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"ILLOGICALITY" IN JAPANESE SMALL BUSINESS

——A Comparative Survey of Earnings of Small Manufacturing Plants in Japan, Britain and the United States——

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I

Any study of the problem of small business in Japan must reckon with some fundamental factors which would seem unique to Japan seen from Western eyes. First, in Japan, the problem is that of "medium-small" business instead of "small" business. In other words, it is generally thought that in her industrial structure there exists a big group or stratum which might be termed "medium-small" business.

In Western countries, large, medium or small are different categories of size of business. However, in Japanese eyes, small and medium enterprises form an inseparable group vis-à-vis large enterprise. Literally speaking, the expression may be ambiguous or unscientific, but on the other hand, it is also undeniable that there exists one group, however heterogeneous in composition, which has peculiar characteristics as compared with ordinary or "large" capitalist enterprises. Moreover, though not so popular as in Japan, we find a few cases where similar expressions are in use, for example, "petites et moyennes entreprises" in France or Belgium. The expression in Japan means, therefore, that her "small" business is composed of heterogeneous elements. Nevertheless, these elements form one group in contrast to other sectors of her industry and they have some common features other than their common size.

Second, the classical and original type of small industry was those small

producers under the old handicraft or putting-out system. They were first called small industry when they confronted the competition raised by the newly born capitalist factory system. This experience of fatal struggle was more or less general during the industrial revolutions in Western countries. However, this transition period in Japan was fairly short and unique, not being accompanied by the same small industry problem as in Europe. As a whole, Japan's traditional small industries existed side by side with large mills imported from the West during the period. Rather, in her case, this co-existence served to achieve the transformation to a capitalist production system, a transformation which was at first full of obstacles to be overcome.[1]

Third, the internationally recognized tendency is that size of plants in manufacturing became larger in various countries during the inter-War period. According to statistics compiled by the International Labor Organization,[2] Japan followed this general tendency. The ratio of the number of workers employed in establishments with 1000 or more employees to the total number of workers in establishments employing 10 or more workers was over 22% for Japan (1951). This rate of concentration was lower only than that in the United States (1947) and the United Kingdom (1949) in the I.L.O. report. Yet, although Japan has followed the general trend toward larger units, there has been a concurrent tendency which is somewhat unique. According to the I.L.O. report, though it remarks that statistics in small establishments are valueless for international comparison on account of differences in coverage, the number of employees in small establishments employing less than 10 persons in Japan has grown in proportion to the total number of employees in manufacturing a trend opposed to that of small plants in most other countries during this period. Though these comparisons are taken from statistics complied by different methods in the various countries, they may suffice to make it clear that in Japan there exists a peculiar two-way concentration toward both larger and smaller industrial units. I have given this two-way concentration, which has persisted in Japan for some forty years, the name "concentration toward two poles or extremes". One of my colleagues called it a "double-hemped camel" type of concentration.

Fourth, we must note the fact that the role of smaller plants in Japan is very large compared with other industrialized countries. As seen above, they not only survive but also increase. Examination of the annual Japanese census of manufactures since 1950 emphasizes this point. This census, organised along lines of similar statistics published in the United States, is not free from defects, but does enable fairly correct statistical comparisons such as that presented in Table 1 (data for the Unitde Kingdom also added). Because small business units naturally dominate the distributive or service trades in every country, data

[1] As to the problem at that time, see my article, "Japanese Small Industries during the Industrial Revolution", *The Annals of the Hitotsubashi Academy* (Hitotsubashi University, Tokyo, Japan), Vol. 2, No. 1 (Oct. 1951).

[2] "The Size of Industrial Establishments", *International Labour Review* (I. L. O. Geneva), Vol. LXXIII, No. 6 (June 1956).

for this sector is omitted here.

Even in manufacturing, plants with less than 50 employees are numerous in all three countries. They comprise more than 80% of the total number in the United States as well as in the United Kingdom; while in the case of Japan, they constitute nearly 97% of the total. However, employment figures clearly show

Table 1. *Number of Plants and Employment in Manufacturing by Size of Plant*

Size of Plant (employees)	Number of Plants (%)			Number of Employees (%)		
	Japan	United Kingdom	U.S.A.	Japan	United Kingdom	U.S.A.
1～ 9(1～10)	77.8	77.1*	48.6	19.9	9.6*	3.3
10～ 49(11～49)	19.1	13.0*	33.5	29.0	10.8*	12.6
50～ 99	1.7	4.3	7.7	9.3	9.6	9.1
100～499	1.2	4.6	8.3	18.4	31.0	29.1
500～999	0.1	0.6	1.1	7.1	12.4	13.2
1000～	0.1	0.4	0.8	16.3	26.6	32.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

Japan: Census of Manufactures, 1953; United Kingdom: Census of Production, 1949; U.S.A.: Census of Manufacture, 1947. Figures with * are for sizes in parentheses.

that small plants are far more important in Japan than in other countries. In Japan, nearly half of all workers in manufacturing are employed in plants with less than 50 persons, while only about 16% in the United States and 20% in United Kingdom are found in this category.

