STRUCTURE OF MANUFACTURING INDUSTRIES IN TERMS OF THEIR RANKS

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With the initiation of the import substitution policy during the postwar period, a great number of manufacturing enterprises expanded in size and many new ones were established. The product mix of Philippine industry has therefore changed, and at the moment we are turning out a great variety of new products which had to be imported in the past.

The above remark becomes more obvious when we examine new industries at their most disaggregated industry classifications — for instance, at the level where they are called by their usual industrial names. When we follow traditional classifications of industries, a lot of these minute changes are absorbed by aggregation. At a two-digit ISIC, one still finds a reclassification of manufacturing enterprises useful and meaningful. In Philippine manufacturing, except for one industry (products of coal and petroleum or ISIC 32) which has been aggregated with the miscellaneous group (ISIC 39) to prevent revelation of *per* firm figures,[1] there are 19 such industry classifications.[2]

The question to which we shall direct ourselves is whether, on the basis of the two-digit aggregation of all industries in manufacturing, there is reason to make the statement that the composition of manufacturing in terms of certain economic characteristics (such as output, employment, payrolls, fixed assets, etc.) has changed significantly between 1948 and 1956, 1948 and 1960, and 1956 and 1960. Perhaps at this point it is essential to stress

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[1] There are about 4 or 5 firms engaged in petroleum refinery operations.

[2] See G. P. Sicat, "The Structure of Philippine Manufacturing: Prospects for the 1960's," in *The Philippine Economy in the* 1960's, ed. G. P. Sicat (Quezon City: Institute of Economic Development and Research, University of the Philippines, 1964), pp. 204n, 207n.

the fact that we are not trying to explain the growth of any one of these economic characteristics. We take these as given. Widely known is the fact that manufacturing volume in the country has increased greatly during these postwar years. Whether such an increase has led to changes in the corresponding relationships of the industry groups among themselves is another thing. That is the question to which this investigation is directed.

Elsewhere, the first author has analyzed the changes in percentage distribution of the manufacturing sector.[3] This paper will extend that analysis by using ranking and simple correlation analysis of industrial groups in the manufacturing sector. Generally, three types of economic characteristics are used in pushing forward this analysis: (1) measures of absolute total size of industry groups, (2) measures of average size of establishments in the industry, and (3) some measures dependent on the size of the industry group relative to the whole manufacturing sector. The appendix enumerates all the individual measures and the definitions employed in this paper.

The procedure that will be followed is very simple. A ranking of all industries based on the size of the characteristic under consideration is made for the years 1948, 1956 and 1960. Then, for any desired two periods, we compute the Spearman's rank correlation coefficient, making allowances for tied ranks whenever the differences between the industry characteristics appear to be very small.[4] A test of the null hypothesis that the ranks are independent is equivalent to testing whether the ranks of the industry groups have changed significantly. This may be done either through a t-test or with the use of Old's Table of *Critical Values of the Spearman Rank Correlation Coefficient*.[5]

As a check on the procedure, the simple correlation coefficient is also computed, with usual correlation tests being used to determine whether correlation is significant or not. This procedure is to correlate the actual values observed for each characteristic. In the computation of Spearman's rank correlation coefficients, such values observed are first trans-

[3] *Ibid*, especially pp. 198-210.

[4] The data available for this study represent, in most instances, very rough estimates of the characteristics being measured. Very slight differences in magnitude may be due to estimation error. This limitation inherent in the data causes the observers to fail to distinguish such differences as truly exist and recourse is made to the concept of tied ranks. This does not preclude the possibility of genuine indistinguishability of the industries concerned. The criterion used for tying ranks is the simple rule for rounding whole numbers to the nearest thousand. Take, for example, "Wood and Cork Products" and "Machinery, Except Electrical." Value added for the former in 1948 was 2,472 (thousand pesos), and for the latter 2,434 (thousand pesos). Both figures were treated as if they were reported as 2,000 (thousand pesos).

