3. Differences in standard deviations about the average rates of return among industry groups and firm classes.

It is now in order to see, however, if the last conclusion is also true of the standard deviations about the average rates of return. The average rates of return were computed over the years. The test is whether the standard deviations were equal among industry groups and among tax- and non-tax-exempt firms.

Table 6 summarizes the results based on an analysis of variance of the type used in the immediately preceding tests. They show that while the standard deviations of the industry groups were not significantly different, at least the difference appears when the tax- and non-tax-exempt firms are

Table 6

Analysis of Variance Test on Standard Deviation About Average Rates of Return

Source of Variation	Sales F (n,d)	Equity F (n,d)
Among Industry Groups	1.8405 (12, 12)	2.5409 (12, 12)
Among Class of Firms	7.5116** (1, 12)	4.4258* (1, 12)

**Significant at 2.5 per cent.

*Significant at 10 per cent.

Note: The numbers in the parentheses are the degrees of freedom of the F-statistic where n = numerator and d = denominator.

considered. This is more marked with the standard deviations from average rates of return on sales.

It should be emphasized that the standard deviations were computed from the average rates of return over the years of a given industry group. Earlier mention was made that for any given year and for any industry group average rates of return were the ones used. I did not test for the standard deviations in any given cross-section, because of the diversity in the number of firms appearing per industry group. Since the samples for some industry groups consisted of a few firms, any measure of standard deviations would not be very meaningful. But over the years, this is a very useful statistic on the rates of return.

The finding confirms the significant difference in the wider range of riskiness of the tax-exempt firms than the non-tax-exempt, something already emphasized elsewhere.[19]

V. Multi-product Corporations with Tax-Exempt Product Lines

Mention at the beginning was made of the fact that there were a number of large multiproduct corporations with some tax-exempt product lines. Their operations were mixed; they had activities which never enjoyed direct recognition as "new and necessary" industries and there were others in which such

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[19]See pp. 22-3, above.

recognition had been extended by application of the law. I have pointed out that the existence of such firms have provided complications to the data used here, because there was no way of segregating the performance of certain tax-exempt product lines against the non-tax-exempt. I have used the bold assumption that if the firm had tax-exempt operations, it is to be classified as tax-exempt in the firm classifications.

Some effort at explaining the rates of return of these firms is now in order. Again, data limitation beset us. Although aggregate rates of return data for particular firms are available, the product line rates of return are available only for 1959. The latter are statistical data compiled by the Department of Finance staff in charge of the implementation of the law on new and necessary industries. The Department of Finance data were based on different concepts, and it is in order to explain this.[20] The list of 100 largest corporations in the Philippines as published in the U.E. Business Review was used as the guideline in singling out those large firms which had multiproduct operations.

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[20]The Department of Finance data were not based on exactly the same concepts as the ones derived from the Hooley data. The capital concept used was paid-in capital. Accounting definitions tell us that paid-in capital is less than equity capital by the amount of earned surplus and interest accruing to stockholders. The Finance data were silent as to whether sales were gross or net, but profits were reported as net profits. To the extent that paid-in capital is less than equity capital, we shall expect the rate of return to paid-in capital to be higher than equity capital, assuming that the profit returns considered are the same.

The earlier notation will be extended to take into account new concepts. Let $\hat{r}_{ij}$ stand for the rate of return on $\underline{i}$ (i = sales, capital) of the j^{th} product line of a tax-exempt activity and r^h_i the rate of return on $\underline{i}$ of the firm $\underline{h}$. A hat is placed over the first rate of return concept to differentiate it from the data that have been used already. Then, we can define an approximate measure, Δr^h_{ij}, of the difference in the rate of return for a tax-exempt product line from that of a firm, $\underline{h}$ that is,

$$\Delta r^h_{ij} = \hat{r}_{ij} - r^h_i.$$

If only data of $\hat{r}^h_{ij}$ were available, i.e., data of $\hat{r}_{ij}$ for a given firm $\underline{h}$, the comparability of the data at the firm level would have been possible. But this has not been possible.

