Title	Further Considerations on the Turning Point in the Japanese Economy (I)
Author(s)	Minami, Ryoshin
Citation	Hitotsubashi Journal of Economics, 10(2): 18-60
Issue Date	1970-02
Type	Departmental Bulletin Paper
Text Version	publisher
URL	http://hdl.handle.net/10086/8040
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FURTHER CONSIDERATIONS ON THE TURNING POINT IN THE JAPANESE ECONOMY (I)

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I. *Introduction*

In a previous paper [Minami 1968] the writer attempted to throw some light on the date of the turning point[1] in the Japanese economy and came to the conclusion that it had been passed sometime in the early 1960's. The aim of this paper is to attempt a much more comprehensive study of this topic. The main differences between the previous paper and this present one are as follows:

1) In the former the daily wages for the *hi-yatoi* (daily workers) in agriculture were used as a substitute for the subsistence sector wages. (The latter are equal to the subsistence level in wages before the turning point.) In the writer's opinion, however, the annual wage payments to the *nen-yatoi* (annual contract workers) are a better substitute for them for the following reasons:

a) The annual wage earnings are better than the daily wages, because, conceptually, the subsistence level is concerned with the wage earnings rather than the wage rate, and because, practically, the economic behavior of labor force in this country is generally considered to be made in terms of wage earnings.

b) Wages for the annual contract workers are better than those for the daily workers. There are two reasons for this. Firstly, the wages of the former are less sensitive to changes in economic activity, so that they are much more suitable for long-term studies. Secondly, the annual wage earnings are also a much better index for the implicit wages of unpaid family workers who comprise a major part of the agricultural labor force. This is because almost all the annual contract workers tend to live together with the workers in their employer's family.

2) In the previous paper we did not analyze wages in sectors other than the subsistence sector. Wages in the capitalist sector, for instance the textile industry, may be another good index for the subsistence sector wages, because of the equalization between the capitalist and the subsistence sectors.

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The writer is very much indebted to Mr. William Hall at present at the Institute of Economic Research of Hitotsubashi University for comments and discussions on the paper and also for his help with the English in it.

[1] The turning point is defined as that point of time in which labor supply from the subsistence to the capitalist sector ceases to be unlimited or becomes limited. In regard to the definition and concept of unlimited and limited supplies of labor, see [Ohkawa & Minami 1964].

3) Investigations into the changes in wage differentials, which are defined later in the paper, were not fully made in the former paper. They may be of considerable benefit in dating the turning point.

4) Statistics for the number of people employed in the various industry groups which were used in the former paper are the estimates by Hijikata and the writer. Newer and better estimates by M. Umemura, however, are now available for certain periods.

5) In extracting trends from time series data in previous paper the writer was not careful enough. He did not use moving averages for them, only annual statistics. The former will be used in this paper.

II. *How to Find the Turning Point*

(*1*) *Notes on Finding the Turning Point*

In finding the turning point the following items should be kept in mind.

1. *The Theory of the Turning Point is Applicable Only to the Unskilled Labor Force*

It is not applicable to the skilled labor force; i.e., engineers, machine repair men, research workers, and managers, who are considered to be limited in supply at any stage of economic development [Lewis 1954, reprint, p. 406]. It is difficult, however, to identify which is the skilled and which is the unskilled labor force, since the difference is one of degree. For practical purposes, however, we should select and use the statistics for that labor force which is considered to be the most unskilled.

2. *The Theory of the Turning Point Is Not Applicable to the 'Modern Sector'*

The theory of the turning point depends on the supposition of a dual structure in the economy or the coexistence of a subsistence and a capitalist sector. It is not easy, however, to find a suitable substitute for them among individual industry groups. J.C.H. Fei and G. Ranis, who formulated the Lewisian theory mathematically, substituted the agricultural (or primary) and the non-agricultural (or non-primary) industries for the subsistence and for the capitalist sectors respectively [Fei & Ranis 1964]. Strictly speaking this substitution is not quite accurate. Firstly, agriculture may include capitalistic farms which work on the profit maximization principle. Secondly, small enterprises in the non-agriculture (especially tertiary) industry should be considered as belonging to the subsistence sector.

What is the content of the capitalist sector? In this respect the hypothesis of the 'differential structure of industries' in the non-agriculture industry proposed by K. Ohkawa should be recalled [Ohkawa 1965, pp. 482~84]. This hypothesis states that the non-agriculture industry is composed of three industrial groups; i.e., the traditional, the semi-modern and the modern. The first is composed of small scale enterprises for example those with less than five or ten employees). This group belongs to the subsistence sector. The second and the third groups are composed of, for instance, the textile industry, and the big firms of the metal, machinery and chemical industries respectively. One of the characteristics which distinguishes the second from the third group is the difference in technology. The technology of the third group, the so-called 'borrowed technology', is very modern. This is in the sense that the capital intensity and therefore the labor productivity are much higher in the third than in the

second.

Another and essential difference is the fact that the labor markets of the two are independent of each other. The labor market of the second group, the semi-modern can be considered to be common to the subsistence sector as well. The labor force moves freely between the second group and the subsistence sector. With an increase in the demand for labor in the second group during boom years, labor migration out of the subsistence sector is accelerated, and *vice versa*.[2] As a result of migration, wages become equivalent between the second group industries and the subsistence sector.[3] Capitalists in the second, the semi-modern group employ labor and capital to the extent that they can maximize the profit rate by paying subsistence wages for workers from the subsistence sector. This is exactly what is assumed in the theory of the turning point.

On the other hand the labor force of the third group, the modern, has no direct relation with the subsistence sector. It is sustained from within and/or by the second group.[4] Because of its modern technology, the marginal productivity of labor or the demand price for labor are much higher in this third group than in the second. Therefore in this group wages which are higher than those in the second and in the subsistence sector are the norm.[5] In a word, the theory of the turning point cannot be applied to the modern sector.

Consequently therefore, our theory is concerned with the following industries; in the subsistence sector, nearly all primary industry as well as the traditional enterprises of non-primary industry, and in the capitalist sector, the semi-modern group of non-primary industry. In attempting to find the turning point therefore, it is necessary to carefully select and use statistics for these particular industries. Below we use the primary (or agriculture) industry as a substitute for the subsistence sector and concentrate mainly on analysing statistics concerned with it. This is because the data are so poor for the second part of the subsistence sector, described before, the traditional enterprises of non-primary industry.

3. *The Turning Point Is Not a Specific Point of Time*

Theoretically the turning point is defined as a specific point of time. But, the turning point, as one of the historical phenomena in the long-term process of economic development, can not be defined as a specific point of time, nor for that matter as a certain year, since it extends over a number of years.

4. *The Turning Point Is a Long-Term and a Trend Related Economic Phenomenon*

Transition from the stage of unlimited supplies of labor to that of one where supplies are limited is a structural change in the economy or a trend phenomenon. Thus it should be distinguished from phenomenon such as those caused by economic fluctuations like business cycles with their seven or eight years cycles or long swings which have about a twenty years

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[2] This will be clarified later in Chap. VIII, Section (6).

[3] We will find a close relationship between wages in the agricultural industry (subsistence sector) and those in the textile industry (semi-modern sector). (See Chap. III, Section (2).)

[4] There is a possibility that the second generation of migrants from the subsistence sector will be hired by the modern sector.

[5] The emergence of wage differentials in the 1920's supports this supposition. The widely-spread belief that the two labor markets are independent of each other is due in large measure to the pioneering work by S. Ujihara [Ujihara 1966].

cycle.[6] There may be some cases in which the economy passes the turning point 'temporarily' with the increase in demand for labor. The increasing demand is caused by accelerated technological progress and capital formation in the capitalist sector during an upward phase of a long swing. However, this is not the real turning point. In order to overcome such a difficulty, one should try to eliminate the effects of economic fluctuations from the time series statistics.[7]

(2) *Criteria for Finding the Turning Point*

1. *Comparison between Wages and Marginal Productivity of Labor in the Subsistence Sector (Criterion 1)*

According to the definition of the turning point, real wages w_a are larger than marginal productivity of labor MP_a in the subsistence sector, and are equal to the latter, before and after the turning point respectively.[8] (Both real wages and marginal productivity are measured in subsistence sector goods.) In comparing wages with marginal productivity therefore, one may clarify the existence and the date of the turning point. This provides the most rigorous test of the turning point.

This test is not, however, completely without its problems as follows:

1) Even in the stage of limited supplies of labor, there is a time lag between a wage increase and a productivity increase, so that wages are not equal to marginal productivity. Therefore it should be noted that there are some cases in which the labor supply is limited even if wages are not exactly equal to marginal productivity.

2) The second problem stems from a difficulty in estimating wages and marginal productivity for the same labor force. If we use wage statistics for wage earners, then the comparable marginal productivity statistics should also be used. It is impossible, however, to estimate this. Thus it is necessary to estimate the marginal productivity of the total labor force (which include unpaid family workers as well) and compare it with the average wages of the wage earners. No problem arises in this comparison, if we assume that the wages for the wage earners (especially the annual contract workers) are equal to the implicit wages for the unpaid family workers or workers in their employers' family. In the writer's opinion, this supposition may be considered to be true, because the annual contract workers live together with

[6] In regard to studies on Japanese business cycles and long swings M. Shinohara, K. Ohkawa and H. Rosovsky and S. Fujino have made great contributions [Shinohara 1961, Chap. 3; 1962, Chap. 4] [Ohkawa & Rosovsky 1962; 1968] [Ohkawa 1962, Part 1, Chap. 2] [Fujino 1965, Part 1].

[7] C.P. Kindleberger tested the unlimited supplies of labor hypothesis in the European countries [Kindleberger 1967]. However, the observation period covered only the postwar years which, in the writer's opinion, is too short for this type of study. For instance he attempted to demarcate the turning point by considering changes in the relative income share of labor for the postwar period. These changes, if any, do not necessarily mean the turning point has been reached, but may be a result of economic fluctuations. In order to distinguish structural changes in the economy from such fluctuations, a much longer period, for instance, the period including both the pre and the post World War II era may be needed.

[8] In testing for the existence of surplus labor or disguised unemployment, attention has often been paid to the existence of zero marginal productivity of labor, e.g.; [Schultz 1964] [Jorgenson 1966; 1967]. However, this cannot be considered to be a reasonable test of unlimited supplies of labor. This is because marginal productivity is not necessarily zero but can be positive or negative in the stage of unlimited supplies of labor.

their employers' families. There is no way, however, to prove this supposition quantitatively. Therefore some people may still harbour a certain doubt about the reliability of our comparison between wages and marginal productivity.

3) The third problem comes from the difficulty in estimating the marginal productivity of labor which is obtained by multiplying the output elasticity of labor by the average productivity of labor. The latter can be easily obtained. It is very difficult, however, to estimate the annual figures for the former. In this paper we shall estimate the Cobb-Douglas production function with elasticity constant over the entire period. However, since we have no concrete proof for our assumption of constant output elasticity,[9] our estimates of marginal productivity might not be free from biases.

2. *The Correlation between Wages and Marginal Productivity of Labor in the Subsistence Sector (Criterion 2)*

In view of the availability and the reliability of the data to be used, we have had to acknowledge that Criterion 1 involves a few problems. Criterion 2, as set forth below, is less rigorous but may perhaps be considered as more realistic in a sense. In the relationship

$$w_a = a + b\ MP_a,$$

the coefficient of determination r^2 is zero and unity, in the stages of limited and unlimited supplies of labor respectively. By applying the annual statistics for w_a and MP_a to this relation and by estimating the figure for r^2 of various sub-periods therefore, we may be able to identify the two stages and the turning points.[10]

Unlike the test depending on Criterion 1, the relative sizes of wages and of marginal productivity are not our concern here. That is to say that firstly, even if wages are smaller than marginal productivity, the non-existence of a relationship between the two means that labor supply is unlimited. Secondly, a complete correlation between them means that labor supply is limited, even if the two are not equal with each other. With this, the first problem in Criterion 1 is completely eliminated. The second one can be avoided by the assumption that two ratios are constant. They are the ratio of the implicit wages of family workers to the market wages of wage earners and that of the number of family workers to the number of wage earners. The third problem still remains inevitable.

However, this criterion has certain other problems associated with it.

1) Even in the stage of unlimited supplies of labor, both the subsistence level or real wages and marginal productivity in the subsistence sector may increase to some extent. Therefore, some positive correlation may appear between them. Thus it should be noted that a positive correlation does not necessarily mean the existence of limited supplies of labor.

2) As the time lag between a wage increase and a productivity increase is not necessarily uniform over time, and as there are some problems in regard to the reliability of real wages and marginal productivity, the coefficient of determination can be less than unity even in the stage of limited supplies of labor. Therefore we cannot write off the possibility of the existence of limited supplies of labor, even should the coefficient be calculated to be less

[9] As will be developed in equation (23), the output elasticity of labor γ becomes constant when there is neutral technological progress ($B_N=0$) and when there is unit elasticity of substitution ($\sigma=1$).

[10] B. Hansen regressed real wages and the average productivity of labor (a substitute for marginal productivity) in Egyptian agriculture and by so doing tested the marginal theory of wages and the subsistence wage theory [Hansen 1966].

than unity.

3) As in any time series analysis this test is not free from the possible influences of trends in the variables. In view of these problems, it would be better to transform or generalize this criterion as follows. The correlation is relatively weak and relatively strong, in the stages of unlimited and limited supplies of labor respectively. And thus, the turning point may be identified as the point of time in which the correlation coefficient rises stepwise from a low to a high level.

The above discussion has assumed the use of time series data. But, by using cross sectional data for example, regional data, one does not encounter these problems. On the condition that firstly, the subsistence level is independent of the productivity level and that secondly, for each year, the output elasticity of labor is equivalent among the various regions, the degree of correlation between regional wages and average productivity tells the pattern of labor supply. Therefore the first problem (positive correlation between wages and marginal productivity does not necessarily mean the existence of limited supplies of labor) does not occur. The second problem (there is a possibility of the existence of limited supplies of labor even if the correlation is not perfect) may not emerge either in this case. This is if we assume that the time lag between a wage increase and a productivity increase is of uniform among the various regions for each year. And one is not troubled either by the third problem, that which arises from the auto-correlation between the variables.

