

Title	Employment structure and labor's relative share
Sub Title	
Author	辻村, 江太郎(Tsujimura, Kotaro)
Publisher	
Publication year	1964
Jtitle	Keio business review Vol.3, (1964.) ,p.33- 53
JaLC DOI	
Abstract	
Notes	
Genre	Journal Article
URL	https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=AA00260481-19640000-03919631

慶應義塾大学学術情報リポジトリ(KOARA)に掲載されているコンテンツの著作権は、それぞれの著作者、学会または出版社/発行者に帰属し、その権利は著作権法によって保護されています。引用にあたっては、著作権法を遵守してご利用ください。

The copyrights of content available on the KeiO Associated Repository of Academic resources (KOARA) belong to the respective authors, academic societies, or publishers/issuers, and these rights are protected by the Japanese Copyright Act. When quoting the content, please follow the Japanese copyright act.

EMPLOYMENT STRUCTURE AND LABOR'S RELATIVE SHARE

by

Kotaro Tsujimura

Preface

S. Kuznets has pointed out, after his analysis of long-term time series covering 10-12 countries, as below:¹⁾

1) In general, national capital formation proportions have increased in parallel with the rises in per-capita income. However, in America and Great Britain the increases have disappeared in the relatively earlier period of economic growth, despite sustained rises in per-capita income. On the contrary in Sweden, Japan and others the increases can be recognized tens of years later than the beginning of remarkable rises in national income and per-capita income. Thus exceptions are too many to assume simple relationship between income level and capital formation.

2) Also by traverse, international comparison as to the postwar period, close relationship between income level and national savings proportion cannot be realized, since some high-income countries have shown low proportions of capital formation, while some low-income countries have had high ones.

3) The marginal capital coefficients show, in international comparison, a wide variance ranging from under-2 to over-5, and also as to the patterns of time-serial fluctuation, intimate similarity among countries cannot be recognized. Again in the moving averages extending over more than twenty years, they does not show any particular, firm value.

From these observations Kuznets has drawn conclusions as follows. It is difficult to testify by long-term time series such simple relation as $S=ky$, or $gc=S$. As the cause-and-effect relations of per-capita income→savings proportion, and savings proportion→growth rate show irregular fluctuations, the effectiveness of economic forecast based on singular correlation is doubtful. Between the relations between these variables there may lie many other

1) Kuznets, Simon: "Quantitative Aspects of the Economic Growth of Nations, VI: Long-Term Trends in Capital Formation Proportions, *Economic Development and Cultural Change*, Vol. 9, No. 4, Part 2, July 1961.

factors, and any difference in the beginning conditions may greatly influence relations in later developing stages.

At the joint-point of capital formation and economic growth, unquestionably lies capital utilization rate, that depends on economic and social conditions of wide sphere. To find out more essential ones of these conditions makes just our future task. Kuznets concludes thus.²⁾

In this article, I want to take up the problem of employment structure, as one of the conditions that govern the relations between income level and savings proportion and those between capital formation and economic growth.

It is natural that, through the rapid postwar growth of the Japanese economy, it has been the supply of fund rather than the supply of labor that confines the possible upper limit of growth rate, and in so far the equation $gc=S$ has been the condition most attended. But unobjectionably there is another essential condition in the backgrounds, that there has been no bottleneck in the supply of labor. A point to be noticed here is that, since surplus labor supply existed as the beginning condition, the volumes of potential yearly supply of labor have always exceeded the figures of the growth of labor power.

In the below I shall put focus upon a point that the employment structure in this country has made capital formation easy, mainly through wages. This, however, does not mean to overlook the importance of the earned income that have supported, side by side with the farm income, the effective consumer demands for 1951-1960 period. As well known, side by side with the steady increase in farm income—derived from agricultural reforms, support to rice price and technical advances—the rise in earned income has served to minimize the effects of the decrease in investment demands in recession periods. To inquire into this point further will lead one to the study of the interactions between rise of demand for a consumer goods and that of supply capacity by medium of price, and the interrelations between capital formation in respective industrial sectors (and degree of capital utilization) and earned income regarding demands. By a Pareto-type consumption function, that we have developed, it is seen that consumer demand is more elastic with respect to price, than is presented by the usual partial-equilibrium type demand function.³⁾ But as the space does not allow full explanation of this point, I shall proceed to set forth my study confining to the cost side of the problem, and that, only a part of it, employment structure→wages decision→capital accumulation.

1. Labor's Relative Share and Capital Formation

It is the restraints from investment-savings side that has been hitherto recognized as the factor that confines the upper limit of growth potentiality.

2) Kuznets; op. cit., p. 56.

3) Tsujimura, Kotaro: "Family Budget Data and the Market Analysis," *Bulletin of the International Statistical Institute*, Vol. 38, Part 2 (Tokyo, 1961), pp. 227-228.

It is generally known that the business fluctuations in the postwar economy have been successive cycles of recession→softened finance→increased investment→boom→deterioration of balance of payments→tightened finance→recession.

According to the national income statistics for 1958-1960, out of gross national savings about 47 per cent is provided from depreciation allowance and reserves of corporations and 34-41 per cent from personal savings, besides 20 per cent accounted for by current account surpluses of government. The sources of personal savings consist, besides earned income, of proprietor's income, personal rent income, personal interest income and personal dividend income. The rate of personal savings, including all these, to total disposal income is higher compared with that in earned income only; this reflects higher savings rate in incomes other than earned income. (ref. Table 2 and 5 of this section.)

Within personal income, wages and salaries and other types of incomes are in the ratio of 10:7 for 1958. We can assess by this ratio the savings rate in personal income excluding workers' income as 23.8 per cent for that year; far exceeding that of workers' income, 14.1 per cent. Hence it may be said that the low proportion of earned income to gross national product for 1951-1960 as shown in Table 1 and not over, acted favorably for capital accumulation. As seen in Item 4 of Table 1, the proportion of earned income to total personal income showed a clear upward trend. This depends mainly on the fact that, during the period 1954-1959, while total employment showed an increase of 4 million persons, the number of employees increased by more than 5 million and that of proprietors and family workers decreased by more than 1 million; thus the proportion of employees to total employment rose by more than 20 per cent from 38 per cent to 47 per cent.

While the proportion of earned income to total personal income showed a sharp rise from 45 per cent for 1951 to 55 per cent for 1960, its proportion to gross national product registered no noteworthy rise, only from 33 per cent to 38 per cent during the same years. (Table 1). This results from the fact that the effect of the rise in the proportion of employees was offset by the increase in capital depreciation allowance as proportion to gross national product. (Item 5 of Table 1).

