REGIONAL DIFFERENCES IN THE DISTRIBUTION OF INDUSTRIAL EMPLOYMENT IN JAPAN

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With the rapid economic development from the Meiji era on, Japan has progressed from an agricultural nation at the beginning of this century to a present-day advanced industrialized nation. However, because of a pronounced regional concentration of industry which exists despite Japan's small size, there have come to be wide regional differences in the structure of industry. I believe that this may be witnessed in the regional differences in the distribution of industrial employment.

INTRODUCTION

THE PURPOSE OF THIS ARTICLE is to discuss first, the present state of regional differences in the distribution of the industrial labor force; and second, the changes that have taken place in these differences during the period between 1920 and 1960. The data presented here is based on the 46 prefectural totals given in the *Census* and, for the convenience of our analysis, has been organized into twelve regional categories, excluding Okinawa.[1]

1   The twelve regions and their constituent units are as follows:

A. Hokkaidō: Hokkaidō

B. Tōhoku: Aomori, Iwate, Miyagi, Akita, Yamagata, Fukushima

C. Northern Kantō: Ibaraki, Tochigi, Gumma

D. Southern Kantō: Saitama, Tokyo, Chiba, Kanagawa

E. Hokuriku : Niigata, Toyama, Ishikawa, Fukui

F. Tōsan : Nagano, Yamanashi

G. Tōkai: Gifu, Shizuoka, Aichi, Mie

H. Kinki: Shiga, Kyoto, Osaka, Hyōgo, Wakayama, Nara

I. Chūgoku: Tottori, Shimane, Okayama, Hiroshima, Yamaguchi

J. Shikoku: Tokushima, Kagawa, Ehime, Kōchi

K. Northern Kyūshū: Fukuoka, Saga, Nagasaki

L. Southern Kyūshū: Kumamoto, Ōita, Miyazaki, Kagoshima
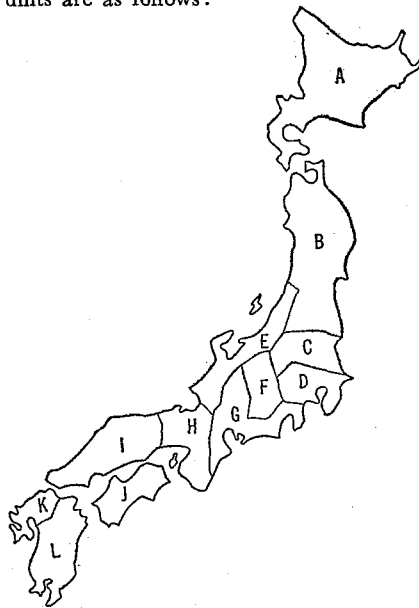
I. PRESENT CONDITIONS: 1960

We are undertaking here an examination of the regional differences in the distribution of industrial employment in Japan. Just as in the modern world advanced industrialized countries with high national income exist side by side with underdeveloped countries with low national income, so within Japan advanced areas intermingle with less advanced areas. Conspicuous disparities in regional income levels and distribution of industrial employment may be seen which are in no way different from such disparities on an international level. Let us first examine present conditions. Table 1 shows regional levels of income, comparing the prefecture income estimates in 1960 with the *Census* figures for total prefectural employment in the same year. According to this data, the greatest part of national income is concentrated in the three affluent regions of Southern Kantō, Kinki and Tōkai, the centers of which are Tokyo, Osaka and Nagoya respectively. The degree of inequality[2] in regional distribution of income is remarkably higher at 32.0 than the degree of inequality in employment and population at 21.8. Supposing that for the purpose of equalizing regional income levels we redistribute regional employ-

Table 1. Regional Distribution of Income and Employment, 1960

	Prefectural Income		Total Employment		Annual Income per Worker	
	Million yen	%	Thousand Person	%	Thousant yen	%
Hokkaidō	587,660	4.9	2,187	5.0	269	97
Tōhoku	847,140	7.0	4,285	9.8	198	71
Northern Kantō	508,084	4.2	2,495	5.7	204	74
Southern Kantō	3,279,760	27.1	8,274	18.9	396	143
Hokuriku	579,037	4.8	2,626	6.0	221	80
Tōsan	290,618	2.4	1,409	3.2	206	74
Tōkai	1,383,543	11.4	5,032	11.5	275	99
Kinki	2,237,795	18.5	6,495	14.9	345	125
Chūgoku	737,322	6.1	3,390	7.8	217	78
Shikoku	413,664	3.4	1,925	4.4	215	78
Northern Kyūshū	757,109	6.2	2,758	6.3	274	99
Southern Kyūshū	487,551	4.0	2,811	6.5	173	62
Whole Country	12,109,283	100.0	43,691	100.0	277	100

Source: Keizai kikakuchō (Economic Planning Agency), *Kemmin shotoku tōkei* (Prefectural Income Statistics), Tokyo, 1963.

