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# A US-JAPAN COMPARISON OF WAGES-PRICE STRUCTURE

by

*Ryōichi Suzuki*

## I

A noticeable transformation has been taking place in the economic structure of Japan since the so-called "Iwato boom" beginning in 1959. The phenomena involved may be able to discuss from various aspects, but the underlying tone is a shift of the Japanese economy from that of labor-surplus pattern to that of labor-shortage. In the prewar period through the 20's of Shōwa (up to 1955) latent unemployment had been considered as the country's destiny, making always a source of worry to governmental employment policies. Since low-wage employment was feasible, smaller enterprises had no particular desire to foster mechanization. Their equipment investments were only of limited amount. In these industries production was labor-intensive type, whose products were relatively cheap. Such a basic tone, however, has drastically been changed by the expansion of Japan's economic scale beginning with the Iwato boom. Since employment by bigger firms has come to extend over those classes of workers who had been employed by smaller firms, the latter have been obliged to sustain wage rises of rapid pace in order to continue their operation, which has resulted in the requirement to productivity improvement by way of mechanization. In the past labor-surplus period, first improvements of labor productivity — notably in manufacturing — forewent, followed — with some time-lag and at a lower rate — by wage rises, leaving the remnants for employment increases. This process is reversed in the labor-shortage period, that is to say, wage rises forego, followed by productivity improvements. Yet in many cases among light industries or commerce businesses improvement of productivity is not always easy to realize to an expected extent for technical or financial reasons. Is it possible, then, to charge the difference between wage increase and productivity rise on the rise of product price? An affirmative answer to this problem will lead to the

wage-inflation theory. However, it must be considered difficult, in most cases, to raise prices by reason of increases in costs so much, if the idea of "demand elasticity with respect to price" is to be introduced. Furthermore, there is the impact of the trade liberalization being progressively effected since 1961. From the first it has been said that the products of Japan's heavy-chemical industries are costly compared with American goods due to the inferior position of capital accumulation. Hence, the liberalization should increase the need of efforts to lower prices. Contrastively in the case of light industries price rises to some degree have been possible on account of their greater dependency on labor, hence lower international comparative prices. For these reasons the trade liberalization has brought about appreciable changes in the price structure.

On the other hand, since liberalization effects approximation of the price structure of production factors among trade-participant countries as has been pointed out by B. Ohlin, a rise in Japan's wages, which have been relatively low, will be resulted from the liberalization, notably to America. Thus a double force will be worked on wages to rise. In this article a positive analysis is intended, in relation with the American economy that has the closest connection with the Japan's economy, on the transformations in wages, employment, productivity and price structure during the recent seven years — beginning in 1959, a year just preceding the present labor shortage and the liberalization.

This paper makes a sequel to the writer's articles "Chinkin to Seisansei no Kokusai hikaku," Chap. 7 of *Keizaiseichō to Seikatsu Suijun* (International Comparison of Wages and Productivity, Chap. 7 of *Economic Growth and Standard of Living*), Chūōkeizai-sha, 1964, and "Bukka-Chinkin Hendō no Kokusai hikaku," Chap. 2 of *Bukka to Chinkin* (International Comparison of Price-Wage Fluctuations, Chap. 2 of *Prices and Wages*), Zeimukeiri-kyōkai, 1965. Data used are; for America, wages and employment from the Department of Labor, *Monthly Labor Review* (mainly June 1967) and *do*, *Wage and Earnings* (Oct. 1959), and production and prices from the Bank of Japan, *Gaikoku Keizai Tōkei Nempō* (Annual Statistical Report on Foreign Economy, mainly 1966); for Japan, employment and wages from the Ministry of Labor, *Rōdōshō Tōkei Nempō* (Ministry of Labor's Annual Statistical Report) (mainly *Monthly Labor Statistics*, covering enterprises of 30 employees or more, and wages showing male-female averages) and prices, production and productivity from the Bank of Japan, *Keizai Tōkei Nempō* (Annual Statistical Report) in which are compiled wholesale price indices by the Bank, production indices by the Ministry of International Trade and Industry, and productivity indices by the Japan Productivity Center.

## 2

Let's begin with the comparison of wages by industries in 1966 between the United States and Japan. For the comparison, average weekly wages in America for 1966 were increased by 30/7 times to estimate monthly wages, which were then converted to yen denomination with a rate 1 dollar=300 yen. The results, i.e., monthly wages by industries in yen denomination, were divided by average wages for corresponding industries of Japan. The ratios between the two countries's wages thus obtained are shown in Table 2. By the table we see the wage differential is smaller for distribution sectors such as wholesale-retail trade and finance than for manufacturing. Among manufacturing the ratio is smallest for the tobacco manufacture, which is apparently due to the particular form of enterprise of this industry in Japan. Speaking generally durable-goods industries have larger ratios, while light industries smaller. This may be said a reflection of the differences of industrial structure between the two countries.

