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FIRM SIZE AND RATE OF GROWTH IN PHILIPPINE MANUFACTURING

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The nature of the relationship between firm size and growth rate has been of interest to economists studying the dynamics of the competitive process in industrialized economies. This topic has not been well investigated in the context of developing economies, partly because of the lack of sufficient data and partly as a consequence of the concern with aggregate growth rates. However, inasmuch as the growth rate of an economy is the weighted sum of the growth rates of the individual production units, it is appropriate that the latter be the subject of inquiry.

In a previous issue of this journal, we have examined the relationship between changing establishment concentration and industry growth in Philippine manufacturing (Lindsey, 1978). We found a positive association between these two variables, suggesting that the growth of manufacturing industries was of primary benefit to larger establishments. Here we wish to pursue the subject more directly by examining the pattern of firm growth rates in the manufacturing sector of the Philippine economy as a function of firm size.

Hymer and Pashigian surveyed the literature on the relation between firm size and growth rate in the U.S. and the U.K. (1962). They found substantial agreement that there was little or no correlation between firm size and growth rate, but that there was an inverse association between firm size and the variability of firm growth rate.[1] However, the variability of the growth rates of large-sized firms was too great for them to be regarded as a collection of *independent* small firms; thus there must be some advantage to being large for them to continue to operate in such a fashion. This, Hymer and Pashigian suggest, is either economies of large-scale operation and/or monopoly power. We shall return later to these possibilities in the Philippine context.

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[1] Recently Singh and Whittington (1975) have found a mild positive association between firm size and growth rate in the U.K.

Two sets of growth rates were calculated for firms in the manufacturing sector of the Philippines: one for the period 1961-1970; the other, for 1967-1972.[2] Nineteen sixty-one data were obtained only for 156 firms. We are reasonably confident that we have data for the 60 largest firms in that year, but data may be missing for large firms that ranked below the top 60 and did not grow rapidly. Therefore, the association between firm growth rate and 1961 asset size may be biased downward.

Fifty-nine of the 60 largest manufacturing firms in 1961 were operating in 1970. The correlation between the 1961-1970 average annual growth rate of these firms in terms of assets and their 1961 asset size is quite low and statistically insignificant, -0.0419.

Table 1 presents information on the larger group of firms for which we have data. The average annual growth rate and the standard deviation of the growth rate by 1961 asset size class are listed both for the entire group of 156 firms and for the 147 of these which were operating in 1970. For the former, it was assumed that those firms for which we do not have 1970 data, ceased operating; they were assigned a growth rate of -50.00 per cent per year, which is equivalent to a reduction in size of 99.90 per cent over the decade.

No attempt was made to value assets in constant prices. From 1961 to 1970, the wholesale price index rose at an average annual rate of 6.79 per cent, and the import component of that index rose at a rate of 5.78 per cent yearly (National Economic and Development Authority, 1974, pp. 342-343). Subtracting the growth rate of the price indices from the average growth rate of assets gives a reasonably good estimate of real growth.

The distribution of growth rate and standard deviation of growth rate by asset size class of firms is broadly consistent with the findings of Hymer and Pashigian. The correlation coefficients between size and standard deviation of growth rate are significant at the 10 per cent level, both for all firms ($r = -0.5299$) and for surviving firms only ($r = -0.5493$).[3]

For all firms, there is a small negative correlation between size and growth rate ($r = -0.1638$). However, the correlation becomes much stronger when only surviving firms are included ($r = -0.5002$). Although neither coefficient is significant at the 10 per cent level,

[2] See Lindsey (1976) Chapter 5 for a discussion of data sources and problems.

[3] See Appendix Table 5 for matrices of correlation coefficients for variables in this study.

By 1961 Asset Size Class

Number of Firms	Lower Bound of Asset Size Class (₱ millions)	Average Annual Growth Rate of Firm Assets (%)	Standard Deviation of Growth Rates (%)
	All Firms [a]		
3	100.0	11.52	4.31
4	50.0	8.30	2.49
5	40.0	8.72	1.08
8	30.0	8.86	6.39
20	20.0	8.79	22.05
18	15.0	10.54	4.28
19	10.0	16.32	7.00
14	8.0	14.05	5.67
18	6.0	12.36	24.54
23	4.0	0.42	44.80
24	0.0	21.47	34.33
	Surviving Firms Only		
3	100.0	11.52	4.31
4	50.0	8.30	2.49
5	40.0	8.72	1.08
8	30.0	8.86	6.39
19	20.0	11.89	5.77
18	15.0	10.54	4.28
19	10.0	16.32	7.00
14	8.0	14.05	5.67
17	6.0	16.03	7.67
18	4.0	14.43	13.11
22	0.0	27.96	17.15

[a] Firms which were not operating in 1970 were assumed to have an annual growth rate of −50.00 percent. This implies a fall in size over the decade of 99.90 percent.