3. *Movements in Real Wages in the Subsistence Sector (Criterion 3)*

Examination of the movement in real wages in the subsistence sector (in this case wages deflated by the consumer price index) may be some benefit in finding the turning point. In this case, however, we should pay attention only to trends in the movement of wages which should be distinguished from changes caused by fluctuations in economic activity. If the subsistence level is constant over time, constant and increasing trends in real wages signify the stages of unlimited and of limited supplies of labor respectively. And the turning point is identified as that period of time in which real wages begin to increase sharply. In reality, however, the subsistence level increases with the passing of history. Consequently it is impossible to identify the two stages and the turning point. We may be able to eliminate this difficulty by assuming that the historical increase in the subsistence level, if any, is slow when compared with the increase in the real wages caused by the increase in marginal productivity of labor after the turning point. Under this assumption we can then state that if real wages in the subsistence sector or those for the unskilled workers show slightly increasing trends for some years and thereafter sharp increases, the point of time between the former and the latter years may be identified as the turning point.

4. *Changes in Wage Differentials (Criterion 4)*

Generally speaking wage differentials between skilled laborers (or the modern sector labor force) and unskilled laborers (or the subsistence and capitalist sectors labor force) arises from the difference between them in the rate of increase in the demand function for labor and/or the difference in the level of the elasticity of labor supply.[11] This in turn implies two things as below.

[11] Rigorous examination making use of a mathematical model will be given in 5.

1) Before the turning point, there is a possibility of the emergence of wage differentials, as the elasticity of labor supply is different between the two kinds of labor force. In this case, even if there is the same increase in the demand for labor, the wage increase is small for the unskilled labor force (dependent as it is on an increase in the subsistence level), and big for the skilled labor force. There is another possibility, however, that of when wage differentials do not actually emerge; i.e., the increase in real wages for the skilled labor force is not larger than the increase in the subsistence level. This is possible in the case where the skilled labor force is not so limited, and/or where the increase in demand for this skilled labor is not big enough.

2) After the turning point, unskilled laborers become limited, and because of this wage differentials may stop increasing and begin to decrease. Therefore the decrease in wage differentials during the period in which the real wages for the unskilled show a sharp increase demarcates the turning point.

In the above discussion we have been concerned with trends in wage differentials, and not with fluctuations dependent on long swings in economic activity. During the upward phase of a long swing, the supply of both skilled and unskilled labor becomes insufficient and the real wages for them increase. However, the supply of skilled labor seems to be much more elastic in the short-run than unskilled labor. This is because one can substitute unskilled labor for skilled labor after some training, but one cannot easily make up a deficiency of unskilled labor.[12] Thus there is a decrease in wage differentials. In a downward phase, the real wages for unskilled labor decrease because of the decrease in the demand for such labor. On the other hand, the real wages for skilled labor do not go down, as the demand for skilled labor does not decrease. Because of this contrast, there is an increase in wage differentials.[13] From this general pattern of fluctuations in wage differentials, we may safely deduce a hypothesis. This is that a successive decrease in wage differentials during the downward phase is a decrease in a trend.

5. (*Appendix*) *Theory of Wage Differentials*

Let us assume that all factors including labor force do not move between the two sectors, sector 1 and sector 2. Denoting the labor force supply, real wages, and the elasticity of labor supply by X, w, and η respectively, the supply functions which the two sectors face are given by

(1) $X_1=A_1w_1^{\eta_1}$

(2) $X_2=A_2w_2^{\eta_2}$,

where A is a positive constant.[14] Demand functions are derived from the Cobb-Douglas functions,

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[12] Referring to this Lewis stated "Skilled labour may be the bottleneck in expansion, just like capital or land. Skilled labour, however, is only what Marshall might have called a 'quasi-bottleneck'.... For it is only a very temporary bottleneck, in the sense that if the capital is available for development, the capitalists or their government will soon provide the facilities for training more skilled people [Lewis 1954, reprint, p. 406].

[13] K. Taira gave a similar explanation for the relationships between wage differentials and long swings which he found in prewar Japan [Taira 1960; 1962]. Similar studies have been made in the United States by M.W. Reder [Reder 1955] and L.G. Reynolds and C.H. Taft [Reynolds & Taft 1956].

[14] Any conclusions will not be altered, if we take A as a parameter shifting as a function of time.

(3) $O_1=B_1e^{\lambda_1 t}K_1^{\beta_1}Y_1^{1-\beta_1}$

(4) $O_2=B_2e^{\lambda_2 t}K_2^{\beta_2}Y_2^{1-\beta_2}$,

where O, λ, Y, K and β denote output, the rate of neutral technical progress, labor force, non-labor input (e.g., capital stock) and the output elasticity of the non-labor input respectively. B is a constant. In a state of equilibrium (wages=the marginal productivity of labor), the following relations occur.

(5) $w_1=(1-\beta_1)O_1/Y_1$

(6) $w_2=(1-\beta_2)O_2/Y_2$

or

(7) $w_1=(1-\beta_1)B_1e^{\lambda_1 t}K_1^{\beta_1}Y_1^{-\beta_1}$

(8) $w_2=(1-\beta_2)B_2e^{\lambda_2 t}K_2^{\beta_2}Y_2^{-\beta_2}$.

From these, the demand functions for labor are derived;

(9) $Y_1=[(1-\beta_1)B_1]^{\frac{1}{\beta_1}}e^{\frac{\lambda_1 t}{\beta_1}}K_1w_1^{-\frac{1}{\beta_1}}$

(10) $Y_2=[(1-\beta_2)B_2]^{\frac{1}{\beta_2}}e^{\frac{\lambda_2 t}{\beta_2}}K_2w_2^{-\frac{1}{\beta_2}}$.

Under the assumption that supply is equal to demand:
(1)=(9) and (2)=(10), we obtain

(11) $w_1=\{[(1-\beta_1)B_1]^{\frac{1}{\beta_1}}/A_1\}^{\frac{\beta_1}{1+\eta_1\beta_1}}(e^{\lambda_1 t}K^{\beta_1})^{\frac{1}{1+\eta_1\beta_1}}$

(12) $w_2=\{[(1-\beta_2]B_2]^{\frac{1}{\beta_2}}/A_2\}^{\frac{\beta_2}{1+\eta_2\beta_2}}(e^{\lambda_2 t}K^{\beta_2})^{\frac{1}{1+\eta_2\beta_2}}$.

From these equations we have the relation which explains the rate of change in wage differentials, w_1/w_2,

(13) $G(w_1/w_2)=V_1/(1+\eta_1\beta_1)-V_2/(1+\eta_2\beta_2)$.

Here V denotes the rate of shift in the demand functions for labor:

$$V_1\equiv\lambda_1+\beta_1G(K_1) \qquad V_2\equiv\lambda_2+\beta_2G(K_2).$$

Let us now look at three cases which might possibly arise.

1) The case in which there is no difference between two sectors both in the level of output elasticity and in the level of the elasticity of labor supply:—

$$\beta_1=\beta_2=\beta, \qquad \eta_1=\eta_2=\eta.$$

The relation (13) then becomes

(14) $G(w_1/w_2)=(V_1-V_2)/(1+\eta\beta)$.

This means that the rate of change in wage differentials depends upon the difference in the rate of shift in the demand functions. This difference is caused by differences in the rate of technological progress, in the rate of increase in non-labor input, and in the output elasticity of non-labor input.

2) The case in which there are no differences in output elasticity and in the rate of shift of the demand functions:—

$$\beta_1=\beta_2=\beta, \qquad V_1=V_2=V.$$

The relation (13) then becomes

(15) $G(w_1/w_2)=\dfrac{\beta(\eta_2-\eta_1)}{(1+\eta_1\beta)(1+\eta_2\beta)}V$.

Thus wage differentials change in favor of that sector which is faced with the labor with the smaller supply elasticity. (A special case occurs when one sector is faced with unlimited supplies of labor.) In this case wage differentials turn against this sector.

3) The case in which there are no differences in the elasticity of labor supply and in the

rate of shift in the demand function:—

$$\eta_1=\eta_2=\eta, \qquad V_1=V_2=V.$$

The relation (13) then becomes

$$(16) \quad G(w_1/w_2)=\frac{\eta(\beta_2-\beta_1)}{(1+\eta\beta_1)(1+\eta\beta_2)}V.$$

In this case wage differentials change in favor of the sector with smaller output elasticity.

From the above discussions, we may conclude that there are two factors which explain the emergence of wage differentials. Firstly, there is the difference between the two sectors in the rate of shift of the demand functions for labor (excluding the difference in the output elasticity of non-labor input). Secondly the difference in the elasticity of labor supply must sometimes be continued.

In regard to the emergence of wage differentials in the 1920's in Japan a number of hypotheses have been developed.[15] In the writer's opinion, these hypotheses can be considered as belonging to the general theory of wage differentials as developed above.

1) The hypothesis explaining wage differentials in terms of labor productivity differentials:— In this hypothesis there are three variants, a) capital concentration, b) borrowed technology and c) incomplete output market which are regarded as affecting labor productivity differentials.[16] The variant a) has been expressed by M. Shinohara [Shinohara 1961, Chap. 5], variant b) by T. Watanabe [Watanabe 1965; 1968] and Y. Yasuba [Yasuba 1967], and variant c) by M. Ito [Ito 1962]. This hypothesis corresponds to our explanation of wage differentials which depended on differences in the rate of shift of the labor demand function.

2) The hypothesis depending on the existence of surplus labor:—The hypothesis by T. Ishizaki [Ishizaki 1967] is an example of this. In his hypothesis, however, the definition of surplus labor is not clear. If it is defined as unlimited supplies of labor, then the hypothesis corresponds to the explanation of the emergence of wage differentials under surplus labor given in our theory. It is impossible, however, to explain the emergence of wage differentials in the 1920's merely by stating that there existed surplus labor. This can be easily seen if we consider the non-existence of wage differentials before 1920. During this time it is generally believed that surplus labor existed. Therefore we cannot explain the emergence of wage differentials in the 1920's in terms of surplus labor only.

6. *Changes in the Marginal Productivity of Labor in the Subsistence Sector (Criterion 5)*

In Criterion 3 slow increases and sharp increases in real wages in the subsistence sector were considered to be a sign of the existence and of the disappearance of unlimited supplies of labor respectively. If we are to take these sharp increases in real wages, as a sign of the passing of the turning point, then they should necessarily be accompanied by sharp increases in the marginal productivity of labor. Wage increases without productivity increases occur as a result of cyclical fluctuations or of a rising subsistence level.

An increase in the marginal productivity of the subsistence sector labor force depends on a shift in the marginal productivity schedule and on a decrease in the size of the labor force. The former is caused by an increase in the non-labor to labor ratio and by technological progress. Therefore some examination into changes in the size of the labor force, the factor

[15] A survey on these hypotheses is given, for instance, in [Ono 1969]. The discussion here owes a great deal to his survey.

[16] For details, see [Ono 1969].

ratio and technological progress may tend to collaborate any test of Criterion 5.

7. *Elasticity of Labor Supply from the Subsistence Sector to the Capitalist Sector (Criterion 6)*

Unlimited and limited supplies of labor can be defined as the labor supply from the subsistence to the capitalist sector, which has an infinite elasticity or a positive and finite elasticity respectively. Therefore, determination of changes overtime in elasticity may give one of the best tests for the turning point. Annual figures for the elasticity can be obtained by using cross-sectional data, if available, for each year. But because of the lack of such data, we are attempting a much simpler estimation by using time-series data. This is made by investigating changes in the slope of the curve which shows the relation of the size of labor force in the capitalist sector N_i to the real wages in the subsistence sector w (deflated by the consumer price index), both measured on the logarithmic scale.

This test involves some problems however.

1) Firstly, because of possible increases in real wages caused by the rising subsistence level in the stage of unlimited supplies of labor, one cannot conclude the limited supplies of labor occur even if the slope is not infinite. To overcome this difficulty, we should understand that the year in which the curve shows a downward kink, or in which its slope decreases stepwise may be the turning point.

2) Secondly, one may rightly feel anxiety about identification of the supply elasticity of labor from the demand elasticity for labor. (If we can estimate both the demand and the supply functions simultaneously, this problem does not appear.) In the writer's opinion, however, this problem may not be as serious as it appears, because of the following reasons. Firstly, because our labor supply function (the long-term supply function) may be expected to be much more stable than the demand function for labor. Depending on technological progress and the capital accumulation, the demand function shifts continuously. Therefore the elasticity of N_i with respect to w may be considered to be not far from the real value for the supply elasticity of labor.[17] Secondly, as w represents wages deflated by the consumer price index, the relation between w and N_i stands for the response of labor supply to wage changes. (In the demand function for labor, wages deflated by the price index for the capitalist sector products w_i should be included.)

8. (*Appendix*) *The Turning Point and Changes in the Relative Income Share of Labor*

In his first article on the turning point, Lewis stated that the relative income share of labor declines (or the relative share of profit rises) in the stage of unlimited supplies of labor, where real wages remain unchanged [Lewis 1954, reprint, p. 418]. C.P. Kindleberger, who studied the turning point in the European countries, stated that the relative share of labor would decline or remain constant before the turning point and rise after the turning point [Kindleberger 1967, p. 8].

However their statements on this point are not particularly persuasive. In the capitalist sector, real wages w_i are equal to the marginal productivity of labor and therefore the relative share of labor is always equivalent to the output elasticity of labor γ, both in the stages of unlimited and of limited supplies of labor. Therefore changes in the relative share of labor depend uniquely on the shape of the production function and on changes in the production

[17] On this point see [Klein 1962, pp. 11~12].

function in this sector.

