 16 and 19,  $(P_{16})$ , to obtain the hypothetical American youth unemployment and employment. However, note that teenagers are defined differently in Japan. The starting age of Japanese teenagers is 15 years as opposed to 16 in the U.S. Since most 15 year-olds are in school, the published participation rate would underestimate the participation rate for the hypothetical U.S. economy, thus overestimating the difference in the effect of youth behavior. We correct this possible

problem by increasing the participation rate (Sj) by 5/4, in effect calculating the hypothetical participation rate of 16-19 year-olds.<sup>7</sup>

The effect of the difference in youth behavior is dramatic as shown in Table 1B. Teenage employment is reduced by more than 3 million persons and teenage unemployment is reduced by more than 90%. This result underscores from an international perspective the importance of the teenage unemployment problem in the United States addressed in the beginning of this subsection.

Adding the adult employment, (C20), and adult unemployment, (D20), to youth employment and unemployment, respectively, the total employment and unemployment adjusted for the difference in youth behavior are calculated.

$$(3.6) \text{ Hypothetical U.S. unemployment} = (P16)(Sj)(5/4)(Vj) + (D20) \equiv (D4).$$

$$(3.7) \text{ Hypothetical U.S. employment} = (P16)(Sj)(5/4)(1-(Vj)) + (C20) \equiv (C4).$$

$$(3.8) \text{ Hypothetical U.S. unemployment rate adjusted for youth unemployment} \\ = (D4)/((D4)+(C4)) = 8.45 \% \quad \text{in 1982.}$$

The American unemployment rate would have been 1.24 (=9.69-8.45) percentage points lower had American teenagers behaved like Japanese teenagers in the labor market. In 1982 the magnitude was not as large as the difference in temporary layoffs, but more than the difference due to the size of the agricultural sector. The effect of teenage behavior on the unemployment rate should be emphasized in future discussions of explaining why the Japanese unemployment rate is so low compared to the U.S. unemployment rate. We did not take into account the secondary effect that reduced teenage employment might be filled by the adult unemployed, thus reducing the adult unemployment rate. Hence the contribution of the youth unemployment adjustment is underestimated.

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7. This adjustment assumes that no 15 year-old in Japan is participating in the labor market. This correction by a factor of 5/4 would not change the hypothetical unemployment rate by more than one-tenth of a percentage point. Following the technique of cliometrics, an approximate adjustment is taken on the "conservative" side, i.e., the smallest adjustment for a hypothetical economy in order to claim that our explanations are the least of possibilities.

TABLE 1: Youth participation and employment in Japan and in the hypothetical U.S.

TABLE 1A: Survey of Japanese Employment Structure in 1979.

For Ages between 15 and 19, (unit=1,000 persons)

Popula- tion	Employed -----					Not Employed-----			
	Total	Employ Main	House	School	secondary Others	Total	House	School	Others
8,036	1,346	1,181	10	150	5	6,690	73	6,487	130

Source: Bureau of Statistics, Prime Minister's Office, "Report on Basic Study on Employment Structure".

TABLE 1B: Actual and Hypothetical Youth Employment and Unemployment in the US in 1982. (Unit=1000 persons)

	Actual	Hypothetical, using the raw participation rate, 15-19.	Hypothetical, correcting the participation rate for 16-19.
Youth employment	6,549	2,672	3,341
Youth unemployment	1,976	135	191

Hypothetical employment using the participation rate for 15-19 years old  
=  $(P_{16})(S_j)(1-U_j)$

Hypothetical unemployment using the participation rate for 15-19 years old  
=  $(P_{16})(S_j)(U_j)$

Hypothetical employment =  $(P_{16})(S_j)(5/4)(1-U_j)$

Hypothetical unemployment =  $(P_{16})(S_j)(5/4)(U_j)$

Source: Most American data are taken from the Economic Report of the President, which reprints from data in Bureau of Labor Statistics, Department of Labor. The ratio of "job losers on layoff" to unemployment is provided directly by Bureau of Labor Statistics.

Japanese data are from Report of Labor Force Survey by the Statistics Bureau of the Prime Minister's Office.