Table 2. *Employment in Manufacturing by Size of Plant* (1950=100)

Size of Plant (employees)	1950	1951	1952	1953	1954	1955
4～ 49	100.0	109.5	113.3	120.5	127.6	133.4
50～199	100.0	109.7	113.8	127.7	126.1	139.4
200～	100.0	110.1	108.4	117.4	115.7	117.9
Total	100.0	109.8	111.5	120.7	122.8	128.6

Census of Manufactures.

Moreover, as seen in Table 2, the importance of small plants in Japan has increased during the period since 1950. Except for 1951, growth in employment was absorbed chiefly by plants employing less than 200 persons. While the rate of growth of employment in plants with more than 200 persons was, in general, less than the average, that of plants with less than 50 employees was higher than the average. Furthermore, estimates of growth in the labor force made by the government statistics office show that the largest increase was in retail trade, which is composed chiefly of small business. Thus, not only in distributive trades,

but also in manufacturing, employment in small establishments is growing in present day Japan. According to studies by the Japanese Fair Trade Commission, concentration of productive power in the hands of a few large firms is also an established fact in many branches of trade and industry. Still, small estabishments continues to grow increasingly important in Japan.

The foregoing discussion seems to indicate that the Japanese industrial structure is a favourable milieu for small business. Yet, such an interpretation is rather superficial, because the existence, as well as the growth, of small business in Japan rests on certain conditions which economically seem unsound. This is the chief theme of this article.

II

Generally speaking, as the above I.L.O. report states, recent economic development points to the decline of small plants as a result of the trend toward large scale establishments.

Of course, even with this general trend, small businesses will not be extirpated. There will always be economic conditions which make possible the existence of small businesses. When demand is local, irregular, limited or special, small business units are of optimum size. Firms are also small when supply depends on labor, skills or raw materials which can be obtained only locally, irregularly or under limited conditions. Thus, basic materials such as iron and steel, chemical goods and textile yarns are produced by large mills, while goods produced at later stages of manufacturing, such as garments, furniture and confectionery, are often left in the hands of small producers.

In the process of modern economic development, even production which had long been accomplished on a small scale, such as shoe making and tailoring, has been transferred to large scale industry in many cases. However, as seen in many countries, this process does not sweep away all small firms. Various explanations focusing on the opitimum size of business have been offered by Western economists, from Marshall to Steindl, for this phenomenon.

Of course, the development of industrialization has given birth to new conditions for small business concerns. For example, as a result of industrialization, a new source of power—small electric moters—has become available to small plants. Formerly, steam power was not available to small firms. Also standardization of parts has opened a wide area of specialization in the production of such products as automobiles and sewing machines. This, in turn, has provided a new means of existence for small plants. Moreover, the development of new techniques for making machinery has reduced the price of many machines, made them smaller and put them within the reach of small producers. This machinery, together with the new source of power, has made the position of the small plants of today far different from that of those in the early days of the Industrial Revolution.

Also, the case of so-called localized industry given by Marshall should be added. It has been proved in many countries that, as a result of external economies, various small plants clustered in a particular locality can operate profitably in the manner of a single large plant.

There are further causes which make it possible for small plants to exist. It is often said that government policy acts as a bulwark for small scale, traditional and local industry, as in the case of the German spirit distilleries except the beer industry. Also, an unorganized local labor supply in a locality removed from a large industrial center might provide an opportunity for small businesses to exist. Such requisites for existence are rather irrational or uneconomic compared with those mentioned above. They operate only to provide small business with a limited sphere of activity.

The foregoing discussion might provide some explanation for the continued survival of small business. However is it sufficient to explain the status of small business in Japan, or the fact that small business in Japan has not only survived but has continued to grow at a faster rate than in Westerm countries? In the present article, a statistical approach is made to such questions, utilizing figures of per capita value added of plants from the Census of Manufacture. This source contains per capita value added figures for Japan since 1950. The figures cover more then 400 manufacturing industries, each classified by size of plant. Though not complete satisfactory for our purpose, especially because the figure of business is not available, these figures shed some light on the situation of small industry in Japan.[3]