From the production function characterized by decreasing return to each factor and constant returns to scale,

(17) $Y_t=F(N_t, K, t)$,

the relation

(18) $G(Y_t)=J+\gamma G(N_t)+\delta G(K)$

is obtained.[18] Here Y_t, N_t, K, t, J, γ and δ denote output, labor force, capital, time, the rate of neutral technological progress, output elasticity of labor and output elasticity of capital respectively.

$$J=F_t/F \qquad \left(F_t\equiv\frac{\partial F}{\partial t}\right)$$

$$\gamma=F_N N_t/F \qquad \left(F_N\equiv\frac{\partial F}{\partial N_t}\right)$$

$$\delta=F_K K/F \qquad \left(F_K\equiv\frac{\partial F}{\partial K}\right)$$

$$\gamma+\delta=1$$

Subtracting the growth rate of the labor force $G(N_t)$ from (18), we obtain the growth rate of the average productivity of labor Y_t/N_t,

(19) $G(Y_t/N_t)=J+\delta G(K/N_t)$.

Meanwhile differentiating the marginal productivity of labor F_N with respect to time, we have

(20) $G(F_N)=B_N+J+G(K/N_t)\delta/\sigma$,[19]

where B_N and σ stand for the degree of labor saving bias of technological progress[20] and

[18] Differentiating (17) with respect to time,

$$\frac{dY_t}{dt}=F_t+F_N\frac{dN_t}{dt}+F_K\frac{dK}{dt}$$

and dividing this by Y_t, we obtain

$$\frac{dY_t}{dt}\Big/Y_t=\frac{F_t}{F}+\frac{F_N N_t}{F}\cdot\frac{dN_t}{dt}\Big/N_t+\frac{F_K K}{F}\cdot\frac{dK}{dt}\Big/K$$

or

$$G(Y_t)=J+\gamma G(N_t)+\delta G(K).$$

[19] Differentiating

$$F_N=F_N(N_t, K, t)$$

with respect to time, we have

$$\frac{dF_N}{dt}=F_{NN}\frac{dN_t}{dt}+F_{NK}\frac{dK}{dt}+F_{Nt}$$

and therefore

$$G(F_N)=\frac{F_{NN}N_t}{F_N}G(N_t)+\frac{F_{NK}K}{F_N}G(K)+\frac{F_{Nt}}{F_N}.$$

Assuming linear homogeneity, we have

$$Y_t=F_N N_t+F_K K.$$

Differentiating this with respect to N_t and K, we obtain

$$F_{NN}N_t=-KF_{NK}=-KF_{KN}.$$

Substituting this into the relation of $G(F_N)$, it becomes

$$G(F_N)=\frac{F_{KN}K}{F_N}G(K/N_t)+\frac{F_{Nt}}{F_N}.$$

[20] Following J.R. Hick's definition, technological progress is labor-using, neutral, and capital-using when

$$\frac{F_{Nt}}{F_N}\gtrless\frac{F_{Kt}}{F_K}.$$

Therefore in the case of the neutral technological progress,

$$B_K=B_N=0.$$

for the elasticity of substitution between labor and capital respectively.

$$B_N \equiv F_{Nt}/F_N - J \qquad \left(F_{Nt} \equiv \frac{\partial F_N}{\partial t} = \frac{\partial^2 F}{\partial t \partial N_i}\right)$$

$$\sigma \equiv \frac{d\left(\frac{K}{N_i}\right)}{\frac{K}{N_i}} \Bigg/ \frac{d\left(\frac{F_N}{F_K}\right)}{\frac{F_N}{F_K}} = \frac{F_K F_N}{F F_{KN}}^{21} \qquad \left(F_{KN} \equiv \frac{\partial F_K}{\partial N_i} = \frac{\partial^2 F}{\partial N_i \partial K}\right).$$

From this equation we have the growth rate of capital-labor ratio K/N_i,

(21) $G(K/N_i) = [G(F_N) - (B_N + J)]\sigma/\delta$.

Substituting this into (19), (19) then becomes

(22) $G(Y_i/N_i) = J + [G(F_N) - (B_N + J)]\sigma$.

Subtracting (22) from (20), the growth rate of γ is obtained;

(23) $G(\gamma) = B_N + [G(F_N) - (B_N + J)](1 - \sigma)$.

This relation means that the effect of an increase in the rate of growth of the marginal productivity of labor F_N (real wages) on an increase in the rate of growth of output elasticity of labor (the relative share of labor) depends solely on the level of the elasticity of substitution σ. That is to say, an increase in $G(F_N)$ brings a decline and a rise in $G(\gamma)$, when $\sigma > 1$ and when $\sigma < 1$ respectively. $G(F_N)$ is constant in the case of $\sigma = 1$. Therefore unless we have an exact measurement of the value of σ, we are unable to say anything about the direction of changes in the relative share of labor in the capitalist sector.

Assuming real wages are constant in the stage of unlimited supplies of labor, (23) becomes

(24) $G(\gamma) = B_N - (B_N + J)(1 - \sigma)$
$= \sigma(B_N + J) - J$.

This is not always negative, it can be zero or positive depending on the value for σ, B_N and J. In other words we cannot say that the relative share of labor always declines in a state of unlimited supplies of labor.

9. *Criteria on Finding the Turning Point: Summary*

In this section six criteria on finding the turning point have been put forth. Among these, Criterion 1, in which comparison is made between the level of wages and the level of marginal productivity of labor in the subsistence sector is the most direct reflection of the theory of the turning point. Therefore this criterion gives the most rigorous test on the turning point. Therefore our test based on this criterion may play a crucial role in our studies on the Japanese turning point. The second most rigorous test is given by Criterion 6, in which the elasticity of labor supply from the subsistence to the capitalist sector is studied. Both Criteria 1 and 6 have some weaknesses in practice, however, because of the availability and the reliability of data. To compensate for these weaknesses, tests based on the other criteria (Criteria 2, 3, 4 and 5) should be attempted as well.

III. *Real Wages in the Subsistence Sector (Test Depending on Criterion 3)*

(1) *Real Wages in Agriculture*

As a substitute for the subsistence sector wages, the wages for agricultural wage earners

[21] See [Marglin 1966, p. 62].

are used. One may argue that the latter are not a good substitute, because the great bulk of the agricultural labor force is comprised of unpaid family workers.[22] In the writer's opinion, however, it is not unrealistic to assume that agricultural wages are equal to the implicit wages for unpaid family workers. This is because, as was stated earlier, a fair proportion of the wage earners in agriculture (annual contract workers) live together with the workers in their employer's family.

There are two series for agricultural wages. They are 1) annual wage payments to annual contract workers and 2) daily wages to daily workers. 1) The annual contract workers are almost always sons and daughters of families on small farms. They are usually younger than thirty and single, and are nearly always employed on a yearly basis or from the early spring until the late fall. Sometimes their contract is renewed a couple of times. They are engaged in agricultural activity and in the case of female workers, in housekeeping as well. Almost all of them live in the same buildings as their employers and are provided with wages as well as food and working clothes. 2) The daily workers, who also come from small farms, are employed on a day-to-day basis. Because of the two reasons which were already put forth in Chap. I, we will mainly use wage statistics for the annual contract workers.

Long-term series for the wages of annual contract workers by sexes was estimated by N. Takamatsu [Umemura & others 1966, Table 34].[23] His estimates, covering the years from 1888[24] to 1945, made use of the *Nōshōmu Tōkeihyō* (*Statistical Tables of Agriculture and Commerce*) and the *Nōsaku Yatoi Chingin-hyō* (*Survey of Agricultural Wages*). For the post-World War II years we have neither statistics nor estimates. The reason for this is that the number of annual contract workers has decreased conspicuously in the postwar period. Therefore the writer has attempted to estimate the wages for these annual contract workers (Appendix Table 2) by using the wage statistics available for daily workers (Appendix Table 1) in conjunction with the number of working days of family workers (Appendix Table 4). Fig. 1 depicts moving averages of the annual contract worker wages deflated by the consumer price index (*CPI*) and by the implicit price deflator for consumption expenditure (*IDCE*). The *CPI* deflated real wages are called *A* series, while the *IDCE* deflated wages are termed *B* series. In the early years, *B* series exceeded *A* series since the rate of growth was much higher in *IDCE* than in *CPI*. (In 1896 *A* was 78 per cent of *B*.) There is no reason, of course, for these two deflators to be exactly equal to each other, but the difference between the two in this case seems to be too large. We may conclude therefore the method of estimating one or both of them is defective. And since we are not in a position to judge the relative reliability of the two deflators, we will use both wages deflated by the two deflators.

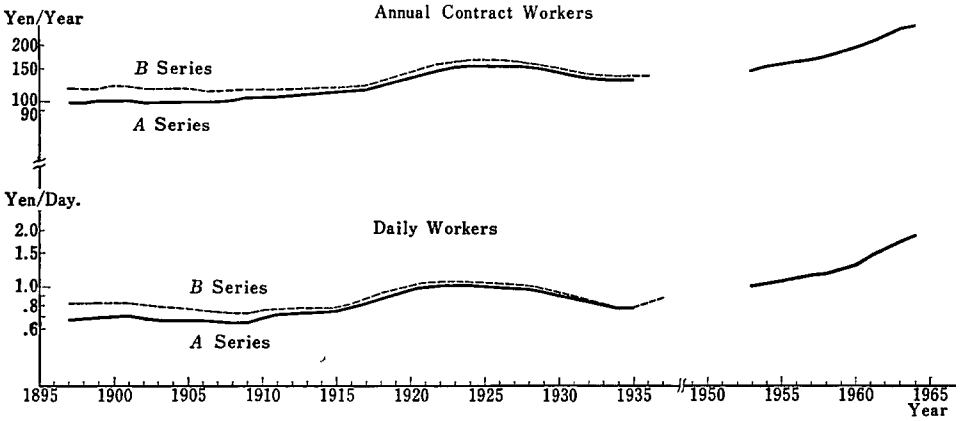
When we look at the changes in real wages over time we see that real wages were almost constant up until about 1917 (especially in *B* series). Then they increased until they began

[22] According to the *Nōka Keizai Chōsa* (*Survey of Farm Household Economy*) by the *Nōrin-Shō* (Ministry of Agriculture and Forestry) in 1962, family workers make up 96 per cent of the total working hours [Umemura & others 1966, p. 100].

[23] These estimates involve the following problem. For 1921–45 the original statistics are compiled in terms of daily wages. Therefore the estimator multiplied the daily wages by the constant figure 300 (the presumed number of working days per year) and obtained the annual wage payments [Umemura & others 1966, p. 105]. These annual wage payments will have some biases therefore, if the number of working days changed during these years.

[24] Although the first year of these estimates is 1888, it is since 1894 that successive annual estimates have been available.

FIG. 1. REAL WAGES IN AGRICULTURE (BOTH SEXES, 1934~36 PRICES)



Remarks: *A* series=agricultural wages (for the annual contract workers and for the daily workers)/consumer price index (*CPI*).

B series=agricultural wages (for the annual contract workers and for the daily workers)/implicit deflator for consumption expenditure (*IDCE*).

Seven year moving averages and five year moving averages for the pre and the postwar years respectively.

Wages are the arithmetic averages of male and female wages.

Sources: *Wages for the annual contract workers and for the daily workers: Prewar:* Takamatsu estimates [Umemura & others 1966, pp. 220~21]. *Postwar:* Appendix Tables 1 and 2.

CPI: Before 1965: Noda estimates [Ohkawa & others 1967, pp. 135~36]. *After 1966;* estimated by linking it with the nationwide *CPI* figures compiled by the *Sōri-fu Tōkei-kyoku* (Bureau of 'Statistics, Office of the Prime Minister).

IDCE: Shinohara estimates [Shinohara 1967, p. 106].

TABLE 1. ANNUAL COMPOUND RATES OF GROWTH OF *GNP* (1934~36) DURING LONG SWINGS

(per cent)

Periods	Rates of Growth
1885 (*T*)~1898 (*P*)	4.33
1898 (*P*)~1905 (*T*)	2.27
1905 (*T*)~1919 (*P*)	4.21
1919 (*P*)~1931 (*T*)	3.56
1931 (*T*)~1938 (*P*)	6.00
1938 (*P*)~1954 (*T*)	.52
1954 (*T*)~1961 (*P*)	10.86
1961 (*P*)~1964	8.86

Remarks: Rates of growth are measured between moving averages centered on indicated years. The last figure is an exception for this. It is measured between crude values (1960 prices).

GNP figures are seven year moving averages in the prewar and five year moving averages in the postwar respectively. Exceptional cases are those of 1938 and 1954, in which *GNP* figures are three year moving averages.

P and *T* signify the peak and the trough of long swings respectively.

Sources: For the prewar period, Hitotsubashi estimates are used while for the postwar period, the Economic Planning Agency estimates were used [Ohkawa & Rosovsky 1968, Table 1-1 on p. 9].

TABLE 2. REAL WAGES IN AGRICULTURE (1934~36 PRICES)

(yen)

			1898 (*P*)	1905 (*T*)	1919 (*P*)	1931 (*T*)	1938 (*P*)	1954 (*T*)	1961 (*P*)	1964 (*T*)
Annual Contract Worker Wages (Annual)	*A* Series	Both Sexes	98	97	128	137	146	155	209	260
		Male	117	115	151	154	164	170	227	285
		Female	78	77	105	119	127	139	191	234
	B Series	Both Sexes	118	114	137	144	140			
		Male	142	137	161	162	158			
		Female	94	90	112	125	122			
Daily Worker Wages (Daily)	*A* Series	Both Sexes	.680	.661	.910	.859	.910	1.049	1.437	1.832
		Male	.779	.740	1.046	.992	1.001	1.150	1.565	2.013
		Female	.580	.581	.775	.741	.819	.952	1.314	1.663
	B Series	Both Sexes	.826	.773	.970	.904	.944			
		Male	.947	.866	1.114	1.021	1.050			
		Female	.704	.680	.825	.780	.838			

Remarks: Seven year moving averages and five year moving averages for the pre and the postwar years respectively. There are exceptional cases: Figures of *A* series for 1938 are crude values, figures of *A* series for 1964 (for the annual contract worker wages only) are three year moving averages, and figures of *B* series for 1938 are five year moving averages.