Moreover, since firm $\underline{h}$ might be engaged in tax- and non-tax-exempt activities, it is most ideal to disaggregate the components of r^h_i. The rate of return of firm $\underline{h}$ is likely to be a weighted sum of the rates of return among several product lines, i.e.,

$$r^h_i = \sum_\nu \alpha_\nu r^h_{i\nu}$$

where the subscript ν stands for product lines whether tax- or non-tax-exempt, α_ν the weight for the given product line, and $\sum_\nu \alpha_\nu = 1$. All this, unfortunately, is not possible to

gather. Firms keep their operations a well-guarded secret, and therefore the reports submitted for public records are as vague and as aggregative as possible.

So, we are back to Δr^h_{ij}. We attempt to show the limited paired data (r_{ij} and r^h_i) of 16 large firms in the following figures. On the vertical axis, r^h_{ij} is measured. On the horizontal axis, r^h_i. In order to simplify the presentation, we replace the subscript $\underline{i}$ by the corresponding type of rate of return data, $\underline{s}$ for sales and $\underline{k}$ for capital. Thus, we have Δr^h_{sj} and Δr^h_{kj} on the one hand and r^h_s and r^h_k on the other. If Δr^h_{ij} is positive, the product line rate is higher than that of the firm; if negative, the other way around. The figures reveal that the incidence of positive Δr^h_{ij} observations is as often as that of the negative ones. It may be added that because of the difference in capital concepts developed here,[21] we may state that Δr^h_j may be overstated slightly. However, the rates of return on sales, Δr^h_{sj}, may be roughly comparable with the data used in the first part of the study, and would tend to give a countercheck to the true value of Δr^h_{kj}.

As one would expect, the results are inconclusive. For one thing, the year 1959 was, as pointed out earlier, one in

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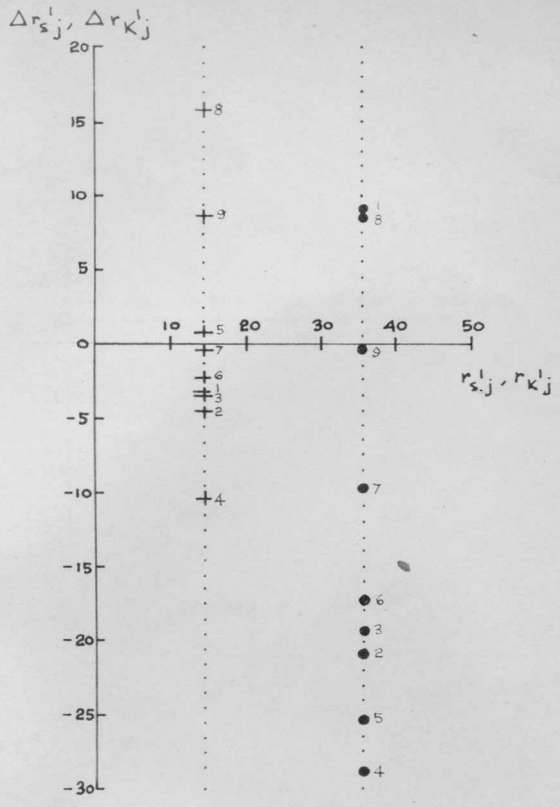
[21]See preceding footnote.



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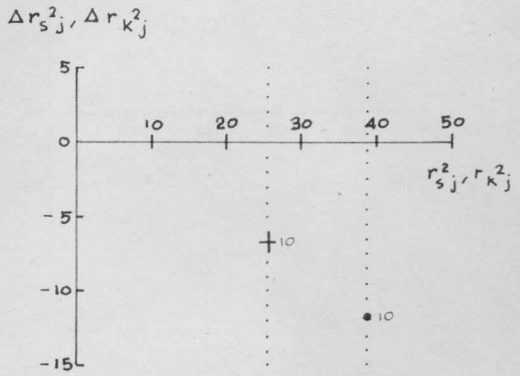

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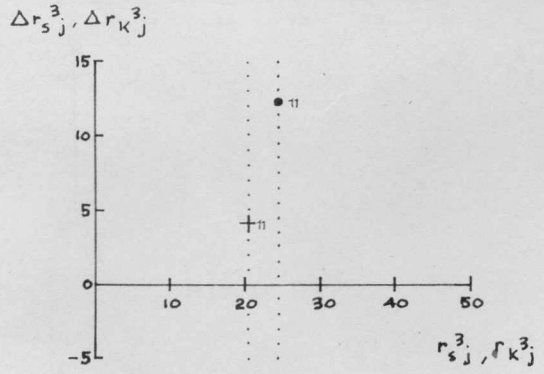