[5] See Sidney Siegel, *Nonparametric Statistics for the Behavioral Sciences* (New York: McGraw-Hill, 1956), p. 428.

ormed into rank, whereupon the characteristics compared (the ranks) become measures of relative order of magnitude for every one of the ndustries.

In the next section, we shall describe the nature of the data used. Subsequently, we shall report the results of the computations. In the final section, an attempt will be made to interpret these results.

DATA

This study makes use of data reported by the *Census of Manufactures,* 1948 and the *Annual Survey of Manufactures,* 1956 *and* 1960. The peculiarities of these materials are enumerated in this section. What is obvious is that the 1948 data are products of a census enumeration while the 1956 and 1960 data are estimates obtained by stratified sampling techniques.

The 1948 Census of Manufactures covers all establishments engaged in manufacturing on a commercial scale. The surveys of manufactures cover manufacturing establishments employing 5 or more workers. The extent of the field covered by the criterion "manufacturing on a commercial scale" may be differentiated from the extent of the field covered by the criterion "employing 5 or more workers," by the following observations:

(1) The Census of 1948 enumerated a total of 29,463 establishments.

(2) The Survey of Manufactures draws samples out of a frame consisting of some 9,000 establishments only.

It is evident that the fields covered by the Census and the Surveys do not coincide, that of the Census being larger.[6] How much larger the Census field is, it would need more than "counting heads" to know, however. Perhaps, this could be better determined by comparing the relationship of the "large establishments" to the size of the whole field. (See table below.)

	*Per Cent Accounted for by all Large Establishments**		
	1948	1956	1960
Employment in all industries	25.6	73.3	80.0
Payroll in all industries	60.3	84.1	89.7

* Especially when considering the difference between the concepts of "establishment" used (as pointed out elsewhere in the text).

* Establishments employing 20 or more workers.

The difference that could be observed between 1948 and 1956, or between 1948 and 1960, may indicate that the bases to which "large establishments" were related stand for significantly different portions of the total manufacturing sector.[7]

Definitions

The 1948 Census of Manufactures defines an establishment as "an individual, association, corporation, partnership or government agency with the proper Internal Revenue license," and the Survey of Manufactures defines it as "a plant, mill, factory, or ship at a single physical location, where a particular manufacturing, fabricating, processing, and/or assembling operation is performed."

The classic example of the difference between these two definitions would be the case of a corporation with more than one plant at several places. It would be counted as one establishment by the Census, but as several establishments by the Survey.

Classification Schema

The Census of Manufactures does not classify industries by the ISIC Code as the Survey of Manufactures does. The Census data are so summarized that it is impossible to make out meaningful disaggregations of the data for more intensive analysis. Fortunately, however, the 1948 data were reported in a form which allows rough conversion to ISIC 2-digit groupings, using the ISIC Code adopted by the Survey of Manufactures, as revised in 1959.

The 1959 classification differs from that of 1956. Industry 3733 (Lighting Fixtures) was called Industry 3562 in the old classification code. Thus, "Lighting Fixtures" is part of Industry Group 35 during 1956, but part of Industry Group 37 during 1960 (and 1948).

Industry 374 (Household Electrical Appliances) in the 1959 code does not exist in the 1956 Code. In its place are two other groups: Industry 3692 (Service, Industry and Household Machines) and Industry 3693 (Miscellaneous Machinery Parts). Industries picked out of these two old groupings form Industry 374; the industries left over combined to form Industry 3694 (Service and Industry Machines). Thus, Industry Group 36, having given away certain industries to Industry Group 37, contains less components during 1960 (and 1948) than those it contains during 1956.

[7] Unless industry concentration increased by a very, very marked degree during the relevant period.