2   The degree of inequality in regional distribution is defined as follows:

$$\frac{1}{2}\Sigma\left|X_i-\frac{1}{n}\right|$$

where X_i is the share of X occupied by region i and n is the number of regions. For example, in the case of the regional distribution of population, it refers to the proportion of total population occupied by the number of people who must be transferred between regions in order to equalize the population of each of the regions.

Table 2. Industrial Distribution of Employment by Region, 1960

(total= 100)

	Hokkaidō	Tōhoku	Northern Kantō	Southern Kantō	Hokuriku	Tōsan	Tōkai	Kinki	Chūgoku	Shikoku	Northern Kyūshū	Southern Kyūshū	Whole Country
PRIMARY SECTOR	35.8	52.7	49.1	14.4	43.6	47.0	27.9	16.9	40.0	45.6	30.0	54.0	32.8
Agriculture	28.0	48.6	47.9	13.6	41.8	45.0	25.3	15.8	37.0	40.0	26.8	49.9	30.2
Forestry, Hunting	2.7	1.9	0.6	0.1	0.8	1.9	1.0	0.6	1.2	2.6	0.4	1.8	1.0
Fishing, Marine Products	5.1	2.2	0.6	0.7	1.0	0.1	1.6	0.5	1.8	3.0	2.8	2.3	1.5
SECONDARY SECTOR	23.9	16.1	21.8	37.9	25.3	23.6	37.3	39.5	24.4	20.5	28.1	14.3	29.2
Mining	5.0	1.6	1.1	0.2	0.4	0.2	0.4	0.3	1.1	0.6	6.7	0.9	1.2
Construction	8.6	5.9	4.1	6.4	6.2	6.7	6.3	6.2	6.0	5.5	7.2	5.4	6.2
Manufacturing	10.4	8.6	16.6	31.4	18.7	16.8	30.6	33.0	17.4	14.4	14.2	8.0	21.7
TERTIARY SECTOR	40.3	31.2	29.1	47.7	31.1	29.4	34.8	43.6	35.6	33.9	41.9	31.7	38.0
Wholesale, Retail Trade	14.5	12.6	12.6	20.1	12.9	11.7	15.0	18.8	13.7	13.4	17.1	12.9	15.7
Banking, Insurance, Real Estate	1.6	1.1	1.1	3.0	1.4	0.9	1.6	2.5	1.3	1.4	1.7	1.0	1.8
Transportation, Communications	6.8	4.1	3.3	5.7	4.3	3.6	4.6	6.1	5.5	4.6	5.7	3.6	5.0
Electricity, Gas, Water Supplies	0.4	0.4	0.3	0.5	0.6	0.6	0.6	0.6	0.5	0.6	0.7	0.5	0.5
Services	12.2	9.8	9.1	14.9	9.6	10.3	10.5	12.9	11.3	11.3	13.2	10.6	11.8
Public Services	4.8	3.2	2.6	3.4	2.4	2.3	2.6	2.6	3.3	2.6	3.5	3.1	3.0

Source: Sōrifu tōkeikyoku (Statistics Bureau, Office of the Prime Minister), *Nippon no jinkō Shōwa 35 nen* (Population of Japan, 1960), Tokyo, 1961, pp. 418-419.

ment so as to correspond to regional income. The total regional shift in the labor force necessary to accomplish this would come to 5.15 million persons, or 11.8% of total national employment. Thus, because of the pronounced regional imbalance in income, the regional differences in income level are correspondingly large. The annual income levels of Southern Kantō and Kinki are outstandingly high at 400,000 yen and 350,000 yen respectively, followed by the three regions of Tōkai, Northern Kyūshū and Hokkaidō whose income levels are generally on a par with the national average. The income levels for Hokuriku, Chūgoku and Shikoku are approximately 20% lower than the national average, while those for Tōsan, Northern Kantō, Tōhoku and Southern Kyūshū are still lower. The levels of Tōsan and Southern Kyūshū are particularly low—not even amounting to 200,000 yen—and thus only correspond to half of Southern Kantō and Kinki, respectively.

The problem posed here is to determine the nature of the correspondence displayed between the distribution of industrial employment in each region and the ranking in levels of income. Let us begin our search for the presence of regularity by utilizing rank-order correlations. The values of the rank-order correlation coefficients of fifteen industrial groups are presented in Table 3.

Table 3. Rank-order Correlation Coefficients of the Level of Income by Sector and the Industrial Distribution of Labor Force, 1960

PRIMARY SECTOR	Δ.993
Agriculture	Δ.979
Forestry, Hunting	Δ.451
Fishing, Marine Products	Δ.091
SECONDARY SECTOR	.951
Mining	Δ.302
Construction	.637
Manufacturing	.727
TERTIARY SECTOR	.790
Wholesale, Retail Trade	.888
Banking, Insurance, Real Estate	.932
Transportation and Communications	.799
Electricity, Gas, Water Supplies	.442
Services	.670
Public Services	.252

First, we may note that there are consistently negative correlations among natural resource industries, including agriculture, forestry, fishing, and mining, while in the other industrial groups the correlations are positive. At the least, this regional comparison enables us to say that the first proposition of Petty's Law of the declining proportion of the primary sector might equally well be phrased as the declining weight of natural resource industries.