Sources: "The 100 Largest Commercial and Industrial Corporations in the Philippines in 1961," *Business Review* (Manila: Faculty Club of the College of Business Administration, University of the East), 5 (August, 1963), pp. 13-17. Also same journal, December, 1963, and subsequent volumes, the August issue. *Business Day's Two Hundred Largest Corporations [1967]* (Quezon City, Philippines: Enterprise Publications, Inc., 1968). *Business Day's 1000 Largest Corporations* (Quezon City, Philippines: Enterprise Publications, Inc.). This is an annual publication, first published for 1968 in 1969. The Securities and Exchange Commission files of corporation financial statements. Personal interviews.

the size of the difference between the two supports our earlier comment that the possible exclusion of some firms among the largest 150 in 1961 that ceased operating or did not become significantly larger during the decade, would give a downward bias to the association between size and growth rate.

In addition, the larger firms are limited to a considerable extent by the growth rate of the domestic market, especially in those areas where little attention has been given to exports. The smaller firms can expand more rapidly, growing at the expense of other smaller firms and, perhaps, at the expense of inefficient or acquiescent larger firms. Some of the firms which were small in 1961 and grew very rapidly during the 1961-1970 period are controlled by foreign corporations or by domestic capitalists who have interest in other, already large, firms (Lindsey, 1976, pp. 158-160). These firms do not have to depend necessarily upon their own profits or on funds borrowed in the open market to expand rapidly. They can rely upon the economic power of their owners which exist, to a large extent, because of their control of other productive resources. On the other hand, larger firms may be in a better position to take advantage of a growing market or protect themselves in a stagnant one.

A second set of growth rates was calculated for firms for the period 1967-1972. Although we have more, and more complete information on firms in this period, there remain data problems. First, several firms came into operation during the 1967-1972 period. Rather than give them an infinite rate of growth, we used as the initial year in calculating their average rate of growth, the first year in which they were in operation.[4] Second, the average growth rate will be compared with the 1970 asset size. It would have been preferable to compare size with future growth, not with an average of past, present, and future growth. However, the last year for which data were available for our analysis is 1972, and resource limitations necessitated that we use 1970 data for firm size.

Average growth rate by asset size class and the standard deviations within class are presented in Table 2. The correlation be-

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[4] If firms were in operation during the entire six-year period, the rate calculated would be the geometric mean of the five yearly growth rates. Some firms were not in operation, however, for one or more of these years; for others, information is not complete. It was decided to include those firms for which the growth rate could be determined for at least three years in this period. Of the 518 large manufacturing firms operating in 1970 for which we have data, growth rates could be calculated for 434. Of the 60 largest firms in 1970, growth rates could not be calculated for 5, two of which were in the 10 largest. In addition, one firm was excluded because its average annual growth rate, 86 per cent, was sufficiently large to bias our calculations.

Table 2 — 1967-72 Average Annual Rate of Growth of Firms by 1970 Asset Size Class

Number of Firms	Lower Bound of Asset Size Class (₱ millions)	Average Annual Growth Rate of Firm Assets[a/] (%)	Standard Deviation of Growth Rates (%)
3	500.0	19.87	3.61
4	200.0	19.77	9.67
12	100.0	22.36	13.68
17	80.0	10.96	8.53
18	60.0	18.82	15.63
22	50.0	10.66	7.07
22	40.0	23.17	16.91
24	30.0	21.84	30.84
21	25.0	14.60	10.52
22	20.0	19.11	13.79
40	15.0	20.02	21.81
24	12.5	15.62	14.85
29	10.0	15.60	12.93
23	8.0	18.93	15.88
38	6.0	15.20	14.49
36	4.0	15.28	11.08
78	0.0	12.73	19.85

a/ Growth rates are average geometric rates for firms for which at least three yearly rates of growth in the period 1967-1972 are available.

Source: Same as Table 1.

tween growth rate and asset size is slightly positive ($r = 0.2462$), and the standard deviation of firm growth rate of the larger asset size classes is generally less than that of the smaller asset size classes ($r = -0.5224$). The former is not significantly different from zero; the latter is, however, at the 5 per cent level of significance.

