Disguised Unemployment Revisited

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Disguised Unemployment Revisited*

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Abstract

This paper newly examines historical statistics on labor productivity and agricultural wages in three East Asian regions (Japan, Taiwan and Korea) during the early days of industrialization, together with a review of selected relevant studies on Southeast Asia (the Philippines and Thailand). As expected, wages are found to be equal to the marginal product of labor in five of the nine cases examined (nineteenth century Japan, pre- and post-World War II Taiwan, and the Philippines and Thailand after WWII), whereas in the remaining four they are found to be closer to the average product of labor (Japan and Korea in the pre-WWII decades, and time-series as well as cross-sectional observations on Japan immediately after WWII). The implications of the findings are discussed in the closing section.

I. Introduction

The purpose of this essay is to re-examine the relationship between agricultural wages and agricultural productivity in the light of newly compiled historical statistics of Asian economies, and to contemplate the historical implications of the findings. Before addressing the main theme of the essay, it is appropriate to briefly review the historical background that has prompted the authors to venture into the present investigation.

Immediately after the Second World War, when the Japanese economy was struggling to recover from the devastation of war, with a low standard of living, a few prominent economists in the country attempted to resolve the riddle of the co-existence of a very low rate of unemployment and the relatively abundant supply of labor. The fact that the issue was of great relevance to empirically minded Japanese scholars in the late 1940s and early 1950s[1] can be easily seen from a number of articles and books that discussed the problem. Often cited were some of the earlier writings of Western economists that described the conditions of subsistence labor during the early days of industrialization (Nurkse (1953), Robinson (1973), and Wharton (1969), among others).

It is worth noting in this context that empirically-minded economists such as Tôbata

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[1] The important work of Kumagai (1957), a critical assessment of the Keynesian Revolution that showed essentially the same theoretical concern as that expressed by macro economists in the Western nations at the time, may have been prompted also by a concern on the excess-supply condition of labor in the social context where Marxian economics was a predominant school of thought.

(1956) and Kitô (1948) put forward the concept of total employment (*zembu koyô*), meaning all-out participation in work, where all the members of an organization (typically a family), with the exception of infants and the invalid, contribute to production activities. This concept was elaborated by Ohkawa (1959, 1972 and 1975), a one-time student of Tôbata, who argued that family members participating in owner-operating enterprises were "excessively employed" in the sense that they supplied their labor services to the extent that their reservation wage was equal to the average, not marginal, value-added of labor. This implied that the total income of the work unit (family) was equally divided among all the participating members. Under this condition, the marginal product of labor is lower than the market wage, and the level of employment is higher than the case when the marginal product of labor is equal to the market wage.[2] According to Ohkawa, this mechanism of employment applied not only to the farming sector, but could also be found in cottage industries in manufacturing. However, the leading manufacturing sector was typically dominated by the profit-maximizing principle, especially when it operated with borrowed technologies from the West, and its level of employment was determined in such a way that the market wage was equal to the marginal product of labor. Figure 1 illustrates such an economy with two representative sectors, agriculture and manufacturing, with labor assumed to be homogenous throughout the economy. The total labor force ($\overline{ac}$) is divided between agriculture ($\overline{ab}$) and manufacturing ($\overline{bc}$). Thanks to the principle of "excessive employment," there is no unemployment in this economy.[3]

Figure 1. A model of "excessive employment"
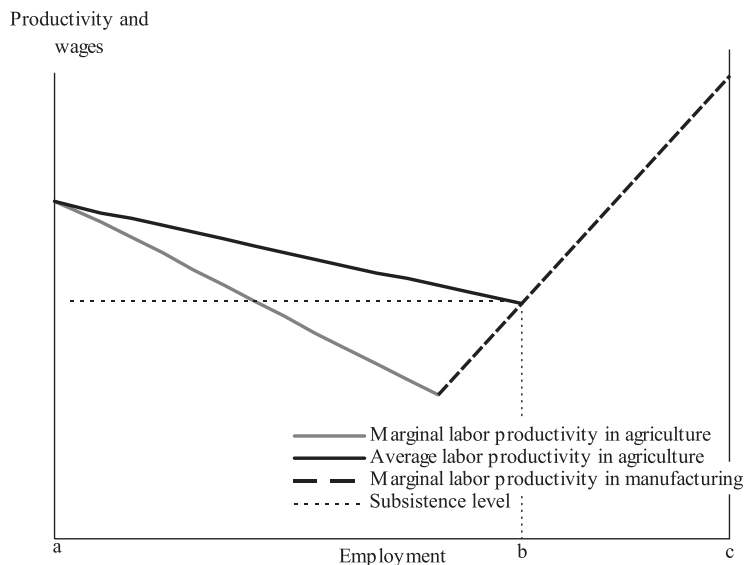
Source: Noda (1959: 118).

A world of "excessive employment" is governed by a communal principle which directs its members to share the means and outcomes of their work with other members of the group.[4]

Based on field observations, a similar idea was expressed at around the same time by

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[2] Similar theoretical arguments have been presented by Georgescu-Roegen (1966) and Ishikawa (1967), among others.

[3] The diagram indicates the limiting case where no exodus of labour takes place from the farming to manufacturing sectors. If the manufacturing wage were greater than the average product of farming labor, no one would be content to remain in agriculture (cf. Imai 1971: 31-34).

some Western scholars who initiated a new discipline called "development economics." They argued that in poverty-stricken areas, the marginal product of labor might even be zero, while positive labor remuneration was provided. This would suggest an excessive level of employment, hence the term "disguised unemployment."

Minami (1973) then argued that the Japanese economy had reached a "turning point" at around 1960, and moved from the stage of "unlimited" to "limited" supplies of labor. He substantiated his thesis by showing that the wage was equal to the *average* labor product in agriculture up to 1940, whereas it became equal to the *marginal* product of labor after 1961. This amounted essentially to a reconfirmation of the Ohkawa thesis as explained above[5].