Second, the systematic correspondence between income levels and distribution of industrial employment is not necessarily uniform for all industrial groups. The correlations for forestry, fishing, mining, and electricity, gas and

water are extremely weak. However, because the relative importance of each of these four industries is small in the total employment of their respective regions, they do not have a positively disturbing effect on Petty's Law.

Third, the values of the correlation coefficients are satisfactorily high for both the primary sector at −0.99 and the secondary sector at 0.95. In comparison the value for the tertiary sector at 0.79 does not seem satisfactorily high. Our situation is no exception to the frequently mentioned fact that the tendency for a low correlation in the tertiary sector constitutes the weakest link in Petty's Law.

The relative weakness of the correlation for the tertiary sector lies largely in the disturbing influence of electricity, gas and water and puplic services. If we recalculate the rank-order correlation omitting these two industrial groups from the tertiary sector, the value of the correlation improves dramatically to 0.848. Remaining weak spots are the correlations for transportation and communications and the service industries, but for these we may detect the following clearly disturbing factors. Employment in the service industries in Tōkai and Hokuriku is remarkably small in comparison with the levels of income; while in contrast, employment in the service industries in Southern Kyūshū is disproportionately large. And it may be concluded that employment in the Tōkai region in transportation and communications is relatively small, while it is relatively large in Hokkaidō. In regard to the Tōkai region, two explanatory factors come to mind: first, the geographical fact that this area lies in the corridor which extends from the Tokyo-Yokohama metropolitan area to the Kyoto-Osaka-Kōbe metropolitan area. Second is the historical fact that Nagoya, the third largest economic center after the Tokyo-Yokohama and Kyoto-Osaka-Kōbe metropolitan areas, has not yet developed fully. In regard to Hokkaidō, it may be inferred that the low population density magnifies employment in the transportation and communication industries to a certain extent. And the regional differences in the accumulation of under-employment may perhaps explain why employment in the service industry is so small in the Hokuriku region and so large in Southern Kyūshū, because agriculture, retail trade and service industries are known to be three biggest reservoirs of under-employment in Japan and there is some reason to believe that the accumulation of under-employment might relatively be limited in the Hokuriku region and widespread in Southern Kyūshū.

The value of the correlation coefficient for the secondary sector is drastically higher than the values for any of its component industries. The unexpectedly small proportion of employment in manufacturing in Northern Kyūshū and Hokkaidō has lowered the correlation for manufacturing industries, but this is because it just so happens that employment in the mining and construction industries in these two regions has been conspicuously large. If we combine mining and manufacturing, and construction and manufacturing respectively, and calculate the rank-order correlations for each of these, the value of the correlation coefficients become 0.881 and 0.783 respectively, a marked improvement in comparison with the value of manufacturing alone.

Table 4.   Rank-order Correlation Coefficients between Industrial
Labor Force, 1960

	PRIMARY SECTOR	SECONDARY SECTOR	Mining	Construction	Manufacturing	TERTIARY SECTOR	Wholesale, Retail Trade	Banking, Insurance, Real Estate	Transportation, Communications	Electricity, Gas, Water Supplies	Services
SECONDARY SECTOR	Δ.944										
Mining	.275	Δ.369									
Construction	Δ.628	.568	Δ.040								
Manufacturing	Δ.720	.832	Δ.316	.208							
TERTIARY SECTOR	Δ.825	.671	Δ.005	.498	.336						
Wholesale, Retail Trade	Δ.906	.783	Δ.079	.455	.521	.958					
Banking, Insurance, Real Estate	Δ.921	.827	Δ.068	.502	.533	.858	.946				
Transportation, Communications	Δ.827	.666	.114	.633	.313	.925	.857	.850			
Electricity, Gas, Water Supplies	Δ.449	.477	Δ.241	.409	.369	.259	.409	.350	.381		
Services	Δ.708	.526	Δ.002	.514	.194	.946	.855	.743	.858	.367	
Public Services	Δ.301	.098	.631	.336	Δ.322	.650	.558	.434	.631	Δ.177	.643

The value for the rank-order correlation coefficients among the various indus-
trial components are given in Table 4. If we first extract from this table the
figures for each of the three sectors as a whole, the correspondences among
each of the three are as follows:

Figure 1.
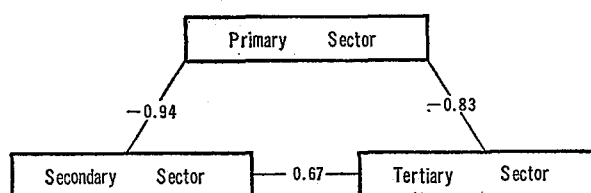
There is definite tight fit between the regional variations of the primary
sector ratios and those of the secondary and tertiary sector ratios. There is
also a good correspondence between the variations for the secondary and
tertiary sectors, but it is difficult to say that this correspondence is satisfactory
when compared with the others.