Possible Imperfections in the Survey Estimates: 1956 *and* 1960

There are observations that indicate possible areas of imperfections, such as this one below:

Data on Rubber and Rubber Products: 1956 *and* 1960
Establishments Employing 5-19 *Workers*

	1956	1960
No. of Establishments	3	4
Employment	23	36
Payroll	29 (Thous. ₱)	66 (Thous. ₱)
Products Sold	21 (Thous. ₱)	0 (Thous. ₱)
Value Added	55 (Thous. ₱)	326 (Thous. ₱)
Fixed Assets	470 (Thous. ₱)	45 (Thous. ₱)
Electric Energy Used	27 (Thous. KWH)	175 (Thous. KWH)

The preceding figures are evidently not consistent. There is good reason to be cautious where the Survey figures are concerned. A source of statistical anomalies is inherent in the type of stratified sampling method employed. It is to be noted that the Survey stratifies the universe on the basis of "expected employment size" — which, in practice, is equated to the "employment size reported during the year immediately preceding the current survey period." Here lies the "built-in" handicap because the establishments may have already changed their characteristics (some establishments certainly have a great capacity for growth, or negative growth for that matter) during the year of the Survey. The fact that the frame is revised annually implies that "actual reports" do vary markedly from "expectations" in certain cases. Then it follows that, during any one survey, at least one stratum may contain some units foreign to it. Where this occurs to a great extent, the sub-sample becomes non-representative of the stratum. Consequently, estimates of sub-population characteristics based on it are seriously affected.

Certain observations hint of definite cases of significant overlapping, such as what appears below:

Data on Establishments Employing 5-19 *Workers*: 1956

	Average Employment Per Establishment
Tobacco Products	25
Wood and Cork Products	21

Such an anomaly could have arisen only from the inclusion of sampling units that belong to another subset (in this particular case, the sub-

set of establishments employing 20 or more workers in the sample population). It will not be difficult to discover instances of this nature if close analysis of Survey data is made.

These limitations give an idea as to how far one can fully make use of Survey of Manufactures data. Greater difficulty arises, of course, when we attempt to compare the data for the 1948 Census and the data of either one of the Surveys. We can proceed however with the assumption that for each survey year, the rough orders of magnitudes for each characteristic studied in an industry will approximately represent the relative position of an industry group in manufacturing vis-a-vis the other industry groups. If any of the errors in one survey year are built-in, the errors will arise for each one of the 2-digit industries, and therefore such systematic errors will tend to make each industry group in the same relative position as if "true" observations are reported. Moreover, even if we assume that the shift of the sample set into "small" (15 to 19 employees) and "large" (20 and above) subsets produces the built-in errors, the aggregation over the whole sample population will tend to provide a countercheck to any such tendencies for data bias. This assumption is certainly less bold than the one used in another paper.[8]

RESULTS

Relationship between total industry size and average firm size. Tables 1.a and 1.b show that, for any year, the average size of the reporting firm (or establishment in the case of the Surveys) is not in any way related to the total industry size. The larger the industry group, the more firms there are likely to be. But the average size of the firm in the industry size is likely to be different for different industry groups regardless of industry size, because of certain market factors such as optimum capacity size per establishment.

For all the characteristics discovered, the rank and simple correlation coefficients are not significant. They are in fact close to zero in most instances, although the rank correlations are slightly higher than the correlation coefficients. The negative values of the coefficients show that some of the industries with small values for the specific characteristic under consideration may have larger average sizes. But since the derived correlation coefficients are not significant, such variations are not regular.

[8] On the strength of the assumption that survey years can be compared because they are drawn from roughly the same population, except for new "births", computations of rates of growth of certain industry groups were made between the two survey years. This is decidedly a very bold assumption, and it is not hard to see that there is an upward bias in the estimates of the rates of growth. But if the rates of growth were roughly correct as orders of magnitudes such findings with definite upward bias provide a significant record of what seems to have happened in the manufacturing sector. See G. P. Sicat, *op. cit.*