It may be that the pattern of firm growth rate and the variability of growth rate differ across industries and that our aggregation process has covered over intra-industry associations between firm size and either of the two variables. To test this possibility, the firms in each two-digit ISIC industry were ranked by 1970 asset size and divided into asset size classes, with the largest firms being placed in

Table 3 — 1967-1972 Average Annual Firm Growth Rate by Industry

Industry Number[a/]	Number of Firms	Average Annual Growth Rate of Firm Assets by Quantile (%)			
		1	2	3	4
20	72	16.84	20.51	14.24	13.30
23	41	8.07	17.24	24.96	9.48
25	67	17.44	10.67	17.44	13.85
27	24	27.73	15.60	13.36	10.79
31	64	15.25	19.59	21.93	13.07
33	22	9.06	13.48	17.12	17.02
34	25	22.89	16.81	9.92	7.15
		1	2	3	
22	18	19.46	32.94	6.67	
35	18	17.37	13.75	11.54	
37	18	18.72	16.20	32.98	

a/ See Appendix Table A for industry definitions.

Source: Same as Table 1.

the first quantile. The average growth rate and standard deviation were calculated for each class. Seven industries had a sufficient number of firms to be divided into quartiles; in three others, three divisions were used.[5] (See Tables 3 and 4).

Disaggregating the firms into their two-digit industries does not affect our earlier conclusions. Examining the direction of movement in the average firm growth rate in each industry going from a higher quantile to a lower one, showed a change in both directions. Majority of the changes are negative, implying some positive association between growth rate and firm size. But there are wide variations.

There is also considerable up and down movement in the standard deviations going from one quantile to the next for each industry; the number of changes in each direction is almost the same.

[5] The following analysis is similar to that in Hymer and Pashigian (1972).

Table 4 — Standard Deviation of 1967-1972 Average Annual Firm Growth Rate by Industry

Industry Number a/		Standard Deviation of Average Annual Growth Rate of Firm Assets by Quantile (%)			
		1	2	3	4
20	72	10.80	16.61	8.99	25.58
23	41	17.15	18.54	26.11	26.70
25	67	15.30	21.98	17.79	15.60
27	24	27.06	14.54	12.16	5.82
31	64	10.67	11.23	11.45	18.78
33	22	7.89	11.18	21.55	9.63
34	25	13.84	9.85	11.53	11.03
		1	2	3	
22	18	15.28	58.37	10.16	
35	18	6.13	13.05	12.67	
37	18	3.55	6.13	21.39	

a/ See Appendix Table A for industry definitions.

Source: Same as Table 1.

However, the standard deviation is generally smaller in the first quantile than in the others for each industry. Earlier, we noted that a smaller variability in the growth rate of large firms could be the result of their behaving as a collection of independent smaller firms. We tested this possibility.

The ratio of the median size of firms in each quantile to that of the smallest quantile, n, was used as an estimation of the number of small independent firms of equivalent size in each of the larger firms. The predicted standard deviation of rate of growth in each quantile is the ratio of the standard deviation of the smallest quantile to the square root of the estimated n. In almost every instance, the actual standard deviation is greater than the predicted standard deviation. (See Table 5).

The standard deviation of the growth rate of the larger size classes is smaller than that for the smaller size classes, both for the

Table 5 — Ratio of Actual to Predicted Standard Deviation of Firm Growth Rate by Industry

Industry Number [a]	Ratio of Actual to Predicted Standard Deviation of Growth Rates by Quantile [b]			
	1	2	3	4
20	2.25	2.15	0.79	1.00
23	2.09	2.72	1.70	1.00
25	4.59	3.59	1.84	1.00
27	108.16	5.56	2.76	1.00
31	2.10	1.32	1.06	1.00
33	2.44	2.48	2.88	1.00
34	9.02	3.69	2.08	1.00
	1	2	3	
22	4.78	9.76	1.00	
35	3.09	1.61	1.00	
37	0.33	0.45	1.00	

a/ See Appendix Table A for industry definitions.

b/ See discussion in text for definition of predicted standard deviation.