P and *T* signify the peak and the trough of long swings respectively.

For the concept of *A* and *B* series, see Figure 1.

Sources: The same as Figure 1.

to decrease in the latter half of the 1920's. They next showed a conspicuous increase in the post-World War II years especially from the end of the 1950's. These changes in real wages seem to be related to changes in economic activity. K. Ohkawa and H. Rosovsky found long swings or the so-called Kuznets cycles in the rates of growth of the real *GNP*. The rates of growth, between the years of peak (*P*) and trough (*T*), are shown in Table 1. Table 2 includes figures by sexes of real wages for the peak and trough years. Their rates of growth are calculated and shown in Table 3, Column (1). They are small in the downward phases of the long swings, 1898~1905 and 1919~31, and large in the upward phases, 1905~19 and 1931~38. (The only exception to this is that the rates of growth are much smaller in 1931~38 than 1919~31 in the case of *B* series.) This means the existence of a relationship between long swings and changes in real wages. For the postwar period, however, the growth rates are much larger in the downward phase of 1961~64 (7~8 per cent) rather than in the upward phase of 1954~61 (4~5 per cent). (The period 1938~54, which includes the period of the Second World War, should be excluded from our studies.) Even the rates of growth in the phase of 1954~61 are still higher than those in 1905~19 which showed the highest rates of growth (2 per cent in *A* series) among the prewar periods. Thus we may state that 1) the rates of growth are much higher in the postwar than in the prewar years, and 2) real wages have steadily increased independently of changes in economic activity in the postwar years. In a word, in so far as trends in real wages are concerned, the real wages of the annual contract workers in agriculture have increased at a much faster rate during the postwar period than they did during the prewar period.

TABLE 3. ANNUAL COMPOUND RATES OF GROWTH OF REAL WAGES IN AGRICULTURE (1934~36 PRICES)

(per cent)

			(1) Peak to Trough and Trough to Peak Rates of Growth							(2) Peak to Peak Rates of Growth			(3) Trough to Trough Rates of Growth			(4) Average Rates of Growth for the Pre and the Postwar Years	
			1898 ~ 1905	1905 ~ 1919	1919 ~ 1931	1931 ~ 1938	1938 ~ 1954	1954 ~ 1961	1961 ~ 1964	1898 ~ 1919	1919 ~ 1938	1938 ~ 1961	1905 ~ 1931	1931 ~ 1954	1954 ~ 1964	Prewar	Postwar
Annual Contract Worker Wages	*A* Series	Both Sexes	△.16	1.98	.58	.92	.37	4.27	7.29	1.27	.71	1.56	1.33	.54	5.17	1.34	5.04
		Male	△.25	1.95	.16	.90	.26	4.13	7.58	1.21	.43	1.66	1.12	.43	5.17	1.13	4.82
		Female	△.16	2.21	1.04	.92	.56	4.54	6.77	1.40	.99	1.77	1.68	.67	5.21	1.68	5.06
	B Series	Both Sexes	△.48	1.31	.41	△.41				.71	.12		.90			.81	
		Male	△.51	1.15	.05	△.35				.60	△.10		.64			.60	
		Female	△.62	1.57	.92	△.35				.83	.45		1.26			1.26	
Daily Worker Wages	*A* Series	Both Sexes	△.40	2.28	△.48	.82	.89	4.50	8.09	1.39	0	1.99	1.01	.87	5.57	1.04	5.43
		Male	△.73	2.47	△.44	.13	.87	4.40	8.39	1.40	△.23	1.94	1.13	.64	5.60	1.06	5.29
		Female	.03	2.06	△.37	1.43	.94	4.60	7.85	1.38	.29	2.06	.94	1.09	5.58	1.04	5.47
	B Series	Both Sexes	△.95	1.62	△.59	.62				.77	△.14		.60			.52	
		Male	△1.28	1.80	△.72	.38				.77	△.31		.64			.50	
		Female	△.50	1.38	△.47	1.02				.76	△.08		.53			.53	

Remarks: Figures in (1), (2) and (3) are calculated by applying the relation $ln\ w=a+bt$ to the figures of two specified years. (All figures of annual compound rates of growth in this paper are obtained by this method.) Figures in (4) are obtained by applying the above relation to the annual statistics.

△ signifies negative figures.

For (1), (2) and (3), see Table 2. Figures in (4) are for 1897~1935 in the case of *A* series of the annual contract worker wages and the daily worker wages, for 1897~1936 in the case of *B* series of the annual contract worker wages, and for 1897~1937 in the case of *B* series of the daily worker wages. In all cases the postwar years cover 1953~1964.

Source: The same as Figure 1.

Before concluding this section we should refer to one difficulty which may arise from our argument above. It is possible that our comparison of the postwar rates of growth with the prewar ones might not be appropriate. This is because postwar wages were obtained by linking them with the daily worker wages, which are, as was already stated, much more sensitive to economic conditions. Therefore, in so far as we are concerned with a comparison between pre and postwar wages, the daily worker wages may be much more appropriate. In Fig. 1 the real wages per day for the daily agricultural workers are also depicted. They are similar in pattern to the real wages for the annual contract workers. One difference in the pattern between the two wage series is that the amplitude of swings is much bigger in the case of the daily worker wages. The rates of growth for daily worker wages in Table 3, Column (1) are larger in the upward phases and smaller in the downward phases than those for the annual contract worker wages. That is to say that the daily worker wages are

much more sensitive to economic fluctuations. Our interests here, however, are rather in the comparison between the pre and postwar. The rates of growth in 1954~61 (4~5 per cent) are higher than those in 1905~19 (2 per cent). Both of these periods occur in upward phases. Furthermore the postwar downward phase in 1961~64 shows the growth rate (8 per cent) to be twice as high as that for 1954~61. Consequently our conclusion regarding the trend in real wages, which was derived by examining the annual contract worker wages, has been confirmed here.

Next let us examine directly trends in real wages. Looking at Fig. 1, one sees that, on the while real wages, for the annual contract workers as well as for the daily workers, were stable during the prewar years. From around 1918 they increased somewhat but returned to the 1918~19 level in 1932~33 after the decrease which occurred from the end of the 1920's to the early 1930's. In contrast to this remarkable increases can be found in the postwar period. To confirm this statement, let us calculate the rates of growth of the trends in real wages, by using two methods. The first is to calculate the rates of growth of the real wages from peak to peak years and those from trough to trough years. The second is to obtain average rates of growth for entire years as a whole, by applying the relation $lnw=a+bt$ to the annual statistics of real wages w and time t.

The rates of growth obtained through the first method are shown in Columns (2) and (3) of Table 3. In the first place let us look at the figures for the annual contract workers. Peak to peak rates of growth in Column (2) for the prewar periods (1898-1919 and 1919-38) are between .4 per cent 1.4 per cent in the case of A series and less than 1 per cent in the case of B series. They are between 1.6 per cent and 1.8 per cent for 1938-61 in the case of A series. This period includes, however, the war time years, so that the growth rates for this period cannot be taken to stand for the postwar figures. An exact comparison between the pre and postwar rates of growth may be made by comparing trough to trough rates of growth in Column (3). They are between 1.1 per cent and 1.7 per cent for 1905~31,[25] as opposed to more than 5 per cent for 1954~61, both of these being A series figures. Thus it may be said that the postwar rates of growth are three or four times as large as the prewar ones. (In this case the period 1931-54 including as it does a war time period should be excluded from in our discussion.) The difference in the rates of growth of wages between the pre and postwar periods is much bigger in the case of the daily workers. In this case the trough

[25] Real wages for the annual contract workers were not at a bottom in 1931, one of the trough years of long swings. A bottom was in 1934. The average rates of growth for 1905~34 are, as a reference, calculated and shown below

(per cent)

		Annual Contract Worker Wages	Daily Worker Wages
A Series	Both Sexes	.96	.52
	Male	.85	.75
	Female	1.20	.45
B Series	Both Sexes	.48	.05
	Male	.31	.08
	Female	.72	△ .02

The rates of growth for 1905~34 are much smaller than those for 1905~31 in Table 3.

to trough rates of growth are between .9 per cent and 1.1 per cent for 1905~31,[26] and 5.6 per cent for 1954~64. Once again both figures are series A figures. In the postwar period the rates of growth have been six times as large as those of the prewar years.

The rates of growth of the trends in real wages, which are calculated by the second method, are shown in Column (4). In the case of the annual contract worker wages, they are between 1.1 per cent and 1.7 per cent, and about 5 per cent for the pre and the postwar years respectively. While in the case of the daily worker wages, they are about 1 per cent and 5 per cent for the prewar and the postwar years respectively. In both of these cases, the postwar growth rates are about five times as large as the prewar ones.

We may therefore state conclusively that real wages in agriculture were almost constant or showed slight increases in the prewar period and showed sharp increases for the postwar years, especially those since the end of the 1950's.[27] Following Criterion 3 put forth in Chap.

[26] See footnote 25.

[27] The Takamatsu estimates of agricultural wages for the prewar period were from the *Nōshōmu Tōkei-hyō* (*Statistical Tables of Agriculture and Commerce*) and the *Nōsaku Yatoi Chingin-hyō* (*Survey of Agricultural Wages*). Agricultural wages in the prewar period are also available from the *Kome Seisanhi Chōsa* (*Rice Production Cost Survey*) and the *Nōgyō Keiei Chōsa* (*Agricultural Management Survey*) both compiled by the *Teikoku Nōkai* (*Imperial Agricultural Association*). Appendix Tables 6 and 7 are the results of recompilation of these statistics. The figures for these wages deflated by *CPI* are shown in the table below.

REAL WAGES IN AGRICULTURE IN THE *RICE PRODUCTION COST SURVEY* AND THE *AGRICULTURAL MANAGEMENT SURVEY* (1934~36 PRICES)

(yen)

Year	*Rice Production Cost Survey*	*Agricultural Management Survey*
1922	1.18	
1923	1.16	
1924	1.21	
1925	1.11	.95
1926	1.11	
1927	1.05	.93
1928	1.09	
1929	1.06	
1930	1.08	.80
1931	.94	.78
1932	.91	.67
1933	.92	.71
1934	.97	.74
1935	1.01	.73
1936	1.02	.80
1937	.97	.76
1938	1.03	.96

Remarks: Wages are daily wages.
Sources: *Wages*: Appendix Tables 6 and 7.
Deflator (*CPI*): See Table 2.

Although it should be acknowledged that there may be some problems in continuity of these statistics, they have a similar pattern to those of Figure 1. That is, they decreased in the 1920's, reached their lowest level at the beginning of the 1930's, and thereafter increased to some extent.

For the postwar period we can estimate the wages for the *nen-yatoi* (annual contract workers) and for the *rinji-yatoi* (temporary workers) from the *Nōka Keizai Chōsa* (*Survey of Farm Household Economy*) by the *Nōrin-shō* (Ministry of Agriculture and Forestry. Appendix Table 3 contains the results of the estimates. The figures in the table below are the ratios of our estimates for daily worker wages to the daily wages of annual contract workers and also the ratio of daily worker wages to temporary worker

RATIOS OF DAILY WORKER WAGES IN AGRICULTURE IN THE *SURVEY ON PRICES AND WAGES IN RURAL VILLAGES* TO THE AGRICULTURAL WAGES IN THE *SURVEY OF HOUSEHOLD ECONOMY*

Year	Ratios to the	
	Annual Contract Worker Wages	Temporary Worker Wages
	in the *Survey of Farm Household Economy*	
1952	1.7	1.0
1953	1.5	1.0
1954	1.5	1.0
1955	1.5	1.0
1956	1.4	1.0
1957	1.5	1.0
1958	1.4	1.0
1959	1.4	1.0
1960	1.3	1.0
1961	1.4	1.0
1962	1.4	1.0
1963	1.2	1.1
1964	1.7	1.1
1965	1.3	1.1
1966	1.4	1.0

Remarks: Wage statistics are all annual figures.

Sources: Wages in the *Survey on Prices and Wages in Rural Villages* are from Appendix Table 1. Wages in the *Survey of Farm Household Economy* are from Appendix Table 3.

wages. Daily worker wages are obtained form the *Nōson Bukka Chingin Chōsa* (*Survey on Prices and Wages in Rural Villages*) (Appendix Table 1), while annual contract worker wages and temporary worker wages are calculated from the *Survey of Farm Household Economy*. The ratios are 1.0 or 1.1 in the case of the temporary worker wages; i.e., daily worker wages are always equal between the two kinds of statistics (the *Survey on Prices and Wages in Rural Villages* and the *Survey of Farm Household Economy*). In the case of annual contract workers the ratios are between 1.2 and 1.5, or can be taken to be constant. 1964 is an exception to this; the ratio shows an abnormal figure. This comes from a problem in the wage statistics of annual contract workers in the *Survey of Farm Household Economy* for that year. (It should be mentioned that the wage statistics for both annual contract workers and daily workers in the *Survey of Farm Household Economy* as given in Appendix Table 3 are not, strictly speaking, continuous in the period 1961~1962. This is because per capita wages, before 1961, were estimated by dividing wage payments by the number of adult man equivalent labor days, and, after 1962, by the real number of labor days. This is the reason why we did not use annual contract worker wages from the *Survey of Farm Household Economy* and but rather estimated them by linking them with daily workers wages contained in the *Survey on Prices and Wages* in *Rural Villages*.

I, this suggests that the turning point was passed only in the postwar years.