Table 1.a OBSERVED RELATIONSHIPS BETWEEN [illegible]
CHARACTERISTICS OF MANUFACTURING INDUSTRIES

Characteristics[1]	Values of Spearman Rank Correlation Coefficient and Levels of Significance[2]							Number of Observations	
	1948	1956			1960				
	All	All	Small	Large	All	Small	Large	1948	1956, 1960
Employment (E, e)	—.56	.11	.15	.31	—.04	—.13	.42	17	19
Payroll (P, p)	.05	.12	.00	.32	.07	—.08	.39	17	19
Gross Value of Product (S, s)	n.c.	.24	.32	.68	.32	.51	.65	none	19
Value Added (V, v)	.18	.23	.04	.58	.30	—.18	.71	17	19
Share of Total Value Added									
Productivity Index ($\overline{V}$, v*)	.18	.26	.04	.54	.28	—.20	.72	17	19
Value of Fixed Assets (A, a)	n.a.	.22	.29	.50	.33	.27	.70	none	19
Electric Energy Used (U, u)	n.a.	.55	.50	.81	.69	.30	.91	none	19

[1] Capital letters refer to total value for the corresponding characteristics, small letters to the average value of each firm or establishment.
[2] Using a one-tailed Test of Significance

No underscoring = not significant
Single underscoring = significant at 5%
Double underscoring = significant at 1%

n. a. = not available
n. c. = not calculated

Table 1.b OBSERVED RELATIONSHIPS BETWEEN CERTAIN CHARACTERISTICS OF MANUFACTURING INDUSTRIES

Characteristics[1]	Values of Pearson Coefficient of Simple Correlation and Level of Significance[2]							Number of Observations	
	1948	1956			1960				
	All	All	Small	Large	All	Small	Large	1948	1956, 1960
Employment (E, e)	—.197	—.174	—.122	.141	—.010	—.107	.387	17	19
Payroll (P, p)	—.054	—.170	—.048	.203	—.016	—.421	—.017	17	19
Gross Value of Product (S, s)	n.c.	.071	—.026	.474	.002	.070	.493	none	19
Value Added (V, v)	—.071	.151	—.184	.486	—.016	—.237	.473	17	19
Share of Total Value Added, Productivity Differential ($\overline{V}$, v*)	—.077	.154	—.209	.538	—.016	—.142	.474	17	19
Value of Fixed Assets (A, a)	n.a.	.088	—.012	.302	.195	—.125	.486	none	19
Electric Energy Used (U, u)	n.a.	.272	.716	.417	.354	.017	.595	none	19

[1] Capital letters refer to total value for the corresponding characteristic, small letters to the average value of each firm or establishment.
[2] Using a one-tailed Test of Significance
No underscoring = not significant
Single underscoring = significant at 5%
Double underscoring = significant at 1%

n. a. = not available
n. c. = not calculated

There are exceptions here, especially as regards observations for the Survey years. For large establishments rank correlations and simple correlations differ, although when the data for the "whole" sector are lumped, the significant rank correlation disappears. The simple (Pearson) correlation coefficients are not significant. We can therefore conclude that the differences in the values observed for each industry group are so disparate for any industry in terms of absolute total size (per characteristic) and of average size that no correlative association can be predicted.

It should be noted that such a conclusion is independent of levels to which certain firms or establishments control a portion of value of output, value-added, or any other characteristic.[9]

The Period Industry Change Comparisons

What is more interesting now is to look at the values (either actual or in terms of rank) of a characteristic in a given year and then compare it with that for a later year.

A. 1948 *Compared with* 1956 *and* 1960

Tables 2.a and 2.b show the comparisons for these years. In 1948, when the Census was made, the state of manufacturing was not very extensive. Most of the new industries that got established in the postwar year were not yet in operation. Moreover, 1948 was part of a period in which industries ruined during the war were being rehabilitated. But when classified in accordance with the ISIC, a meaningful set of observations is obtained.[10]

The conceptual differences upon which the Census and Survey data are based have not deterred us from venturing into an analysis of changes in industry rankings or in relative significance of the 2-digit industry groups where data could be obtained on a comparable basis for the two years.

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[9] This will be the subject of a future monograph on the structure of Philippine manufacturing by the same authors.