The ratios for 1966 are much smaller compared with those for 1959, for one thing owing to the growth of Japan's national economy. But such contraction of wage differentials between the two countries would safely be smaller if taken in terms of real wages, in view of the rises in consumer prices during the two years. The ratio for wholesale-retail trade, which in 1959 was smaller than those for manufacturing industries generally, has turned still lower in 1966; it has become smaller even compared with the leather & hide and tobacco industries reversing the position in 1959. Then is it proper to deem that such a change is due to wage rises in commerce accompanying increased fluidity of manpower? No, rather it should be taken to be derived from the smallness of wage rise in American wholesale-retail trade during the seven years in question. And, the rubber manufacture, which ranked top in the differentials in 1959, has been lowered to rank 4th, being replaced by the metal goods industry. On the whole the changes in the rank are substantial. Industries with small contraction of differential during the seven years, remaining at nearly previous ratios, are mining and the transport equipment and leather & hide manufactures, in the order of non-change. On the other hand, high rates of contraction are found for rubber, miscellaneous manufactures and printing & bookmaking. Thus there lies no outright correspondence between the absolute level of ratio and the rate of contraction.

Next let's see the structure of employment. By the data of manufacturing for 1959, the ratio of employment between America and Japan — dividing American figure by Japan's figure for each corresponding median-classification section of manufacturing — is high for the clothe, oil & coal products and furniture manufactures, while low for fiber, metal goods and leather &

hide. This tells that in America weight is placed on the production of finished goods while in Japan sections of raw stuffs and semifinished products have heavier weight. And the rate for the distribution sector is small compared with those for manufacturing sections, suggesting relatively larger employment in the Japan's tertial sector.

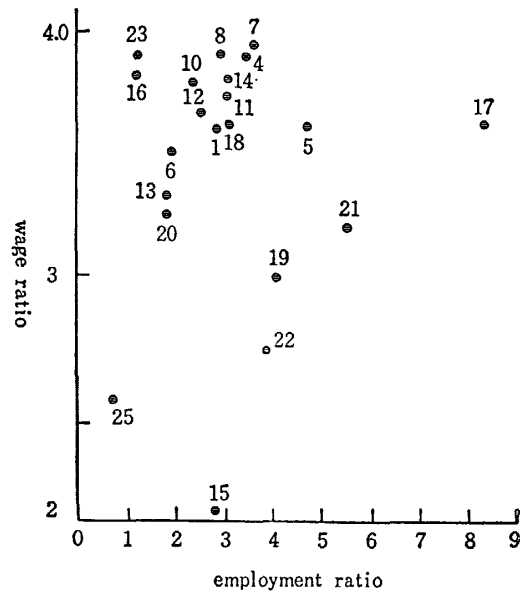
By the figures for 1966, employment in the wholesale-retail trade of Japan is larger than that of America. For manufacturing industries the ratio has commonly declined reflecting the rapid growth of Japan's employment for the past seven years, with the rubber manufacture as the only exception. For those sections of manufacturing that ranked high in 1959 — clothe, oil & coal products, furniture — the ratio has shown appreciable increases in 1966, although their high-rank positions are not changed. On the other hand, for the fiber, leather & hide and chemical sections, which were low in the ratio, the rate of contraction, if any, is small. These changes suggest a general approximation of industrial structure between Japan and America. By the overall observation of industries, however, there can be seen no linear correlation between the base-time employment ratios and the rates of contraction.

Then, how have been the correlations between wages and employment? Is there any relation between the changes in the wage ratio and those in the employment ratio? Chart 1 shows these relations. In the Chart, under the effect of (1) mining and (23) rubber manufacture a shape of positive correlation, if indefinite, is observable as the whole, that is to say, there appears to be a flow toward sections of higher wage ratio. If the correlation were high, it would mean that there are established two conditions: (1) in both

Chart 1



Chart 2



America and Japan inter-industries mobility of labor is perfect, and (2) for both countries dependency on mutual trade is high. Actually, however, the degree of correlation is not so high suggesting, in particular, that in the said second condition the dependency is weak on the part of America.

Chart 2 presents the relations between the wage ratio and the employment ratio, where the correlation is still lower than in Chart 1. In other words, it may be said, there is shown a fact that the proposition that labor moves toward higher-wage industries can be established only at a time-point where a dynamic process or competition has been completed; in a cross-sectional observation amid adaptation process, the fact does not always conform with transcendental reasonings.

### 3

Next, let's go on to the relations between wages and prices. First the data for Japan will be examined. In Table 4 are contrasted, by industries, productivity indices compiled by the Japan Productivity Center and wage indices by the Labor Ministry (Monthly Labor Statistics), both for 1966, figures being re-computed on 1959-base.\*

In comparing the two sets of indices, two points are to be kept in mind.