(2) *Real Wages for Female Workers in the Textile Industry*

In Table 4 and Fig. 5 the annual wages of female production workers in the textile industry after being deflated by the two deflators are depicted. The annual wage payments for the female production workers were obtained as follows. For the prewar years, they were estimated by multiplying the writer's estimates of the daily wages by the number of working days per year. For the postwar period, they were calculated by multiplying total cash earnings per month by twelve. The monthly cash earnings were obtained from the *Maigetsu Kinrō Tōkei* (*Monthly Labor Statistics*), which is compiled by the *Rōdō-shō* (Ministry of Labor). Real wages show a slight increase for the prewar period and a sharp increase for the postwar period, especially that since the end of the 1950's.

TABLE 4. REAL WAGES FOR FEMALE PRODUCTION WORKERS IN THE TEXTILE INDUSTRY (1934~36 PRICES)

(yen)

	1905 (*T*)	1919 (*P*)	1931 (*T*)	1938 (*P*)	1954 (*T*)	1961 (*P*)	1964 (*T*)
A Series	113	178	199	175	275	362	430
B Series	132	190	210	175			

Remarks: Annual wage payments.
Seven year moving averages and five year moving averages for the pre and postwar years respectively. The only exceptions are the figures for 1938—*A* series is a crude figure, while the *B* series is a three year average.
Sources: The same as Figure 5.

TABLE 5. ANNUAL COMPOUND RATES OF GROWTH OF REAL WAGES OF FEMALE PRODUCTION WORKERS IN THE TEXTILE INDUSTRY (1934~36 PRICES)

(per cent)

	(1) Peak to Trough and Trough to Peak Rates of Growth						(2) Peak to Peak Rates of Growth		(3) Trough to Trough Rates of Growth			(4) Average Rates of Growth for the Pre and the Postwar Years	
	1905 ~ 1919	1919 ~ 1931	1931 ~ 1938	1938 ~ 1954	1954 ~ 1961	1961 ~ 1964	1919 ~ 1938	1938 ~ 1961	1905 ~ 1931	1931 ~ 1954	1954 ~ 1964	Prewar	Postwar
A Series	3.25	.93	△1.84	2.82	3.93	5.74	△.09	3.16	2.18	1.41	4.47	2.24	4.54
B Series	2.60	.83	△2.61				△.43		1.79			1.74	

Remarks: Figures in (4) for the prewar period are for 1902~35 in the case of *A* series and for 1902~36 in the case of *B* series. The figure for the postwar period is for 1953~64.
Sources: The same as Figure 5.

This finding is confirmed by Table 5. The figures in Columns (1), (2), (3) and (4) stand respectively for the peak to trough and trough to peak rates of growth, the peak to peak rates of growth, the trough to trough rates of growth, and the average rates of growth for

the complete prewar and postwar periods. The following observations may be made here:
1) In the *A* series data the upward phase in the postwar period 1954~61, shows a larger rate of growth (3.9 per cent) than the upward phases of the prewar period, 1905~19 and 1931~38 (3.3 per cent and △1.8 per cent respectively). In the case of *A* series data for downward phases the rates of growth are much higher in the postwar period of 1961~64 (5.7 per cent) than in the prewar period of 1919~31 (.9 per cent).
2) The trough to trough rate of growth for the postwar years 1955~64 (4.5 per cent) is twice as high as that for the prewar periods 1905~31 (2.2 per cent) in the case of *A* series. (Prewar vs. postwar comparison is impossible in the peak to peak rates of growth.)
3) The average rates of growth for the complete prewar and postwar periods are calculated as 2.2 per cent and 4.5 per cent respectively in the case of *A* series.

These imply 1) that the full-scale increase in real female wages for this industry began after the end of World War II and 2) that these wages are closely correlated with the agricultural wages in Fig. 1. (Real wages for female agricultural workers have a similar pattern to those for both sexes, which are drawn in Fig. 1. Therefore we can compare Fig. 1 with Fig. 5, assuming that Fig. 1 demonstrates female wages.) The second implication means that wage differentials between the agricultural and textile industries for female workers have been almost constant from the long-term point of view. This may be easily in Fig. 2, which

FIG. 2. RATIOS OF PRODUCTION WORKER WAGES IN THE TEXTILE INDUSTRY TO AGRICULTURAL WAGES (FEMALE)

Remarks: Annual wage payments.
Agricultural wages are for the annual contract workers.
Seven year moving averages and five year moving averages for the pre and the postwar years respectively.
Sources: See Fig. 5.

demonstrates for female workers, the ratio of textile industry wages to the annual contract worker wages in agriculture. This ratio has never been smaller than 1.5 nor larger than 2.0. This constancy may be taken as 1) a justification of the wage statistics both for agricultural wages and for textile industry wages, and/or 2) as a justification that the key assumption in our theory of a dual economy that labor force in the capitalist sector (textile industry) has been mainly supplied from the subsistence sector (agriculture) is correct.[28]

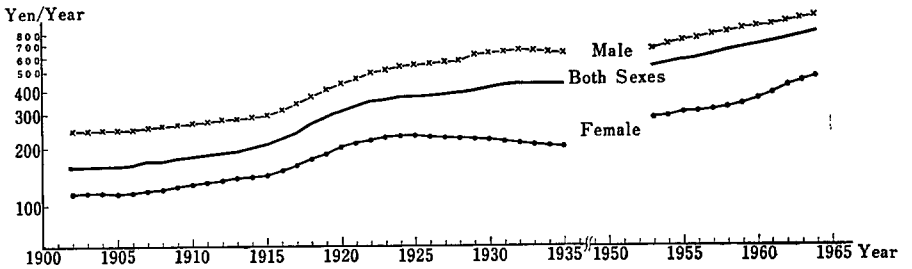
[28] As an example of evidence against our conclusion that female workers in textile industry were unlimited in supply, one could possibly suggest the well-known violent competition for workers in the cotton spinning industry in the late Meiji and early Taishō period. In the writer's opinion, however, this competition may not be inconsistent with our earlier conclusion. As has been pointed out previously by M. Umemura and A. R. Tussing, the competition did not mean the existence of labor insufficiency. Rather, it resulted from temporary regional disequilibria caused by a lack of information and by the immobility of the labor force [Umemura 1961, pp. 180~181] [Tussing 1966, p. 74]. If the competition meant labor insufficiency or limited supplies of labor, real wages for such labor should have increased to a great extent. Tussing, who comprehensively studied the labor force and wages of this industry in Yamanashi Prefecture for these periods, concluded that the supply of labor for the nonagriculture sector was elastic [Tussing 1966, p. 79].

IV. *Wage Differentials between the Capitalist and the Subsistence Sectors (Test Depending on Criterion 4)*

(1) *Real Wages for Manufacturing Industries and Wage Differentials between the Manufacturing and Agricultural Industries*

The wage differentials in which we are interested here are those between the modern or semi-modern sector (capitalist sector in our theory) and the traditional (subsistence) sector, which can be considered to be the same as the differentials between skilled and unskilled worker wages. In this section average wages in manufacturing industries[29] and those for annual contract workers in agriculture are used as indexes for the skilled worker and for the unskilled worker wages respectively. Before studying manufacturing industry-agricultural industry wage differentials, it may be convenient to briefly look at changes in the wage series of agriculture and that of manufacturing industries and to point out some differences between

FIG. 3. REAL WAGES OF THE PRODUCTION WORKERS IN MANUFACTURING INDUSTRIES (1934~36 PRICES)



Remarks: Annual wage payments for those establishments with thirty or more production workers.

Seven year moving averages and five year moving averages for the pre and the postwar years respectively.

For the definition of *A* and *B* series, see Fig. 1.

Sources: Prewar wages: They are estimated by multiplying daily wages by the working days per year. Daily wages are Minami estimates [Ohkawa & others 1967, pp. 247~249]. The number of working days per year for 1923~44 is twelve times the number of working days per month in the *Maigetsu Kinrō Tōkei* (*Monthly Labor Statistics*) [*Rōdō Undō Shiryō Iinkai*, pp. 222~225]. For 1899~1922, the average figure for 1923~25 is assumed.

Postwar wages: They are calculated by multiplying the total cash earnings per month for the production workers in the *Monthly Labor Statistics* by twelve. Total cash earnings per month are from the *Rōdō-shō* (Ministry of Labor), *Maigetsu Kinrō Tōkei Chōsa Sōgō Hōkoku-Sho* (*Annual Report of the Monthly Labor Statistics*).

[29] The wage statistics used in Fig. 3 are for those establishments with 30 or more production workers. Accordingly it seems that the traditional sector is not included in these statistics. Semi-modern sector industries, such as the textile industry, however, are included. Therefore the average wages for manufacturing industries as a whole cannot be considered to be an exact index for modern sector wages or for skilled worker wages.

TABLE 6. REAL WAGES OF THE PRODUCTION WORKERS IN MANUFACTURING INDUSTRIES (1934~36 PRICES)

(yen)

		1905 (*T*)	1919 (*P*)	1931 (*T*)	1938 (*P*)	1954 (*T*)	1961 (*P*)	1964 (*T*)
A Series	Both Sexes	157	290	421	432	553	704	795
	Male	247	404	639	585	700	886	986
	Female	113	188	216	191	292	384	459
B Series	Both Sexes	184	309	442	428			
	Male	289	431	671	580			
	Female	132	199	227	193			

Remarks: Seven year averages and five year averages for the pre and the postwar years respectively. The only exceptions are the figures for 1938—*A* series is a crude figure, while *B* series is a three year average.

Also see Fig. 3.

Sources: The same as Fig. 3.

them in their pattern of change. Real wages for agriculture were fully studied in Chap. II. In this section we will begin the discussion by examining changes in real wages for manufacturing industries.

Table 6 and Fig. 3 give real wages by sexes for manufacturing industries as a whole. The average wages for both sexes show a slight increase from 1902 through to about 1915 and thereafter a big increase until 1922~23. In the postwar period a steady increase is found. In comparing this figure with Fig. 1, one can determine the differences between the manufacturing and agricultural industries in regard to changing patterns in real wages. The differences are as follows:

1) The increases for some years after the end of World War I were much bigger for manufacturing industry wages.

2) During the latter half of the 1920's and the beginning of the 1930's manufacturing industry wages increased slightly,[30] whereas agricultural industry wages decreased.

3) Wage increases in manufacturing industries have been steady for the postwar period, while those in agricultural industries have increased sharply since the end of the 1950's.

Table 7 contains the rates of growth of manufacturing industry wages expressed in constant prices. As far as average wages for both sexes are concerned, the following points can be seen from the table:

1) The rates of growth between the peak and trough years in Column (1) are about 3 or 4 per cent for all phases of the long swings, with the exception of the period 1931~38. (Once

[30] This was because of the increasing percentage of workers in high wage industries and the aging of workers during this period. For the prewar era we do not have sufficient data for wages by age groups which cover long periods. The *Rōdō Tōkei Jitchi Chōsa* (*Survey of Labor Statistics*) by the *Sōri-fu Tōkei-kyoku* (Bureau of Statistics, Office of the Prime Minister) gives, however, wage statistics by age groups for every third year after 1924. These data show that the nominal wages did *decrease* for all age groups and for all industry groups for the two periods; 1924~27 and 1927~30 [*Rodō Undō Shiryō Iinkai* 1959, pp. 296~297]. During the former period, the average figure for all groups increased by 1.4 per cent per year.

TABLE 7. ANNUAL COMPOUND RATES OF GROWTH OF REAL WAGES OF PRODUCTION WORKERS IN MANUFACTURING INDUSTRIES (1934~36 PRICES)

(per cent)

		(1) Peak to Trough and Trough to Peak Rates of Growth						(2) Peak to Peak Rates of Growth		(3) Trough to Trough Rates of Growth		
		1905~1919	1919~1931	1931~1938	1938~1954	1954~1961	1961~1964	1919~1938	1938~1961	1905~1931	1931~1954	1954~1964
A Series	Both Sexes	4.38	3.10	.37	1.54	3.45	4.05	2.10	2.12	3.79	1.19	3.63
	Male	3.51	3.82	△1.26	1.12	3.37	3.57	1.95	1.80	3.66	.40	3.43
	Female	3.64	1.16	△1.76	2.65	3.91	5.95	.08	3.04	2.49	1.31	4.52
B Series	Both Sexes	3.70	2.98	△ .46				1.71		3.37		
	Male	2.86	3.69	△2.08				1.56		3.24		
	Female	2.93	1.10	△2.32				△ .16		2.08		

Remarks: See Fig. 3.
Sources: Table 6.

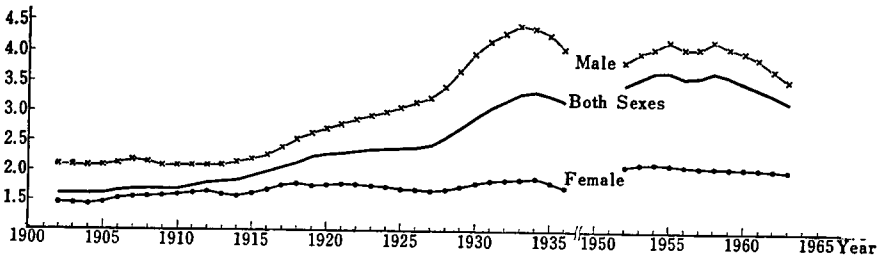
again the period 1938~54 is omitted since it covers the war time period.) This means firstly, that the rates of growth are almost equivalent between the pre and postwar periods if we exclude the period 1931~38. Secondly, for the prewar period the correlation between long swings and changes in real wages is much weaker for the manufacturing industry than it was for the agricultural industry. Thirdly, there is no correlation for the postwar period.

2) The trough to trough rates of growth in Column (3) for the prewar period (1905~31) and for the postwar period (1954~64) are almost equal. (The same kind of comparison is impossible for the peak to peak rates of growth in Column (2).)