[10] The analyses comparing 1948 data with those of 1956 and 1960 do not include three industry groups, namely: Industry Group 32 (Products of Petroleum and Coal), Industry Group 33 (Non-metallic Mineral Products) and Industry Group 39 (Miscellaneous Manufactured Products). Industry Group 32, which comprises petroleum and refinery products and miscellaneous products of petroleum, was not in existence as of 1948. As for Industry Groups 33 and 39, there is no readily available means of getting data on value added. As indicated elsewhere in the appendix, value added data for 1948 were estimated from figures on gross value of output by applying a certain ratio, which ratio, is not given for these two industry groups. In addition, Industry Group 39 characteristics, as reported for 1956 and 1960, incorporated the characteristics of Industry Group 32, which had, by that time appeared on the scene. It is believed that a large degree of complications due to non-comparability of aggregates through time would be minimized by the exclusion of these industries from the analyses.

Table 2.a OBSERVED STABILITY OF INDUSTRY RANKS, USING CERTAIN CHARACTERISTICS OF MANUFACTURING INDUSTRIES AS RANKING CRITERIA

Characteristics[1]	Values of Spearman Rank Correlation Coefficients and Level of Significance[2]					Number of Observations	
	All			Small	Large		
	1948, 1956	1948, 1960	1956, 1960	1956, 1960	1956 1960	1948, 1956 1956, 1960	1956 1960
Employment (E)	.58	.48	.92	.86	.91	17	19
Payroll (P)	.65	.29	.86	.83	.88	17	19
Gross Value of Product (S)	n.c.	n.c.	.86	.58	.91	none	19
Value Added (V)	.77	.72	.90	.76	.84	17	19
% Share of Total Mfg. Value Added (V)	.76	.74	.91	.66	.85	17	19
Value of Fixed Assets (A)	n.a.	n.a.	.80	.58	.76	none	19
Electric Energy Used (U)	n.a.	n.a.	.89	.64	.91	none	19

[1] Capital letters refer to total value for the corresponding characteristic.

[2] Using a one-tailed Test of Significance

No underscoring = not significant
Single underscoring = significant at 5%
Double underscoring = significant at 1%

n. c. = not calculated
n. a. = not available

TABLE 2.6 OBSERVED RELATIONSHIPS BETWEEN TWO ANNUAL MEASUREMENTS OF CERTAIN CHARACTERISTICS OF MANUFACTURING INDUSTRIES

Characteristics[1]	Values of Pearson Coefficient of Simple Correlation and Level of Significance[2]					Number of Observations	
	All			Small	Large		
	1948, 1956	1948, 1960	1956 1960	1956, 1960	1956, 1960	1948, 1956 1948, 1960	1956, 1960
Employment (E)	.935	.904	.961	.984	.912	17	19
Payroll (P)	.870	.845	.944	.965	.924	17	19
Gross Value of Product (S)	n.c.	n.c.	.977	.962	.974	none	19
Value Added (V)	.918	.934	970	.787	.966	17	19
% Share of Total Mfg. Value Added $(\overline{V})$	.914	.925	.970	.958	.967	17	19
Value of Fixed Assets (A)	n.a.	n.a.	.882	.874	.851	none	19
Electric Energy Use (U)	n.a.	n.a.	.781	.725	.765	none	19

[1] Capital letters refer to total value of the corresponding characteristic.
[2] Using a one-tailed Test of Significance, all values significant at 1%.
n. c. = not calculated
n. a. = not available

Because of lack of cross tabulation by employment size in the Census data, it is only possible to compare ranks of the sets of 2-digit industries for all the manufacturing sector. Of these, two other comparisons of ranks are made — one for industry size and the other for *average* size of the establishment in the industry.

Correlation of industry sizes. The correlations of industry sizes between 1948 and 1956 (column 1 of Tables 2.a and 2.b) are all significant. But rank correlations are generally lower in value than the simple correlation coefficients. This evidence confirms that when 1948 and 1960 industry sizes are under comparison, the rank correlations become slightly lower in value but, except for total payrolls, all rank correlations are significant. The check provided by Pearson correlation coefficients however reveal that correlation is significant at 1 per cent level. Such a result may be interpreted to mean that some differences in the sizes of the characteristics used which may appear to change the ranks of industry groups are not significant enough to remove simple correlations between the observed data.