### 3.5 Total Effect

Combining the four factors discussed above, we can calculate the hypothetical U.S. unemployment rate which is adjusted for armed forces personnel, temporary layoffs, and the differences in the size of the agricultural sector and in the youth participation and unemployment rates. Some adjustments may be overlapping, such as youth agricultural employment. Keeping the estimation procedure simple, we assume that the ratios of agricultural employment are the same for youths and for adults. We also assume that the ratios of temporary layoffs among youths and among adults are the same. The multiplier of agricultural adjustment,  $\langle M \rangle$ , calculated in equation (3.4), is multiplied by adult civil unemployment to derive agricultural sector-adjusted adult unemployment. Then job losers on layoffs must also be counted as employed in this hypothetical economy. Since the size of the adult labor force is assumed to be constant, hypothetical adult employment is the difference between the actual adult labor force and the hypothetical unemployment.

$$(3.9) \text{ Hypothetical Adult Unemployment} = D20K = \langle D20 \rangle M(1-L).$$

$$(3.10) \text{ Hypothetical Adult Employment} = C20K = \langle C20 \rangle + \langle D20 \rangle - \langle D20K \rangle.$$

The total employment of this hypothetical U.S. economy is the sum of armed forces employment, hypothetical adult employment (3.10), and hypothetical youth unemployment (3.7). The total unemployment is obtained by adding hypothetical adult and youth unemployment.

$$(3.11) \text{ Hypothetical Unemployment Rate}$$

$$= \langle \langle D20K \rangle + \langle D16h \rangle \rangle / \langle \langle D20K \rangle + \langle C20K \rangle + \langle D16h \rangle + \langle C16h \rangle \rangle = 6.3\% \quad \text{in 1982.}$$

In sum, we have constructed a hypothetical U.S. economy where the agricultural sector has the same size as Japan, temporary layoffs are hidden

as hoarded workers by implicit lifetime employment, and only a small fraction of youths are participating in the labor market like Japanese youths. The unemployment rate of the hypothetical economy is about 3.4 percentage points lower than the actual unemployment rate in 1982. In other words, about 46% of the difference between the published U.S. and Japanese unemployment rates is corrected. Considering that most of the adjustments were underestimated, actual explanatory powers of suspected factors may well be larger.

Table 2 summarizes statistics for explanations of the difference in the unemployment rates in the past five years. Contributions of the agricultural sector are becoming smaller and smaller. The teenage unemployment contribution is becoming smaller, too. The former is due to a rapid decline in the agricultural share of employment in Japan. The latter is due to a sharp increase in American adult unemployment in 1982. An increase in the contribution of layoffs since 1979 is due to recessions in the U.S., which increase the U.S. temporary unemployment rate.

#### 4. Implications of Adjusted U.S. Unemployment

Since employment in the agricultural sector in Japan continues to decline, so does the contribution of the agricultural sectors in explaining the difference in unemployment rates. Combining the armed forces and agricultural adjustment, only 10 % of the difference is explained. Since temporary layoffs move countercyclically, so does the percentage contribution. The sample period (1975-1982) can be regarded as an intermediate cycle from a trough to a trough. We can conclude that the temporary layoff adjustment explains about 27 % in a recession and about 17 % in a boom year. The teenage unemployment explains between 17 and 29 %. Both the teenage participation rate and the teenage unemployment rate are much lower in Japan. The teenage participation rate in Japan continues to decline, while its unemployment rate

TABLE 2: SUMMARY OF CONTRIBUTIONS OF FOUR FACTORS

	1975	1976	1977	1978	1979	1980	1981	1982
<b>Unemployment rates</b>								
(1) U.S. published	8.46	7.70	7.06	6.07	5.85	7.14	7.61	9.69
(2) Japanese published	1.88	2.01	2.04	2.24	2.09	2.02	2.21	2.36
(3) U.S. hypothetical	5.07	5.01	4.70	4.04	3.82	4.49	5.01	6.29
<b>Difference</b>								
(4) published (1)-(2)	6.58	5.69	5.02	3.83	3.76	5.12	5.40	7.33
Unaccounted = (3)-(2)	3.19	3.00	2.66	1.80	1.73	2.47	2.80	3.93
(5) Accounted (1)-(3)	3.39	2.69	2.36	2.03	2.03	2.65	2.60	3.40
Accounted % =(5)/(4)	51.5%	47.3%	47.0%	53.0%	54.0%	51.8%	48.2%	46.4%
<b>Marginal contribution of each factor: factor adjusted hypothetical U.S. rates</b>								
(6) Armed forces	8.26	7.53	6.91	5.94	5.73	7.00	7.47	9.50
Difference = (1)-(6)	.20	.17	.15	.13	.12	.14	.14	.19
Contribution (6)/(4)	3%	3%	3%	3%	3%	3%	3%	3%
(7) Temporary layoff	6.67	6.60	6.20	5.38	5.04	5.72	6.30	7.74
Difference = (1)-(7)	1.79	1.10	.86	.69	.81	1.14	1.31	1.95
Contribution (7)/(4)	27%	19%	17%	18%	22%	28%	24%	27%
(8) Agriculture	7.81	7.12	6.54	5.63	5.45	6.70	7.18	9.16
Difference = (1)-(8)	.85	.58	.52	.44	.40	.44	.43	.53
Contribution (8)/(4)	13%	10%	10%	11%	11%	9%	8%	7%
(9) Youth unemployment	7.07	6.41	5.86	4.97	4.81	6.04	6.49	8.45
Difference = (1)-(9)	1.39	1.29	1.20	1.10	1.04	1.10	1.12	1.24
Contribution (9)/(4)	21%	23%	24%	29%	28%	21%	21%	17%

Note: Because of rounding errors and second-order effects, the sum of differences due to the four factors do not add up to total accounted differences.