II. The case of Japanese agriculture

To recapitulate the above discussion, here we re-estimate average and marginal labor productivity in Japanese agriculture and compare them with the prevailing wages of farm labor. The following paragraphs explain the simple, computational procedure and its results.

Taking into consideration the fact that the quality of labor improved significantly over time, the labor input data (N) is adjusted to take into account the increase in the average number of school attendees in the population (A) by defining a new labor input series, AN. A Cobb-Douglas production function is estimated using the linear combination of net capital stock (K) and cultivated land area (L), both expressed in 1934-36 prices and normalized by the new labor input series (AN) to explain the overtime variations in gross value-added (in 1934-36 prices) per adjusted labor input (V/AN). An index of new technology inputs λ and a dummy variable (D) are introduced, where λ indicates the market values (in 1934-36 prices) of chemical fertilizers (nitrogen and potassium phosphate) used, and D takes values of nil for the period up to 1945 and unity after 1945[6]. Constant returns to scale are assumed. The time-series data (1895-1960) with 66 observations yield

$$\ln(V/AN) = 0.49 + 0.0004\lambda + 0.60 \ln\{(L+K)/AN\} - 0.03D \ln\{(L+K)/AN\},$$
$$\quad\;\; (0.63)\;\; (3.96) \qquad (5.22) \qquad\qquad\quad (-4.21)$$

R^2 (adjusted for the degrees of freedom) = 0.62, Root MSE = 0.09, and F = 37.07.

The figures in parentheses stand for Student's t statistics. The results of Chow's test suggest that there were statistically significant structural changes after the Second World War.[7] The results of the regression imply that the share of labor changed slightly from 0.40 in the years before 1946 to 0.43 in the post-War decades.[8] Applying the above estimated values of

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[4] This principle may be likened to that once proposed by Weitzman (1984). Its theoretical background was stipulated in Weitzman (1983).

[5] The Ohkawa-Minami thesis has been critically disputed by Jorgenson (1967).

[6] The following data set is used for the estimation. Agricultural workforce: Umemura et al. (1966: Table 33 [pp. 218-19]); average length of school attendance: Mombushō (1962: 59); net capital stock: Umemura et al. (1966: Table 29 [pp. 212-13]); cultivated land areas and their 1934-136 prices: *ibid*. Table 32 [pp. 216-17] and Table 34 [pp. 220-21]; chemical fertilizers and their respective 1934-36 prices: *ibid*. Tables 20-25 [pp. 196-206], and gross value added: *ibid*. Table 13 [p. 182].

[7] The null hypotheses that the parametric values of the relevant explanatory variables are nil (i.e. Chow's tests) yield the following results.

Variables	λ	D	λ and D
F values	15.72	17.69	12.41
Probability of error	0.0002	0.0001	0.0000

[8] Because of the assumption of linear homogeneity, 1 - 0.60 = 0.40 for the pre-War, and $1 - (0.60 - 0.03) = 0.43$ for the post-War years. The former value is larger than the earlier estimate by Minami (0.24), whereas the latter is smaller than that of the same author (0.56). See Minami (1973: 183, 197, 200, 202).

the production elasticity of labor to average value-added labor products in agriculture, we obtain estimates of the marginal product for successive years. Figure 2 summarizes these findings, showing the newly computed figures for labor productivity, both average and marginal, compared with the levels of the annual wages of agricultural day workers, including payments in kind.

Figure 2. Labor productivity and wages in Japanese agriculture
(in current yen per year)
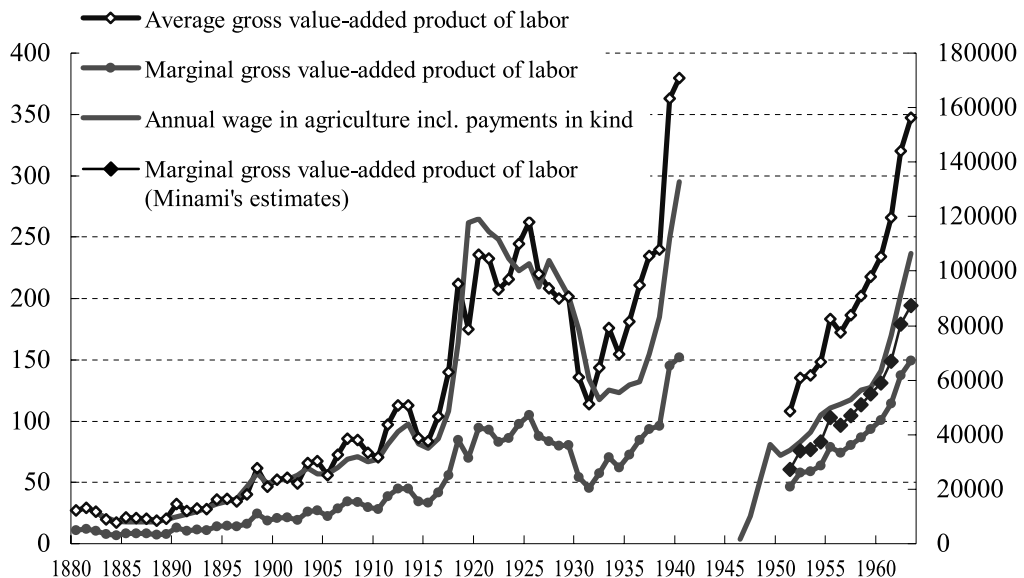
Notes:

Wage figures are weighted averages of the daily earnings of male and female day workers (*hiyatoi*), with the weights being the annual sizes of respective agricultural workforce, multiplied by the estimated total number of work days per year. Right scale for the post-Second World War years.