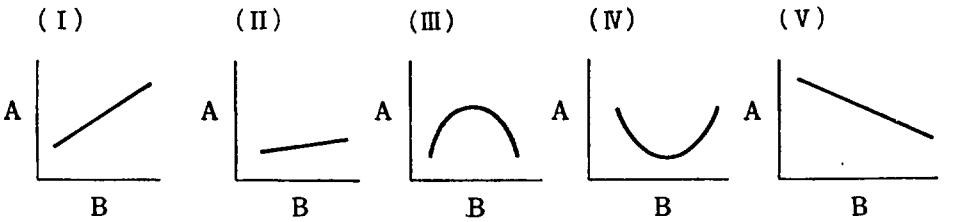
III

Each industry or trade ordinarily has its own size structure in a given national economy at a given time. As it may be supposed that a certain technical organiza-

[3] Value added is derived by subtracting from the total value of shipment the total cost of materials used (including that of pieces put out or contract work) and fuel or electric energy consumed. Per capita value added is the total annual value added by a plant divided by the number of employees in the plant. Per capita value added has many defects as a "quasi-criterion" of optimum size. 1) It dose not correctly reflect the rate of profit. 2) The figures are for plants or establishments, so nothing is known about the enterprise inself. 3) The figures used in this analysis are for one year only. 4) The costs subtracted from the value of the shipment include only the cost of materials and fuel or energy, so the so-called value added figure includes such costs as overhead charge, selling costs, and head office managing costs, as well as cost of redemption. 5) In this article, in order to obtain per capita value added, annual total value added was divided by the number of employees on fixed date. Hours worked and the like were not considered. 6) Size of plant, classified by number of employees, does not necessarily coincide with size of plant classified by capital invested. 7) Though it is better to have data covering all sizes of plants, plants with less than 10 employees are omitted in the tables. This is because data concerning business activities are less reliable for these small plants and also because family workers, who receive no fixed compensation but weigh heavily at least in these small plants, are included in the census of manufacture of Japan while they are excluded from that of U.S.A.

Despite deficiencies in methods and data, these value added figures throw a new light upon the problem of Japanese small business. They are comparable to those of the United Kingdom and, especially, those of the United States, because Japanese census methods are similar to those used in the United States.

tion will prevail in an industry notwithstanding differences in size of plants, per capita value added by size of plant will disclose the character of the industry. Industries may be classified to several types according to the relation of size of plant to per capita added value. In the first case, the larger the plant, the higher the per capita value added; in the second, this correlation is much lower; in the third, medium size plants have the highest per capita productivity, with smaller and larger plants both being lower; in the fourth, medium size plants show the lowest productivity, both smaller and larger plants being higher; and in the fifth, the smaller the plant the higher the per capita productivity. The curves for these five cases are shown below. Of course, there can occur such irregular relations between size of plant and productivity that it is impossible to draw any curve.



A=productivity; B=size

To examine the relationship between size of plant and per capita value added in Japan, Table 3 was compiled from data given in the 1952 Japanese Census of Manufactures (Plants with less than 4 employees are excluded because the figure of value added is not published). In contrast to the five cases given above the census data was classified into three categories. Category A corresponds to case five; B includes cases three and four, above, and industries in which value added is uniform regardless of the size of plant; and C combines cases one and two above. Although the Census covers 425 industries, the following industries are not included in Table 3: 73 industries whose nature is so complex as to virtually preclude treatment as individual industries, e.g. those described as "not elsewhere classified" or "miscellaneous"; 17 industries having only a single size unit; and 15 industries in which trends are so irregular that they cannot be classified in any of the three categories.

Of the remaining 320 industries, 34 (group 1) are composed of various sizes of plants employing from 4 to 29 workers (including 5 of plants employing from 4 to 19 workers, and of plants employing from 10 to 29); 37 (group 2) are composed of plants employing from 4 to 49 workers (including 1 of plants employing from 10 to 49); 60 (group 3) of plants employing from 4 to 99 workers (including 4 of plants employing 10 to 99); 60 (group 4) of plants employing from 4 to 199 workers (including 2 of plants employing from 10 to 199, and 1 of plants employing from 30 to 199); 77 (group 5) of plants employing from 4 to 499 workers (including 5 of plants employing from 10 to 499 and 1 of plants employing from 20 to 499); 24 (group 6) of plants employing from 4 to 999 workers (including 2 of plants

Table 3 *Industries Classified by Relationship between Per Capita Value Added and Size of Plants*

Industry Group by Size of Plants (number of employees)	Number				Percentage			
	Categories of Industries Classified by Trends of Per Capita Value Added							
	Total	A	B	C	Total	A	B	C
1. including sizes of plants employing 4—29 workers	34	5	11	18	100.0	14.7	32.3	52.9
2. including sizes of plants employing 4—49 workers	37	7	3	27	100.0	18.9	8.1	73.0
3. including sizes of plants employing 4—99 workers	60	3	14	43	100.0	5.0	23.3	71.6
4. including sizes of plants employing 4—199 workers	60	0	8	52	100.0	0	13.3	86.6
5. including sizes of plants employing 4—499 workers	77	3	14	60	100.0	3.9	18.2	78.0
6. including sizes of plants employing 4—999 workers	24	0	3	21	100.0	0	12.5	87.5
7. including sizes of plants with employees from 4 to more than 1000	20	0	1	19	100.0	0	5.0	95.0
8. including sizes of plants employing at least 100 worerks	8	5	0	3	100.0	62.5	0	37.5
Total	320	23	54	243	100.0	7.1	16.8	75.9