Table 1. Earned Income and Capital Formation

year	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
(1) Gross National Product (100 billion yen)	54	61	70	75	82	93	101	104	126	147
(2) Earned income (100 billion yen)	18	22	22	28	31	35	39	42	48	55
(3) (2)/(1) (%)	33	36	31	37	37	38	38	40	38	38
(4) Proportion of (2) to personal income (%)	45	47	49	50	49	51	52	54	54	55
(5) Proportion of capital depreciation to (1) (%)	5.1	5.9	6.7	7.5	7.9	8.5	9.2	10.0	10.0	10.4
(6) National capital formation proportion (%)	30.6	27.4	27.9	23.4	25.4	31.8	31.6	27.3	35.0	38.2
(7) Proportion of private sector to (6) (%)	75.3	71.8	67.5	66.1	65.7	76.6	74.8	67.2	74.7	76.1

Source: Economic Planning Agency, "Report on National Income".

As explained above, the relatively low proportion of earned income, that has relatively low savings rate (although high compared with those in foreign countries), contributed to bring about high rate savings as the whole eco-

nomy. The macro-economic portion of labor's share is governed by that in unit enterprise, as well as by the proportion of employee to total employment. As the proportion of wage-salary income to total income, namely added value, reflects the relative position between productivity and wages, as to be explained later, it may be said that the high rate of savings depends ultimately on the relative lowness of wages as against productivity.

We cannot simply say that smaller proportion of earned income is the better, when viewed from the standpoint of utilization grade of production power. In view of the weighty role played by the steady increase in earned income after the war, we must say, the facts that the labor's portion in each period was not too low, and the time lag between the rises of productivity and wages was not too long, made indispensable factors for high rate growth too.

In short, through the period 1951-1960 the wage level, in relation to productivity, maintained a favorable balance to realize high rate growth, since it was neither so high as to hinder capital accumulation, nor so low as to impede expansion of home market; notwithstanding whatsoever the intentions of government, business or trade union were.

As one of the factors that have derived these situations, I should like to examine the role played by the employment structure and the balance between labor supply and demand.

2. Supply-Demand Balance of Labor and Employment Structure

As it will be seen later, the labor's portions of distribution as regards every section of manufacturing industry in Japan are substantially low, as compared with corresponding figures in America. This represents a case of general tendency that the portion is generally low in backward countries.

Now I shall examine the particularities of the Japanese employment structure with reference to some indices, comparing them with those in more advanced countries. Firstly the proportion of employee to total employment in 1960 is 54 per cent, that is, lower by 9 per cent than Italy, as shown in Table 2. Correspondingly in Japan proprietor-and-home worker, the pre-modern type of employment, occupy near half the total employment.

Table 2. Proportion of Employee to Total Employment

Country	Year	Proportion
Japan	1960	54%
United States	1960	84
United Kingdom	1951	88
France	1954	65
W. Germany	1959	77
Italy	1960	63

Source: For Japan, Statistics Bureau, PMO; "Labor Power Survey"; for US, U.S. Department of Labor, "Employment and Earnings", 1961; for others, ILO, "Year Book of Labour Statistics", 1958, 1961.

Table 3. Proportion of Employee in Manufacturing

Year	Proportion
1954	72%
1956	76
1958	79
1959	81

Source: Statistics Bureau, PMO; "Labor Power Survey".

The same as to manufacturing industry, the bearer of the task of industrial modernization, is shown in Table 3. The proportion of employee to total employment in manufacturing is even under the levels of all industries in America and Great Britain.

Table 4. Numbers and Distributions of Employees in Manufacturing, by Scales

	Japan: 1954		United States: 1954		United Kingdom: 1949		W. Germany: 1956	
	Number	Proportion	Number	Proportion	Number	Proportion	Number	Proportion
Total	6,196	100.0	15,651	100.0	7,421	100.0	6,639	100.0
1- 9	1,430	23.1	595	3.8	359	4.8	169	2.5
10- 49	1,806	29.2	1,961	12.5	840	11.3	721	10.9
(1- 49)		(37.8)		(17.2)				(11.7)
50- 99	554	9.0	1,475	9.4	749	10.1	651	9.8
(50- 99)		(12.0)		(9.8)				(8.6)
100-499	1,062	17.1	4,549	29.1	2,421	32.6	2,050	30.8
(100-499)		(23.5)		(30.2)				(28.4)
500-999	404	6.5	1,964	12.5	971	13.1	868	13.1
(500-999)		(26.9)		(42.8)				(51.3)
1000-	938	15.1	5,108	32.6	2,081	28.1	2,180	32.8

Source: For Japan, Statistics Bureau, "Statistical Survey of Business Place", 1954, 1961; for U.S., "Census of Manufactures", 1954, 1958; for U.K., "Census of Production", 1949; for W. Germany, "Statistische Jahrbuch", 1954, 1959.

We could say, in manufacturing, the modernization is centered around bigger scale industries. The distribution of employees by enterprise scales is seen in Table 4. In Japan the proportion of employees employed in enterprises of under-500 workers is 22 per cent, that is, far smaller than 45 per cent in America, 41 per cent in Great Britain, and 46 per cent in West Germany. Also as to real numbers, the employees of over-500 enterprises in Germany, where total population counts only a little more than half that of Japan, amount near triple to those in Japan.

Table 5. Differences in Per-Capita Added Value and Wages, by Scales
(Over-1000 enterprise = 100)

	Japan (1955)		United States (1954)		United Kingdom (1949)		W. Germany (1951-52)	
	Added value	Wages	Added value	Wages	Added value	Wages	Added value	Wages
1- 9	—	—	70.7	63.0	—	—	73.9	81.7
4- 9	27.6	40.0	—	—	—	—	—	—
10- 49	36.8	45.7	72.3	75.6	91.4	82.5	71.9	} 87.8
50- 99	50.9	53.5	77.4	81.9	93.8	83.7	72.8	
100-499	72.1	64.8	85.6	82.9	96.4	85.5	82.8	} 91.6
500-999	95.6	79.1	92.9	88.9	98.1	89.3	90.4	
1000-	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: For Japan, MITI, "Manufacturing Statistics", 1954; for U.S., "Census of Manufactures", 1954; for U.K., "Census of Production", 1949; for W. Germany, "Statistische Jahrbuch", 1954. I owe this table to Mr. R. Shioda.

a) Added value divided by number of employee. For U.K. production amount (gross production minus material costs, fuel costs and sub-contract production costs). For Germany sales amount. b) Wages divided by number of employee. c) Wages 1951, sales amount 1952. d) 11-49 persons.