- (1) Coverage is not the same for the two indices.
- (2) The productivity index is a pile-up work of items of products, with weight of added value, thus eliminating the effects of structural changes as far as possible. Contrastively the wage index is based on average wages per worker for respective industries (in median group), consequently reflecting structural changes within each industry. For an extreme instance, even if the wage level of an industry remains unchanged, an increase of employment in its higher-wage subsections or enterprises would result in a higher value of wage index. The productivity index by the Center does not involve such a result. In a growing economy indices involving structural changes are likely to show higher values.\*\*

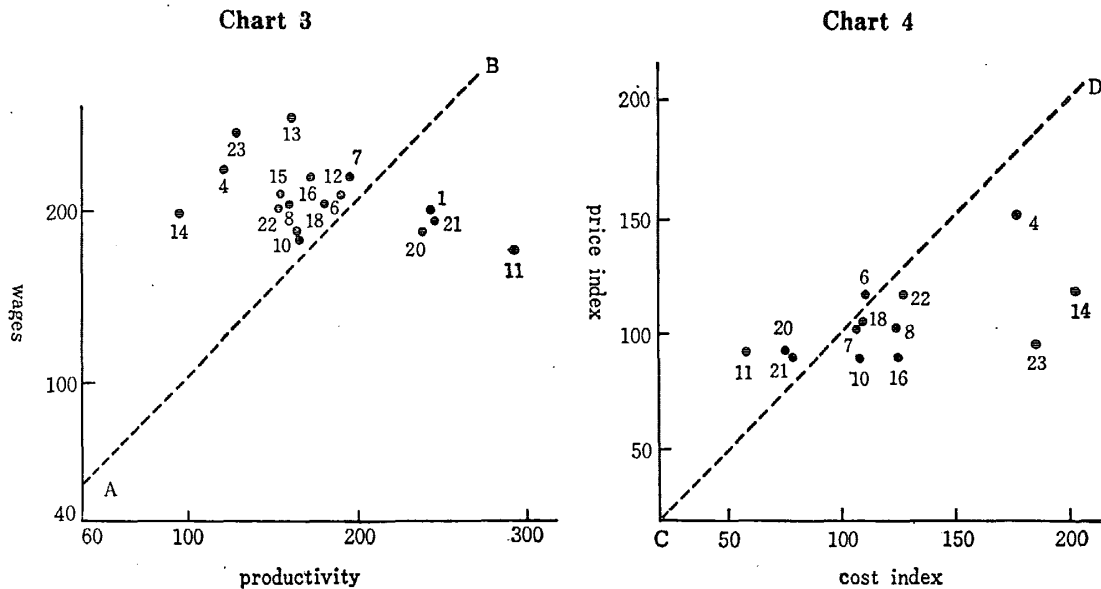
Having these points in mind, Chart 3 was prepared to observe the results to be derived from Table 4. AB is a right line with a 45-degree slope to both axes. For industries positioned on this line, if any, the rate of labor-productivity increase and that of money-wage increase are equivalent; for

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\*For the oil & coal products manufacture the productivity index was obtained by dividing the production index of the Ministry of International Trade and Industry by the employment index of the Labor Ministry, because the figures by the Productivity Center seemed uncomparable due to overmuch dis-aggregation. As to the fiber and the clothe & belongings manufactures, whose productivity indices are combined into one value by the Center, wage indices of the two manufactures were aggregated, putting arithmetic average weighted by employment of 1959.

\*\*See the writer, *Seisansei Shisū to Bumpai no Mondai*, Chap. 3 of *Chingin Riron no Kenkyū* (Productivity Index and Distribution Problems, Chap. 3 of *Studies in Wage Theories*), Japan Productivity Center, 1959.

industries lying left-above side of the line, the rate of wage rise is higher than that of productivity rise, to present a phenomenon of "cost push." Such a phenomenon is most marked for (13) miscellaneous manufacturing and (23) rubber manufacture, but also for other industries of an appreciable number the wage rise surpasses the productivity rise. The rate of productivity rise is substantially higher than that of wage rise for (11) transport equipment, followed by (1) mining, (20) chemical and (21) oil & coal products industries.



Then, are the increases in production costs actually resulting in the rises in product prices?