Thus from the first conclusion in 1) (that the rates of growth of real wages during the phases of the long swings are almost equivalent for the pre and the postwar periods) and from discussions in 2) above, one may safely state that manufacturing industry wages have increased at almost the same speed both before and after World War II.

The features mentioned above in regard to changes in manufacturing industry wages are in striking contrast to those for agricultural wages. This contrast implies that there has been changes in the wage differentials between the two industries. Fig. 4 demonstrates the ratios of manufacturing industry wages to agricultural industry wages for annual contract workers. The ratio for both sexes increased from around 1910. This increase accelerated for a while after 1927 and then began to decrease after 1934. In the postwar period there is an increase before 1954 and a big decrease after 1958. This tends to serve as proof for our hypothesis, put forth in Chap. II, regarding the relationship between long swings and changes in wage differentials. That is to say, the increases in wage differentials for 1928~34 and before 1954 correspond to the decreases in economic activity in the period 1919~31 and 1938~54 respectively, while the decreases in wage differentials after 1934 correspond to the increase in economic activity for the period 1931~38. It should be noticed, however, that the decreases after 1958, corresponding to the rising economic activity of 1954~61, continued even during the downward phase 1961~64. Following Criterion 4 this implies that the labor market underwent a structural change at the end of the 1950's or at the beginning of the

FIG. 4. RATIOS OF THE WAGES OF PRODUCTION WORKERS IN MANUFACTURING INDUSTRIES TO THE WAGES OF ANNUAL CONTRACT WORKERS IN AGRICULTURE



Remarks: Wages of production workers in manufacturing industries/wages of annual contract workers in agriculture.

Both wages are annual wage payments.

Seven year moving averages and five year moving averages for the pre and the postwar years respectively.

Sources: The same as Figs. 1 and 3.

1960's.

Let us examine wage differentials by sexes. In Fig. 3 real wages and average wages for males have a similar pattern of change. Therefore in Fig. 4 changing patterns of wage differentials for males and for both sexes are almost the same. Accordingly our arguments about changes in wage differentials for both sexes also hold true for wage differentials for males only. Attention should be paid rather to female wages. They differ from average wages and male wages in the following ways. 1) Female wages decreased slightly after the middle of the 1920's, during which time average and male wages continued to grow. 2) The rate of growth of female wages increased in the 1960's, whereas the rates of growth of average and male wages have been almost constant. The features exhibited above by female wages are almost exactly the same as those exhibited by female wages in agriculture. This being the case, wage differentials between the manufacturing and the agricultural industries for female workers, as demonstrated in Fig. 4, have been strikingly stable for both the pre and the postwar years.

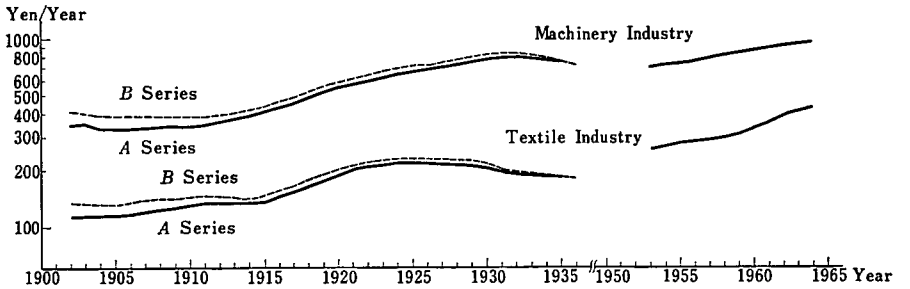
Why is it that wage differentials by industry are subject to remarkable fluctuations for male workers and yet remain almost stable for female workers? The reason may be as follows. The labor force in the two industries is heterogeneous in the case of male workers, while it is homogeneous in the case of female workers. Putting it concretely, almost all female workers in the manufacturing industry are supplied from the subsistence sector (agriculture), while on the other hand, some parts of the male labor force are skilled workers who have no connection with the subsistence sector.

(2) *Real Wages in Industries Having the Highest and the Lowest Wages Respectively, and the Differentials between Them*

Previously, average wages for manufacturing industries as a whole were used as a substitute for the wages of skilled workers. They are not a good substitute, however, because they include the wages for the unskilled workers as well. In this sense it may be much more

reasonable to use male wages for the machinery industry as a substitute[31] and to compare them with female wages for the textile industry. The former, male wages for the machinery industry, are the highest while the latter, female wages for the textile industry, are the lowest wages by sexes and by industry groups among manufacturing industries. They are divided by the two deflators and are set out in Fig. 5. Real wages for the machinery industry and

FIG. 5. REAL WAGES OF PRODUCTION WORKERS IN THE MACHINERY INDUSTRY (MALE) AND IN THE TEXTILE INDUSTRY (FEMALE) (1934~36 PRICES)



Remarks: See Fig. 3.

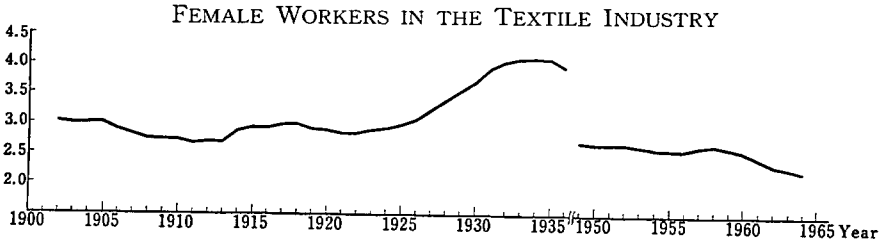
Sources: Prewar: Wage statistics are obtained in the same way as in Fig. 3 with the following exceptions. For the number of working days in the machinery industry for the prewar period, the average figures for manufacturing industries as a whole (Fig. 3) are used. The number of working days in the textile industry is taken from the *Nōshōmu Tōkei* (*Statistics of Agriculture and Commerce*) [*Rōdō Undō Shiryō Iinkai* 1959, p. 218] for 1899~1921. The number of working days for 1922 is assumed to be an average of the figures for 1921 and 1923. The figures after for 1923 is obtained by taking the figures of the *Monthly Labor Statistics* [*Rōdō Undō Shiryō Iinkai*, pp. 225~225] and multiplying them by twelve.

Postwar: Wage statistics are calculated to be twelve times the total cash earnings per month of a production worker which are taken from the *Monthly Labor Statistics*. Wages for the machinery industry are the weighted averages of four industry groups in the above statistics: 'machinery', 'electric machines and tools', 'transportation equipment and tools', and 'precision machines and tools'. Wages for females in the textile industry are the weighted averages of two industry groups in the *Monthly Labor Statistics*, 'textiles' and 'clothing and other textile goods'. Weights for these various industry groups are the number of production workers in them at the end of each year.

For 1950 and 1951, however, wage statistics both for the machinery and textile industries are not available, so that they are estimated by linking them with the wages for regular workers. Wages for regular workers in 1950 are obtained by taking averages of the two figures for Jan.-Sept. and for Oct.-Dec. of that year. Wage statistics are all taken from the *Rōdō-Shō* (Ministry of Labor), *Maigetsu Kinrō Tōkei Yōran* (*Statistical Abstract of the Monthly Labor Statistics*) and *Rōdō Tōkei Nenpō* (*Year Book of Labor Statistics*).

[31] As an index for skilled worker wages, the wages for male production workers in the machinery industry are much better than the average figures for all manufacturing industries. See footnote 29.

FIG. 6. RATIO OF THE WAGES OF MALE PRODUCTION WORKERS IN THE MACHINERY INDUSTRY TO THE WAGES OF FEMALE WORKERS IN THE TEXTILE INDUSTRY



Remarks: Both the production worker wages in the machinery industry and the wages of female workers in the textile industry are annual wage payments.

Seven year moving averages and five year moving averages for the pre and the postwar years respectively.

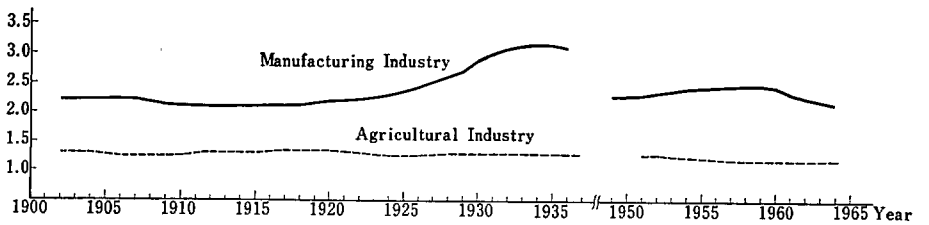
Sources: The same as Fig. 5.

for the textile industry show similar patterns of change to those of the male and female wages respectively in manufacturing industries as a whole which appeared in Fig. 3. Therefore the ratio of the wages of the male machinery worker to those of the female texile worker, which is drawn in Fig. 6 changes in a similar way to the ratio of the wages of production workers in manufacturing industries to the wages of annual contract workers in agriculture shown in Fig. 4. So that our conclusions in Section (1) are confirmed here.

(3) *Wage Differentials between Sexes in Manufacturing Industries*

As indexes for the wages of skilled and unskilled workers, the wages of male and female workers respectively in manufacturing industries may be adopted.[32] The changes in these wages

FIG. 7. RATIOS OF MALE WORKER WAGES TO FEMALE WORKER WAGES IN THE AGRICULTURAL AND MANUFACTURING INDUSTRIES



Remarks: Wage statistics are all annual wage payments.

Seven year moving averages and five year moving averages for the pre and the postwar years respectively.

Sources: The same as Figs. 1 and 3.

[32] The wage statistics for male production workers are not a good substitute for skilled worker wages, in the sense that the former include unskilled workers as well. In the writer's opinion, however, male worker to female worker wage differentials can be considered to be one of the indexes for skilled worker to unskilled worker wage differentials. In this paper we did not discuss changes in wage differentials by age groups, education and so forth. They may be of benefit to our discussion of the turning point. In particular the fact that wages for new employees increased remarkably and that wage differentials by age groups began to decrease at the end of the 1950's and the beginning of the 1960's may prove to be extremely important.

have already been discussed earlier in Fig. 3, so there is no need to repeat that discussion here. Fig. 7, which depicts the male worker to female worker wage ratio in manufacturing industries is similar to Fig. 4. Thus the conclusions in Section (1) are once again confirmed here. In Fig. 7 the male worker to female worker wage ratio in agriculture is also depicted for reference purposes. This ratio is completely constant over the entire period. This means that male and female workers are homogeneous and are substitutable for each other in agriculture. These features may be contrasted with those in manufacturing industries in which, simply speaking, male and female workers belong to different labor markets.

(4) *Wage Differentials by Scale of Establishments*

One of the most appropriate indexes for wage differentials of the modern to the semi-modern (capitalist) and the traditional (subsistence) sectors is that using the scale of establishments. For the prewar years continuous data are not available. Consequently we are forced to try to find trends in wage differentials by making use of statistics for selected years. The first statistics which are available are those from the *Kōjō Tōkei-hyō* (*Factory Statistics*) of 1909 and 1914. They are summarized in Table 8. They show that wage differentials by scale of establishments did not exist in either of these years.[33] The second batch of available statistics are those from the *Kōgyō Chōsa-sho* (*Survey on Manufacturing Industries*) of some cities in 1932. Table 9 is the result of M. Umemura's compilation from them. As was pointed out by Umemura himself, large wage differentials are found here. Strictly speaking this table is not directly comparable with Table 8; the former is compiled by using the scale of the amount

TABLE 8. WAGE DIFFERENTIALS AMONG VARIOUS SCALES OF ESTABLISHMENTS IN MANUFACTURING INDUSTRIES (1909 AND 1914)

(yen)

Number of Employees (persons)	1909	1914
Average	.33 (97)	.38 (95)
5～ 10	.34 (100)	.40 (100)
10～ 30	.33 (97)	.37 (93)
30～ 50	.32 (94)	.35 (88)
50～ 100	.32 (94)	.36 (90)
100～ 500	.33 (97)	.36 (90)
500～1,000	.32 (94)	.39 (98)
1,000～	.34 (100)	.43 (108)

Remarks: Wages are daily wages of production workers.
Figures in brackets are indexes using 100 as a base figure for the wages of the smallest scale establishments.
Gas and electric utilities are included.
Sources: The *Kōjō Tōkei-hyō* (*Factory Statistics*) [Umemura & Nakamura 1959].

[33] In regard to industry groups, however, Y. Yasuba did find some wage differentials between the various scales in the same statistics [Yasuba 1967]. His findings contradicted the widely spread belief that there were no wage differentials by scale before 1920.

TABLE 9. WAGE DIFFERENTIALS AMONG VARIOUS SCALES OF ESTABLISHMENTS IN MANUFACTURING INDUSTRIES (1932)

(yen)

Amount of Capital (yen)	Wages and Salaries
Average	433
~ 100	174 (100)
100~ 500	202 (116)
500~ 1,000	223 (128)
1,000~ 2,000	257 (148)
2,000~ 5,000	304 (175)
5,000~ 10,000	363 (209)
10,000~ 50,000	453 (260)
50,000~100,000	524 (301)
100,000~500,000	566 (325)
500,000~	671 (386)

Remarks: Wages are annual wage and salary payments for production workers, and clerical and technical staffs.

Figures in brackets are indexes using 100 as a base figure for the wages of the smallest scale establishments.

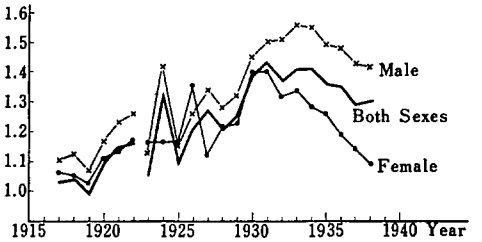
Sources: Estimates made by M. Umemura from *Kōgyō Chōsa-sho* (*Survey of Manufacturing Industries*) of five cities and one metropolitan prefecture [Umemura 1961, p. 209].

of capital, whereas the latter uses the scale of the number of employees of establishments. Because of possible correlation between the amount of capital and the number of employees, it may be reasonable to infer the non-existence of wage differentials before the 1920's, and their subsequent appearance in the 1920's.