The above may be taken as evidence that even while the manufacturing sector grew, the relative shares of the 2-digit industries to the whole sector (in terms of the characteristics picked out) are still significantly the same. In short, if one thought in terms of ranks, industry rankings have not changed between 1948-1956 and 1948-1960.

Correlation of average establishment sizes. We are quite aware that the Census data are observations for firms.[11] If the concepts do not create much of a difference especially when taking *average* sizes, then we can compare average firm sizes within a given 2-digit industry in 1948 with those in the same industry in 1956 or 1960. The results are shown in the first columns of Tables 3.a and 3.b. The results reveal that the correlations are not significant or, if they are, only at the 5 per cent level. The interesting thing here is that the value added characteristic proved significant for 1948 and 1960 but not for 1948 and 1956. However, the values of the correlation coefficients are really too low to make one conclude that such statistically significant correlations may not have been due to chance or built-in errors in the comparisons.

The conclusion that may be derived here is that per establishment rankings have changed between 1948 and 1956 and 1948 and 1960. This result is not obvious from the fact that correlations between total industry

[11] See discussion on Data, above.

Table 3.a OBSERVED STABILITY OF INDUSTRY RANKS, USING CERTAIN CHARACTERISTICS OF MANUFACTURING INDUSTRIES AS RANKING CRITERIA

Characteristics[1]	Values of Spearman Rank Correlation Coefficient and Level of Significance[2]					Number of Observations	
	All			Small	Large		
	1948, 1956	1948, 1960	1956, 1960	1956, 1960	1956, 1960	1948, 1956 1948, 1960	1956, 1960
Employment (e)	—.04	.30	.78	.01	.81	17	19
Payroll (p)	.04	.36	.73	.29	.80	17	19
Gross Value of Product (s)	n.c.	n.c.	.80	.35	.84	none	19
Value Added (v)	.41	.51	.87	.08	.90	17	19
Value of Fixed Assets (a)	n.a.	n.a.	.72	—.08	.75	none	19
Electric Energy Used (u)	n.a.	n.a.	.93	.37	.93	none	19
Productivity Differential (v*)	.39	.52	.87	.11	.81	17	19

[1] Small letters refer to the average value of each firm or establishment.

[2] Using a one-tailed Test of Significance

No underscoring = not significant
Single underscoring = significant at 5%
Double underscoring = significant at 1%

n. c. = not calculated
n. a. = not available

Table 3.b OBSERVED RELATIONSHIPS BETWEEN TWO ANNUAL MEASUREMENTS OF CERTAIN CHARACTERISTICS OF MANUFACTURING INDUSTRIES

Characteristics[1]	Values of Pearson Coefficient of Simple Correlation and Level of Significance[2]					Number of Observations	
	All			Small	Large		
	1948, 1956	1948, 1960	1956, 1960	1956, 1960	1956, 1960	1948, 1956 1948, 1960	1956, 1960
Employment (e)	.148	.192	.666	.204	.695	17	19
Payroll (p)	—.137	.074	.720	.152	.743	17	19
Gross Value of Product (s)	n.c.	n.c.	.763	—.102	.844	none	19
Value Added (v)	.228	.440	.794	—.108	.863	17	19
Value of Fixed Assets (a)	n.a.	n.a.	.538	—.181	.459	none	19
Electric Energy Used (u)	n.a.	n.a.	.768	.213	.852	none	19
Productivity Differential (v*)	.232	.441	.793	.112	.864	17	19

[1] Small letters refer to the average value of each firm or establishment

[2] Using a one-tailed Test of Significance

No underscoring = not significant
Single underscoring = significant at 5%
Double underscoring = significant at 1%

n. c. = not calculated
n. a. = not available

size and average establishment sizes in terms of the characteristics are generally not significant.