Sources: See Table 1. Raw data used for calculation are provided from the author upon request.

continues to increase. In the U.S., the teenage unemployment rate moves in parallel with the total unemployment rate, while there is a positive trend in its participation rate. The difference in teenage behavior will continue to be significant between Japan and the U.S.

Our adjustment of the U.S. unemployment rate concerns both the structural and cyclical parts. The difference between the two unemployment rates is halved, but it remains to be seen how the adjusted rate compares with the Japanese rate in terms of cyclical behavior. Hamada and Kurosaka (1983) argue that Okun's coefficient, the change in the GNP gap with respect to the change in the unemployment rate, is much higher in Japan. Although Hamada and Kurosaka (1983; section 2) were aware of the statistical problem of the Japanese unemployment rate (as discussed in section 2 of this paper), they used the unadjusted data, because they lacked a long series of adjusted data.<sup>8</sup>

Let us consider the Hamada-Kurosaka argument in our framework. The difference in Okun's coefficient (measured in unadjusted data) can be attributed to several reasons. One of the obvious ones is the difference in the layoff practice. Since temporary layoffs are eliminated in our adjustment of the U.S. rate, it is of some interest to see the difference in Okun's coefficient made by our adjustment. With annual data between 1975 to 1982, the elasticities of the employment rate (one minus unemployment rate) with respect to real gross national product are estimated for the U.S., the adjusted U.S., and the Japanese economies:

$$(4.1) \quad \log(1-U) = \beta_0 + \beta_1 \log(Y) + \beta_2 \text{ TIME} + \epsilon.$$

Okun's coefficient is calculated as  $1/\beta_1$ . Hamada and Kurosaka (1983) reported

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8. The Special Survey, which made it possible to adjust the Japanese rate to the U.S. concept, was conducted only from 1977 to 1980. This is an additional reason why adjustments of the U.S. rate are preferred in this paper.

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that Okun's coefficient is much larger for the entire period of postwar Japan than the U.S. and also for subperiods. Table 3 summarizes estimations from 1975 to 1980 using published rates for both countries and the U.S. adjusted unemployment rate calculated in the preceding section.

The unemployment rate does not reflect the employment change when there are many discouraged workers. An increase in the employment rate,  $1-U$ , is often moderate as compared to an increase in the level of employment in the recovery phase, because discouraged workers start participating the market. Hence, it is in some cases desirable to use the employment level in order to judge the labor market condition. Based on this argument, the logarithm of the employment level,  $E$ , is regressed on the logarithm of real GNP to calculate the elasticity of employment with respect to GNP.

$$(4.2) \quad \log(E) = \gamma_0 + \gamma_1 \log(Y) + \gamma_2 \text{ TIME} + \epsilon,$$

where  $E$  denotes the employment level. The result of this regression is also reported in Table 3.

It is clear from Table 3 that the adjusted U.S. unemployment rate behaves as a cross of the U.S. rate and the Japanese rate in every respect. Although the adjusted rate is exactly the midpoint of the two published rates with respect to the mean over the sample period, it behaves closer to the American rate with respect to cyclical aspects, namely the standard deviation and Okun's coefficient. The elasticity of employment with respect to GNP shows also a significant difference between the U.S. and Japan. The U.S. employment level increases by 0.7 %, while the Japanese employment level increases by only 0.2 %, when the respective GNP increases by 1 %. However, adjusting for the differences in the agricultural size, layoff practices and teenage behavior, the U.S. elasticity is only 0.35%. Therefore, about a half of the difference in the elasticities is due to those factors.

TABLE 3: Summary Statistics of Unemployment Rates

	United States published	United States adjusted	Japan published
1975-1982			
Mean	7.5	4.8	2.1
Standard deviation	1.2	0.7	0.1
Okun's coefficient ( $1/\beta_1$ )	2.1	4.3	13.7
Elasticity of employment ( $\gamma_1$ )	0.687	0.348	0.188

Sources: Means and standard deviations are calculated from Table 2. Okun's coefficients are calculated as in Hamada and Kurosaka (1983). Details of regression results are shown below. Hamada and Kurosaka reported 13.2 for Okun's coefficient for 1974 to 1982.