Another particularity in the case of Japan is that 50 per cent of employees are in the under-50 group. It may be seen, by comparisons of "per-capita wages" and "per-capita added value" by business scales, that there exists difference not only quantitatively but also qualitatively in the distribution of labor power. For, in European countries the wages in under-50 enterprises stand 70-80 per cent of those in over-100 enterprises, while in Japan the ratio is less than 50 per cent (Table 5).

Thus in Japan the proportion of modern type employee to total employment is remarkably low, reflecting the existence of a wide sphere of pre-modern labor market surrounding modern market.

On the other hand, the proportion of employee to total employment by sexes is shown in Table 6. To take the figures in Table 6 as the index of modernized employment, it will be seen that the backwardness of employment in Japan is more marked with female workers. According to W. A. Lewis' reasoning, the larger proportion of pre-modern employment means ample supply of labor power in the modern type labor market.

Table 6. Proportion of Employee to Total Employment by Sexes, 1954

	Male	Female
Japan	52.3%	32.7%
United States	78.7	91.1

Source: ILO, "Year Book of Labour Statistics," 1957.

The supply-demand balance of labor power, or the degree of tightness or softness of labor market, can be seen in a more direct index. According to the ratio between effective number of vacant jobs and that of job applications, compiled in the "Employment Security Statistics" (Ministry of Labor), the supply amounted to 3.6 times as large as the demand in 1955. Afterwards the ratio gradually declined, until in 1961 a balance was almost reached. In Germany job vacancies registered 6 times as large as job applications in that year. As duplications as regards both vacancies and applications are involved in the Employment Security Statistics, the vacancies tend to be overestimated in soft labor market, and applications to be unduely increased in tight market. Allowing such over-statements, from these figures we can recognize the great difference in the degree of stringency in labor market.

The same can be seen in the rates of job-enter and quit. By figures appearing in the Monthly Labor Statistics (Japanese Ministry of Labor) and the Monthly Labor Review (American Department of Labor), the enter-rate shows about 2 per cent in Japan and 3-4 per cent in America; quit-rate, 2 per cent in Japan and 3-4 per cent in America. Either rate is higher in America, reflecting the tight market.

To select reasonable index to represent the positions of labor market is, in itself, a problem theoretically to be answered. But tentatively referring several indices, we could say that the above explained analysis that the pre-modern labor market provides sources or potentials of labor supply to the modern type market, in other words, the relatively low proportion of employee to total employment means a greater degree of surplus-supply pattern, does not contradict any index.

3. Theory of Marginal Productivity and the Low Labor's Relative Share

In order explain a fact that the labor's relative share in one industry of one country is lower than that in the same industry of other country, the theory of marginal productivity may be most appropriate after all. For, it makes, along with the theory of consumer behaviors, two pillars of the modern economic theory, and it is indispensably relied upon in preparing an econometrical model, so that it makes something more than a mere simultaneous system of statistical regression equations.

Several possible ways are thinkable for explaining the above problem by way of linear homogeneous function. The most frank explanation is that in Cobb-Douglas' function

$$Q = BK^\alpha L^{1-\alpha}$$

the elasticities are different between country A and B. This explanation is adopted, for instance, by Prof. K. Okawa who interpretes that the low labor's share in Japan is derived from the fact that the value of α is higher than that in more advanced countries, due to imitation of imported techniques.⁴⁾

The second way of approach is, like Marschack-Andrews' model,⁵⁾ designating volume of employment as L , unit wage as w , capital input as K , unit capital cost as r , labor cost as $w(w \cdot L)$, capital cost as $R(r \cdot K)$, to suppose a system

$$\text{Production function } Q = Q(L, K) \quad (1)$$

$$\text{Added value } V = S(Q) \quad (\text{product market}) \quad (2)$$

$$\text{Labor cost } W = W(L) \quad (\text{labor market}) \quad (3)$$

$$\text{Capital cost } R = R(K) \quad (\text{capital market}) \quad (4)$$

where, designating price as P , $V = PQ$ Then putting

$$\text{Production elasticity } \alpha_K, \alpha_L = 1 - \alpha_K$$

$$\text{Price elasticity for added value } \beta_0$$

$$\text{Employment elasticity for labor cost } \beta_L$$

$$\text{Capital volume elasticity for capital cost } \beta_K$$

from maximum condition of profit $\pi = V - W - R$, we obtain equilibrium equation

$$\text{labor's share } \omega = \frac{W}{V} = \alpha_L \frac{\beta_0}{\beta_L} \quad (5)$$

or

$$\text{wage} = \text{productivity } w = \left(P \cdot \frac{Q}{L} \right) \alpha_L \frac{\beta_0}{\beta_L} \quad (6)$$

$$\text{wage} = \text{marginal productivity } w = \left(P \cdot \frac{\partial Q}{\partial L} \right) \frac{\beta_0}{\beta_L} \quad (7)$$

Thus, by adding Kalecki-like market-monopoly degree, we can show the possibility of differences in labor's share under a common production function. As well known, when product market is competitive β_0 coincides with 1, when monopolistic smaller than 1. Similarly, when labor market is com-

4) Kazushi Okawa: "Analysis of Japanese Economy-Growth and Structure", 1962, pp. 19-22. (in Japanese)

5) Marschack, J., and W.H. Andrews: "Random Simultaneous Equations and the Theory of Production," *Econometrica*, Vol. 12, 1944.

petitive β_L coincides with 1, and when under buyer's monopoly $\beta_L > 1$.

As clarified in Equation 5, the more seller's-monopolistic product market is, or the more buyer's-monopolistic labor market is, under a given α_L , the smaller becomes labor's portion. Therefore in order to explain the higher labor's share in American manufacturing, we should testify that enterprises' monopoly in either product market or labor market, or in both, is more influential in Japan than in America.

The third way of approach is to use CES production⁶⁾ developed by Stanford group. The CES function was developed partly aiming at an explanation of a fact that, by the regression between per-capita added value and wages, computed respectively with each industry in about 20 countries, wage coefficient is generally smaller than 1. That, when productivity in added value is taken as dependent variable, per-capita wage coefficient is smaller than 1, is of similar meaning with that the higher wage is, the larger is labor's share, and vice versa. By CES function we can easily explain the international difference of labor's share, by an evidence that the substitution elasticity, that takes particular value in CES function, is smaller than 1.

In contrast to Cobb-Douglas' function, in the case of CES function lengthy explanation is not necessary; only that the share in Japanese manufacturing is lower than that in American, because the shape of the function is such.