The numbers of work days are derived by dividing the total labor input (man-days), estimated by Shintani (1981), by the total size of agricultural workforce, and are smaller than the figures reported in the Farm Household Economic Survey (averaged 155 and 184 days, respectively, for 1957-63), since the latter survey included direct labor (such as preparation and product sales) whereas the former did not. In addition, the latter defined a "day worked" as any day when a person was agriculturally occupied for one hour or longer (*ibid*., 1936 edition, p. 12).

Sources:

Nominal gross value added: Umemura et al. (1966: Table 13 [pp. 182-83]); agricultural workforce: *ibid*. Table 33 [pp. 218-19]; agricultural wages: *ibid*. Table 34 [pp. 220-21], and Minami (1973: 200).

It is clear from Figure 2 that annual agricultural wages were approximately equal to the average product of labor throughout the pre-Second World War years, staying far above their marginal counterparts. After 1945, however, they were between the two sets of productivity figures, being higher than the marginal but significantly lower than the average values of labor productivity. One may well surmise that after the Land Reform of 1945-50, the influence of

the pre-War institution of "excessive employment" declined rapidly. Nonetheless, it must have still been powerful enough to last until the beginning of the high growth era.[9]

III. The nature of labor services in Japanese agriculture

Before proceeding further, we will examine the nature of the wage labor in Japanese agriculture, as it is one of the cornerstones upon which the interpretation as well as the relevance of our findings depends critically.

Small-land holding has long been a salient characteristic of Japanese agriculture. The predominant farming style was that of owner-cum-tenant cultivation, where most of the needed labor was provided by owner-cultivators and their family members. In other words, hired farming hands comprised only a very small proportion of the cost of Japanese farming. Especially before World War II, there were few full-time (landless) agricultural laborers who engaged in farming operations throughout the year, with the exception of people called *nenko*,[10] who were employed by relatively large landowners who resided in villages and were themselves agricultural cultivators. Aside from the *nenko*, there were two kinds of agricultural labor: day laborers (*hiyatoi*), and village helping hands (*yui*); the latter exchanged labor services with other villagers but received no pecuniary compensation.[11] Most of the day labourers and *yui* helpers were occupied only during the busier seasons of the year (i.e., weeding, planting, and harvesting).

The *nenko* were mostly live-in employees, either male or female, who in certain cases were akin to bonded servants in status. They were contracted to work either for a full year or for roughly nine months from early spring to late fall, but some of them (especially when they were married) may have been daily commuters. They were typically engaged in farming labor for about 184 days a year.[12]

Nenko received their remuneration annually, while day laborers were paid daily. In addition, both were supplied by their employers with payments in kind, in the form of meals and/or rice, as well as, in the case of *nenko*, boarding and work clothes. Such non-monetary compensation made up a substantial proportion in value terms of their total earnings, and should be counted as part of the labor compensation. According to a government report published in 1921, the proportion of such provisions in the total value of labor income amounted to as much as 51.0% (male) and 56.2% (female) in the case of *nenko*, and 28.6% (male) and 29.0% (female) in the case of day laborers engaged in planting rice (cited in Umemura et al. 1966: 101). It is quite important, therefore, to come up with reasonable estimates for payments in kind.

Significant structural changes must have taken place in post-Second World War Japanese agriculture (as evidenced by the regression exercise reported in the previous section), especially after the beginning of the era of rapid economic growth. For one thing, *nenko* labor dis-

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[9] Obviously, the validity of the last statement hinges on the reliability of the estimated production elasticity of labor. If it was as high as the 0.56 in Minami (as noted in footnote 8 above), the post-1945 wages were just about equal to the marginal product of labor.

[10] The term *nenko*, meaning one-year contractual employee, is different from the well-known term *nenkô*, referring to merit ratings accruing from continuous work over the course of the years in non-agricultural industries..

[11] According to the 1960 *Nôka keizai chôsa* (Farm Household Economic Survey) of the Ministry of Agriculture and Forestry, 93.4% of the average total annual working hours per farm household (3,274 hours) was contributed by family labor, versus 3.4% by day labor, 2.8% by *yui*, and 0.5% by *nenko* (Umemura et al. 1966: 99).

[12] The average number of working days of farming households in the 1951-63 period, based on reports of *Nôka keizai chôsa* (Farm Household Economic Survey) and cited by Minami (1973: 266). Figures for the post-Second World War period have been suggested here, as one may argue that the number of working days after the Land Reform would approximate rather accurately the physiological need of Japanese farming irrespective of timing.

appeared from the scene: its proportion of the expenditures for hired hands declined from about 20 percent in 1950 to a tiny 4 percent in 1970, according to the *Farm Household Economic Survey*. The practice of *yui* also clearly declined.

In the computation exercise reported in the previous section, agricultural labor productivity was compared with the annual earnings equivalent of agricultural day laborers, which was estimated by multiplying their average daily wages by their annual number of work days. It is possible, however, that the compensation of the day laborers reflected the labor intensity that would be required during the busiest times of the year.[13] Multiplying the day workers' earnings by the total number of days of average farming operations may have led to an overestimation of the economic value of the unit labor cost.

Alternatively, the wages of *nenko* could have been adopted for the pre-Second World War decades (but not for the post-War years due to the lack of data). One might even argue that it would be better to adopt the *nenko* workers' compensation, as it would more accurately reflect the economic contributions of agricultural workers in annual production, inasmuch as they are involved in the entire farming cycle. Be that as it may, the use of the *nenko* wage data leads to essentially the same conclusion as reported in the previous section.