Based on data contained in the Japanese Census of Manufactures (1952). Industries in which per capita value added decreases, in general, as size of plants increases comprise category A. Industries in which the reverse is true comprise category C. Category B is formed by industries not included in categories A or C.

employing from 10 to 999, and 3 of plants employing from 20 to 999); 20 (group 7) of plants employing from 4 to more than 1000 workers (including 2 of plants employing from either 10 or 20 to more than 1000); 8 (group 8) of larger plants only (including 2 of plants with at last 100 employees, 3 with at least 200, and 3 with at least 500).

Of these 320 industries, 243 (more than 75%) belong to category C, while industries which belong to category A number only 23 (7%). Thus, for nearly three fourths of Japanese industry, increasing returns to scale is the rule. Besides, those industries in which the reverse is true are not only few but also have a special characteristic. Of the 23 industries in category A, 12 are in groups 1 and 2, while 5 are in the 8 industries of group 8. In other words, 17 of the 23 industries with decreasing returns to scale are included among industries composed of either only small or only bigger plants. Thus, Table 3 indicates that, in Japan, small plants coexist with large plants throughout industry, even though they earn a poorer return.

Of course, we should not exaggerate the import of Table 3. It shows only the number of industries, the relative weights of the various industries in terms of employment, total production or aggregate value added not being considered.

Further, categories A, B and C represent only roughly the relationship of per capita value added to size. The degree of irregularity or slope and the height of the trend curves are also omitted from consideration.

Nevertheless, it seems underiable that this analysis, however incomplete, indicates that small plants in Japan have a status different from their counterparts in Britain.[4] In Western experience, small size does not necessarily signify lower productivity. In Japan, in three cases out of four, smallness seems to mean lower earnings than for competitors of larger size, even though the number of small plants is overwhelming.

If the highest per capita value added is a proper criterion for determing "quasi-optimum" size of plants, the plant size which has the most employees in an industry

Table 4. *Industries Classified by Size of Plant with the Highest Per Capita Value Added in the Industry.*

Industrial Group	Japan (1952)							U.S.A. (1949)						
	10 ~ 19	20 ~ 49	50 ~ 99	100 ~ 199	200 ~ 499	500 ~	Total	10 ~ 19	20 ~ 49	50 ~ 99	100 ~ 249	250 ~ 499	500 ~	Total
Food	7	10	9	6	4	1	37	6	5	6	11	7	7	42
Textiles	5	6	7	11	1	8	38	6	5	5	3	4	11	34
Apparel	1	4	1	—	3	—	9	14	6	7	9	3	3	42
Lumber & wood products	8	8	5	—	1	—	22	2	1	4	6	1	2	16
Furniture	2	4	2	1	—	—	9	1	2	1	3	6	3	16
Paper	—	2	3	2	1	2	10	2	—	5	3	1	—	11
Printing	3	2	—	3	—	2	10	3	1	3	3	2	4	16
Chemicals	6	6	5	8	6	5	36	7	13	1	8	7	5	41
Petroleum & coal products	3	4	1	—	2	—	10	1	1	4	1	1	—	8
Rubber	2	3	1	2	1	1	10	—	—	—	—	2	2	4
Leather	2	5	2	1	—	—	10	2	3	2	1	3	1	12
Stone, clay & glass products	4	10	7	5	5	3	34	2	5	7	6	5	5	30
Primary metals	2	2	4	6	6	5	25	—	4	4	4	5	3	20
Metal goods	—	16	2	9	7	—	34	6	—	6	7	8	4	31
Machinery	2	3	3	10	12	4	34	2	4	5	8	10	10	39
Electrical machinery	2	—	6	4	8	4	24	—	1	2	4	6	8	21
Transportation equipment	—	1	1	1	3	5	11	1	2	2	3	2	4	14
Professional instruments	—	4	4	—	3	2	13	—	1	3	2	—	4	10
Miscellaneous	13	10	7	7	4	—	41	5	7	6	9	7	7	41
Total	62	100	70	76	67	42	417	60	61	73	91	80	83	448

Based upon data contained in the Census of Manufactures of Japan (1952) and Census of Manufacture of the United States (1947). 8 industries in Japan are omitted because of incomplete statistics. For both countries, plants with less than 10 employees are omitted for the same reason.