According to the figures in Table 4, the primary sector has a high rank-
order correlation with all industries except mining, public services, and elec-
tricity, gas and water. Moreover, because it is clear that these three industrial
groups do not have a close, systematic correspondence with any of the other
industries,[3] we have experimented with various combinations of secondary and

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[a]   Although we acknowledge the positive correlations of 0.63–0.64 between public services
and mining on the one hand and transportation and communications and service in-
dustries on the other, the actual significance of these is slight.

tertiary sector industries whose rank-order correlations are high. The results are shown in the pentagonal figure given below:
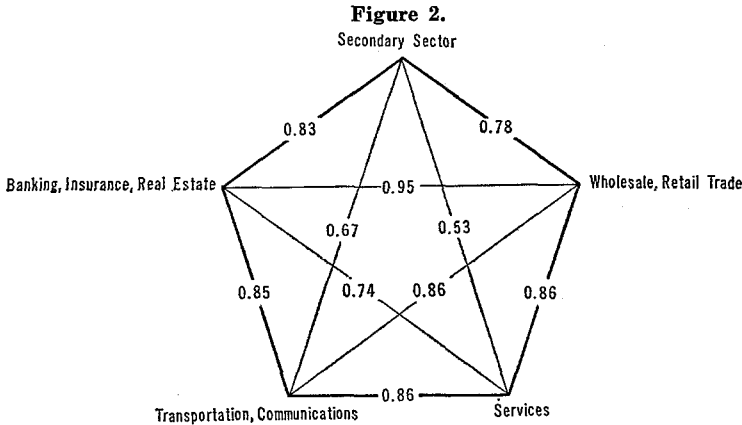
Figure 2.

Before discussing the content of this figure it is necessary to describe briefly the strategy of regional economic development planning in order to clarify the purpose of this figure. Policies and measures for regional economic development have been truly multitudinous, including the invitation of factories, the fostering of local industries, the consolidation of a highway network, and the improvement of the structure of agriculture. The basic principle behind this encouragement of regional development has served to infuse an impulse to industrialize and, with continued full utilization of the diffusion effect, to gradually reorganize the industrial structure of the region concerned. It scarcely needs to be remarked that the manner in which opportunities for industrialization are handled holds the key to the success or failure of regional economic development. But what we are interested in here is not the specific nature of industrialization itself, but rather the diffusion effect of industrialization and the resulting reorganization of industrial structure. Thus, our aim here is to try to grasp the direction in which spread of the diffusion effect is taking place—that is to say, the direction in which reorganization of the structure of industry is progressing—through using the results given in the pentagonal figure.

Our index for industrialization here is the proportion of the labor force employed in the secondary sector. According to Table 4, the rank-order correlation coefficient between the secondary sector and manufacturing ranks high at 0.83. Moreover, if we interpret industrialization in a broad sense, and take it to mean the development of both mining and manufacturing, the rank-order correlation coefficient between mining and manufacturing and the secondary sector is an extremely high 0.97.

Progress of regional industrialization and rise in the proportion of employment in the secondary sector[4] become a motivating force which functions

4   Although theoretically speaking it is not inevitable that with the progress of industrialization there is a rise in the proportion of the labor force employed in the secondary sector, in fact there are numerous instances in which such a relationship does exist.

as a general diffusion agent among the five closely corresponding industrial groups. Finally there occurs an extensive expansion in the proportion of industrial employment which is congruent with the close mutual correspondence among all the groups, from wholesale and retail trade down. The reverse side of the same coin is the decreasing weight of the primary sector. However, because the rank-order correlations between the secondary sector and services and between the secondary sector and transportation and communications are both somewhat low in comparison with the others, this should be seen as indicating that there is wide latitude for particular regional characteristics deriving from local geography and historical characteristics to come to the fore. Be that as it may, through this kind of correspondence among industries, the distribution of industrial employment has developed in a definite order, with particular regional characteristics for the developed industrialized regions of Southern Kantō and Kinki, the newly industrialized region of Tōkai, the underdeveloped agricultural regions of Tōhoku and Southern Kyūshū, etc. This kind of regional individuality is the true substance of "regionalism," the causal analysis of which is an important problem for regional analysis. But at the present stage of research, we are not sufficiently prepared to venture so far.

II. CHANGE: 1920–1960

Let us turn to Table 5 to examine the historical change and transition in the distribution of industrial employment in each region during the forty years from 1920 to the present. Due to the limitations of the data, our observations have been limited to the major sectoral level.

First, let us look at the primary sector. The nationwide proportion of employment in the primary sector shows a decline of 20 percentage points from 54% in 1920 to 33% in 1960. Looking at Table 6, we may see that this change is equivalent to a transition from the level of present-day Mexico and Greece to that of Italy and Austria. Thus during the 1920–1960 interval, Japan has risen from the level of the average underdeveloped agricultural nations of Southern Europe to a level corresponding at the least to the advanced Western European nations.