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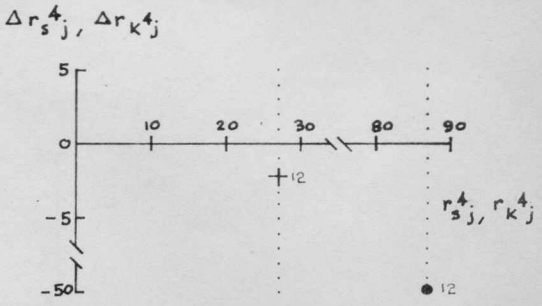

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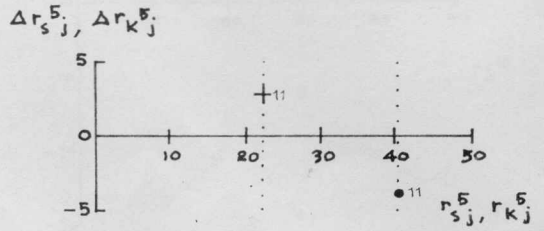

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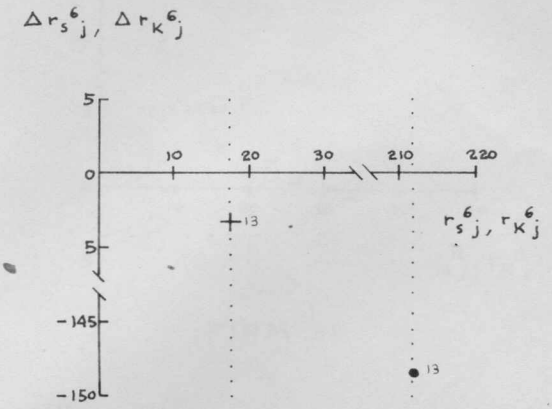

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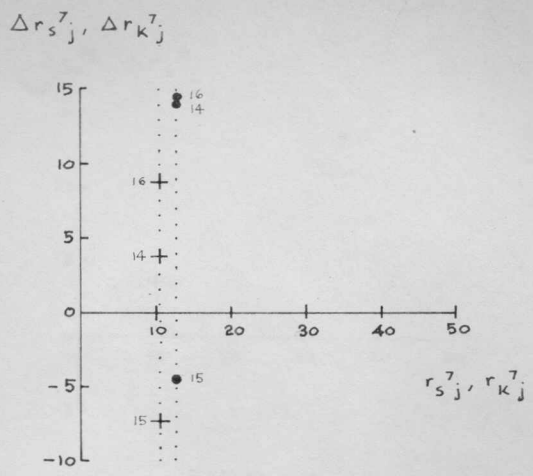

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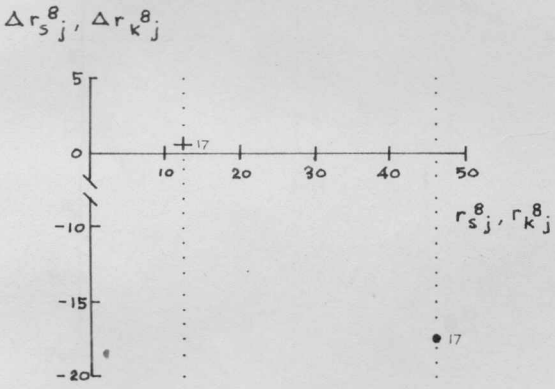

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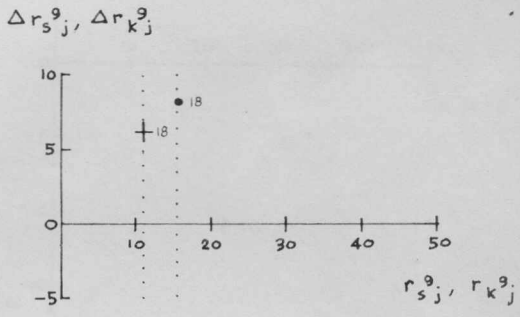