This inference may be confirmed with time series data for particular regions. The first data are available from the studies of wages in the Northern Kyūshū industrial areas made by K. Odaka. He estimated two series of wage differentials; i.e., the wage ratio of Yawata Iron and Steel Company production workers to iron moulders and that of the Nagasaki Shipbuilding Yard production workers to blacksmiths. These statistics stand for wage differentials between the modern and the traditional sectors. After examining these statistics, he concluded that wage differentials appeared at the beginning of 1920's in the case of the former series and in the middle of the 1920's in the case of the latter series. [Odaka 1968, Fig. 4 on pp. 86 & 87].

The *Tōkyō-shi Tōkei Nenpyō* (*Annual Statistical Tables of Tokyo City*) give the wages for 1917~38, distinguishing between two scales of establishments; 1) less than 10 employees and 2) 10 or more employees. (For the latter half of the period the scale changes to 1) less than 5 employees and 2) 5 or more employees). (These data are shown in summary form in Appendix Table 5.) The wage ratios of the large scale to the small-scale establishments are calculated and demonstrated by sexes in Fig. 8. These ratios seem to represent the modern vs. traditional sector wage differentials. It may be easily seen that wage differentials 1) did not exist in the 1910's, 2) emerged in the 1920's and 3) decreased in the 1930's. 1) and 2) seem to prove our hypothesis that wage differentials appeared in the 1920's. 3) comes from

FIG. 8. WAGE DIFFERENTIALS BETWEEN LARGE SCALE AND SMALL SCALE ESTABLISHMENTS: MANUFACTURING INDUSTRIES IN TOKYO CITY



Remarks: For 1917~22, average wages of the establishments with ten or more production workers/those of the establishments with less than ten production workers.

For 1923~38, average wages of the establishments with five or more production workers/those of the establishments with less than five production workers.

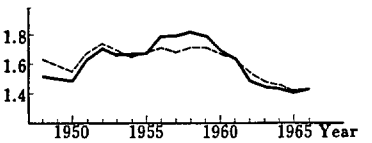
Wages are all daily wages.

Gas and electric utilities are included.

Sources: Appendix Table 5 which is estimated from *Tōkyō-shi Tōkei Nenpyō* (*Annual Statistical Tables of Tokyo City*).

the fact that demand for unskilled laborers increases in the upward phase of long swings. For the postwar period we have the studied by A. Ono. Fig. 9 demonstrates the wage ratios of these establishments with 500 or more regular employees to those with 30~90 employees. Where an unbroken line is used, it indicates that wages are total cash earnings per month taken from the *Maigetsu Kinrō Tōkei* (*Monthly Labor Statitsics*), and where a dotted line is used, it indicates that wages are standardized figures, both of these being for industrial groups, the type of worker (production workers or clerical and technical staffs), the sex and the age of employees. Before 1958 the unbroken line showed an increase, while the dotted line remained

FIG. 9. WAGE DIFFERENTIAL BETWEEN LARGE SCALE AND SMALL SCALE IN MANUFACTURING INDUSTRIES



Remarks: Average wages of the establishments with five hundred and more regular employees/those of the establishments with thirty or more but less than ninety-nine regular employees.

An unbroken line and a dotted line indicates the actual wage statistics and the standardized figures respectively for industry groups, status (production workers vs. clerical and technical stuffs, sexes and age.

Wages are dependent on the total cash earnings per month.

Sources: Estimates by A. Ono [Ono 1969, Fig. 3 on p. 207].

constant. Thereafter, however, both of them showed a decline. We should pay special attention to the fact that this decline continued even during the downward phase from 1961 to 1965.

(5) *Changes* in *Wage Differentials-Summary*

In this chapter we examined the changes in wage differentials between a) the manufacturing and agricultural industries, b) the highest and the lowest wage industries, c) male and female workers, and d) large scale and small scale establishments. These differentials were used as a substitute for those between the capitalist and the subsistence sectors or for those between skilled and unskilled laborers. From these examinations the following findings were arrived at: 1) Wage differentials decreased and increased in the upward and the downward phases respectively of the long swings. 2) Wage differentials came into being in 1920's. 3) Wage differentials continued to decrease during the early 1960's, the years of downward phase of the long swings, in spite of the general pattern of their changes we saw in finding in 1).

As has been already stated, finding 1) is a confirmation of the findings made by K. Taira.

Finding 2) confirms the assertion by M. Umemura and others. Here it may be of benefit to summarize the factors connected with the formation of wage differentials in the 1920's. a) One of the factors is a difference between the rate of shift of the demand function for skilled labor as opposed to that for unskilled labor. In the 1920's, the period of qualitative change in the Japanese economy, modernization of the industrial structure (increasing emphasis on heavy industries), improvement of facilities and rationalization of management were made.[34] As a result of this, the structure of the demand for labor changed; i.e., demand for the skilled worker increased while that for the unskilled worker decreased. b) Another factor is a difference in the supply elasticity of labor between the two types of laborers. That is to say, unskilled laborers were unlimited while skilled laborers were limited in supply.

The implication of finding 3) is very important. The decreasing wage differentials in the earlier half of the 1960's were not a result of changes in economic activity but a trend phenomenon. We may then state that for the first time wage differentials began a trend decrease in the 1960's. This first experience of declining wage differentials may imply further that, following Criterion 4, the turning point was passed in the early 1960's.

[34] These qualitative changes are represented by the remarkable increase in the capital-labor ratio and by the increase in regard to total capital stock of the share of durable production equipment for this period [Ohkawa & others 1966, p. 32; Fig. 2-2 on p. 19].

APPENDIX

APPENDIX TABLE 1. WAGES FOR THE DAILY WORKERS IN AGRICULTURE IN THE POSTWAR YEARS

(yen)

Year	Excluding *makanai*			Including *makanai*		
	Both Sexes	Male	Female	Both Sexes	Male	Female
1949	201	226	175	274	301	247
1950	176	199	153	238	265	211
1951	189	212	165	245	272	219
1952	213	239	187	272	301	243
1953	237	264	210	299	330	270
1954	262	292	233	332	366	298
1955	269	301	238	339	374	305
1956	279	310	248	349	384	314
1957	293	327	260	365	404	328
1958	307	342	272	379	419	340
1959	318	351	287	392	428	358
1960	346	381	313	423	460	387
1961	307	465	383	508	554	464
1962	521	572	471	617	671	563
1963	616	676	559	722	787	661
1964	697	776	624	826	913	744
1965	768	853	689	898	991	812
1966	838	930	755	939	1,037	851

Remarks: Wages are per day figures.

Under the *makanai* system, workers are given one or more free meals per day. According to the statistics compiled by the Ministry of Agriculture and Forestry, for males in the year 1966, 33 per cent of daily workers were provided with one meal per day, 26 per cent with two meals per day, 36 per cent with three meals per day, while 5 per cent were provided with four meals per day. *Nōson Bukka Chingin Tōkei* (*Statistics of Prices and Wages in Rural Villages*), *Nōrin Tōkei Kyōkai*, 1968, p. 199.

Sources: Estimated from the *Nōson Bukka Chingin Chōsa Hōkoku* (*Report of the Survey on Prices and Wages in Rural Villages*), by the *Nōrin-shō* (Ministry of Agriculture and Forestry).

APPENDIX TABLE 2. WAGES FOR THE ANNUAL CONTRACT WORKERS IN AGRICULTURE IN THE POSTWAR YEARS

Year	Both Sexes	Male	Female
1950	32.9	36.8	28.9
1951	36.1	40.3	32.0
1952	40.0	44.6	35.5
1953	44.1	48.8	39.4
1954	48.9	54.2	43.5
1955	49.9	55.4	44.5
1956	51.3	56.8	45.8
1957	53.8	59.8	47.9
1958	56.3	62.9	49.6
1959	59.4	65.1	53.7
1960	63.1	69.0	57.3
1961	76.1	83.1	69.1
1962	85.2	93.3	77.1
1963	100.0	109.4	90.6
1964	113.6	126.0	101.2
1965	122.7	135.8	109.6
1966	129.8	143.1	116.6

Remarks: Wages are per year figures.

Sources: Wages in the both sexes column are the averages of the male worker wages and the female worker wages for the respective years.

Both male worker and female worker wages are estimated by making use of the daily wages for the daily workers and the number of working days per year. Let us denote the annual contract worker wages in the prewar period by w_a, those in the postwar period by w_a', the daily worker wages (per day) in the prewar period by w_b, and those in the postwar period by w_b', the number of working days (per year) in the prewar period by L, and that in the postwar period by L'. Here we will make the assumption that the ratio of the daily worker wages (per year) to the annual contract worker wages is equal in the prewar and the postwar years; namely

$$w_bL/w_a=w_b'L'/w_a'.$$

From this we obtain

$$w_a'=w_b'L'\frac{w_a}{w_bL}.$$

By, substituting the values for w_b', L' and $w_a/(w_bL)$ in this relation, we can estimate w_a'.

Figures for w_b' are from Appendix Table 1. For L' the number of working days for unpaid family workers in Appendix Table 4 is substituted. $w_a/(w_bL)$ is .80 for male workers, and .79 for female workers. These figures are the averages for the decade, 1929~38, which are obtained by assuming the number of working days to be 207 per year, the method of calculation used being shown in the table below:

	w_a	w_b	L	w_bL	w_a/w_bL
	(yen)	(yen)	(days)	(yen)	
Male	159.6	.970	207	201	.80
Female	122.3	.748	207	155	.79

Figures for w_a and w_b are from [Umemura & others 1967, pp. 220~21]. Figures for L and L' are from Appendix Table 4.

APPENDIX TABLE 3. AGRICULTURAL WAGES IN THE *SURVEY OF FARM HOUSEHOLD ECONOMY*

(yen)

Year	Annual Contract Worker Wages	Temporary Worker Wages
1952	159	262
1953	193	303
1954	217	335
1955	221	339
1956	242	357
1957	242	373
1958	270	383
1959	273	392
1960	316	419
1961	368	499
1962	438	624
1963	583	647
1964	500	735
1965	667	819
1966	667	915

Remarks: Wages are per day figures.

Wages are calculated by dividing total wage payments (per household, per year) by the number of working days (per household, per year). In the *Survey of Farm Household Economy* the number of working days before 1961 is an adjusted one, being in terms of adult man equivalent. Therefore the figures in this table are not continuous between 1961 and 1962. However, because the adjusted figure does not differ greatly from the crude figure, this discontinuity does not appear to be too serious.

The estimates for annual contract worker wages in 1964 seem to be abnormal.

Sources: Both total wage payments and the number of working days are from the *Nōka Keizai Chōsa* (*Survey of Farm Household Economy* (compiled by the *Nōrin-shō* (Ministry of Agriculture and Forestry) in *Nōka Keizai Chōsa Hōkoku* (*Report of the Survey of Farm Household Economy*). However, the number of working days is not available for 1952~56 and 1962. The number of working days for these years is estimated by linking it with the number of working hours.

APPENDIX TABLE 4. THE NUMBER OF WORKING DAYS PER YEAR IN AGRICULTURE

Year	The Number of Working Days	Year	The Number of Working Days
1932	217	1956	185
1933	215	1957	185
1934	207	1958	187
1935	207	1959	190
1936	204	1960	187
1937	204	1961	188
1938	200	1962	174
		1963	174
1950	174	1964	172
1951	185	1965	171
1952	185	1966	173
1953	185	1967	175
1954	185		
1955	185		

Sources: Estimated from the *Nōrin-shō* (Ministry of Agriculture and Forestry), *Nōka Keizai Chōsa* (*Survey of Farm Household Economy*).

Prewar period: Estimated by dividing the total number of working days (for both unpaid family workers and wage earners) by the number of workers employed in agriculture [Inaba 1952, pp. 61~63].

Postwar period: Estimated by divididing the total number of working days by the number of workers employed in agriculture. Both figures are from the *Nōka Keizai Chōsa Hōkoku* (*Report of the Survey of Farm Household Economy*). The years 1952 ~56 are the only exception to this. Figures for these years are obtained by linear interpolation.

APPENDIX TABLE 5. WAGES FOR PRODUCTION WORKERS BY THE SCALES OF ESTABLISHMENTS IN MANUFACTURING INDUSTRIES IN TOKYO

(yen)

Year	Average			For Establishments with less than 10 Production Workers (1912～1922) and less than 5 (1923～1938)			For Establishments with 10 or More Production Workers (1912～1922) and 5 or More (1923～1938)		
	Both Sexes	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female
1912	.497	.569	.273						
1913	.469	.529	.257						
1914	.477	.540	.245						
1915									
1916	.528	.590	.287						
1917	.66	.73	.34	.64	.67	.64	.66	.74	.35
1918	.861	.958	.460	.833	.875	.833	.867	.978	.462
1919	1.394	1.554	.754	1.403	1.474	1.403	1.393	1.572	.756
1920	1.640	1.802	.928	1.524	1.587	1.524	1.666	1.856	.936
1921	1.808	1.985	1.031	1.618	1.681	1.618	1.851	2.064	1.041
1922	1.861	2.037	1.091	1.652	1.706	1.652	1.920	2.148	1.104
1923	2.015	2.189	1.072	1.924	1.960	.928	2.026	2.221	1.076
1924	2.042	2.192	1.107	1.577	1.602	.958	2.103	2.280	1.113
1925	1.928	2.066	1.022	1.789	1.832	.890	1.953	2.113	1.029
1926	1.927	2.049	1.134	1.650	1.686	.847	1.979	2.125	1.149
1927	1.882	2.001	1.065	1.535	1.559	.953	1.943	2.088	1.070
1928	1.92	2.04	1.10	1.63	1.65	.91	1.98	2.12	1.11
1929	1.68	1.77	.99	1.39	1.41	.81	1.74	1.86	1.00
1930	1.49	1.56	.94	1.14	1.15	.68	1.58	1.67	.95
1931	1.34	1.41	.87	1.00	1.01	.63	1.43	1.52	.88
1932	1.21	1.33	.73	.93	.95	.56	1.27	1.43	.74
1933	1.18	1.30	.70	.88	.90	.53	1.24	1.40	.71
1934	1.17	1.29	.68	.87	.89	.54	1.23	1.38	.69
1935	1.16	1.28	.67	.89	.91	.54	1.21	1.36	.68
1936	1.20	1.32	.69	.92	.94	.58	1.24	1.39	.69
1937	1.30	1.44	.73	1.03	1.05	.64	1.33	1.50	.73
1938	1.54	1.72	.84	1.21	1.25	.77	1.57	1.77	.84

Remarks: Figures are per day figures.
The figures for establishments include gas and electric utilities as well.
Sources: Estimated from the *Tōkyō-shi Tōkei Nenpō* (*Statistical Tables in Tokyo City*).