IV. A cross-sectional view of Japanese agriculture in 1961

In an effort to explore the upward shifts in Japanese agricultural labor productivity in the late 1950s and to evaluate their possible impacts on the country's non-agrarian labor market, Nishikawa and Torii (1967) estimated a cross-regional Cobb-Douglas agricultural production function for 1961.[14] Drawing on their results, Figure 3 below shows the marginal productivity of male labor, together with the average value-added product of total labor inputs (including male and female), both of which are compared with the average wages of male and female agricultural day laborers. All the variables are expressed in yen per hour, and labor earnings are calculated in two ways, with and without payments in kind (see Figure 3).

The findings of the diagram generally accord with the observations in the last part of the Section II. By 1961, the levels of agricultural wages in the north-western parts of Japan had become almost equal to the marginal, rather than average, labor productivity of agriculture.[15] However, in the relatively more industrialized, south-eastern parts of the country, the values of annual labor earnings were clearly very close to the other end of the spectrum. The contrast between these two patterns is strengthened if the daily earnings of agricultural laborers are augmented by 12.5 percent to include average value of payments in kind, as indicated by the dotted line (with triangles) in the Figure.

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[13] Herein lies, it seems, a reason why care should be taken in interpreting the concept of marginal productivity in agriculture.

[14] The dependent variable was agricultural total output in value (or gross farm income), which was explained by N_M (working hours by men), N_F (working hours by women), H (hours of power inputs such as animal and/or mechanical services), C (expenditures on current inputs such as fertilizers), and K (combined values of non-residential buildings and of cultivated land areas). Ten regions were identified, excluding Hokkaido and Okinawa, and a dummy variable was assigned to each region to account for varying climatic, geographic and other conditions. The estimated linear logarithmic specification for 1961 (with 60 observations) showed that the production elasticity of male labor (0.184) was significantly different from zero, while that of female labor was non-significant due to multi-collinearity, and that the sum of all the elasticity values added up to unity (Nishikawa and Torii 1967: 16-17). The original data covered a year extending from 1 April 1961 to 31 March 1962.

[15] One must bear in mind that Figure 3 presents the marginal products of male labor input only, since (as explained in footnote 14 above) the corresponding values for female labor could not be computed. The weighted averages of marginal products of male and female labor inputs (if available) would have been slightly lower than those of male labor, but the gist of the argument in the text would not have been affected.

**Figure 3. Labor productivity and wages in
Japanese agriculture by region (1961)**

(in yen per hour)
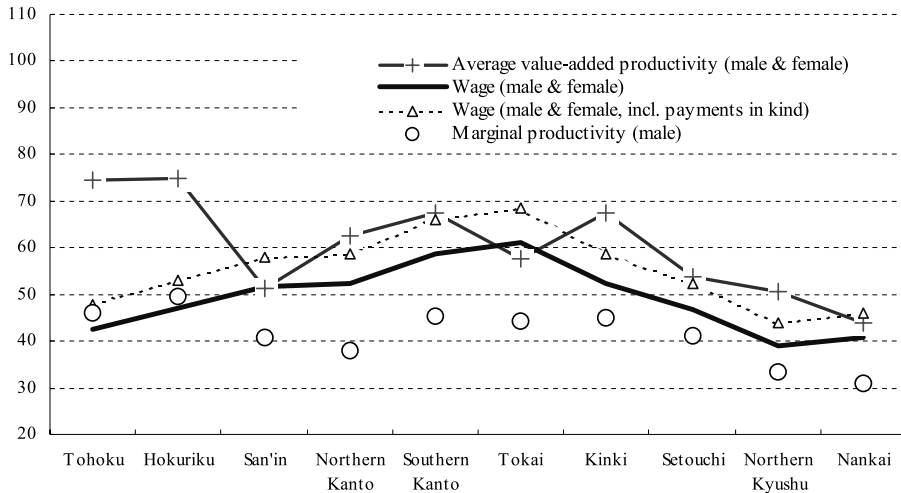
Sources:

The marginal productivity figures for male labor are borrowed from Nishikawa and Torii (1967: 20). Average value added labor productivity is calculated as agricultural income (i.e., agricultural revenue minus production costs) divided by total male and female working hours, on the basis of data given in the Ministry of Agriculture and Forestry's *1961 Nôka keizai chôsa hôkoku (Farm Household Economic Survey)*, p.133 and pp.80-83, respectively. Agricultural daily wages (with no payments in kind) are taken from the same Ministry's *1961 Nôson bukka chingin chôsa hôkokusho [Report on Agricultural Prices and Wages]*, p.340. The average ratios of payments in kind to money wages (12% for males and 13% for females) are derived from *ibid.*, p. 339.

These findings likely reflect a process of stage shifting in Japanese agriculture, from the share-economy-dominating, old style to a new type involving labor transactions, where agricultural remunerations were determined according to a genuine profit-maximizing principle. This interpretation is not only consistent with the notion of "excessive employment," which was widely recognized (as pointed out earlier) among Japanese economists in the 1950s and 60s, but also seems convincing as a reason for explaining the extremely low unemployment rates in the labor-abundant phase of post-War Japanese industrialization.

V. A record of late-nineteenth-century Japanese farming

A fascinating discovery has been made on the nature of labor transactions in pre-industrialized Japan (around 1845-46). An examination of the official records of a feudal clan government has revealed, among other things, that the marginal principle was in operation in nineteenth century Japan.

The *Chōshū* Clan, located at the south-end of Honshū Island (in present day Yamaguchi Prefecture), was a relatively advanced economic region in mid-nineteenth century Japan. Its agricultural productivity was relatively high, in part because of the cultivation of cash crops such as cotton and vegetable oil. The clan government was eager to promote infant industrialization, and was itself engaged in the enterprise of salt extraction from seawater, the product of which was sold in the market to enrich the clan's fiscal revenues.