[4] For example see Colin Clark, *The Conditions of Economic Progress*, London, 1940; L. Rostas, *Productivity, Prices and Distribution in Selected British Industries*, Cambridge, 1948.

may be optimun for that industry. Based on this assumption, I will refer to an international comparison between Japan and the United States.[5]

Table 4 shows that, of a total of 417 industries in Japan, 62 have their highest per capita value added in plants with 10–19 employees, 100 in plants with 20–49 employees, 70 in plants with 50-99 employees, 76 in plants with 100–199 employees, 67 in plants with 200–499 employees, and 42 in plants with 500 or more employees. Of 448 industries in the United States, 60 have maximum per capita value added in plants with 10–19 employees, 61 in plants with 20–49 employees, 73 in plants with 50–99 employees, 91 in plants with 100–249 employees, 80 in plants with 250–499 employees, and 83 in plants with 500 or more employees. Of course, this distribution is different for the various groups of industries in the two countries. For example, in Japan, 7 of the 37 industries belonging to the food group attain their highest per capita value added in plants with 10–19 em-

Table 5. *Industries Classified by Prevailing Size of Plants*

Industrial Group	Japan (1952)							U.S.A. (1947)						
	10 ~ 19	20 ~ 49	50 ~ 99	100 ~ 199	200 ~ 499	500 ~	Total	10 ~ 19	20 ~ 49	50 ~ 99	100 ~ 249	250 ~ 499	500 ~	Total
Food	17	11	2	5	2	—	37	1	5	15	11	3	7	42
Textiles	11	9	8	3	2	5	38	—	—	5	8	14	7	34
Apparel	4	4	1	—	—	—	9	3	13	15	10	1	—	42
Lumber & wood products	17	5	—	—	—	—	22	—	2	7	6	1	—	16
Furniture	4	5	—	—	—	—	9	—	2	4	6	3	1	16
Paper	1	6	1	—	2	—	10	—	—	2	4	5	—	11
Printing	5	3	—	1	—	1	10	—	3	4	4	5	0	16
Chemicals	7	6	5	8	3	7	36	—	7	11	9	5	9	41
Petroleum & coal products	2	5	1	—	2	—	10	—	1	4	1	1	1	8
Rubber	2	3	1	2	2	—	10	—	—	—	—	—	4	4
Leather	6	3	1	—	—	—	10	—	2	5	3	2	—	12
Stone, clay & glass products	9	16	2	3	2	2	34	2	4	5	4	6	9	30
Primary metals	3	4	—	3	7	5	25	—	—	3	2	7	11	20
Metal goods	12	14	7	1	—	—	34	—	2	6	7	9	7	31
Machinery	1	14	11	2	5	1	34	—	—	1	6	9	23	39
Electrical machinery	—	5	5	4	7	3	24	—	—	—	2	4	15	21
Transportation equipment	1	2	2	—	3	3	11	—	—	1	3	1	9	14
Professional instruments	1	4	6	1	1	—	13	—	—	—	1	2	7	10
Miscellaneous	9	18	3	2	—	—	41	—	7	9	14	6	5	41
Total	121	137	59	35	38	27	417	6	48	94	101	84	115	448

See notes for Table 4.

[5] Tables 1, 4~9 were prepared with the collaboration of Mr. Kikutaro Takizawa, Lecturer of the Economics Faculty, Nagoya University. This is part of the research assigned to him as a member of a study commission on small business problems which is composed, mainly of university professors and of which I am the chairman since 1948.

ployees, while in the United States the figure is 6 out of 42 industries. In the machinery group, only 2 of the 34 Japanese machine industries yield their highest per capita value added in plants with 10–19 employees, while in the United States 2 out of 39 do so when plants are of this size.

Table 5, classifies the same industries from the standpoint of the prevailing size of plant in each. The number of employees in plants of the same size rather than the number of plants is used in determining the relative importance of various plant sizes in the industry.

A simple method was used for purposes of classification for Table 5. That is, the point of 50% in the distribution of the total number of employees in an industry was used to determine prevailing size in the industry. Employees in the industry were grouped according to the size of plants in which they worked. Then, the number of employees in each size group were added, from smallest to largest, until the group was reached where the number of workers therein, added to the number of all workers in smaller plant size groups in the same industry, constituted more than half of the total number of workers in the industry. The industry was then classified in the plant size category where the midpoint was reached. That size group was said to "prevail" for that industry.

When this classification is applied to 417 Japanese industries, the prevailing size of plant for 121 industries is the plant with 10–19 employees, for 137 industries, it is the plant with 20–49 employees, for 59 the plant with 50–99 employees; for 38, the plant with 200–499 employees and for 27, the plant with 500 or more employees. For industries in the United States, the distribution is different. Industries in which the determining 50% point occurs at larger plant sizes are far more numerous than those in which it occurs at small sizes.