APPENDIX TABLE 6. REGIONAL WAGES AND AVERAGE PRODUCTIVITY OF LABOR IN AGRICULTURE—RECOMPILATION OF THE *AGRICULTURAL MANAGEMENT SURVEY* (COMPILATION BY THE SCALES OF FARMS)

(yen)

	1925				1927				1930			
	Middle Scale		Small Scale		Middle Scale		Small Scale		Middle Scale		Small Scale	
	Wages	Productivity	Wages	Productivity	Wages	Productivity	Wages	Productivity	Wages	Productivity	Wages	Productivity
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Tōhoku	1.21	2.71	.98	1.82	.93	1.65	1.01	1.53	.58	.90	.66	.89
Kantō	1.30	2.15	1.51	1.92	1.09	1.52	1.51	1.53	.53	.64	.79	.84
Hokuriku	1.38	2.57	1.09	2.38	1.09	1.65	1.05	2.01	.77	.96	.84	1.32
Tōkai	1.31	2.65	1.51	2.31	1.02	2.05	1.32	1.82	1.18	2.12	1.20	.79
Kinki	1.54	3.26	1.38	2.39	1.22	2.56	1.46	2.23	.87	1.52	.91	1.09
Chūgoku	1.03	1.90	1.57	2.33	1.05	2.06	1.76	2.12	1.22	1.10	1.00	1.12
Shikoku	1.32	3.02	1.12	2.28	1.29	2.16	1.21	1.70	.93	1.30	1.00	.89
Kyūshū	.78	2.99	.87	1.99	.87	1.94	.86	1.65	.72	1.30	.76	.88
Average	1.23	2.69	1.25	2.15	1.06	1.90	1.28	1.80	.78	1.15	.88	.96

	1931				1932				1933			
Tōhoku	.57	.90	.53	.91	.53	1.06	.63	1.11	.63	1.28	.54	1.12
Kantō	.67	.79	.59	.82	.56	.94	.54	1.02	.53	1.18	.58	1.24
Hokuriku	.72	1.14	.69	1.39	.59	1.55	.53	1.18	.65	1.51	.67	1.46
Tōkai	.65	.85	.81	.84	.66	1.20	.50	.95	.68	1.56	.83	1.21
Kinki	.85	1.18	.92	1.12	.90	1.43	.74	1.26	.99	1.61	.83	1.55
Chūgoku	.84	1.02	.79	1.05	.85	1.23	1.00	1.02	.87	1.46	.67	1.12
Shikoku	.69	1.31	.84	.89	.76	1.80	.45	.95	.77	2.16	.64	1.26
Kyūshū	.64	1.18	.74	1.10	.46	1.36	.67	1.18	.54	1.37	.70	1.08
Average	.69	1.02	.75	1.00	.63	1.25	.64	1.10	.67	1.42	.69	1.27

	1934				1935				1936			
Tōhoku	.55	1.27	.51	1.25	.64	2.15	.63	1.36	.70	1.56	.58	1.34
Kantō	.57	1.12	.46	1.25	.47	1.45	.54	1.22	.50	1.64	.63	1.47
Hokuriku	.60	1.56	.79	1.49	.67	1.97	.90	1.75	.84	1.86	.87	1.85
Tōkai	.75	2.03	.63	1.11	.63	1.72	.61	1.45	.74	2.35	.76	1.54
Kinki	.81	1.61	1.00	1.77	1.14	2.03	1.09	1.97	1.23	2.51	1.12	2.09
Chūgoku	1.02	1.38	1.10	1.24	.84	1.70	.94	1.33	1.18	1.73	1.08	1.45
Shikoku	.70	1.95	.81	1.20	.69	2.12	.54	1.41	.85	2.39	.91	1.34
Kyūshū	.59	1.74	.63	1.17	.50	1.43	.68	1.39	.71	2.00	.73	1.32
Average	.68	1.48	.75	1.34	.68	1.75	.76	1.52	.80	1.91	.84	1.56

	1937				1938				1939			
	Middle Scale		Small Scale		Middle Scale		Small Scale		Middle Scale		Small Scale	
	Wages	Productivity	Wages	Productivity	Wages	Productivity	Wages	Productivity	Wages	Productivity	Wages	Productivity
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Tōhoku	.68	1.76	.59	1.97	.90	1.87	.75	2.42	1.00	3.13	1.05	3.21
Kantō	.70	1.71	.85	1.58	.83	2.10	1.22	1.79	1.20	3.37	1.38	3.05
Hokuriku	.70	2.07	1.00	2.16	.85	2.08	1.15	2.47	1.29	2.54	1.56	3.90
Tōkai	.89	2.33	.79	1.83	.96	2.21	1.39	2.11	1.95	4.12	2.03	3.17
Kinki	1.34	3.22	1.18	2.18	2.32	3.12	1.39	2.15	1.87	4.22	1.25	3.04
Chūgoku	.98	2.44	1.29	1.63	1.52	2.34	1.44	1.94	2.08	3.38	1.71	2.40
Shikoku	1.09	2.70	.73	1.53	1.44	2.96	1.19	1.60	1.40	4.68	2.08	2.65
Kyūshū	.84	2.20	.99	1.73	1.01	2.17	.78	1.81	1.06	3.11	1.03	2.79
Average	.86	2.19	.95	1.81	1.09	2.22	1.17	2.01	1.38	3.40	1.51	2.96

	1940			
Tōhoku	1.38	2.90	1.93	3.71
Kantō	1.42	4.06	1.64	3.31
Hokuriku	1.09	2.68	1.40	3.69
Tōkai	2.21	4.70	2.29	3.34
Kinki	2.74	4.83	2.15	3.22
Chūgoku	1.59	3.69	2.53	2.92
Shikoku	1.52	4.39	2.11	2.91
Kyūshū	1.39	3.22	1.77	2.80
Average	1.57	3.64	2.02	3.19

(Compilation for all Regions and for All Scales as a Whole)

Year	Wages	Productivity	Year	Wages	Productivity
1925	1.25	2.34	1933	.68	1.34
1926			1934	.72	1.41
1927	1.15	1.86	1935	.73	1.61
1928					
1929			1936	.82	1.70
1930	.83	1.05	1937	.84	1.81
			1938	1.16	2.32
1931	.72	1.01	1939	1.45	3.16
1932	.63	1.17	1940	1.81	3.39

Remarks: (1): Wage payments per capita (per year).

(2): Gross value added per capita (per year).

For 1926, 1928 and 1929 only original cards are available. These cards have not been compiled here.

Large scale farm households are excluded, because the sample size is too small.

Sources: The *Nōgyō Keiei Chōsa* (*Agricultural Management Survey*) by the *Teikoku Nōkai* (Imperial Agricultural Association), in *Nōgyō Keiei Chōsa-sho* (*Report of Agricultural Management Survey*). For the method of estimation, see Chap. VI, Section (3), 1.

APPENDIX TABLE 7. REGIONAL WAGES AND AVERAGE PRODUCTIVITY OF LABOR IN AGRICULTURE—RECOMPILATION OF THE *RICE PRODUCTION COST SURVEY*

(yen)

	1922		1923		1924		1925		1926	
	Wages	Productivity	Wages	Productivity	Wages	Productivity	Wages	Productivity	Wages	Productivity
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Tōhoku	1.41	2.04	1.44	2.67	1.42	3.08	1.33	3.81	1.29	3.35
Hokuriku	1.56	1.72	1.50	2.64	1.50	3.82	1.42	4.10	1.22	3.01
Kantō & Tōsan	1.40	1.84	1.71	3.06	1.80	3.70	1.73	3.40	1.66	2.77
Tōkai	1.33	1.56	1.82	2.79	1.42	3.11	1.38	4.05	1.29	3.55
Kinki	1.79	2.28	1.91	3.77	1.82	3.86	1.59	3.90	1.60	3.94
Chūgoku	1.93	3.76	1.35	1.97	1.93	4.11	1.60	4.57	1.59	4.04
Shikoku	1.63	3.30	1.61	3.41	1.45	4.88	1.33	4.95	1.15	4.65
Kyūshū	1.70	2.50	1.57	4.45	1.57	4.19	1.45	4.44	1.43	5.01
Average	1.53	2.24	1.49	2.76	1.57	3.68	1.46	4.00	1.40	3.54
	1927		1928		1929		1930		1931	
Tōhoku	1.15	3.47	1.16	3.03	1.19	2.78	.94	1.29	.67	1.33
Hokuriku	1.28	2.77	1.19	2.71	1.09	2.59	1.23	1.28	.93	1.38
Kantō & Tōsan	1.40	2.88	1.39	2.32	1.25	2.16	1.05	1.38	.94	1.59
Tōkai	1.16	4.72	1.23	3.60	1.14	4.04	1.04	1.61	.81	1.51
Kinki	1.35	3.59	1.46	3.10	1.35	3.47	1.24	1.98	.96	1.73
Chūgoku	1.46	3.96	1.26	3.13	1.59	4.38	1.33	2.07	1.06	1.95
Shikoku	1.62	3.85	1.18	4.29	1.18	4.17	1.18	1.97	.92	1.72
Kyūshū	1.39	2.88	1.07	3.38	1.18	4.10	1.23	2.29	.78	1.77
Average	1.30	3.37	1.30	3.13	1.23	3.36	1.13	1.65	.87	1.53

	1932		1933		1934		1935		1936	
	Wages	Productivity	Wages	Productivity	Wages	Productivity	Wages	Productivity	Wages	Productivity
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Tōhoku	.66	1.67	.72	1.74	.76	1.93	.80	1.87	.84	2.31
Hokuriku	.90	1.67	.93	2.00	.97	2.41	1.05	2.68	1.17	3.14
Kantō & Tōsan	.77	1.63	.83	1.74	.85	2.17	.93	2.26	.96	2.33
Tōkai	.80	1.98	.88	2.07	.93	2.66	1.01	2.72	1.09	3.17
Kinki	.87	2.26	.96	2.44	1.00	2.54	1.05	3.02	1.09	3.44
Chūgoku	1.08	2.12	1.09	2.46	1.13	3.06	1.20	3.24	1.24	3.66
Shikoku	.88	2.18	.92	2.36	.95	2.81	.99	2.84	1.05	3.29
Kyūshū	.87	2.26	.93	2.50	.94	2.47	.98	3.02	1.08	3.37
Average	.85	1.90	.89	2.06	.94	2.48	1.01	2.68	1.04	3.00

	1937		1938		1939		1940	
Tōhoku	.82	2.83	.96	3.08	1.37	3.97	1.68	3.45
Hokuriku	1.12	3.17	1.25	3.38	1.62	4.53	1.86	4.23
Kantō & Tōsan	1.06	3.16	1.28	3.11	1.78	4.64	2.07	3.80
Tōkai	1.12	3.19	1.31	3.39	1.62	3.70	1.91	3.08
Kinki	1.19	3.73	1.31	3.85	1.79	4.95	2.13	3.96
Chūgoku	1.32	3.64	1.50	4.11	1.91	4.35	2.35	4.07
Shikoku	1.26	4.24	1.48	4.16	1.85	4.62	2.03	3.73
Kyūshū	1.29	3.20	1.42	3.89	1.80	4.95	2.18	4.15
Average	1.07	3.25	1.24	3.46	1.66	4.35	1.96	3.78

Remarks: (1): Wage payments per capita (per year).

(2): Gross value added per capita (per year).

Figures are for *jisakusha* (owner farmers) only.

The original statistical tables are compiled by prefectures. The figures by prefectures have been recompiled into eight regions by using the number of farm households by prefectures as weights. The eight regions are those regions which have been used in the *Survey of Farm Household Economy* since 1962.

Tōhoku=Aomori, Iwate, Miyagi, Akita, Yamagata and Fukushima.

Hokuriku=Niigata, Toyama, Ishikawa and Fukui.

Kantō & Tōsan=Ibaragi, Tochigi, Gunma, Saitama, Chiba, Tōkyō, Kanagawa, Yamanashi and Nagano.

Tōkai=Gifu, Shizuoka, Aichi and Mie.

Kinki=Shiga, Kyōto, Ōsaka, Hyōgo, Nara and Wakayama.

Chūgoku=Tottori, Shimane, Okayama, Hiroshima and Yamaguchi.

Shikoku=Tokushima, Kagawa, Ehime and Kōchi.

Kyūshū=Fukuoka, Saga, Nagasaki, Kumamoto, Ōita, Miyazaki and Kagoshima.

For some years there are no statistics available in some prefectures. Therefore one should be careful when making comparison over time with the estimates in this table.

Sources: The *Kome Seisan-hi Chōsa* (*Rice Production Cost Survey*) by the *Teikoku Nōkai* (Imperial Agricultural Association) [Ishibashi 1961]. For the method of estimation, see Chapt. VI, Section (3), 1.

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