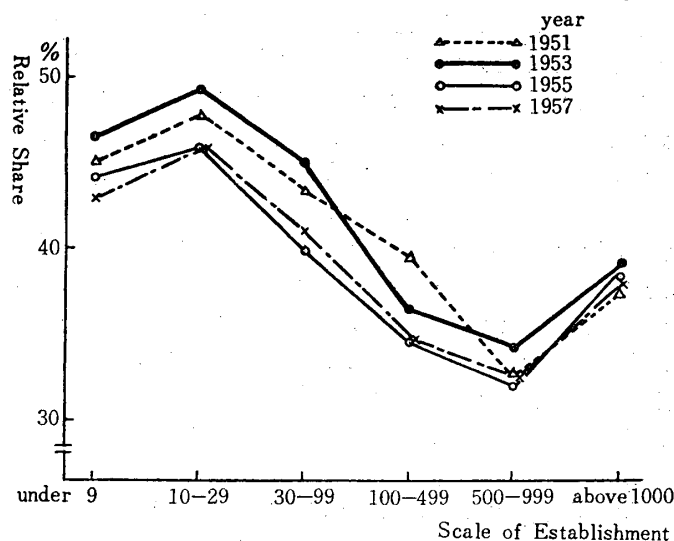
There may be many other hypotheses, besides the above mentioned three ways, to explain international difference of labor's share, but here I shall not go into them. As once Henry Poincaré has remarked, hypotheses to interpret a certain empirical fact are numberless. Our subject is to find out the most convenient one for systematic explanation of phenomenons.

The first approach, that the low labor's portion in Japan depends on the greater "power" of capital in Douglas' function, would serve to analyze phenomenons of wide sphere, if provided with adequate complementary factors. Without complementary explanation, in other words, without any explanation of the reason for the bigger "power" by way of, for instance, comparing actual figures of production function based on materials independent from the portion, there is a danger of falling into a synonym duplication. To speak more concretely, provided α_k in Japan is smaller than in America, the measure for quantitative assessment of changes of α_k through the process in which Japanese technical level would catch up that of America, must be clarified.

As aggregate of enterprises of all scales, the labor's share in Japan is lower than in America. As to internal comparison by business scales, as see in Figure 1, the tendency is that in smaller scales the share are high. Inverse trends are seen in both the smallest and largest scales; the former case is born from the fact that some part of proprietor's income, to correspond to wages, is not included into cash income, and hence the inverse trend will disappear if this point is adjusted. Anyhow it looks not so easy a matter to

6) Chenery, Hollis B., Kenneth Arrow, Bagicha Minhas and Robert M. Solow: "Capital-Labor Substitution and Economic Efficiency," *Review of Economics and Statistics*, Vol. 43, No. 3 (August 1961).

Figure 1. Relative Share in Manufacturing by Scales



Source: For Japan, MITI, "Manufacturing Statistics."

render reasonable explanation, utilizing the difference in α_K , both to international difference and between-scale difference at the same time.

By the second explanation, the degree of monopolization, a fact we have is that the monopoly degree of Yawata Seitetsu is higher than U.S. Steel, and that of Japan's five auto companies in aggregate is higher than that of American three companies. In view of the inclination toward administered prices in America, it seems difficult, if not impossible, to make this explanation pierce itself. Also as to internal difference, the difficulty lies in how to deal with the inverse trend in the largest group.

The expression, that buyer's monopoly in labor market is intense, seems fitted to state the case in Japan, so far as its general impression is concerned.

The above mentioned labor cost Function (3) is founded on labor supply function, or, more exactly speaking, the labor function with respect to job application. So long as Marschack-Andrews' specification is concerned, the high degree of buyer's monopoly implies that demand for labor of an enterprise is big enough to administer labor market and that policy of restraining employment would be adopted to prevent wage rise, that follows increased employment. However in view of numerosness of "business places" included in the "Statistical Survey of Business Place" (as of July, 1954), that count 3,300 thousands as to all industries and 530 thousands as to manufacturing, even taking regional markets into account, the effectiveness of β_L for explanation is not to be much expected. Its adaptability is more doubtful, since, according to a recent positive study, the labor supply curve (in the case of perfect monopoly, labor application curve) does not necessarily show a right-upward curve.⁷⁾

The third method, CES production function,⁸⁾ is the most remarkable one

7) I. Ozaki and K. Obi: "Economic Development and Employment Structure", in Keiogijuku Keizaigakukai, Keizaigaku Nenpo, 1963.

8) ref. Note 6.

of recent theoretical performances, I think. By utilizing three sorts of parameter values (substitution, distribution, efficiency) applied to this function, substantially long-run forecast may be possible upon the future trend of labor's share in the process of economic liberalization. If we take, for simplification, that the higher share in high wage country is derived from the reason that the substitution elasticity between capital and labor is smaller than 1, we can analogically expect that the share in Japan will rise in parallel with the rise in wage level. In the case of internal differences by scales, as the share is higher as to lower wage class, as seen in Figure 1, it may be of some difficulty to apply the same method, but supposedly this can be dealt with by more minute grouping of business scales. Anyhow, this method seems most attractive among the three.

Yet I cannot but feel some hesitation in adopting this method. I take negative standpoint not necessarily because I find an argument, in the recent Symposium of Review of Economic Studies, that the CES function is very hard either to prove or to disprove, comparably hard with Friedmann-Modigliani's hypothese on constant income.⁹⁾ There are some rooms for doubt in the conveniency of the theory, because that simple and blunt explanation of labor's share by equilibrium condition on the premise of competitive market is not homogeneous with such concepts as disguised unemployment, imperfect employment or surplus supply of labor, that are utilized in the theory of economic development of backward country.

4. *Douglas' Proposition of Problem and Garschenkron-Lewis' Model*

When once Douglas thought of the measuring of production function, one of his motives was to give an empirical answer to the question: Do wages really coincide with marginal product? He holds doubts as follows. While the marginal productivity theory of the new classical school presupposes full employment, in reality unemployment exists, and it is impossible to confirm that wages coincide with the value of marginal product of employed labor. Theoretically there is possibility that wages are dragged to the productivity of unemployed labor, that is, the productivity of the marginal labor of the society, the zero level. The result of measuring by Douglas and his group showed, as well known, the coincidence between the number of power and the labor's share, on every country except South Africa, proving the rightness of the theory.¹⁰⁾

It is undeniable that, in the theoretical system of the new classical school the theme "wages coincide with marginal product of labor" and the theme "in equilibrium there is no unemployment" are inseparable, and in so far Douglas' problem proposition hits the mark. However, although Douglas precedes Keynes in taking up the existence of unemployment in the context

9) "Symposium on Production Functions and Economic Growth, *Review of Economic Studies*, June 1962.

10) Douglas, P.H.: *The Theory of Wages*, 1947. "Are There Laws of Production?" *Amer. Eco. Rev.*, March 1948.

of theory, he has not explained the ground of unemployment. His remark that "... so far as unemployment exists..." is essential, but not conclusive as a theory. It is also to be noticed that Douglas' observation has been directed to the cyclical unemployment in advanced countries, not to the structural unemployment in backward countries presently under discussion; this corresponds to the above mentioned result that the theory was confirmed with respect to countries other than South African region.