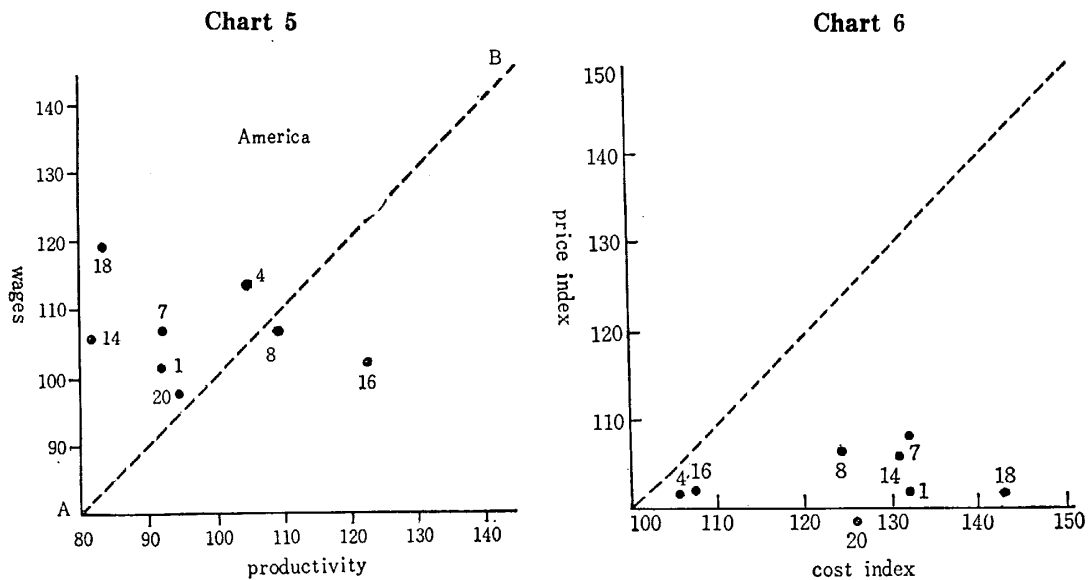
Let  $W/\frac{Q}{L}$  stand for wage-cost index. This represents wage cost involved in a unit of produce. The wholesale prices (in Table 4) are converted figures from the Bank of Japan's indices from 1960-base to 1959-base, since the Bank's original figures do not contain mining and precision instruments sections. Chart 4 shows correlation between the wage-cost indices and the wholesale price indices. If any change in the wage cost were directly reflected in the product price, the point to show such a correlation would be positioned on line CD that has a 45-degree slope to both axes. Actually what approximates closely to this line is (6) glass & earthen ware alone, being followed only by (18) paper & pulp, (22) leather & hide and (27) metal goods manufactures. As a prerequisite for cost rises to be directly reflected in product prices, elasticity of demand with respect to price must be substantially small. Is such a condition being fulfilled? In (11) transport equipment manufacture the extent of price-down is small compared with cost-down. The margin between the two is supposed to have been devoted to equipment investment. Again (20) chemical and (21) oil & coal products manufactures come under the same type, although with some difference of degree. No other industries excepting glass & earthen ware (insofar as the cost and price

indices take more than 100%) are posited in the left-above side. This may be said to tell the situation that it is difficult to charge cost rises outrightly on price rises under the influence of demand elasticity with respect to price. This tendency is most marked in (14) food and (23) rubber industries; for the latter even a fall of price is noticeable despite the wage rise.

4

Let's turn to the case of America (see Table 4). The employment indices were computed from the figures of employment by industries in the Monthly Labor Review, similarly 1959 and 1966 being compared as is with Japan. The production indices are re-computation of the Department of Commerce's figures from 1957-59-base to 1959-base, relying on the Federal Reserve Bulletin and the Survey of Current Business as well as the Bank of Japan's Gaikoku Keizai Tōkei Nempō, 1966. By dividing the production indices by the employment indices, the productivity indices were obtained. The wage indices were calculated from average wages by industries incerted in the Monthly Labor Review. The wholesale price indices are conversion of the figures in the said three sources into 1959-base. It must be noticed in observing the relations between productivity and wages that, contrary to the case of Japan, the productivity indices are not compilation of figures for individual commodities, hence involve structural changes inside respective industries. This means the same base of calculation with the case of wage indices, avoiding the need of consideration as with the case of Japan. However, differences of coverage lie among productivity, wages and employment.

In Chart 5, showing the correlations between the wage and productivity indices, only two industries, (16) fiber and (8) machinery, fall below line AB,



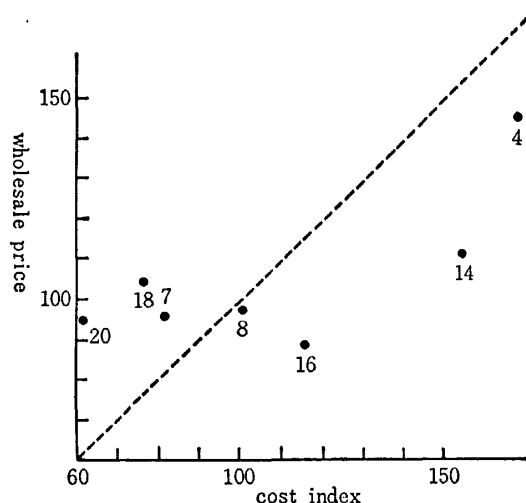


representing a strong pressure toward wage-cost increase, in particular for (18) paper & pulp industry.

Chart 6 reveals the relations between wage cost and price. The price rises here are extremely of small rate, in contrast to the case of Japan. In other words, it seems that in America there exist some factors that can absorb wage-cost rises.