Labor services for salt making were supplied by nearby villages on the seashore, so that the wages must have reflected the opportunity costs of farming adults in the plain area.[16] Surprisingly, Nishikawa (1978) reported that the wages of day laborers engaged in salt making nearly equalled the marginal labor productivity in agriculture (estimated by way of a Cobb-Douglas production function; see the left-hand side column of Table 1). In the mountainous areas of the clan, on the other hand, where physical distance prevented the villagers from acting as a source of salt-making labor, the residents' average expenditures per capita were almost equal to the corresponding agrarian marginal product of labor (see the right-hand side column of Table 1).

Table 1. Labor productivity and wages in nineteenth century *Chôshû*

	Plain area	Mountain area	Explanatory notes
(1) Agricultural production			
a. Agricultural product per village population (in silver *momme*/year)	302.0	160.00	
b. Agricultural population/village population	0.79	0.79	
c. Agricultural product per agricultural population (in silver *momme*/year)	382.28	202.53	a ÷ b
d. Estimated output elasticity of labor	0.50	0.50	
e. Estimated marginal product of agricultural labor (in silver *momme*/year)	**191.14**	*101.27*	c x d
(2) Data pertaining to the village standard of living			
f. Minimum grain intake per head (*koku*/year)		1.25	
g. Minimum rice intake per head (*koku*/year)		0.50	
h. Price of grain (in silver *momme/koku*)		50.00	
i. Price of rice (in silver *momme/koku*)		75.00	
j. Minimum food expenditure per head (in silver *momme*/year)		75.00	{(f - g) x h} + (g x i)
k. Engel's coefficient		0.70	
l. Total expenditure per head (in silver *momme*/year)		*107.14*	j ÷ k
m. Number of days worked on farm	200	200	By assumption
n. Labor compensation for salt production (in silver *momme*/6 months)	**180.00**		1 *momme*/day

Note: One *momme* weighs 3.76 grams, and one *koku* is equivalent to 180.5 litters.
Source: Nishikawa (1978: 69-83)

These calculations suggest that the profit-maximizing principle was at work in a relatively advanced rural district of nineteenth century Japan.[17] This finding is in sharp contrast to that reported in the previous two sections, and calls for careful consideration by researchers.

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[16] No information is available on payments in kind.

[17] On the basis of this evidence, Nishikawa (1978) suspects that the condition of "unlimited supplies of labor" did not apply to nineteenth-century *Chōshū*.

VI. Two cases from East Asia

Let us now proceed to an examination of two East Asian regions outside of Japan, namely Taiwan and Korea, followed by (in the succeeding section) two cases from Southeast Asia, namely the Philippines and Thailand.

(1) The case of Taiwan

Colonial Taiwan left behind a rich stock of high-quality macro economic statistics, allowing economic historians to compile agricultural production statistics by type of crop and by region. Also available are time series statistics of cultivated land areas, capital stock, gainfully occupied agricultural population, and wages for agricultural labor services.

The population statistics of pre-World War II Taiwan call for careful study, as they provide detailed information on village by-employment, which was a common practice during the pre- and early industrialization periods in East and Southeast Asia (cf. Ishikawa, Yamada and Hirashima 1982). This fact implies that farming households in the region at these times required, and were equipped with, relatively abundant supplies of labor, not only technology-wise but also time-wise, to engage in the production of non-agricultural goods and services.[18] In Taiwanese agriculture during Japanese rule, three types of labor services were available in addition to those of the family members of farming households: seasonal employment, annual employment (*nenko*), and temporary or contractual work.[19] With regard to compensation, however, only the annual daily wages (for males and females) were recorded. After independence, the Japanese concept of *nenko* must have been rapidly discarded. Unfortunately, agricultural wage statistics in the post-1945 period are only readily available after 1961, and are reported in a similar fashion as in the pre-independence days, providing (annual average) day rates for males and females.

Real wages in pre-Second World War Taiwan were significantly lower than the comparable earnings level in Japan. Moreover, one finds sizable earning differentials in Taiwan between Taiwanese and Japanese. These findings are consistent with the interpretation that labor supplies in Taiwan during those decades were relatively abundant. A similar condition in the labor market must have prevailed shortly after the Second World War for an entirely different reason, since following the Communist victory on the mainland in 1949, a large number of mainlanders (soldiers and refugees) moved to the island, increasing Taiwan's population by about twenty percent.

An OLS computation is carried out on the set of data for the period of 1911-1972 in a similar fashion as was done in Figure 2, with the same definitions of the variables, yielding the following result.[20] The figures in parentheses record t-statistic values.

$$\ln(V/N) = -1.79 + 0.00 \, \lambda + 0.57 \ln\{(L*K)/N\} + 0.01D \ln\{(L*K)/N\},$$
$$\quad\quad (-1.79) \ (1.74) \quad (6.68) \quad\quad\quad (1.74)$$

R^2 (adjusted for degrees of freedom) = 0.87, Root MSE = 0.12, and F = 110.52.

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[18] Statistical information on village by-employment on such a detailed basis is rarely as available as it is for Taiwan. See Liu et al. (1998).

[19] Called, respectively, *kisetsu yatoi, rinji yatoi, and ukeoi* (*Nōgyō kihon chōsa sho dai 30, nōka keizai chōsa, beisaku nōka* [Basic Agricultural Research No. 30, Farm Household Economic Survey for Rice-planting Farms], published in 1934 by the Economic Promotion Bureau, the Governor's Office of Taiwan, p. 14).

[20] Gross value added and fixed capital (*V* and *K*, respectively, both expressed in 1935-37 prices), cultivated land area (*L*, in thousand hectares) and agricultural work force (*N*, in thousand) are estimates by Ten-hui Lee and Yueh-eh Chen, reported in Tables T3 and T4 of Hayami et al. (1979). The statistics on fertilizer inputs (λ , expressed in thousands of tons) have been taken from *Taiwan nōgyō nempō* [Annual Reports of Taiwan Agriculture] issued by the government, various years.