In 1920 the proportion of employment for the primary sector by region was lowest in Kinki and Southern Kantō, ranking at 35%, while Northern Kyūshū ranked third with 45%. These three regions were the advanced areas at the stage of development, and the 1920 proportion of employment in the primary sector for Kinki and Southern Kantō were almost the equivalent of the proportion of present-day Hokkaidō, while Northern Kyūshū was only the equivalent of present-day Hokuriku and Shikoku. Hokkaidō and Tōhoku followed with 55%, almost corresponding to contemporary Tōhoku and Southern Kyūshū. With Chūgoku, Tōsan, Hokuriku and Shikoku at an intermediate level, ranking 60%, the 65–70% of Northern Kantō, Tōhoku and Southern Kyūshū indicates that these areas were the regions slowest to de-

Table 5. Changes of Industrial Distribution of Employment by Region, 1920–1960

	Hokkaidō	Tōhoku	Northern Kantō	Southern Kantō	Hokuriku	Tōsan	Tōkai	Kinki	Chūgoku	Shikoku	Northern Kyūshū	Southern Kyūshū	Whole Country
PRIMARY SECTOR													
1920	53.8	66.8	64.9	36.3	61.8	60.8	55.4	34.6	60.3	62.0	44.8	69.4	53.6
1930	54.8	66.7	63.3	28.6	58.8	59.7	48.6	29.1	58.1	60.2	43.4	67.9	49.4
1940	49.8	65.4	61.5	22.4	54.3	62.6	42.2	23.5	52.6	59.5	37.4	67.0	44.0
1950	47.5	63.9	62.7	28.3	56.5	61.8	45.6	30.2	54.1	58.8	40.3	66.2	48.3
1955	42.9	59.2	56.6	20.5	50.5	55.6	36.2	24.0	47.7	52.5	36.2	60.4	41.0
1960	35.8	52.7	49.1	14.4	43.6	47.0	27.9	16.9	40.0	45.6	30.0	54.0	32.8
SECONDARY SECTOR													
1920	16.4	13.0	16.7	26.9	16.1	21.2	21.6	29.9	17.0	16.7	28.7	12.0	20.7
1930	15.2	12.3	15.6	25.0	17.2	21.3	24.0	28.9	16.8	16.6	25.9	11.9	20.4
1940	21.0	13.6	18.2	36.2	21.9	17.2	30.0	36.4	22.0	16.8	33.0	11.7	26.2
1950	23.2	13.1	15.9	28.2	19.3	15.6	26.0	30.7	19.3	17.0	28.9	12.4	22.0
1955	21.0	13.4	17.0	30.6	20.6	16.9	30.7	33.2	19.8	17.7	25.1	12.0	23.5
1960	23.9	16.1	21.8	37.9	25.3	23.6	37.3	39.5	24.4	20.5	28.1	14.3	29.2
TERTIARY SECTOR													
1920	29.8	20.2	18.4	36.8	22.1	18.0	23.0	35.5	22.7	21.3	26.5	18.6	25.4
1930	30.0	21.0	21.1	46.4	24.0	19.0	27.4	42.0	25.1	23.2	30.7	20.2	30.2
1940	29.2	21.0	20.3	41.4	23.8	20.2	27.8	40.1	25.4	23.7	29.6	21.3	29.8
1950	29.4	23.0	21.4	43.5	24.0	22.6	28.4	39.2	26.5	24.2	30.8	21.4	29.7
1955	36.1	27.4	26.4	48.9	28.9	27.5	33.1	42.8	32.5	29.8	38.7	27.6	35.5
1960	40.3	31.2	29.1	47.7	31.1	29.4	34.8	43.6	35.6	33.9	41.9	31.7	38.0

Table 6. International Comparison of the Industrial Distribution of Employment, 1960

	Primary Sector	Secondary Sector	Manufacturing	Tertiary Sector
U. K.	4.4	47.0	37.2	48.6
U. S. A.	7.3	37.9	29.7	54.8
Belgium	7.6	44.7	34.7	52.3
The Netherlands	10.3	41.4	30.9	48.3
Switzerland	11.6	49.5	—	38.9
Canada	13.2	33.3	24.7	53.5
Sweden	13.5	41.4	32.0	45.1
West Germany	13.9	48.1	36.4	38.0
Norway	23.2	35.1	26.0	41.7
Denmark[a]	23.5	33.2	—	43.3
Iceland	24.7	37.0	26.0	38.3
France[b]	25.9	36.1	26.6	38.0
Chile	29.1	30.0	18.2	40.9
Italy	31.4	37.6	26.8	31.0
Austria[c]	33.0	36.0	26.5	31.0
Finland	35.6	30.6	21.6	33.8
Ireland[d]	38.1	23.5	16.9	38.4
Spain	41.7	31.0	22.1	27.3
Portugal[e]	49.7	24.5	18.8	25.8
Mexico	54.6	18.7	13.8	26.7
Greece[f]	55.7	19.1	13.7	25.2
Taiwan[g]	56.0	16.2	12.2	27.8
Yugoslavia[h]	59.6	23.0	17.2	17.4
Philippines[f]	60.5	14.7	11.5	24.8
India[f]	72.3	11.7	10.6	16.0
Indonesia[f]	73.3	7.9	5.8	18.8
Turkey	79.0	10.1	7.2	10.9

Note: a)=1955; b)=1957; c)=1951; d)=1959; e)=1950; f)=1951; g)=1956.