Arthur Lewis' theory on "limitless supply of labor in backward countries"¹¹⁾ is not unconnected with Douglas' problem, in the sense that it also represents a form of criticism against the new classical school. Lewis holds that, in an economy with surplus population the marginal productivity in customary industries, including agriculture, can be zero or even negative value, and hence wages are decided by subsistence level. Wages to be paid by modernized sector in these countries are regulated by subsistence wages, that suppliers of labor can earn outside of the sector, before being weighted in comparison with marginal productivity. In Lewis' model wages are exogenously settled at the level of subsistence with some additions and employment adapts itself to wage level. In this sense, equilibrium

wage = marginal product

can exist. This is different from the system of the new classical school in the point that wages and employment are not simultaneously determined.

In contrast to Lewis who takes up the limitless supply of labor in relation to unskilled labor, A. Gerschenkron, in view of the advantages obtainable for backward countries by utilizing stockpile of techniques already developed in advanced countries, has emphasized possible severe shortage of skilled labor suitable to modern type production, and also possible use of labor-saving techniques to a wider extent than in advanced countries.¹²⁾

Of two particular points of Gerschenkron's argument, borrowed technology and scarcity of skilled labor, I shall take up the latter and try to correlate it with Lewis' model. It must be noticed, the distinction between so-called skilled and unskilled labor is usually perceived as a concept of institutional, non-sequent division as employed by British and American trade unions, but, by the suitability as modern labor power are implied not only specialized skills but also social adaptability to cooperative works, general mental ability and fitness to training. When the sense of suitable labor is thus taken, a qualitative distribution ranging from Gerschenkron's scarce, high-quality labor to Lewis' limitless ample labor, from the viewpoint of preference measures to be adopted by modern enterprises, is thinkable. At an unadvanced stage, the qualitative difference between a handful, scarce modern type labor power and that pooled within customary industries is non-sequent. The qualitative distribution will become more sequent as the economy advances, because of

11) Lewis, W.A.: "Economic Development with Unlimited Supplies of Labour," *The Manchester School of Economic & Social Studies*, Vol. XXII, No. 2, May 1954.

12) Gerschenkron, Alexander: "Economic Backwardness in Historical Perspective," *The Progress of Underdeveloped Areas*, (B.F. Hoselitz, ed.) 1952.

increased suitable labor. At the most advanced stage, where labor pool in the customary sector almost diminishes and only meagre group of labor suitable to modernized production can be found, competition for labor power in terms of volume will become intensified, and hence the quality distribution will contraversely become less meaningful.

In the case of Japan the stage of labor power composition is that, while labor pool in customary sector has not yet disappeared, potential, suitable labor power is substantially rich- that is, quasi-advanced stage-; hence the sequence in distribution can be most remarkable. To express after Lewis, the marginal income level of customary sector makes the base line of wage distribution of modernized sector founded on labor quality, above which the wage distribution, conforming to the quality distribution, is shaped.¹³⁾ It represents itself concretely in the wage differences between industries or enterprise scales.

Through 1949 to 1955, the cash income of farmer, perhousehold over the country, increased 2.4 times. The rate of increases in the wages in manufacturing for the same period is shown in Table 7. It will be seen, the increases in agriculture had pushed up the base of wages in manufacturing. The relatively small multipliers for middle classes compared with small classes is supposedly derived from the fact that the effect from agricultural sector is not direct.

Table 7. Wage Increases in Manufacturing by Scales,
rates in percentage, 1949-1955

Scale	Rate of Increase
Over 1000 workers	2.4 times
500-999	2.4
100-499	2.0
30-99	2.0
10-29	2.2
under 9	2.2

Source: Ministry of Labor: Monthly Labor Statistics

On the other hand, the relatively high rates in big scale groups may largely depend on the bargaining power of trade unions in big enterprises. And the strong bargaining power of labor in these may be derived from the fact that labor power there has institutionally a character of non-competitive group, although it is sequent in suitability.

Now, as the labor's relative share are higher in smaller scales, as mentioned above, evidently wages in bigger scales are not so high as to be proportionate to the differences of productivity in added value. To borrow Lewis' reasoning, inside the modern sector, the wages in big scale are exogeneously given by adding something to those in small scale; but, also in this case, through adjustment of employment the equilibrium

wage=marginal productivity

13) When wage level in pre-modern sector after Lewis is concerned, conditions are greatly different between the case of agriculture mostly of landed farmer and the case of farm employment of migrator.

can persist. Then, why don't the share equalize themselves between scales? And why are they lower than those in advanced countries? The answer to these questions may be found just in Gerschenkron's another remark, namely "borrowed technology," I think.

Next let's reconsider these points from another viewpoint. By CES production function, the fact that the portions decline from advanced to backward country as to each industry is explained by the value of substitution elasticity standing at a particular point less than 1. And for this purpose a producer equilibrium of maximum profit is employed, presupposing that both product and labor markets of each industry are competitive. By Cobb-Douglas' function, as the substitution function equals 1, the portion takes a constant value regardless of relative prices of labor and capital, and therefore explanation under equilibrium condition for this phenomenon is impossible.

However if the scope is broadened to the relation between industries, the limit of the explanatory effectiveness of CES function becomes evident. Although the function can give internationally the reasons for the relations between wages and productivity with respect to each industry, it clarifies nothing about the wage differences between industries in one country.

We shall take as an example in the medium-grouping of manufacturing sections, as shown in Table 8. Also in America, it will be seen, the wage differences between industries is not ignorable.

Within 18 manufacturing groups shown in Table 8, in Japan, the difference between primary metal in the first order and clothes & belongings in the

Table 8. Differences and Order in Yearly Wages in Manufacturing, by medium-groups