Regression Result for Okun's Coefficient and Elasticity of Employment

Following Hamada and Kurosaka (1983) as closely as possible, Okun's coefficient is calculated by estimating equation (4.1). The elasticity of employment with respect to GNP is obtained by estimating (4.2). Estimates and (t-statistics) are calculated with first-order serial correlation correction, either with the Cochrane-Orcutt or the maximum likelihood technique, using the TSP, version 4.0. For the U.S. cases, ordinary least squares would give the same Okun's coefficient.

	U.S. (75-82) published U (CORC)	U.S. (75-82) hypothetical Uh (ML)	Japan (75-82) published Uj (CORC)	t-statistics in brackets
$\beta_0$	-3.467 (24.14)	-1.680 (6.28)	-0.379 (1.99)	
$\beta_1$	0.477 (23.65)	0.231 (6.11)	0.073 (1.88)	
$\beta_2$	-0.013 (21.86)	-0.007 (6.47)	-0.004 (2.05)	
$\bar{R}^2$	0.99	0.91	0.33	
Rho	.35 (1.07)	.34 (0.86)	.36 (1.19)	
Okun's coefficient $1/\beta_1$	2.1	4.3	13.7	
$\gamma_0$	4.153 (9.85)	6.559 (12.06)	7.614 (32.86)	
$\gamma_1$	0.687 (11.59)	0.348 (4.55)	0.188 (3.99)	
$\gamma_2$	0.005 (2.79)	0.013 (5.70)	0.003 (1.22)	
$\bar{R}^2$	0.99	.99	.99	
Rho	.40 (1.21)	.25 (0.60)	.17 (0.52)	

TABLE 3

## 5. Concluding Remarks

In this paper, in order to explain the gap between the U.S. and Japanese unemployment rates, adjustments of the U.S. unemployment taking into account the industrial structure and socio-economic differences are proposed. As concluding remarks, let us point out some other factors which would be left as difference unaccounted in this paper.

First, it may be the case that Japan has a stricter eligibility for unemployment compensation which gives laid-off workers an incentive to take jobs or withdraw quickly. In 1982, 60% of the unemployed in Japan were covered by unemployment insurance, while the ratio was 43 % in the U.S. This could mean either that Japanese unemployment insurance is harder to obtain so that many withdraw or that Japanese unemployment is less than the U.S. despite Japanese broader coverage of the unemployed workers. More detailed studies including the degree of coverage are left as an agenda for future research.

Second, although agriculture is a major sector of self-employment, other sectors in an economy have self-employment contributing to reducing unemployment because of increasing participation and decreasing layoffs. It would be possible to calculate the contribution of the size of self-employment in an economy to the difference in the unemployment rate.

Third, we have taken into account the difference in "job losers on layoffs". However, the statistic of "job losers other than those on layoffs" may include workers who are frequently laid off but expect to be rehired although not being labelled as "layoff." There have been several studies emphasizing rapid turnover of workers among jobs. See Hall (1972, 1980), and Clark and Summers (1979). These job losers with short spells of unemployment might not show up as unemployment in Japan, again by implicit contracts in Japan. The firm may support workers until they find alternative jobs. In that

sense, the adjustment with respect to "job losers on layoffs" alone may be underestimating the magnitude. It would be very difficult to find out the portion of unemployed workers in the U.S. who would be protected by an implicit lifetime contract in Japan. Since unemployment in Japan did not emerge as a serious political and economic problem until recently, statistics and analysis on unemployment in Japan have not been as detailed as in the United States. This makes it almost impossible to compare unemployment with respect to duration and reasons between the two countries.

Lifetime and paternalistic employment practices in Japan may be applied not only to those who would be temporarily laid off in the U.S. but also to those who would be dislocated in the U.S. Since a Japanese labor union is organized for all the workers in a single company instead of separate unions for different occupations, large Japanese companies transfer workers to different occupations within a firm quite often. The firm sometimes moves workers to subsidiaries and other firms within an enterprise (zaibatsu) group. Lifetime employment is guaranteed only with a condition that the firm can transfer workers whenever and wherever necessary. Therefore, it is quite conceivable that some dislocated workers in the U.S. would not show up as unemployed in Japan, either.

Lastly, differences between male and female workers should be taken into account. One might suspect that Japanese women participate in the labor market much less than American women. The female participation rates for women in Japan and in the U.S. were 48% and 53%, respectively, in 1982. The Japanese female unemployment rate was 2.3%, as opposed to 2.4% for male. Since the female unemployment rate was also less than the male unemployment in the U.S. in 1982 (contrary to earlier years), the male-female difference in the participation rate or unemployment rate would not explain the gap in the total unemployment rate. Although it is not obvious from the aggregate data

that Japanese female workers behave much differently from their U.S. counterparts, there are possibilities that detailed investigations might suggest otherwise.

The above mentioned factors whose impacts are not measured in the present paper are left to be investigated in the future projects.

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