From these observations it is apparent that the wage-cost rises have not been directly reflected in the price rises. Yet the question is how in the two countries the cost and price rises are representing themselves, that is to say, to what an extent the wage-cost rises are being reflected in the comparative prices between the two countries. This question may be answered by the lower part of Table 6. It presents comparative values of cost indices and price indices, both with Japan's figures as the numerator and American figures as the denominator, the figures being for 1966 on 1959-base. Chart 7

Chart 7



describes this Table in graph. The comparative price on the part of Japan has worsened, i.e., the figure has arisen, with respect to (4) wooden goods, (14) food, (16) fiber and (18) paper & pulp. For the former two goods, the price rise is surpassed by the cost rise, a part of which has been offset by decreases in profit, restraining price rises at lower degree. Contrastively for the paper & pulp manufacture the price rise is greater than the cost rise (true the wage-cost has declined). This industry is one to be largely affected by the impact of trade liberalization, and so such a worsened relative position would suggest hardships in the future. In the case of fiber industry the matter is quite different from paper & pulp, since the comparative price has been primarily lower. (8) machine manufacture is an industry with substantial approximation between both movements of cost and price, in which, however, a moderate rise in cost is contrasted to rather declining price.

Conversely, for (7) metal goods industry the cost decrease is large while the drop in price is not so appreciable. This tendency is more clearly seen for (20) chemical industry. These findings would lead to a conclusion that, while changes in wage cost may be a factor to determine fluctuations of comparative prices, the correlation between the two is very faint. Such a relation seems to be derived from the effects of a number of factors as:

- (1) Price changes in other countries featured with competitive character with Japan and America;
- (2) Demand elasticity with respect to price;
- (3) Financial costs to promote mechanization for productivity improvement;
- (4) Fluctuations in the sales-profit ratios of enterprises.

5

Then, what are the factors to determine wages? Since we have many reasons to believe that, in a labor-shortage economy, labor productivity fluctuates with time-lag after wage increase, we should rather consider those factors defining standard of living that governs labor supply as the factor to explain wage changes.

(1) Nominal national income — theoretically, to take up this factor means to adopt relative-income theory;

(2) Consumer prices — to take up this factor leads to the problem of real wages, and theoretically means adoption of absolute-income theory. In case the rate of nominal-wage increase is larger than that of consumer-price rise, however, some factors seem to exist that hinder explanation of the relation between standard of living and wages on the base of absolute-income theory alone;

(3) Unemployment rate — this factor, as a competitive condition on the side of labor supply, works to check the rate of wage increase. If this effect is to be substantial, labor mobility must be large.

In the analysis below, data for Japan comprise total cash payments adapted from the Monthly Labor Statistics of Labor Ministry, consumer-price indices by the Statistical Bureau of Prime Minister's Office and unemployment rates from the Labor Power Survey. Wages cover manufacturing only for convenience of comparison with America. Also productivity indices regard manufacturing inserted in the Monthly Labor Statistics. Data for America were obtained from the Gaikoku Keizai Tōkei Nempō, 1966. Wages are weekly, instead of hourly, wages of manufacturing, partly for convenience of comparison, partly because weekly earnings were thought more appropriate as the indicator of standard of living, not as a part of costs, than hourly wages.

Thus, we get Table 7. First, by the Table the effect of unemployment on wage increase is observed that in America, where the unemployment rate

fluctuates year by year, the correlation coefficient is negligibly low, while in Japan, with the low unemployment rates in recent years, there can be seen the correlation to some extent. This situation of Japan appears to be due to the large effect of figures of 1959 and 1960 when there still remained a good deal of unemployment, and hence the coefficient is supposed to show decline in the future years. In other words, the effect of  $u$  (unemployment) is considered to diminish in the state of labor-shortage economy where merely frictional unemployment exists. However, this is not always usual in the examples of other countries, so a generic conclusion shall be withheld.

The correlation between nominal national income and money wages are fairly high in both countries. The elasticity of  $w$  (wage index) with respect to  $Y$  (nominal national income) is higher in Japan than in America, although such a value of regression coefficient — a correlation between indices and real figures — may be of somewhat minor significance. This may be regarded as a reflection of the process of rising wage level in Japan. However, this result is inversed in the correlation between wages and consumer prices; in both countries the correlation coefficient is appreciably high, yet the elasticity of  $w$  with respect to  $p$  (consumer price) in America is much higher than in Japan. This result leads to a conclusion that, provided economic growth rate is given, the rate of real-wage increase on the presupposition of the absolute-income theory is higher in America than in Japan, while the rate of relative-share rise from the relative-income theory is higher in Japan.