Sources: ILO, *Yearbook of Labour Statistics*, 1963. OECD, *Manpower Statistics, 1950–1960*.

velop. If we look for corresponding examples for these three regions among the present conditions of various countries, Kinki and Southern Kantō of 1920 were at virtually the same level as today's Finland, while Northern Kyūshū was at that of Spain and Portugal. Hokkaidō and Tōkai were equal to Mexico, Greece and Taiwan, while Chūgoku, Tōsan, Hokuriku and Shikoku were about the same as Yugoslavia and the Philippines. Southern Kyūshū, with the highest proportion of employment, was shoulder to shoulder with India and Indonesia.

By 1960, even the regions which ranked at the bottom of the list—Tōhoku, Southern Kyūshū, etc.—had only attained the level of present-day Mexico, Greece and Taiwan. The regions which stood at the apex of the list—Southern Kantō and Kinki—already were side by side with France, Denmark and Norway in 1940 and by 1960 were pulling ahead of these countries to draw level with West Germany. This is certainly a spectacular leap. This not-

withstanding, however, it is a matter of fact that these regions cannot be held up for comparison with the Netherlands or Switzerland, much less with United Kingdom or Belgium, the most advanced nations.

Next, let us turn to the secondary sector. The nationwide proportion of employment for the secondary sector rose by 8 percentage points from 21% in 1920 to 29% in 1960. Just as in the case of the primary sector, the 1920 level of the secondary sector was on a par with present-day Mexico and Greece. However, the 1960 level has remained at one which approaches Finland and Spain; there still remains a fair gap between the 1960 level and that of Italy or Austria.

In 1920, the highest proportion of employment for the secondary sector was to be found in Kinki and Northern Kyūshū with 30%, followed in third place by Southern Kantō with 27%. As the Tōkai region, along with Tōsan, just barely exceeded 20%, the three regions of Kinki, Northern Kyūshū and Southern Kantō were undeniably the three great mining and manufacturing centers of the time. But even these three centers at the most only came up to the level of industrialization of today's Finland, Spain, and Chile, while Tōsan, etc. remained on a level with today's Yugoslavia, Greece and Mexico. Chūgoku, Northern Kantō, Shikoku, Hokkaidō and Hokuriku, regions which were slow to develop, corresponded to today's Taiwan and the Philippines, and regions such as Tōhoku and Southern Kyūshū were only at the level of today's India.

Even in 1960 the industrialization of the lowest-ranking areas, Tōhoku and Southern Kyūshū, had progressed hardly at all and still hung back on a level with that of Southeast Asia. Hokuriku, Chūgoku, Hokkaidō and Tōsan, etc., however, had arrived at a part with Portugal and Ireland and thus were equivalent to the low-ranking European countries. Moreover, aside from the sole exception of the reviving of industrially stagnant Northern Kyūshū, the progress of industrialization in the other more advanced areas was remarkable. Kinki, Southern Kantō and Tōkai reached a level of such countries as Netherlands, Sweden, Italy and U. S. A. For this reason, the regional differentiation in industrialization expanded dramatically during the forty-year interval.

Let us turn to the tertiary sector. The national average of the proportion of employment in the tertiary sector in 1920 was 26%. By 1960 this had risen sharply to 38%. Statistically speaking, this is a leap from the level of the Southern European countries of Spain and Portugal to that of the countries lying along the axis of Western Europe, West Germany and France, etc.

In 1920 the highest positions were occupied by Southern Kantō and Kinki with 36%, followed by Hokkaidō with 30%, and Northern Kyūshū with 27%. Next in order were those regions clustering around the 20% mark, ranging from Tōkai and Chūgoku with 23% to Northern Kantō and Tōsan with 18%. Highest ranking Southern Kantō and Kinki slightly exceeded the present-day levels of Tōkai, Chūgoku and Finland. Third-ranking Hokkaidō corresponded to present-day Hokuriku, Tōhoku, Italy and Austria. Northern Kyūshū was

the same as Southern Europe, and only reached the level of the present-day low-ranking areas of Northern Kantō and Tōsan. Moreover, the regions which drop below the 20% line—Southern Kyūshū, Northern Kantō, Tōsan, etc.—corresponded only to today's Southeast Asia.

　　Turning to 1960, the lowest-ranking areas of Northern Kantō and Tōsan have approached Italy and Austria. The high-ranking areas of Northern Kyūshū and Hokkaidō have surpassed the 40% mark to line up with Norway and Switzerland, while Kinki is approaching the Northern European countries of Norway and Denmark. Southern Kantō is equivalent to United Kindom and the Netherlands.

　　Along the way to development and progress, the structure of regional industrial employment in the forty-year interval from 1920 to 1960 displayed the changing feature briefly outlined above. However, there is noteworthy disparity in the pre- and post-war trends both regionally and on a nation-wide basis. This is shown below in a comparison of change between 1920-1940 with change between 1950-1960.