To what degree does prevailing size, as shown in Table 5, coincide with the size of plant having the highest per capita value added, as seen in Table 4? Table 6 is a simplification of the combined results of the two previous tables. The six size groups in these tables are reduced to four groups ranging from plants with 10–19 employees to plants with 200 or more (for the United States, 250 or more) employees. Type I is composed of industries in which plants that have over 200 (250 for the United States) employees prevail. This type shows concentration in large size plants. Type II comprises industries in which the prevailing size of plant is one employing 50–199 wokers (50–249 for the United States). Industries in which the prevailing size of plant is one with less than 50 employees make up type III. This type shows concentration in small size plants. Type IV contains only those industries with plants of less than 50 employees. Table 6 shows the distribution of the 417 Japanese and 448 American industries when classified by prevailing size of plant into the four types given above, and when they are further classified by the size of plant which has the highest per capita value added. Out of 65 Japanese industries in type 1, 51 find their highest per capita value added in plants with 200 or more employees. Thus, in nearly 80% of those Japanese industries in which plants employing more than 200 men prevail,

Table 6. *Industries Classified by Prevailing Size of Plant and Size of Plant Having the Highest Per Capita Value Added*

Type of Industry (prevailing size as determined by employee distribution)		Maximum of per-man added value				
		Size of Plant (number of employees)	Industries			
			Number		Percentage	
			Japan	U.S.A.	Japan	U.S.A.
I	Concentration in large size plants (Japan: 200 or more workers; U.S.A.: 250 or more workers)	10~19	2	14	3	7
		20~49	1	23	2	12
		50~99	3	24	5	12
		100~199	8		12	
		(100~249)		28		14
		200~	51		78	
		(250~)		110		55
		total	65	199	100	100
II	Concentration in medium size plants (Japan: 50–199 workers; U.S.A.: 50–249 workers)	10~19	2	28	2	14
		20~49	7	21	8	11
		50~99	21	40	22	21
		100~199	26		28	
		(100~249)		53		27
		200~	38		40	
		(250~)		53		27
		total	94	195	100	100
III	Concentration in Small size plants (less than 50 workers)	10~19	8	15	5	32
		20~49	34	13	23	28
		50~99	45	11	30	23
		100~199	43		29	
		(100~249)		8		17
		200~	20		13	
		(250~)		—		—
		total	150	47	100	100
IV	Small size plants only (less than 50 workers)	10~19	50	3	46	43
		20~49	58	4	54	57
		total	108	7	100	100
Total			417	448		

See notes for Table 4.

large size plants are the most productive, judged in terms of per capita value added. The same tendency is seen in the United States, though to a lesser degree (namely, 110 out of 199 industries, or 55%).

Nearly half the industries in type II are industries in which medium size plants give the best per capita value added results. The results are fairly parallel in the two countries. However, for this type, not too much stress should placed on the coincidence between prevailing size and most productive size, because

the method used to determine prevailing size for an industry was designed chiefly to show concentration in large and small size plants.

Type III industries, where there is a tendency towards small size plants, number 150 in Japan—more than three times the figure for the United States. Of these Japanese industries, in which the prevailing plant size is less than 50 employees, barely 40 (28%) are at the same time industries in which per capita value added is highest with this plant size. For the United States, the corresponding figures are 28 out of 47 industries (nearly 60%).

As to type IV, it is sufficuient to note that industries in this group are far more numerous in Japan than in the United States.

The following conclusions can be drawn from the above analysis. In both Japan and the United States, more than half the industries in which large size plants prevail are also industries in which this size yields the highest per capita value added. In the medium size industries too, many instances are found where medium size appears to be the optimum, although the percentage is somewhat lower than for the industries with large plant size predominant. For Japanese industries in type III, composed chiefly of small size plants, the correlation of prevailing size with optimum productive size is significantly lower than for either of the previous types; but this observation does not hold true for American industries.

As a whole industries in the United States show a tendency toward plant sizes larger than the optimum. In Japan the opposite trend is discernible, there being many more examples than in the United States of industries whose prevailing size of plant is smaller than the size of plant which yields the highest value added per employee. In other words, the large number of small plants in Japan seems to contravene the logic of optimum size.

IV

For a more accurate realization of the significance of plant size, it is desirable to examine further the differences in average per capita added value among various sizes of plants. Table 7 presents an index of average per capita value added for 7 groups of plant size. The figures are averaged for whole industries, and calculated on the basis of 100 for plants with 1000 or more employees.