Figure 4. Labor productivity and wages in Taiwanese agriculture

(in current yen per year)
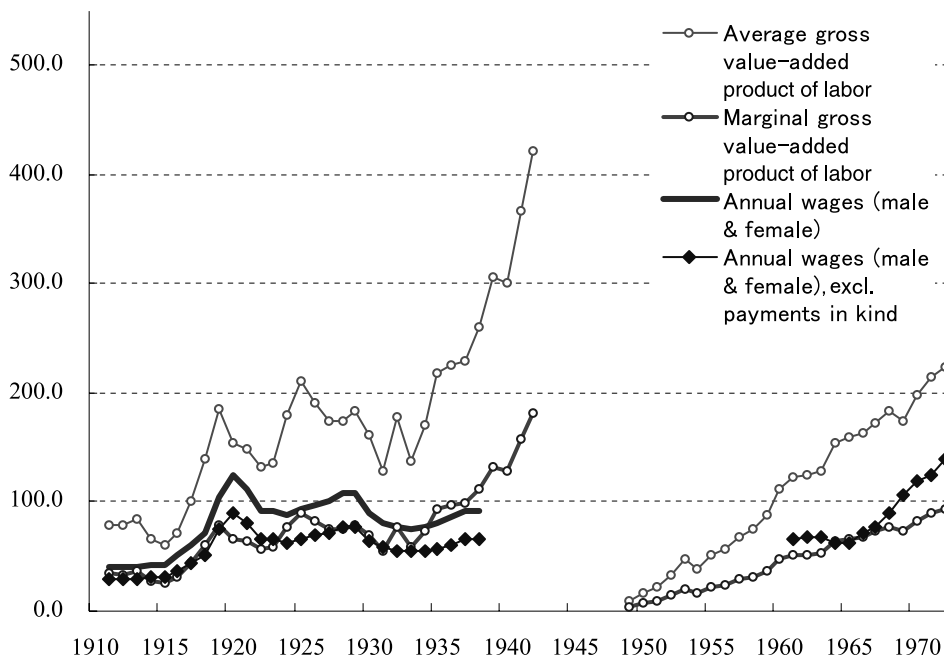
Notes:

   Annual wages are computed by multiplying daily agricultural wages by the number of days worked during the year, and further augmented by the ratio of additional payments in kind (1.4 on the basis of *Nôka rôdô chôsa sono ichi (suitô shusaku nôka)* [*The Farm Household Labor Survey No. 1 (waterfield rice planting farmers)*] by the Taiwan Sôtokufu [The Governor's Office of Taiwan] for the period of November 1936 through October 1937 (issued as number 40 of its Basic Survey on [Taiwan] Agriculture). This figure, however, applies to rice planters, and may differ from that for those who cultivate dry land crops including sugarcane.

   As the wage statistics for the period of 1964-72 report male and female earnings separately, their averages have been estimated by applying respective weights of 0.7 and 0.3, which are roughly equal to the male-female ratio in the agricultural labor force.

Sources:

   Figures for nominal gross value added, size of the agricultural workforce, and annual number of days worked are estimates by Lee and Chen, as reported in Hayami et al. (1979: Tables T-2 and T-4). The figures for gainfully occupied agricultural workforce have been adopted here in order to keep consistency with other estimates by the same authors, but they vary slightly from the newly estimated series by Tadayoshi Taniguchi, to be released in Mizoguchi (forthcoming). Wages are Odaka's estimates as reported in Umemura and Mizoguchi (1988: 258).

   The estimated regression implies that in Taiwanese agriculture, technological progress was positive but not very substantial during the period, while virtually no structural change took place before and after the Second World War.[21] The share of labor changed slightly from

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[21] Chow's test yields the following results.

Variables	λ	D	λ and D
F values	24.34	3.03	15.42
Probability of error	0.000	0.0088	0.000

0.43 in the pre-War to 0.42 in the post-War decades.

Time-series hourly wages of agricultural day workers, including payments in kind, are compared in Figure 4 with the average value-added product of labor as well as with marginal value-added labor productivity, as derived from the estimated Cobb-Douglas production function. Unlike in the case of Japan in the early phases of industrialization, Taiwanese daily labor earnings in agriculture were equal to the corresponding values of marginal labor productivity throughout the entire period of observation, in both pre- and post-colonial decades.

Evidence suggests, therefore, that, in both pre- and post-Second World War Taiwan, the marginality principle was unambiguously operational despite the existence of relatively abundant supplies of labor.

(2) The case of colonial Korea

We conduct a similar regression using the data of colonial Korea for the period of 1911-1938. Figure 5 reports the results of a computation carried out with much the same methodology (as in Figure 2). Labor productivity in the diagram may be slightly underestimated, since the employment figure includes a relatively small portion of forestry workers. Furthermore, the number of working days in farming is not documented in the colonial statistics. For this reason, two alternative figures for the number of working days (i.e. 100 and 140) are used to indicate a band in which monetary compensation (including boarding) must have taken place.

$$\ln(V/N) = -2.62 + 0.76 \ln\{(L*K)/N\},$$
$$ (-1.94)\ (5.50)$$

R^2 (adjusted for the degrees of freedom) = 0.59, Root MSE = 0.08, and F = 30.23.[22]

Attempts have been made to introduce indices that may approximate qualitative improvements in labor (namely, the spread of education) and in production technology (quantity of fertilizer inputs), but they lead to no significant change in the regression. The above result implies that the share of labor during the period was about 24 per cent.[23]

As with the case of Taiwan, three types of agricultural workers can be identified in Korea under the Japanese rule.