Table 7.　Changes in the Proportion of Employment by Sector,
　　　　　　1920-40 and 1950-60

	Primary Sector		Secondary Sector		Tertiary Sector	
	1920–40	1950–60	1920–40	1950–60	1920–40	1950–60
Hokkaidō	Δ4.0	Δ11.7	4.6	0.7	Δ0.6	10.9
Tōhoku	Δ1.4	Δ11.2	0.6	3.0	0.8	8.2
Northern Kantō	Δ3.4	Δ13.6	1.5	5.9	1.9	7.7
Southern Kantō	Δ13.9	Δ13.9	9.3	9.7	4.6	4.2
Hokuriku	Δ7.5	Δ12.9	5.8	6.0	1.7	7.1
Tōsan	1.8	Δ14.8	Δ4.0	8.0	2.2	6.8
Tōkai	Δ13.2	Δ17.7	8.4	11.3	4.8	6.4
Kinki	Δ11.1	Δ13.3	6.5	8.8	4.6	4.4
Chūgoku	Δ7.7	Δ14.1	5.0	5.1	2.7	9.1
Shikoku	Δ2.5	Δ13.2	0.1	3.5	2.4	9.7
Northern Kyūshū	Δ7.4	Δ10.3	4.3	Δ0.8	3.1	11.1
Southern Kyūshū	Δ2.4	Δ12.2	Δ0.3	1.9	2.7	10.3
Whole Country	Δ9.6	Δ15.5	5.5	7.2	4.1	8.3

Note:　Δ=decrease.

　　With the sole exception of prewar Tōsan, the share of the primary sector in employment decreased, with differences in degree. The degree of decline was high in the advanced areas of Southern Kantō and Tōkai, etc., for both pre- and post-war periods, while the decline was slight in the underdeveloped regions of Southern Kyūshū and Tōhoku. Omitting Tōsan, which we recognize to be a clearly aberrant case,[5] the rank-order correlation coefficient

5　Because the silk industry was the specialty of Tōsan, its decline immediately brought about the restoration of agriculture to the region. In this we can see the tragedy of over-specialization in industry. It is probable that a comparative study of pre-war Tōsan and present-day coal mining areas would teach a number of profitable lessons. The rank-order correlation coefficients including Tōsan is 0.343.

for pre- and post-war ranks a high 0.942. However, the prewar range of
decrease differs conspicuously with region, from 13 in Southern Kantō and
Tōkai to 2 in Southern Kyūshū and Tōhoku; while in the post-war period, the
decrease of the underdeveloped areas are sizeable, and leaving aside Tōkai
at 18—as a newly developed industrial belt it ranks far above the others—the
regional differences, ranking from Tōsan's 15 to Northen Kyūshū's 10, have
clearly diminished. This should be carefully noted as suggesting that during
the postwar period the effects of industrialization have for the first time
penetrated into every part of the entire nation.

If we take the trend in proportion of employment in the secondary sector
as an indicator, the progress of industrialization has in general been greater
in the postwar period than in the prewar period. In the areas of Northern
Kantō, Tōhoku and Shikoku, where during the prewar period industrialization
was at a standstill, the progress of industrialization during the postwar period
has gradually come to be outstanding. Even Tōsan, which in the prewar era
sustained severe losses with the decline of the silk industry, in the postwar
period witnessed the progress of re-industrialization brought by the precision
instruments industry. Southern Kyūshū, however, has as yet been unable to
overcome its industrial stagnation and remains as before; and in the postwar
period Hokkaidō and Northern Kyūshū have seen industrialization come to
a halt through the heavy blow dealt by the decline of the coal mining in-
dustry. Thus, with the exception of the areas of Hokkaidō, Northern Kyūshū
and Tōsan, in which certain unusual circumstances prevail, regional indus-
trialization has a high pre- and post-war rank-order correlation of 0.992.[6]

The order of prewar increases according to the proportion of employment
in the tertiary sector moves from the three major economic centers headed by
Tōkai, to the regions south and west of Chūgoku, to the regions north and
east of Hokuriku, to Hokkaidō. In the postwar period the increases in the
share of the tertiary sector rose in the regions other than the three great
economic centers, while the position of the three centers and Hokkaidō either
rose or declined. For this reason, the rank-order correlation coefficient for
the twelve regions is a low −0.413.

Thus, the fact that the tempo of rise in the proportion of employment
in the tertiary sector changed imperceptibly for the three great economic
centers with their high levels of income and, in contrast, accelerated in the
other regions whose level of income was low, clearly suggests that there are
powerful factors other than Petty's Law in operation. If we consider the
high—0.952—rank-order correlation coefficient for the eight regions excluding
the three great economic centers and Hokkaidō, then perhaps we should infer
a regularity which functions to unify the pre- and post-war periods.