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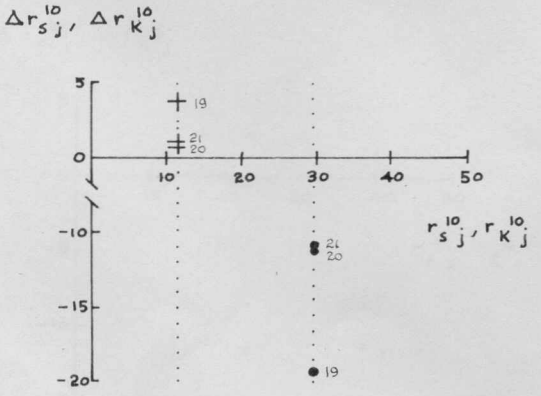

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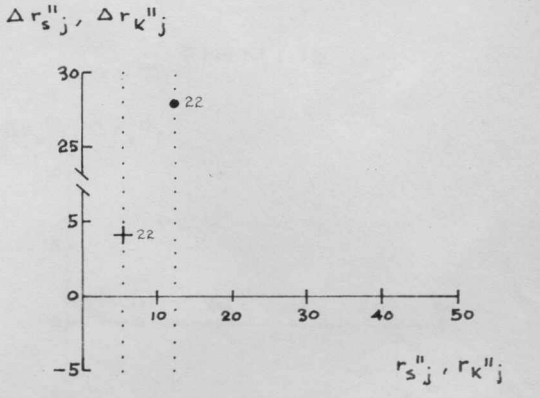

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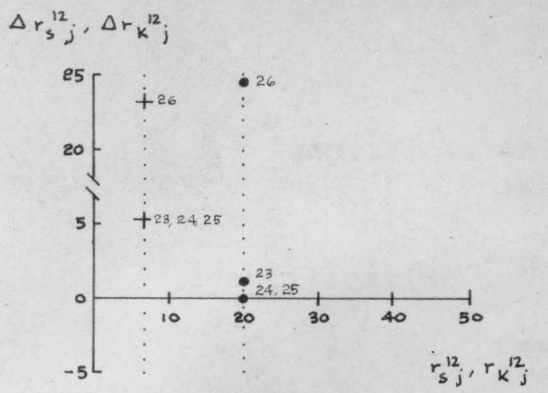

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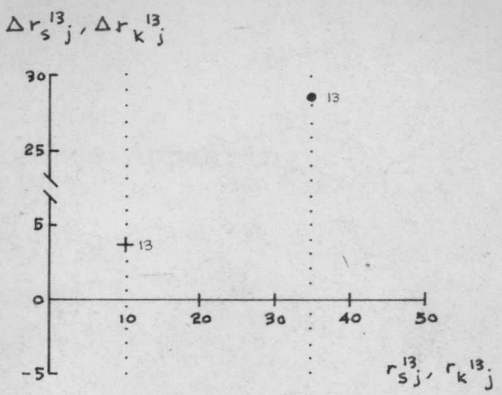

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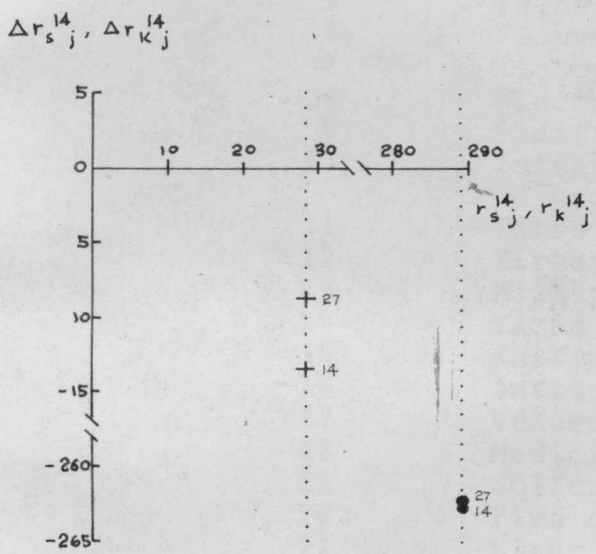