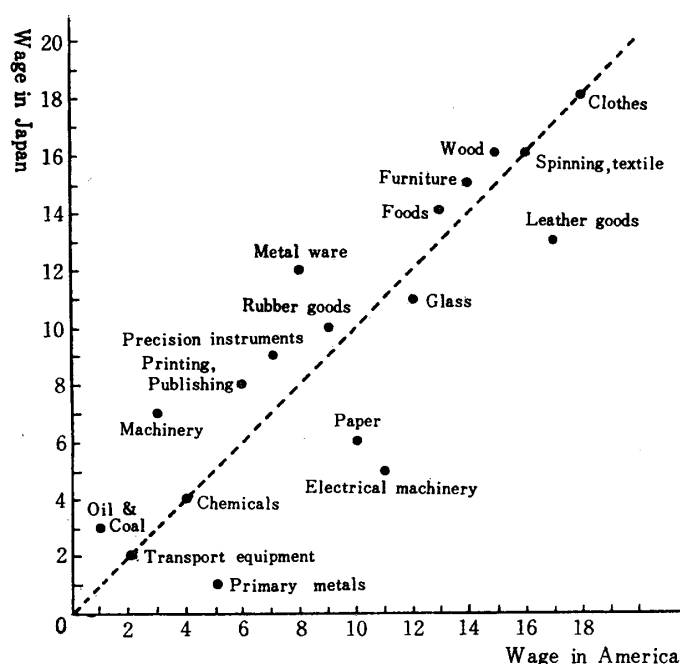
	United States		Japan	
	Order	Index	Order	Index
Foods	13	73.8	14	45.2
Spinning, textile	16	57.3	16	40.6
Clothes, belongings	18	52.7	18	33.6
Wood, wooden goods	15	58.6	16	40.6
Furniture, home appliances	14	68.9	15	44.0
Paper, similar goods	10	81.9	6	75.5
Printing, publishing	6	88.3	8	70.6
Chemicals	4	90.3	4	84.9
Oil & coal products	1	100.0	3	86.6
Rubber goods	9	84.2	10	61.5
Leather goods	17	56.4	13	52.8
Glass, stone	12	77.2	11	60.4
Primary metals	5	89.4	1	100.0
Metal ware	8	84.5	12	58.3
Machinery	3	91.4	7	71.2
Electrical machinery	11	80.7	5	76.3
Transport equipment	2	95.3	2	92.0
Precision instruments	7	86.2	9	66.7

Source: for America, Census of Manufactures, 1954; for Japan, Manufacturing Statistics.

last order is in the ratio 3:1, 256.1 thousand yen to 86 thousand yen. In America between oil & coal products in the highest and clothes & belongings in the lowest, there exists a difference of 2:1; 5,105 dollars to 2,690 dollars. Though a difference of degree is found as compared with Japan it is clear that wage differentials exist also in America.

The contrast of the orders in wage level of manufacturing groups is illustrated in Figure 2. A parallelism between both countries is clear.

Finger 2. Rank Correlation in wage level of manufacturing between Japan and America.



Source: See Table 8.

Two facts may be inferred from this. Firstly in both countries wages are not similar by industries. Secondly a similarity as to the shape of wage differentials exists between both countries.

On the assumption that, as it is in the analysis by CES function, the equilibrium (wages)=(marginal productivity) persists as to every industry, it is implied in the standpoint of the new classical school that full employment equilibrium is attained approximately in the labor market of every industry. This is because the theoretical composition is such that wages are settled simultaneously with employment.

If in America, the most advanced country in the sense that both productivity and wage level are highest, wage differences by industries be recognized, these are to be perceived to depend on the facts that there is no homogeneity of labor through industries; that there is a distribution of labor suitability in the same order with that of wages; and that each class of order has more or less non-competitive character against others.

By reason of the above explanation, we will suppose here the existence of labor markets for respective industries in each country. The problem is whether it is reasonable to think of supply-demand equilibrium in each of such labor markets.

Let's take the surplus labor supply by Douglas, as alternative assumption to take place of CES production function. We assume that, in applying Douglas' function to each medium-group of manufacturing, labor supply and demand are approximately balanced except frictional unemployment, in each labor market. Then labor's share correspond respectively to the number of power in each industry.

On this assumption, even if the wage level in a backward country is relatively low compared with capital cost, under equilibrium, the labor's share would coincide with value α of the same industry of advanced country, by adopting more labor-intensive method of production. However, as Douglas points out, in this case the minimum base of wages will be given by the income level of marginal proprietor-home worker in customary industry, and wages will be settled upon this base, moving upward from the market of low wage industry to that of high wage industry with some additions respectively.

However, as seen already, the labor's share in backward countries are lower than those in advanced countries. On the present assumption, if employment corresponds to a given wage level in line with Douglas' function, such situation would not arise.

It may be "borrowed technology", pointed by Gerschenkron, that could answer the question of this kind.

It has been shown by S. Melman and others that the technical development in advanced countries depends upon the relative prices of labor and capital goods-allowing possible troubles with labor unions, and in so far showing some deviations from nominal prices.¹⁴⁾ This does not contradict the assumption that technical advancement in the course of economic development is neutral, in the sense that it increases the interception in Douglas' function (when plotted into logarithm graph). It is not necessarily unreasonable to look that in the process of changings of relative prices of production factors, and the process of adapting factor combination to them, the adjustment of new classical school type is performed, and thereby full employment equilibrium is attained within each industry's labor market.

It cannot be always said, however, that selection of production method and sort of commodity is not always founded on the relative prices of factors derived from factor endowments. Usually backward countries import ready made equipment or plans, rather than create equipment fitted to the relative prices of factors of their own by importing "engineering handbook" from advanced countries. This is largely derived from lack of human abilities for basic sciences, engineering and techniques. Also in many cases importation of ready made goods may be deemed more economical in view of development costs, to start from basic researches, even if there may be some disharmonies

14) Melman, S.: *Dynamic Factors in Industrial productivity*, 1956.

with the relative factor prices in the country. However, it must be noted, there is another reason for the fact that "borrowed technology" takes form of production methods concretely established in advanced countries.

When an advanced technique is once established, it defines the type of commodity, and further the type of consumption. The leading type of consumption does not only govern international markets but also attract toward it the consumption pattern of backward countries. This affects wide sphere of industries through compensatory relations among commodities, and hence narrows the rooms for a concerned industry to display creativeness of non-advanced type.

In this way, due to multiplied effects of direct "demonstration" in production phase and indirect effects through consumption phase, the production methods of industries in backward countries inevitably resemble those of advanced countries.

So long as the application of "borrowed technology" is directed to such equipment that has been materialized under the influence of commodity pattern, the changing of the combination between equipment and labor in direct production process is possible only to a limited extent, and nothing more can be done than trials of adaptation to factor price relations in indirect process. Therefore an equivalent curve, drawn around a point on the equivalent curve of production function to be realized in advanced country, and with substantially larger curvature, is given to enterprises in backward country, and the combination between labor and equipment is determined at the cross point of the curve and the price curve of production factors. We could name the equivalent curve of backward country quasi-production-function, which may have a smaller substitution elasticity than that of original Cobb-Douglas' function (substitution elasticity=1).

In this way, when, for example, the wage level relative to capital cost in Japan is low compared with that in America, the labor intensiveness would not reach the degree where equilibrium combination of factors in line with the original production were realized, and the labor's share would remain lower than that of advanced type to be given by the original function. In other words, as compared with the supposed case when the same relative prices were realized in the development process of a most advanced country, the equilibrium volume of employment would be smaller. Thus it may be said that, if viewed from the standard of advanced country, an unbalance emerges between relative factor prices and employment, and the realization of full employment, after new classical school's concept is hampered by "borrowed technology".