According to Table 7, the index number for average per capita value added decreases as plant size decreases in the United Kingdom. However, in Japan and the United Sates, the highest average per capita value added is found in plants with 500～999 employees, the index number decreasing regularly as plant size decreases, as in British industry. Thus, the pattern of value added for various plant sizes in Japan does not seem at all unique. Nevertheless, closer examination reveals a remarkable difference between Japan and the other two countries. The difference in value added between the smallest and largest plant size is about 10 points for the United States as well as for the United Kingdom. For Japan,

Table 7. *Average Per Capita Value Added by Size of Plants in Manufacturing in Japan (1952), United Kingdom (1949) and U.S.A. (1947)*

(Plants with 1000 or more employees=100)

Size of Plant (number of employees)	Value Added		
	Japan	United Kingdom	U.S.A.
10～19 (11～24)	36.3	90.0*	89.0
20～49 (25～49)	45.4	92.2*	93.3
50～99	58.5	93.8	97.2
100～199 (100～249)	70.8	95.6	101.5*
200～499 (250～499)	94.1	96.7	103.9*
500～999	103.7	98.1	104.9
1000～	100.0	100.0	100.0

Numbers with asterisks are for sizes in parentheses. Based on data from census of manufactures or of production.

however, the gap exceeds 60 points—six times as much as for the other two countries.

Of course, per capita value added depends to a large extent upon the technical or capital structure of an industry. If Japanese industry differes greatly from industry in other countries in this respect, average per capita value added can be expected to differ also. Table 8 shows average per capita value added for various groups of industry in Japan, the United Kingdom, and the United States. Though the British classification is somewhat different from those for the other two countries, the industry groups for each country are arranged in the order of their average per capita value added, the group with the highest average being given the index number 100.

With allowance for a few inevitable irregularities, there is a common pattern for the three countries. In each country, the chemicals and paper groups have a high index number; the machine and stone-glass groups fall into an intermediate category; and the textiles, clothing and wood products groups are included in a lower category. The primary metals group, which in Japan and Britain has a high index number, falls into the intermediate category in the United States; but the food group, which has a high index number in Britain and the Unitd States, drops into the intermediate category in Japan. The index numbers for the leather group vary remarkably among the three countries.

Although the ranking of the various industry groups is somewhat similar in the three countries, the magnitude of difference between highest and lowest average value added per employee varies considerably. The margin of difference between index numbers of the highest and the lowest industrial groups is 48 points for Britain, 59 points for the United States, and 79 points for Japan.

It is not likely that the technical organization of production in each industry

Table 8. *Indices of Average per Capita Value Added in Various Groups of Industry*

Japan (1952)		U.S.A. (1947)		United Kingdom (1949)	
Petroleum & coal products	100	Petroleum & coal products	100	Chemicals	100
Paper	64	Chemicals	89	Food	98
Chemicals	61	Paper	67	Primary Metals	87
Primary metals	50	Food	66	Leather	86
Printing & Publishing	49	Printing & Publishing	57	Paper & Printing	81
Electrical machinery	49	Machinery	54	Miscellaneous (including rubber)	73
Rubber	46	Metal goods	54		
Transportation equipment	43	Transportation equipments	53	Glass, cement, etc.	73
Food	41	Primary metals	53		
Stone, clay & glass products	40	Rubber	53	Precision instrument, etc.	72
Machinery	37	Stone, clay & glass products	53		
Leather	33	Electrical machinery	52	Machinery	72
Metal goods	32	Professional instruments	49	Vehicles	69
Professional instruments	31	Miscellaneous	47		
Textiles	28	Textiles	45	Textiles	69
Miscellaneous	24	Furniture	45		
Lumber & wood products	22	Apparel etc.	43	Lumber & furniture	63
Apparel etc.	21	Leather	42	Clothing	52
Furniture	21	Lumber & wood products	41		

Based on Census of manufacture or production.
Index number of industrial group with the highest per capita value added in each country=100.

in Japan is so different from that in the other two countries. Therefore, the index number for such groups as textiles and apparel in Japan is very low compared with that for those groups in the other two countries. This lowness is intensified when we compare value added in terms of international prices. However, it should be noted that it is natural for average per capita value added to differ by industry in all countries.

To briefly summarize, the margin between highest and lowest per capita value added in Japan seems to depend more upon size of plant than upon difference among various industry groups. Although the margin between industry groups in Japan appears large, it is less than twice as large as that in the United Kingdom or the United States. However, according to Table 7, the margin between large and small size plants in Japan is nearly six times larger than that in the other two countries.

The investigation can be furthered by examining a few selected industries in which various plant sizes co-exist and the sphere of production seems fairly similar in Japan and the United States. The industries chosen for this purpose

are (1) broad woven cotton and spun rayon fabric, (2) broad woven woolen and worsted fabric, (3) gray-iron foundries, (4) textile machiery, (5) sewing machines, (6) ball and roller bearings, (7) electric lamps and (8) bicycles. The average per capita value added for various plant sizes in each industry is shown in the form of an index number in Table 9. The index number of 100 is that for the largest plant size for that industry in Japan. Of course, this may not be the largest plant size for that industry in the United States.