Source: Same as Table 1.

firms for which the growth rate was an average of the 1961-1970 period and for the firms for which the growth rate was calculated for the 1967-1972 period. In neither case, however, is the standard deviation sufficiently small relative to that of the larger asset size classes for the larger firms to be considered collections of independent smaller firms. Disaggregating the firms by industry, we find that the standard deviation of the growth rate of firms in the larger quantile is generally smaller than that of the smaller quantiles. But again, it is not small enough to allow an interpretation that the larger firms operate as independent collections of smaller firms. Since a large firm could be organized to operate as a collection of independent units, there must be some benefit to operating in an interrelated fashion: economies of scale or monopoly position. And in the Philippine market, the existence of economies of scale would almost always result in monopoly.

There might be other reasons which would cause the owners to operate a large corporation as an interdependent unit even if there were no material benefit. However, it would not seem that they could persist in this type of action for a lengthy period and the firm maintain its relatively large size. And, if they did, their example would not be ignored by others. Thus, the association between firm size and standard deviation of growth rate indicates the existence of significant concentrations of economic power.

The positive association between firm size and growth rate with our second set of data supports this view. It was pointed out that the use of 1970 assets as the measure of firm size gave an upward bias to the correlation between these two variables. However, to the extent that a small positive association remains, it is consistent with our earlier analysis of establishment concentration (Lindsey, 1978) which revealed that changes in concentration were positively associated with industry growth rate. The largest plants were those most able to take advantage of a growing market. The same seems to be true for the largest corporations.

Appendix Table A — Industrial Classification System

Industry Number	Industry
20	Food manufacturing industries, except beverage industries
21	Beverage industries
22	Tobacco manufactures
23	Manufacturing of textiles
24	Manufacturing of footwear, other wearing apparel and made-up textile goods
25	Manufacturing of wood, cane and cork, except manufacturing of furniture
26	Manufacturing of furniture and fixtures
27	Manufacturing of paper and paper products
28	Printing, publishing, and allied industries
29	Manufacturing of leather and leather and fur products
30	Manufacturing of rubber products
31	Manufacturing of chemicals and chemical products
32	Manufacturing of products of petroleum and coal
33	Manufacturing of non-metallic mineral products, except products of petroleum and coal
34	Basic metal industries
35	Manufacturing of metal products, except machinery and transport equipment
36	Manufacturing of machinery, except electrical machinery
37	Manufacturing of electrical machinery, apparatus, appliances and supplies
38	Manufacturing of transport equipment
39	Miscellaneous manufacturing industries

Note: The classification system used by the Office of Census and Statistics follows closely that of the *International Standard Industrial Classification* system of the United Nations.

Source: R.P., Bureau of the Census and Statistics, Department of Commerce and Industry, *Annual Survey of Manufacturers, 1969* (Manila, [1972]). See particularly p. xii.

Appendix Table B — Matrices of Correlation Coefficients of Firm Size, Growth Rate, and Standard Deviation of Growth Rate, By Asset Size Class

I

FIRMS WITH DATA FOR THE PERIOD 1961-1970*

		All Firms			Surviving Firms Only	
		Size	Growth Rate	Standard Deviation of Growth Rate	Growth Rate	Standard Deviation of Growth Rate
All Firms	Size	1.0000	— 0.1638	— 0.5299	— 0.5002	— 0.5493
	Growth Rate		1.0000	— 0.1303	0.6748	0.2764
	Standard Deviation of Growth Rate			1.0000	0.6244	0.8578
Surviving Firms Only	Growth Rate				1.0000	0.8653
	Standard Deviation of Growth Rate					1.0000

*See Table 1 in the text.

II

FIRMS WITH DATA FOR THE PERIOD 1967-1972*

	Size	Growth Rate	Standard Deviation of Growth Rate
Size	1.0000	0.2462	— 0.5224
Growth Rate		1.0000	0.3909
Standard Deviation of Growth Rate			1.0000

*See Table 2 in the text.

REFERENCES

Hymer, Stephen and Pashigian, Peter (December 1962), "Firm Size and Rate of Growth," *Journal of Political Economy*, 70:565-566.

Lindsey, Charles W. (1976), "Concentration in Philippine Manufacturing, 1960-1970," unpublished Ph.D. dissertation, University of Texas at Austin.

Lindsey, Charles W. (March 1978), "Changes in Market Concentration in Philippine Manufacturing: 1960-1970," *Philippine Review of Business and Economics*, 15:109-125.

Philippines, National Economic and Development Authority (1974), *NEDA Statistical Yearbook 1974*, Manila.

Singh, Ajit and Whittington, Geoffrey (January 1975), "The Size and Growth of Firms," *Review of Economic Studies*, 42:15-26.