Next, is the increase in labor productivity,  $Q/L$ , adequate in relation to the wage rise? To examine this, correlation between  $w$  and  $Q/L$  was calculated. The data of  $Q/L$  for Japan have been mentioned above. The data for America were obtained by dividing the index of manufacturing production by that of employment based on manpower survey. So the productivity index is somewhat problematic because the manpower survey involves a gap of sampling between 1960 and 1961, hence a lack in continuity in a strict sense. Allowing for this, on the base of these data a fairly high correlation between  $w$  and  $Q/L$  is found for both countries, as is shown in the lower part of Table 9. By the regression equations there, it is seen that the elasticity, the quotient of productivity rise divided by wage rise, is less than 1 in Japan while more than 1 in America. This may be said to tell the fact that, while in America efforts of improving productivity to meet high wages are successfully bearing fruits, in Japan the increase in productivity has not been able to keep pace with the rise in wages. This may be partly due to the relatively short span of time since the supply-demand balance of labor in the Japan's economy has turned, and hence may be taken to express the agony of smaller enterprises that have not yet completed transformation of business patterns to cope with higher wages.

Table 1. Earnings in America and Japan

	America			Japan
	Weekly(A)	Monthly(B)	yen conversion(C)	Monthly
1. Mining	130.24 \$	558.17 \$	167,451yen	46,506yen
2. Manufacturing	111.92	479.66	143,898	40,510
4. Wooden goods ind.	92.62	396.94	119,082	30,424
5. Furniture ind.	91.08	390.34	117,102	32,543
6. Glass & earthen ware ind.	114.24	476.74	143,022	40,702
7. Metal goods ind.	121.69	521.53	156,459	39,704
8. Machinery ind.	134.90	578.14	173,442	44,486
10. Electrical machinery ind.	108.77	466.16	139,848	37,004
11. Transport equipment ind.	141.86	607.97	182,391	48,954
12. Precision instruments ind.	113.40	486.00	145,800	39,817
13. Miscellaneous manufacturing	88.80	380.57	114,171	34,282
14. Food ind.	103.82	444.94	133,482	35,122
15. Tobacco ind.	84.97	364.16	109,248	53,751
16. Fiber ind.	82.12	351.94	105,582	27,639
17. Clothes & belongings ind.	68.80	294.86	88,458	24,274
18. Paper & pulp ind.	119.35	511.50	153,420	42,346
19. Printing & bookmaking ind.	122.61	525.47	157,641	52,544
20. Chemical ind.	125.46	537.69	161,307	49,138
21. Oil & coal products ind.	144.58	619.63	185,889	58,009
22. Leather & hide ind.	74.88	320.91	96,273	35,472
23. Rubber ind.	111.72	478.88	143,664	36,907
24. Transport & communication	135.65	581.36	174,408	52,255
25. Wholesale & retail trade	79.02	338.66	101,598	40,544
26. Finance & realty trade	92.50	396.43	118,929	*56,204
27. Service ind.	61.12	261.84	78,582	—
28. Electric power & gas ind.	136.95	586.93	176,079	65,735

\* finance

(av.1966) (weekly $\times\frac{40}{7}$ ) (1\$=300yen) (1966)

Table 2. America-Japan Wage Ratios by Industries

	1966		1959(Oct.)		1966/ 1959
	Ratio	Rank	Ratio	Rank	
1. Mining	3.601	I	5.657	I	0.637
2. Manufacturing	3.552	II	5.46	II	0.651
4. Wooden goods ind.	3.914	2	8.082	2	0.484
5. Furniture ind.	3.598	12	7.183	6	0.501
6. Glass & earthen ware ind.	3.514	13	6.778	10	0.518
7. Metal goods ind.	3.941	1	7.679	4	0.513
8. Machinery ind.	3.899	3	6.658	11	0.586
10. Electrical machinery ind.	3.779	7	6.813	9	0.555
11. Transport equipment ind.	3.726	8	5.950	17	0.626
12. Precision instruments ind.	3.662	9	7.160	7	0.511
13. Miscellaneous manufacturing	3.330	15	7.991	3	0.417
14. Food ind.	3.801	6	7.020	8	0.559
15. Tobacco ind.	2.032	19	3.927	19	0.517
16. Fiber ind.	3.820	5	6.530	12	0.581
17. Clothe & belongings ind.	3.644	10	7.492	5	0.486
18. Paper & pulp ind.	3.623	11	6.258	16	0.579
19. Printing & bookmaking ind.	3.000	17	6.352	15	0.472
20. Chemical ind.	3.283	14	6.458	14	0.508
21. Oil & coal products ind.	3.204	16	6.566	13	0.488
22. Leather & hide ind.	2.714	18	4.483	18	0.605
23. Rubber ind.	3.893	4	10.010	1	0.389
24. Transport & communication	3.338	III	4.99	IV	0.669
25. Wholesale & retail trade	2.506	V	5.078	III	0.494
26. Finance	2.116	VI	3.58	VI	0.591
28. Electric power & gas ind.	2.679	IV	3.97	V	0.675