The effects of "borrowed technology" typically appear in the modernized sector of backward country. There is born a sort of gap between relative factor prices and volume of employment, that has not been experienced in the development stages of advanced countries. This is just to be named the structural unemployment.

As mentioned above, we take that wages in labor market of each industry in backward country are settled exogeneously as a piling-up of wage levels

to be shaped upon the base of marginal productivity in customary industry. To recall the order of wages in Table 8, the case in Japan is very similar with that in America, but the difference between the highest and the lowest is wider in Japan. This corresponds to the Gerschenkron's remark, the scarcity of suitable labor in backward country. On the other hand, capital is homogeneous throughout industries, and its price tends clearly to be levelled in a country. Therefore the wider differences between industries in Japan tell that, the higher the wage level in an industry is, the more the relative prices of capital and labor in the industry resemble those in America. Taking the above mentioned effects of "borrowed technology" into consideration, we can infer that in higher wage industry the gap between wages and equilibrium employment in the sense of that in advanced country is narrower, and the rate of structural unemployment, as defined above, is smaller. In the following section I shall examine the correspondence between the from-America difference in labor's share and structural unemployment.¹⁵⁾

5. *Volume of Structural Unemployment and Labor's Relative Share*

To what an extent can we explain international difference in labor's share by the volume of structural unemployment, or the volume of surplus supply to modern labor market? Figure 3 shows the relations between the proportion of employee to total employment, that we take as the index to measure the degree of labor market modernization, and the labor's share of gross added value in manufacturing, covering 32 nations of whom we can obtain comparable materials from statistics of the United Nations, (see also Table 9). It is represented that the lower the proportion of employee is, the smaller is the structural employment. The correlation coefficient between both is significant at 1 per cent level, proving the relation that labor's share is lower as structural unemployment is larger. As a general trend, with an increase of 10 per cent in the proportion of employee, the labor's share rise by 3-5 per cent. It is significant in this way, but the variance of employee's proportion can explain the variance of labor's share only to an extent of 40 per cent. This is rather natural due to the existence of numerous other factors that are not taken here, such as, diversified phases of economic development and business cycle, sectional composition within manufacturing, minimum wage regulation or non-regulation, bargaining power of labor union and degree of concentration of collective bargaining, patterns of capital ownership and business organization, standings of social security system, extent of racial mixture and discrimination, international labor migration, agricultural system and so on. It is to be noticed that, despite these factors, the trend

15) Here I have replaced Lewis' subsistence wage with earning potentiality of marginal labor in customary sector, keeping in mind the measurement of farmer's production function in an unpublished article of Yasuhiko Torii, "Employment Structure of Farms and Productivity in Agriculture." As to examples of the relations between factor substitution and direct-indirect production process, see Tsujimura's article in Tokei Kenkyu Kai ed., "Changes in Productivity and Its Effects," 958. (Both are in Japanese).

is still discernible that labor's share tends to decline as structural unemployment becomes larger.

Next let's examine the comparison between Japan and America with respect to sectional groups of manufacturing. As seen in Table 10, in every group the labor's share in Japan is lower than that in American. As the proportion of employee to total employment in Japan for 1958 is 46 per cent as against 82 per cent in America, the low share in Japan is naturally to be expected, in view of the above shown comparison between 32 nations.

While the labor's share in Japan is lower at every group, the problem to be questioned is whether any similarity with respect to specific group of both countries can be recognized or not. If we suppose that Cobb-Douglas' production function is commonly applied to both countries, and employment in equilibrium is equally maintained, the positions of manufacturing groups on a plane, taking horizontal axe as the proportions in America and vertical axe as those in Japan, shall be placed upon the 45 line. We must firstly inquire the existence of such regularity. To compute the regression between the two countries, designing x as the labor's share in particular manufacturing section in American and z as corresponding one in Japan, we have

$$z = -5.56 + 0.847x, \quad r = 0.693 \dots \dots (8)$$

The correlation is significant at 1 per cent level, proving that the correspondence with regard to a same group still persists.

Then we shall inquire to what an extent the surplus supply in labor market can explain the regression coefficient of under 1 in Equation 8. We cannot use the proportion of employee to total employment as the index to indicate differences of conditions in labor markets of industries. As shown

Table 9. International Comparison of Employee's Proportion and Labor's Share, as of around 1955

	(1) Proportion of Employee to Total Employment	(2) Labor's Share		(1) Proportion of Employee to Total Employment	(2) Labor's Share
Argentina	70.1%	36.5%	Ireland	56.1%	52.4%
Australia	79.8	58.1	Japan	43.6	39.4
Austria	61.9	35.0	Luxemburg	62.6	53.0
Brazil	50.6	31.9	Mexico	45.9	30.9
Canada	81.6	49.5	Netherland	68.4	38.1
Chile	71.4	34.4	New Zealand	79.9	53.3
Columbia	52.5	28.0	Nicaragua	55.1	40.6
Costa Rica	66.5	18.1	Paraguay	33.0	38.3
Denmark	73.8	56.3	Peru	41.7	38.6
Ecuador	52.8	36.7	Puerto Rico	74.7	44.2
El Salvador	55.6	22.5	Sweden	76.8	58.0
South Rohdesia	85.9	49.8	Turkie	13.9	30.0
Finnland	58.1	58.2	United Kingdom	87.8	55.8
France	66.1	56.6	United States	82.1	53.9
Hondurus	35.2	33.7	Venezuela	54.0	37.6
Iceland	79.3	63.8	Yugoslavia	31.6	13.3

Source: 1) ILO; *Year Book of Labour Statistics*; 2) U.N *Patterns of Industrial Growth*, 1938-1958, New York, 1960.

Table 10. Labor's Share in Manufacturing, Japan and America

	(1) Japan	(2) America	(3) [(1)÷(2)]
Foods	27.6%	46.3%	0.60
Spinning, textile	39.2	63.9	0.61
Clothes, belongings	44.2	62.2	0.71
Wood, wooden goods	46.2	60.6	0.76
Furniture, home appliances	53.4	60.9	0.88
Paper, similar goods	37.3	48.4	0.77
Printing, publishing	36.6	57.9	0.63
Chemicals	29.7	36.1	0.82
Oil & coal products	25.6	42.7	0.60
Rubber goods	29.1	55.6	0.52
Leather goods	43.3	62.7	0.69
Glass, stone	34.8	50.7	0.69
Primary metals	45.5	54.4	0.84
Metal wares	46.5	57.9	0.80
Machinery	50.4	58.3	0.86
Electrical machine	38.7	53.4	0.72
Transport equipment	55.2	59.6	0.93
Precision Instrument	52.6	56.4	0.93
Miscellaneous	45.4	59.4	0.76
All sections	39.3	53.9	0.73

Source: Japan; Kogyo-tokeihyo; America, *Census of Manufactures*, 1954.

in Table 11, the proportion of employee as regards female worker is lower than that of male worker, and still evidently low compared with that in America, higher than 90 per cent. The surplus supply is more remarkable as to female worker. The proportions of female worker are different by industries, and clearly the degree of surplus supply is more intense in those industries with higher proportion of female worker. Thus we can use the proportion of female worker as the proxy variable to indicate the degree of surplus supply.