Though only a few industries are examined, the results indicated in Table 8 seem to sustain those in Table 7. In the United States, it is not the rule that the smaller the size of plant, the smaller the per capita value added. Also, the margin between highest and lowest per capita value added does not exceed 50 points, except in the sewing machine and electric lamp industries. However, in Japan a trend curve is followed fairly commonly by the index numbers in each industry. In general, the larger the size of plant, the greater the value added, some deviations being perceptible only in the ball and roller bearing industry and gray-iron foundries.

V

It seems clear that the foregoing data[6] is sufficient to raise at least two basic questions concerning small plants in Japan. First, why is per capita value added in small plants so low relative to that in large plants? Second, why do small plants exist in such large numbers and continue to increase when they are subject to such disadvantages? Adequate answers to these two questions would require treating the entire problem of small business in Japan[7].

[6] As shown in the following table the structure of Japanese industry does not appear to have changed greatly since 1952, data of which year were used in this article.

Per Capita Value Added by Size of Plants in Industry for Japan, 1951~1955

(Index Number)

Plant Size (number of employees)	1951	1952	1953	1954	1955
10~ 19	32	37	32	34	33
20~ 49	40	45	39	42	40
50~ 99	52	59	50	54	51
100~199	63	71	63	68	63
200~499	78	94	80	86	79
500~999	104	104	101	93	96
1000~	100	100	100	100	100

Calculated from the Census of Manufactures. Index number for plants with 1000 or more employees=100

[7] For a brief survey, see my article, "The Nature of Small Industries; A Survey of the Economic Interpretation in Japan", *The Annals of the Hitotsubashi Academy*, Vol. 4, No. 1 (Oct. 1953).

Table 9. *Average Per Capita Value Added in Selected Industries*

(Index Number)

Plant Size (employees)	Value Added		Plant Size (employees)	Value Added	
	Japan	U.S.A.		Japan	U.S.A.
Broad woven cotton & spun rayon fabric			Broad woven woolen & worsted fabric		
10～ 19	22	83	10～ 19	48	96
20～ 29	26	100	20～ 29	47	90
30～ 49	31		30～ 49	65	
50～ 99	29	98	50～ 99	71	80
100～199	31	93	100～199	63	84
200～499	47	93	200～499	64	92
500～999	58	89	500～999	85	96
1000～	(100)	(100)	1000～	(100)	(100)
Gray-iron foundries			Textile machinery		
10～ 19	59	79	10～ 19	34	117
20～ 29	71	86	20～ 29	38	119
30～ 49	77		30～ 49	44	
50～ 99	83	100	50～ 99	48	133
100～199	111	105	100～199	49	124
200～499	110	109	200～499	61	145
500～999	(100)	(100)	500～999	85	124
1000～	—	88	1000～	(100)	(100)
Sewing machines			Ball & roller bearing		
10～ 19	33	167	10～ 19	39	96
20～ 29	32	230	20～ 29	43	92
30～ 49	36		30～ 49	46	
50～ 99	43	112	50～ 99	68	100
100～199	48	120	100～199	50	94
200～499	53	*x*	200～499	150	96
500～999	(100)	(100)	500～999	*x*	94
1000～	*x*	*x*	1000～	(100)	(100)
Electric lamps			Bycycles		
10～ 19	31	58	10～ 19	59	74
20～ 29	34	44	20～ 29	69	91
30～ 49	24		30～ 49	66	
50～ 99	41	54	50～ 99	72	91
100～199	48	*x*	100～199	80	116
200～499	(100)	(100)	200～499	(100)	(100)
500～999	*x*	81	500～999	*x*	111
1000～	*x*	*x*	1000～	—	107

Calculated from census of manufacture of Japan (1952) and the United States (1947). Figures of the sizes 100～199 and 200～499 are 100～249 and 250～499 for the United States.

Because of its significance, Japanese "small-medium" industry constitutes one of the fundamental problems of Japanese economic structure. Of course, small business is not a "monoploy" of Japanese industry; common features of small business exist in various countries. Recently, small business seems to be attracting more attention than before in the United States as well as in other countries. However, the foregoing data indicate the need for special study to achieve an understanding of small business in Japan. It might be excessive to say that these are unique, but Japanese small business does raise important questions such as the two mentioned above, besides having features which are common to small business in other countries. Hitherto, various aspects of small business have been treated chiefly as subjects for theoretical discussion. Though the data are incomplete, it is hoped that the statistical comparison presented in this article has seved to shed some light on the problem of Japanese small business.