Table 3. America-Japan Employment Ratios by Industries

	Employment in Japan 1966	Ratio 1966	Ratio 1959	Change
1. Mining	222(1:000)	2.83	1.75	1.62
2. Manufacturing	6694	2.85	3.59	0.79
4. Wooden goods ind.	177	3.51	5.27	0.67
5. Furniture ind.	96	4.75	6.76	0.70
6. Glass & earthen ware ind.	328	1.96	2.53	0.77
7. Metal goods ind.	379	3.56	4.60	0.77
8. Machinery ind.	635	2.94	3.96	0.74
10. Electrical machinery ind.	790	2.40	2.72	0.88
11. Transport equipment ind.	618	3.08	3.86	0.80
12. Precision instruments ind.	165	2.58	2.67	0.97
13. Miscellaneous manufacturing	239	1.84	3.32	0.55
14. Food ind.	569	3.09	5.20	0.59
15. Tobacco ind.	29	2.83	5.15	0.56
16. Fiber ind.	772	1.23	1.41	0.87
17. Clothe & belongings ind.	167	8.36	1.455	0.57
18. Paper & pulp ind.	223	3.01	3.61	0.81
19. Printing & bookmaking ind.	250	4.10	4.66	0.88
20. Chemical ind.	496	1.92	2.06	0.93
21. Oil & coal products ind.	33	5.54	8.10	0.68
22. Leather & hide ind.	28	1.28	1.96	0.65
23. Rubber ind.	131	3.92	2.22	1.77
25. Wholesale & retail trade	1759	0.75	1.53	0.49

**Table 4. Wage, Productivity and Price Indices in Japan  
and America, by industries**

Japan				
Industries	Wage Index	Productivity Index	Price Index	W / $\frac{Q}{L}$
1. Mining	191.4	244.8	—	—
4. Wooden goods ind.	222.0	124.8	147.1	177.9
5. Furniture ind.	—	—	—	—
6. Glass & earthen ware ind.	203.4	182.9	111.7	111.2
7. Metal goods ind.	218.2	199.1	102.0	109.6
8. Machinery ind.	202.4	162.5	102.2	124.6
10. Electrical machinery ind.	183.6	167.6	89.7	109.6
11. Transport equipment ind.	174.5	295.1	93.2	59.1
12. Precision instruments ind.	207.6	193.7	—	—
13. Miscellaneous manufacturing	252.5	164.4	—	—
14. Food ind.	198.6	97.8	117.9	203.1
15. Tobacco ind.	207.5	157.9	—	—
16. Fiber ind.	217.9	174.5	89.6	124.9
17. Clothe & belongings ind.	"	"	—	—
18. Paper & pulp ind.	183.6	167.2	105.4	109.8
19. Printing & bookmaking ind.	—	—	—	—
20. Chemical ind.	187.1	242.5	92.7	77.2
21. Oil & coal products ind.	194.3	248.0	90.0	78.3
22. Leather & hide ind.	200.7	156.8	116.6	128.0
23. Rubber ind.	244.6	131.8	95.4	185.6

America			
	Productivity Index	Wage Index	Price Index *
4. Wooden goods ind.	106.8	112.9	101.4
5. Furniture ind.	—	120.5	99.1
6. Glass & earthen ware ind.	—	124.1	—
7. Metal goods ind.	91.9	121.8	107.0
8. Machinery ind.	107.5	133.5	105.9
10. Electrical machinery ind.	80.7	120.1	—
11. Transport equipment ind.	102.2	131.2	—
12. Precision instruments ind.	—	120.7	—
13. Miscellaneous manufacturing	—	115.4	—
14. Food ind.	81.5	120.0	105.7
15. Tobacco ind.	—	133.5	—
16. Fiber ind.	122.7	143.0	101.7
17. Clothe & belongings ind. }	"	123.2	(132.0)
18. Paper & pulp ind. }	83.4	123.6	101.6
19. Printing & bookmaking ind. }	"	116.1	(119.1)
20. Chemical ind. }	94.5	119.1	97.8
21. Oil & coal products ind. }	"	119.7	—
22. Leather & hide	—	126.4	109.7
23. Rubber ind.	—	109.5	95.1
1. Mining	91.9	120.9	101.4
25. Wholesale & retail trade	—	103.7	—