Firstly, in order to see whether the labor's share can be explained solely by supply-demand balance in labor market, we have computed regres-

Table 11. Proportion of Employee to Total Employment

Year	Male	Famale	Total
1948	44.6%	24.5%	36.8%
1949	43.2	21.4	34.4
1950	43.8	22.5	35.4
1951	45.6	26.0	37.8
1952	46.0	26.2	38.1
1953	46.5	25.7	38.1
1954	47.2	26.4	38.8
1955	47.5	27.6	39.3
1956	50.0	29.9	41.7
1957	48.3	31.6	43.8
1958	53.8	34.1	45.8
1959	55.5	34.8	47.2
1960	57.2	36.9	49.0

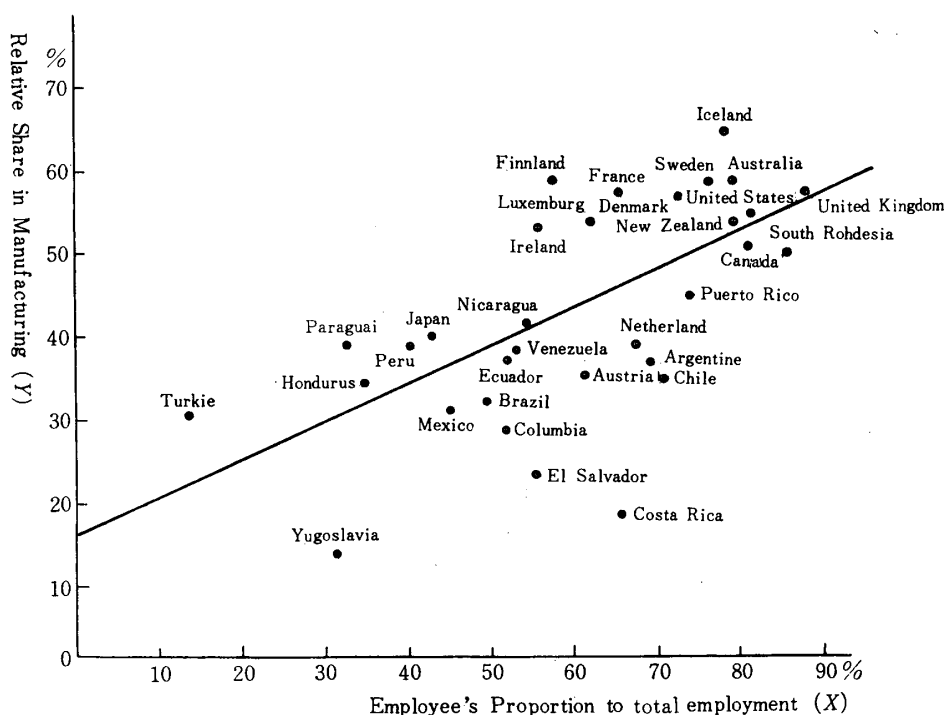
Source: Statistics Bureau, "Labor Power Survey".

Table 12. Proportion of Female Worker, by manufacturing groups

Group	Proportion	Group	Proportion
Foods	33.9%	Leather goods	23.3%
Spinning, textile	71.4	Glass, stone	27.7
Clothes, belongings	69.1	Primary metals	9.0
Wood, wooden goods	20.6	Metal wares	19.3
Furniture, home appliances	12.9	Machinery	10.5
Paper, similar goods	31.2	Electrical equipment	27.3
Printing, publishing	19.1	Transport equipment	8.7
Chemicals	24.3	Precision instrument	28.1
Oil & coal products	19.6	Miscellaneous	43.9
Rubber ware	49.4		

Source: "Manufacturing Statistics", 1954.

Figure 3. Correlation between Employee's Proportion (X) and Relative Share (Y)
 $Y = 14.85 + 0.447X (\pm 0.102), r = 0.624$



Source: See Table 9.

sion between labor's share of distribution in industries z and corresponding proportion of female worker y

$$z = 45.1 - 0.139y, \quad x = 0.279 \quad (9)$$

The regression coefficient is negative, but not significant. Then, in conclusion, the between-industry difference cannot be explained by the supply-demand balance.

Next we insert proxy variable, the proportion of female worker, into Equation 8, the regression between Japan and America as regards portions by industries, and we get

$$z = -5.57 + 0.964x - 0.223y, \quad r = 0.820 \quad (10)$$

(0.179) (0.073)

The correlation coefficient is higher than Equation 8, where supply-demand balance is ignored. Thus to add the proportion of female worker into explanatory variables is useful. The regression coefficient of the proportion of female worker takes significant, negative value. That the value of the constant term shows little difference from Equation 10 also confirms the stability of the equation.

By adding the index of surplus supply of labor, the coefficient of labor's share by industrial groups in America comes to have no significant difference from 1.0. This enables us to interpret that, between America and Japan, the production functions of corresponding industries are almost common. Again the significant deviation of coefficient x from zero implies that the difference between industries can be explained by the significant difference in the power α of production function, commonly in America and Japan.

The negative value of the interception represents the general effect of the difference in labor's portion, derived from the volume of structural unemployment including both sexes.

Now through our pilot study, it has been testified that the hypothesis, "borrowed technology \rightarrow structural unemployment \rightarrow low labor's share" is not lacking, at least not wholly, practical reasonableness. Although more precise, positive analysis remains to be performed, it is inferable from this hypothesis that, in the Japanese economy of 1951-1960, the employment structure, namely the presence of structural unemployment, suppressed labor's share to a level lower than European nations, but did not hamper expansion of home market, have made an essential factor for high rate growth, in connection with capital formation and capital utilization.

As seen in Table 11, recently the employee's proportion in Japan is rapidly increasing, and is expected to reach European level, 80 per cent, in a little more twenty years after 1960. It is easily to be foreseen that this trend will heighten labor's share, and bring about structural changes upon capital formation and distribution. To prepare compatible policies will be indispensable for future high rate growth.