Figure 5 compares wages with labor productivity in pre-Second World War Korea. Marginal labor productivity is estimated (as before) by multiplying the average product of labor by the production elasticity of labor, estimated from the Cobb-Douglas production function. Money wages reported in the statistical yearbooks are multiplied by 2.0 in order to allow for payments in kind, which reportedly amounted to such a proportion (*Chôsen nôka keizai chôsa* [Farm Household Economic Survey] of 1932 by the Chôsen Sôtokufu [The Office of the Governor of Korea]).[24] The Korean agricultural situation in the pre-war period was analogous to the contemporary situation in Japan, in the sense that the principle of marginality was not operational for labor services.

The results of the computation clearly indicate that in the case of colonial Korea, the

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[22] Using working hours, instead of the size of the workforce, as the measure of labor input, the following results are obtained:

$$\ln(V/N) = -3.78 + 0.63 \ln\{(L*K)/N\},$$
$$ (-6.65)\ (3.43)$$

R^2 (adjusted for the degrees of freedom) = 0.35, Root MSE = 0.08. and F = 11.75.

[23] An earlier estimate by Ban (1979) is 0.39, which is closer to the regression estimate cited in footnote 22 above (0.37).

[24] Cited also by Iwakata (1940: 296). The ratio tended to be lower in the northern districts, as shown below (Chôsen Sôtoku Fu 1940: 8).

	north-west	middle	south
1933	1.3	1.9	1.8
1938	1.7	1.7	2.3

Figure 7. Labor productivity and wages in Korean agriculture

(in current yen per year)
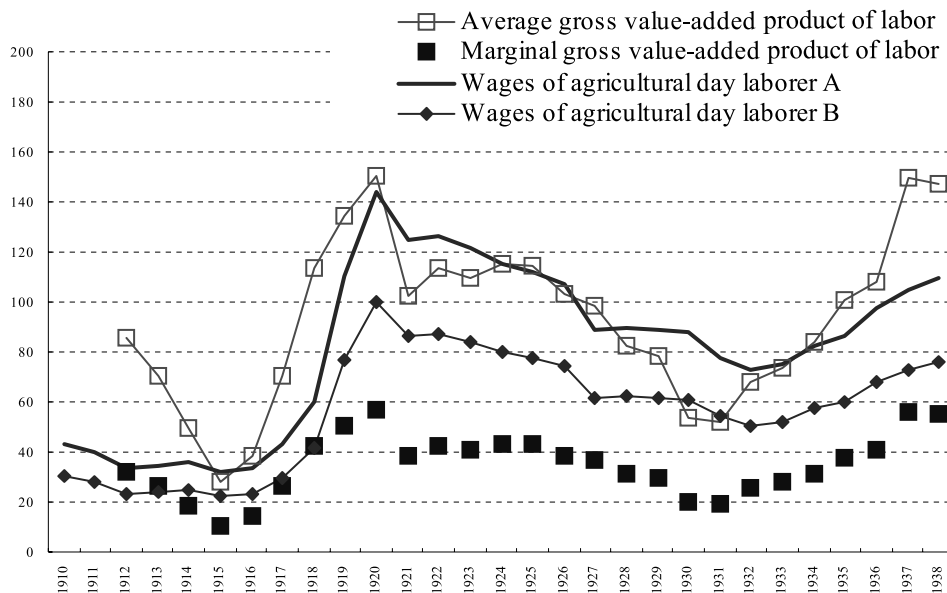
Note:

Annual number of days worked is assumed to be 144 in wage series A, whereas it is assumed to be 100 days in wage series B. 144 is the maximum number of days worked in Taiwanese agriculture, and is borrowed from Lee and Chen (1973: Table T-1), and 100 is the 1960 figure in Korean agriculture as reported in Ishikawa (1967: 275).

Sources:

Agricultural employment, agricultural nominal gross value added, and daily agricultural wages: Umemura and Mizoguchi (1988: 260, 268-269, 262, respectively). Wage figures are adjusted to include payments in kind, which are assumed to be 50 percent of total wages on the basis of information given in *Chôsen nôka keizai chosa* [*Economic Survey of Farming Households in Korea*], *1930-1931* (cited in Umemura and Mizoguchi (1988: 164).

state of "excessive employment" must have existed, just as it did in Japan proper in the pre-War decades.

VII. Two cases from Southeast Asia

(3) The case of a village in Luzon

In 1976 Hayami and Kikuchi assembled farming data from Luzon island, the Philippines, where many landless laborers sought work opportunities in rice fields by providing such services as weeding and cropping. In the village of Los Baños, the authors discovered that only those who offered such labor services were permitted to participate in the cropping, with one-sixth of the crops being offered to them as compensation for their work. Most surprisingly, the value of the compensation was found to be exactly equal to the marginal product of rice cultivation in the village.

Rice production in the post-World War II Philippines registered phenomenal development, and achieved self-sufficiency during the Marcos regime. This accomplishment was to a

great extent due to the "Green Revolution," to which ample contributions were made by research and development conducted at the International Rice Research Institute (IRRI) in Laguna.

During this time of renovation in rice cultivation, the situation in the Philippines was also characterized by an excess supply condition of labor, as indicated by a relatively high unemployment rate. Whereas real per capita national income rose steadily, real agricultural wages continued to fall throughout the period.[25]

Despite the overabundance of labor resources, there is clear evidence from comprehensive field studies in the village of Laguna that transactions on labor services in the village were rational. More specifically, landless workers in the village were under a community norm (called *hunusan*), which stipulated that those participating in short-term, intensive rice period cropping were entitled to receive one-sixth of the crops they collected. As the pressure of labor supply mounted, however, a revision of the community norm came into effect (called *gama*) which restricted the entitlement only to those who had participated earlier in weeding.