B. *Manufacturing Industries*: 1956 *and* 1960

We now go to two survey years where identity of classifications holds. In terms of the whole manufacturing sector, the correlations (Spearman and Pearson) are significant at the 1 per cent level. The large sector (establishments with 20 or more workers) have exactly the same characteristics as the whole sector. The *small* sector of manufacturing has shown instability in correlations. From this it may be inferred that the smaller the size of industries or of firms, the less regular is the pattern to be expected for a given characteristic between the two years. Both these observations are true for the total size of the industries and for the average size of establishments.

It can be said from this that when we take the manufacturing sector as a whole and examine their 2-digit components, there has been a generally stable pattern in terms of either ranks or values of each of the characteristics under consideration.

SUMMARY AND CONCLUSIONS

This undertaking reviews the relative rankings and sizes of 2-digit ISIC manufacturing industries for the years 1948, 1956, and 1960. While it is not denied that growth of the manufacturing sector has been substantial between 1948 and 1960, a number of observations stand out as statistically proven.

1. There is no relationship between total industry size and average establishment sizes within 2-digit industries classified under ISIC. Varying degrees of average establishment sizes may be present depending upon the number of firms and the particular circumstances of the firms in the industry.

2. The relative shares of industry sizes to the total manufacturing sector have remained substantially the same between 1948-1956 and 1948-1960.

3. But average establishment sizes between the periods referred to are generally not related. In terms of ranks, there were substantial changes.

4. In examining the correlation patterns for the years 1956 and 1960, the total and its subclass — the large — manufacturing sector displayed considerably strong correlations, both in terms of industry sizes and in average establishment size.

The Characteristic on Which the Correlations (Pearson and Spearman) Are Based

A. Measures of Absolute Total Size
   1. Employment (E)
   2. Payroll (P)
   3. Value of Products Sold (S)
   4. Value Added by Manufacturing (V)
   5. Value of Fixed Assets (A)
   6. Quantity of Electric Energy Used (U)

B. Average Establishment Sizes, measured by
   1. Employment Per Establishment (e)
   2. Payroll Paid Per Establishment (p)
   3. Products Sold Per Establishment (s)
   4. Value Added Per Establishment (v)
   5. Fixed Assets Per Establishment (a)
   6. Electric Energy Used Per Establishment (u)

C. Some Relative Measures
   1. Per Cent Contribution to Total Value Added by Manufacturing
   2. A productivity index which measures average differential size (in terms of value added) relative to average size of establishments to All Industries, and given by

$$\frac{V_i / n_i}{V^* / N} \quad X \ 100$$

where:

V_i = Value Added in Industry Group i (i = any 2-digit ISIC industry)
n_i = Number of Establishments in i
V^* = Total Value Added by Manufacturing
N = Total Number of Establishments in the Sector

Definition of Basic Terms Used

Employment — Average employment during the year, calculated from data reported for four payroll periods (ending nearest the 15th of February, May, August and November).[1] It includes working owners and unpaid family workers, production and related workers and non-productive workers in the establishment.

[1] Refers to 1956 and 1960 data only. How 1948 data were arrived at is not indicated by the Census report. It is only known that the Census schedule called for reports of monthly employment figures.

Payroll Paid — Includes salaries, wages, overtime pay, commissions, dismissal pay, bonuses, vacation and sick leave pay and other remuneration paid to employees on the payroll of the establishment during entire year, prior to all deductions such as withholding taxes, union dues, etc.[2]

Products Sold — Value of shipments including products sold, those shipped on consignment whether sold or not at the end of the year and those transferred from the plant to wholesale branches, central warehouses, retail stores, or other establishments of the company.

Value Added by Manufacturing — A measure of value created in manufacturing; calculated by subtracting the cost of materials, supplies, containers, fuel consumed, electric energy purchased and contract work from the value of manufacturing receipts.[3]

Fixed Assets — Book value of depreciable assets as of January 1. It includes land, buildings, machinery, transportation equipment and tools which last more than one year.

Electric Energy Used — The figures used for quantity of electric energy used were obtained by deducting the quantity sold by each establishment from the sum of the quantity purchased and generated by it.