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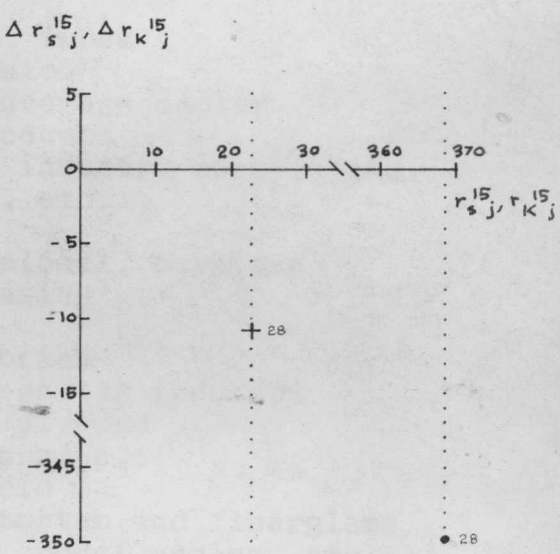

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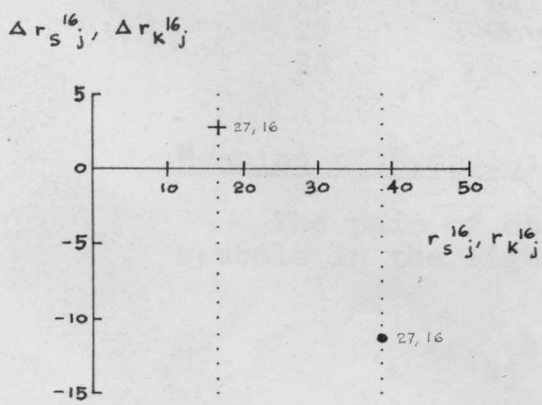

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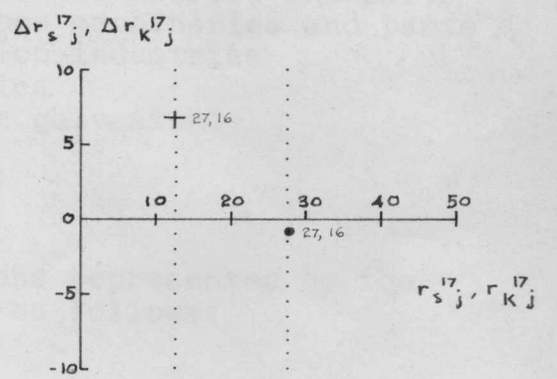

FIRM 17

Identification of the Figures Appearing for Firms 1-17

Identification	Product Line
1	Poultry feeds
2	Dry yeast
3	Corrugated carton containers
4	Screw caps and crown and cork lithography
5	Felds par
6	Flourescent tubes
7	Tin cans, etc.
8	Electric beverage cooler
9	Plastic products
10	Integrated industry of spinning, weaving, etc.
11	Tires
12	Tires, camelback, cushions
13	Milk processing
14	Yarns
15	Knitted fabrics
16	Integrated cotton industry
17	Veneer and plywood
18	Medicinal products
19	Sulfuric acid
20	Fire clay mortar and fiberglass
21	Light bars, rods, angles, etc.
22	Wolmanizing
23	Tools
24	Agricultural machineries and parts
25	Miscellaneous machineries and parts
26	Refrigeration industries
27	Woven fabrics
28	Steel sheet galvanized

Meaning of Symbols:

The pair of observations represented by the symbols in the figures are as follows:

$\cdot \quad (\Delta r_{kj}^{h}, r_{kj}^{h})$

$+ \quad (\Delta r_{sj}^{h}, r_{sj}^{h})$

which foreign exchange difficulties have affected firm profitabilities. For another, it is not possible to utilize for analysis the ideal set of data for such comparisons. Nonetheless, all these make it possible to make some speculative remarks.