Table 2. Labor productivity and wages in
East Laguna Village, Luzon (1976)

(a) Compensation for farming labor			
Type of services rendered	Area worked (ha)	Rate of compensation (peso/ha)	Total value of compensation (peso)
Weeding	19.6	8.0	156.8
Cropping	33.6	11.0	369.6
Total			526.4
(b) Data pertaining to wage determination			
Type of contract	Labor share (%)	Output elasticitiy of labor	t statistics of the elasticity
Owner operator	29.3	0.299	1.47
Share cropper	30.9	0.300	1.48
Fixed-rent tenant	31.8	0.299	1.30

Note: Labor compensation made in kind was converted to peso values using the ongoing market price of grain (rice). No boarding payments were provided.
Source: Hayami and Kikuchi (1981: 113,115, and 121).

Surprisingly, the valuation of the outcome of the communal norm stands up the test of rationalizing behavior by farmers: the share of labor was exactly equal to the output elasticity of labor estimated from the Cobb-Duglas production function. In other words, the labor-abundant, communal society of the Philippines in the mid 1970s practiced the marginality principle of work compensation.

(4) The case of the farming sector in Thailand

The economic transformation of Thai economy in the post-Second World War decades

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25 The seemingly contradictory movements between national income and wages may be partly explained by the sizable international income transfers from overseas Filipinos.

has been quite phenomenal, and certainly deserves close attention from economic historians. Accordingly, Figure 6 provides a time-series view of labor earnings. It is clear from the diagram that labor-service transactions have been conducted in close accordance with economic rationality.

Figure 8. Labor productivity and wages in Thai agriculture

(in current bahts per day)
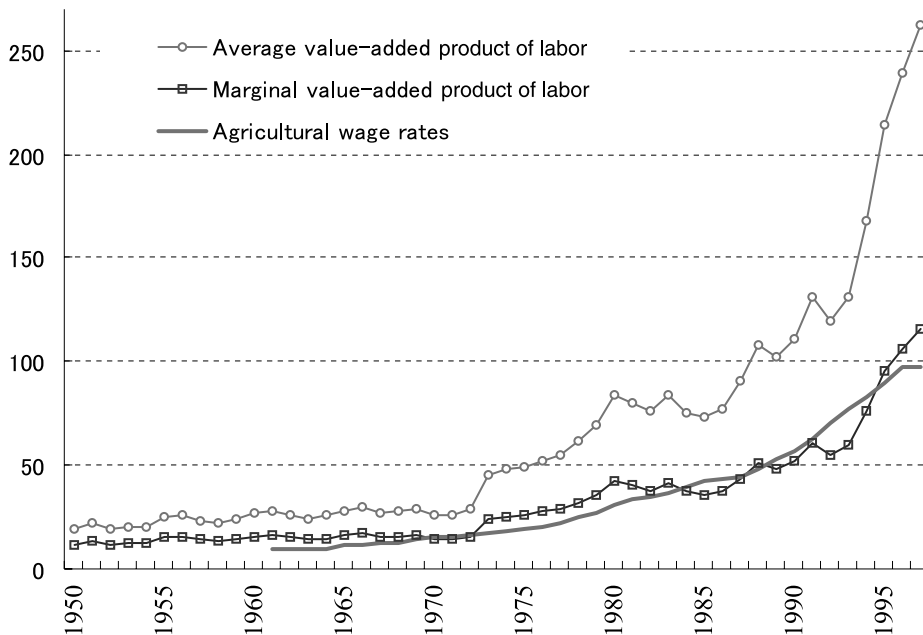
Source: Shintani (2003: 74-75, 165, 215). Wage rates were estimated by Professor Somporn Isvilanonda, and are reproduced here with his gracious consent.

VIII. Summary and interpretation

The re-examination in the present essay of quantitative data on production and labor earnings in modern Asian farming has yielded several very simple observations. First, the thesis of the proponents of "excessive employment" has been found to be consistent with the experiences of pre-Second World War Japan and Korea under colonial rule.[26] This finding notwithstanding, some evidence has also been presented for the argument that "excessive employment" in Japanese agriculture was in the process of being phased out by the early 1960s.

Second, the balance of the cases examined here has indicated, by contrast, that the necessary conditions were met for the maximization of net household income from agriculture. Inasmuch as contractual labor services were bought and sold in competitive markets, it appears that wages and employment were determined according to the marginality principle. The above findings seem to point to the extraordinariness of the phenomenon of "excessive employment." It represents a case where economic transactions are executed according to a

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26 Shintani (1998, 2001) reports that "excessive employment" was practised by modern farming households of mainland China and Indonesia, where the marginal product of labor was much lower than the prevailing market wages.

communal principle, where a group of individuals (such as a family) work together to fulfill common objective, e.g. work sharing. The group as a whole constitutes the basic unit of economic decision making, and the income earned by the group is distributed equally among its members.

By contrast, in a social context where the principles of market transactions are honored and the final economic decision-making is done by individuals (and not by organized units such as families), both sellers and buyers of labor services attempt to optimize their respective economic gains. Under this condition, bargaining between the parties leads to the equalization of wage rates with marginal labor products.

The two types of institutions may operate concurrently, as exemplified in pre-War Japan by labor-intensive farming households (share economy), on the one hand, and large manufacturing enterprises (gains-first economy), on the other. The distinction, moreover, does not necessarily coincide with that of the central ethos of economic systems such as feudalism, capitalism, and socialism. In fact, the gains-first principle was in operation in the labor market of pre-industrialized Japan.

If this interpretation is true, the next task for investigation by economic historians will be: why and how did the two contrasting systems come about and coexist? The question may lead one to an interdisciplinary investigation, which will be greatly welcomed.

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