Thus, any number of pronounced regional characteristics may be seen in
the trend of the distribution of industrial employment in each region. But
nonetheless, over the years there is a surprising display of stability in the

6   Including the regions of Hokkaidō, Northern Kyūshū and Tōsan the rank-order cor-
relation coefficient is 0.546.

rankings of the regional proportion of employment by industry according to size. Today's industrialized areas were already industrialized forty years ago, and the agricultural regions which were underdeveloped before remain agricultural areas still. Table 8 shows that the ranking of the regions is most stable for the primary sector and most unstable for the secondary sector. And the lowest rank-order correlations are for contiguous time periods and the fluctuation in the ranking of the regions is greatest in the case of secondary sector industries for 1930 and 1940. This corresponds to the period when there was a continued forced thrust for conversion from light to heavy industries under wartime economic conditions. This reorganization of industry which accompanied the large-scale shift in regional location of industry has great significance for the regional structure of Japan's economy.

Table 8. Over Time Comparison Rank-order Correlation Coefficients of the Proportion by Sector

	Primary Sector	Secondary Sector	Tertiary Sector
1920 and 1930	.979	.930	.972
1930 and 1940	.979	.874	.972
1940 and 1950	.993	.951	.958
1950 and 1955	.993	.972	.972
1955 and 1960	1.000	.965	.958
1920 and 1960	.951	.816	.930

Table 9 shows change over time in the rank-order correlation among industrial groups which has already been discussed in detail in terms of a cross-sectional analysis for the year 1960. On the basis of this table we may point out two distinct trends. The first is the reversal from 1930 to 1940 in the numerical relationship of the values of the rank-order correlation coefficients between the primary and tertiary sectors on the one hand and the primary and secondary sectors on the other. However, we must be careful in interpreting this reversal, because the obseved difference in the rank-order correlation coefficients between two periods is slight, and we have not detected any other important observable factor corroborating this from another angle. But we may be able to submit the following tentative hypothesis. It is a well-known fact that there occurs an exodus of the labor force from the primary sector to the secondary and tertiary sectors in the course of economic development. And it is also clear that this intersectoral flow of the labor force insures the close mutual correspondence of the primary sector and the other sectors in terms of the industrial distribution of labor. If we review the Japanese experience, from 1920 to 1930 the tertiary sector may be viewed as having a stronger effect than the secondary sector in accelerating the outflow of the labor force from the primary sector by providing employment opportunity for children of peasant families, because the most rapidly expanding large-scale manufacturing industries were the light industries dependent on the labor of young women whose participation to the labor market is temporary. But as has already been stated above, from the latter half of

the 1930's the heavy and chemical industries which depended on adult male workers progressed in leaps and bounds while concomitantly the ability of the secondary sector to absorb labor—in particular male labor—gradually came to exceed that of the tertiary sector. As a result, I am of the opinion that the strength of the correspondence between the primary sector and the other sectors underwent a reversal circa 1940.

Table 9. Changes of Cross-section Comparison Rank-order Correlation
Coefficients of the Proportion of Employment by Sector

	Primary and Secondary Sectors	Primary and Tertiary Sectors	Secondary and Tertiary Sectors
1920	∆.846	∆.860	.573
1930	∆.846	∆.923	.664
1940	∆.951	∆.930	.839
1950	∆.972	∆.951	.916
1955	∆.979	∆.920	.892
1960	∆.944	∆.825	.671

The following objection may be raised against the above hypothesis: the dynamic force behind economic development is industrialization and the expansion of the tertiary sector is at the most only a reflection of this. Moreover, the progress of industrialization in the period during and after World War I was truly astonishing. These points must not be neglected in interpretating changes in the distribution of the industrial working force during the period of the 1920's. It is true that the expansion of industrial production during the period under discussion was dramatic. However, at least in the 1920's the process of industrialization was simultanously a process of rationalization of industry; there was a marked improvement in labor productivity based on the rise in capital per worker, while the expansion of employment in manufacturing as a whole hardly bears comment. I am rather of the opinion that the predicted employment effect of industrialization was expressed indirectly through the induced expansion of the tertiary sector. And it is a matter of fact that in the period of the latter half of the 1930's the direct employment effect of industrialization was expressed in the form of increased employment in manufacturing with widespread repercussions on the agricultural economy.

The second trend which may be seen in Table 9 may be recognized in the rise in the value of the rank-order correlation coefficients which continued to either 1950 or 1955, and the subsequent decline. Although our observations of the declining phase are limited, the tendency is sufficiently regular to permit it to be viewed as a reflection of an actual change. Generally an increasingly close interrelationship among the economic regions which comprise a national economy is a concomitant of economic development, and we may predict that the interrelationships among industrial groups will become tighter both nationally and regionally. As Japan is certainly no exception to this, it is possible to explain the observed increase in rank-order correlation coef-

ficients as corresponding exactly to this process. In spite of this general rule, the manifest decline during the 1950's can only be thought of as suggesting the occurrence of some kind of structural change in the economy, and that at approximately this time the fixed order which had existed up to then in the regional correspondence between industrial groups was breaking down. A discussion of the actual nature of this structural change will have to await later examination, but we can here note the fact that this change was already coming to the surface between the tertiary sector and other sectors by 1955 when the period of rapid economic growth had just started.