Based on the figures, it cannot be established that tax-exempt product line profitabilities were greater than the average profitabilities obtaining for the firms. There were many cases when the location of the points in the scatters are on the northeast quadrant, but there were slightly more cases in which they appeared in the southeast quadrant. However, there is here the importance of weighting (i.e., the values of α_v's for the tax-exempt lines) about which we have no knowledge. It might well be that those product lines appearing in the northeast quadrant contributed a sizable portion of the firm's profits, in which case they pushed up the profit rate of the firms. But it could very well be the opposite -- that rates of return of the large corporations in non-tax-exempt activities were more rewarding. There is one reason why, in the case of some firms, the tax-exempt product lines might not have been as profitable as the firm's traditional products. Since these firms were large ones, their traditional (non-tax-exempt) product lines might have enjoyed higher rates of profit than the tax-exempt ones, especially if the dominant activity is in the traditional product line. But for some other firms, the highly protective film thrown

around new and necessary industries[22] might have contributed to relatively high profits in some undertakings. Yet, the observation already made above that in general average rates of return for tax-exempt firm in a given year were not significantly different from those for non-tax-exempt firms caution us against overstressing profitability. The significance in difference between the standard deviations for classes of firms is enough support of the claim that the rates of return for the tax-exempt firms fluctuated more widely over time than for the non-tax-exempt firms.

We may add one further thought that is more like an educated speculation regarding multiproduct firms. By getting into a tax-exempt product line, a firm was able to obtain the benefits of tax-exempt activities for its non-tax-exempt activities. This could have been in the form of purchasing machinery useful also in the non-tax-exempt operations or in the form of diverting some raw material imports justified for a given tax-exempt product line for the non-tax-exempt activities. Such possibilities could not be discounted since checking with the

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[22]See my "Industrial Policy and the Development of Manufacturing in the Philippines," op. cit.

requirements for a given industry in the justification of certain imports would have been a very difficult task. A future paper will discuss in more detail the tax-exempt firms covered in this study.

VI. Summary

In addition to some of the conclusions mentioned earlier, we can add the following borne out by further statistical analysis.

1. For any class of firms, whether tax- or non-tax-exempt, the rates of return of different industry groups varied significantly for the years 1957 to 1962.

2. For any given year, rates of return differences accounted for by 2-digit industry groups or by firms classified as tax- or non-tax-exempt were not significant. This is also true when we take the rates of return averaged over the years.

3. The standard deviations over the average rate of return computed over the years under study, however, showed that differences among classes of firms were significant although this was not so for industry groups. The standard deviations for the tax-exempt firms were wider, suggesting that rates of return in the tax-exempt firms were subject to wider fluctuations.

4. No exact statements can be made regarding multi-product large corporations which had tax-exempt prdduct lines. This is due to the observation that the overall rate of return

for a given tax-exempt product has not been shown to exceed in a majority of cases the overall rate of return of the large firm. But the decisive factor about which we have no knowledge is the proportional contribution to each firm's profits of a given tax-exempt product line.

It is hoped that these findings clarify more firmly some of the notions about rates of return in at least two classes of manufacturing enterprises in the Philippines during an early period of the country's industrial history. Inevitably tied up with these results is the obvious impact of an economic policy designed to encourage the creation of new industries. We are able to look at the behavior of profit rates during a period when balance of payments difficulties were beginning to be felt.

It is apparent from the results reported that tax-exemption subsidies may have been helpful at least in removing some of the riskiness associated with engaging in new enterprises and in assuring a rate of return at least as high as that expected for unprotected industries. Yet, they are still more risky than traditional industries, as shown by the fact that average rate of return variations were wider for the tax-exempt firms. There are further qualifications and amplifications that I wish to reserve to future papers touching on manufacturing entrepreneurship and again on the tax-exempt industries.

APPENDIX

Analysis of Variance - Rates of Return 1957-1962

Source of Variation	SS[1]	DF[2]	MS[3]	Computed F-Statistic
Tax-Exempt Firms:				
Sales				
Among Industry Groups	1631.00	12	135.92	4.0198
Within Years	2197.74	65	33.81	
Total	3828.75	77		
Equity				
Among Industry Groups	11291.81	12	940.98	4.4593
Within Years	13716.08	65	211.02	
Total	25007.90	77		
Non-Tax-Exempt Firms:				
Sales				
Among Industry Groups	1374.40	11	124.94	21.3718
Within Years	350.76	60	5.85	
Total	1725.18	71		
Equity				
Among Industry Groups	14996.15	11	1363.29	8.8560
Within Years	9236.30	60	153.94	
Total	24232.46	71		