\* wholesale price

**Table 5. Employment and Production in America**

America				
	Employment 1966	Employment 1959	1966/ 1959	Productivity Index
4. Wooden goods ind.	6218	6284	98.9	105.6
5. Furniture ind.	4562	3239	140.8	
6. Glass & earthen ware ind.	6413	4677	137.1	
7. Metal goods ind.	13515	8407	160.8	147.7
8. Machinery ind.	18677	11695	159.7	171.6
9. 10. Electrical machinery ind.	18929	8918	212.3	171.4
11. Transport equipment ind.	19058	12039	158.3	161.8
12. Precision instruments ind.	4265	2302	185.3	
13. Miscellaneous manufacturing	4402	4160	105.8	
14. Food ind.	17608	11679	150.8	122.9
15. Tobacco ind.	837	980	85.4	
16. Fiber ind.	9507	8902	106.8	131.0
17. Clothe & belongings ind.	13956	11057	126.2	
18. Paper & pulp ind.	6707	4594	146.0	135.6
19. Printing & bookmaking ind.	10262	5676	180.8	
20. Chemical ind.	9544	5404	176.6	166.9
21. Oil & coal products ind.	1828	1535	119.1	
22. Leather & hide ind.	3572	3359	106.3	
23. Rubber ind.	5134	2130	241.0	
1. Mining	628	478	131.4	120.7
25a. Wholesale trade.	3459	2688	119.5	
25b. Retail trade.	9761	8377		

**Table 6. Cost and Price**

America		
	Cost Index	Price Index
1. Mining	131.6	101.4
4. Wooden goods ind.	105.7	101.4
7. Metal goods ind.	132.5	107.0
8. Machinery ind.	124.2	105.9
14. Food ind.	131.2	105.7
16. Fiber ind.	107.6	101.7
18. Paper & pulp ind.	142.8	101.6
20. Chemical ind.	126.0	97.8

US-Japan Comparison		
	Cost Index	Price Index
4. Wooden goods ind.	168.3	145.0
7. Metal goods ind.	82.7	95.3
8. Machinery ind.	100.3	96.5
14. Food ind.	154.8	111.5
16. Fiber ind.	116.1	88.1
18. Paper & pulp ind.	76.9	103.7
20. Chemical ind.	61.3	94.8

(Note. Japan's values divided by American values.)

Table 7

Japan						
	Wage Index <i>w</i>	$\Delta w/w$	Nominal National Income <i>Y</i>	Consumer Price <i>p</i>	Unemploy- ment rate <i>u</i>	Produc- tivity
1959	92.6	7.4	10,340	96.5	14.66	88.5
1960	100.0	8.0	12,540	100.0	11.08	100.0
1961	111.6	11.6	14,870	105.3	9.64	111.2
1962	122.1	9.4	16,860	112.5	8.67	111.3
1963	134.7	10.3	19,290	121.0	8.60	124.0
1964	149.3	10.8	21,990	125.6	7.86	141.7
1965	162.9	9.1	24,550	135.2	8.15	148.0
1966	182.7	12.1	28,120	142.1	9.00	166.8
		%	billion yen		%	

America						
	Wage Index <i>w</i>	$\Delta w/w$	Nominal National Income <i>Y</i>	Consumer Price <i>p</i>	Unemploy- ment rate <i>u</i>	Produc- tivity
1959	88.3	6.77	40,000	101.5	5.5	98.0
1960	89.7	1.59	41,450	103.1	5.6	100.0
1961	92.3	2.90	42,730	104.2	6.7	103.5
1962	96.6	4.66	45,770	105.4	5.5	108.6
1963	99.6	3.11	48,190	106.7	5.7	113.3
1964	103.0	3.41	51,810	108.1	5.2	118.8
1965	107.5	4.37	56,240	109.9	4.5	124.0
1966	111.9	4.09	61,670	113.1	3.8	128.2

ten million dollars

Table 8

- Factors to determine *w*
- Correlation between  $dw/w$  and *u*
    - Japan  $r=0.467$
    - America  $r=0.248$
  - Correlation between *w* and *Y*
    - Japan  $w=0.5135Y+33.1410$  ( $r=0.998$ )  
*w, Y* (av.)  
 $\eta = \frac{dw}{dY} \cdot \frac{Y}{w} = 0.748$
    - America  $w=0.1129Y+44.000$  ( $r=0.992$ )  
 $\eta = 0.5545$
  - Correlation between *w* and *p*
    - Japan  $w=1.878p+83.726$  ( $r=0.997$ )  
*w, p* (av.)  
 $\alpha = \frac{dw}{dp} \cdot \frac{p}{w} = 1.665$
    - America  $w=2.250p-140.50$  ( $r=0.963$ )  
 $\alpha = 2.4376$

Table 9

gear	Production Index <i>Q</i>	Employment <i>L</i>	Productivity Index <i>Q/L</i>
1959	106.0	16,675	98.0
1960	108.9	16,796	100.0
1961	109.6	16,326	103.5
1962	118.7	16,853	108.6
1963	124.9	16,995	113.3
1964	133.1	17,274	118.8
1965	145.0	18,032	124.0
1966	158.7	19,084	128.2

(manufacturing) (thousand)

- Correlation between *w* and *Q/L*
- Japan  $Q/L=0.834w+13.912$  ( $r=0.993$ )  
 $\beta = \frac{dQ/L}{dw} \cdot \frac{w}{Q/L} = 0.888$
  - America  $Q/L=1.274w-13.075$  ( $r=0.997$ )  
 $\beta = 1.125$