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[2] 1948 figures include salaries and wages only.

[3] The 1948 Census gives no report of Value Added. The figures used in this study were derived from Total Value of Production by applying the percentage employed by the National Income Branch of the OSCAS in estimating Value Added from gross value of output. The percentage used are listed below:

Industry Groups	*Percentage*: 1948
Food	59
Beverages	44
Tobacco	80
Textiles	72
Footwear and Wearing Apparel	81
Paper and Paper Poducts	58
Printing and Publishing	63
Leather and Leather Products	74
Rubber Products	75
Chemicals and Chemical Products	69
Wood and Cork Products	67
Furniture and Fixtures	64
Basic Metal Products	69
Metal Products	69
Machinery, except Electrical	44
Electrical Machinery, Appliances and Supplies	78
Transportation Equipment	79

Source: Emmanuel Levy, *Review of Economic Statistics in the Philippines: an Interim Report* (Manila: World Bank Philippine Mission, May, 1964; mimeographed), p. 16.

APPENDIX II

For lack of space, we are not reporting here the basic data from the Surveys from which the computations were derived. These can be reconstructed from the Surveys of Manufactures. However, below are the reclassified 1948 Census data, which have never been reported before.

SELECTED CHARACTERISTICS OF INDUSTRY GROUPS: 1948

Industry Code	Descriptive Title	Average Employment Per Establ.	Average Payroll Per Establ. (₱000)	Average Value Added Per Establ. (₱000)	% Share of Value Added	Index of Productivity Differential
20	Food, Manufactured	7	4	36	64.01	164
21	Beverages	5	1	15	7.82	70
22	Tobacco Products	15	12	95	2.50	437
23	Textiles	5	2	12	2.87	56
24	Footwear, Other Wearing Apparel and Made-Up Textile Goods	5	1	8	10.36	38
25	Wood and Cork Products, except Furniture	4	0.5	3	0.45	15
26	Furniture and Fixtures	6	3	10	1.49	47
27	Paper and Paper Products	9	4	14	0.08	63
28	Printed and Published Materials and Allied Products	15	16	56	2.37	259
29	Leather Products, except Footwear	7	2	8	0.12	35
30	Rubber Products	30	24	146	0.69	672
31	Chemicals and Chemical Products	8	5	55	2.02	256
34	Basic Metal Products	12	14	12	0.68	58
35	Metal Products	8	5	54	2.55	251
36	Machinery, except Electrical	4	1	2	0.45	11
37	Electrical Machinery, Apparatus, Appliances, and Supplies	60	253	191	0.35	885
38	Transportation Equipment	5	2	11	1.19	53

Derived From: Census of Manufactures, 1948 Data

SELECTED CHARACTERISTICS OF INDUSTRY GROUPS: 1948

Industry Code	Descriptive Title	No. of Operators	Employment	Payroll (Thous. Pesos)	Value Added (Thous. Pesos)
20	Food, Manufactured	9821	70495	38346	350135
21	Beverages	2839	14639	3430	42799
22	Tobacco Products	144	2210	1806	13648
23	Textiles	1287	5889	2439	15705
24	Footwear, Other Wearing Apparel and Made-Up Textile Goods	6802	30400	8220	56648
25	Wood and Cork Products, except Furniture	768	2850	432	2472
26	Furniture and Fixtures	799	4922	2623	8156
27	Paper and Paper Products	32	283	146	439
28	Printed and Published Materials and Allied Products	231	3402	3658	12960
29	Leather Products, except Footwear	83	539	200	631
30	Rubber Products	26	785	617	3785
31	Chemicals and Chemical Products	199	1621	990	11044
34	Basic Metal Products	298	3466	4109	3742
35	Metal Products	256	1969	1195	13951
36	Machinery, except Electrical	1069	4040	1044	2434
37	Electrical Apparatus, Appliances and Supplies	10	601	2534	1919
38	Transportation Equipment	567	3071	931	6511

Derived from: Census of Manufactures, 1948 Data.