[1]Sum of squares

[2]Degree of Freedom

[3]Mean squares

Analysis of Variance
Rates of Return on Sales

Source of Variation	SS[1]	DF[2]	MS[3]	Computed F-Statistic
1957				
Among Industry Groups	374.51	6	62.42	1.8502
Among Classes of Firms	2.65	1	2.65	.0785
Residual	202.41	6	33.74	
Total	579.57	13		
1958				
Among Industry Groups	792.65	12	66.05	1.3210
Among Classes of Firms	169.63	1	169.63	3.3922
Residual	600.06	12	50.00	
Total	1562.34	25		
1959				
Among Industry Groups	419.34	12	34.94	.6634
Among Classes of Firms	207.16	1	207.16	3.9329
Residual	632.08	12	52.67	
Total	1258.57	25		
1960				
Among Industry Groups	288.94	12	24.08	.9274
Among Classes of Firms	17.81	1	17.81	.6860
Residual	311.56	12	25.96	
Total	618.31	25		
1961				
Among Industry Groups	226.46	12	18.87	.5086
Among Classes of Firms	2.46	1	2.46	.0662
Residual	445.25	12	37.10	
Total	674.16	25		
1962				
Among Industry Groups	216.75	11	19.70	.8161
Among Classes of Firms	5.79	1	5.79	.2399
Residual	265.59	11	24.14	
Total	488.14	23		

[1]Sum of squares
[2]Degree of Freedom
[3]Mean squares

Analysis of Variance
Rates of Return on Equity

Source of Variation	SS[1]	DF[2]	MS[3]	Computed F-Statistic
1957				
Among Industry Groups	120.71	6	20.12	.0577
Among Classes of Firms	.54	1	.54	.0016
Residual	2093.03	6	348.84	
Total	2214.29	13		
1958				
Among Industry Groups	4885.15	12	407.10	1.3309
Among Classes of Firms	432.48	1	432.48	1.4138
Residual	3670.64	12	305.89	
Total	8988.27	25		
1959				
Among Industry Groups	1623.62	12	135.30	.6486
Among Classes of Firms	1479.65	1	1479.65	7.0929
Residual	2503.32	12	208.61	
Total	5606.58	25		
1960				
Among Industry Groups	1687.38	12	140.62	.8324
Among Classes of Firms	91.44	1	91.44	.5413
Residual	2027.24	12	168.94	
Total	3806.07	25		
1961				
Among Industry Groups	1991.04	12	165.92	.7947
Among Classes of Firms	3.23	1	3.23	.0155
Residual	2505.32	12	208.78	
Total	4499.60	25		
1962				
Among Industry Groups	2034.25	11	184.93	1.1224
Among Classes of Firms	2.65	1	2.65	.0161
Residual	1812.41	11	164.76	
Total	3849.31	23		

[1]Sum of Squares

[2]Degree of Freedom

[3]Mean Squares

Analysis of Variance
Average Rates of Return
1957-1962

Source of Variation	SS[1]	DF[2]	MS[3]	Computed F-Statistic
Sales				
Among Industry Groups	217.21	12	18.10	.53285 (12,12)
Among Classes of Firms	14.24	1	14.24	.41912 (1,12)
Residual	407.63	12	33.97	
Total	639.08	25		
Equity				
Among Industry Groups	1155.83	12	96.32	1.02834 (12, 12)
Among Classes of Firms	287.25	1	287.25	3.06676 (1, 12)
Residual	1123.97	12	93.66	
Total	2567.05	25		

[1]Mean of squares

[2]Degree of Freedom

[3]Mean squares

Analysis of Variance
Standard Deviation
1957-1962

Source of Variation	SS[1]	DF[2]	MS[3]	Computed F-Statistic
Sales				
Among Industry Groups	106.79	12	8.90	1.8405 (12, 12)
Among Classes of Firms	36.32	1	36.32	7.5116 (1, 12)
Residual	58.02	12	4.84	
Total	201.13	25		
Equity				
Among Industry Groups	635.68	12	52.97	2.5409 (12, 12)
Among Classes of Firms	92.27	1	92.27	4.4258 (1, 12)
Residual	250.18	12	20.85	
Total	978.14	25		

[1]Sum of Squares

[2]Degree of Freedom

[3]Mean Squares