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CROSS-SECTION ANALYSIS OF INCOME RETENTIONS OF LARGE MANUFACTURING CORPORATIONS

OUR analysis of aggregates of companies over fairly long time periods has revealed a rather stable pattern of relationship between corporate income and corporate savings: a change of 1.0 percentage point in the rate of net income has, on the average, been associated with a change of approximately 0.8 percentage point in the same direction in the rate of retained income. The question now arises whether a similarly stable pattern of relationship between corporate income and corporate savings can be obtained by comparing the behavior of individual companies in single years or for longer periods of time.

Generally speaking, one would expect greater corporate net income, other things being equal, to be associated with greater ability to retain, whether year-to-year or intercompany differences are considered. The effect of higher profitability, however, may be offset to a considerable extent by the influence of other factors. For example, if a company's net income increases from 5.0 to 8.0 percent in one year, retained income is likely to be greater in the second year; but, to mention two of many possible factors, this may not be the case if the stockholders' pressure for dividends becomes stronger, or if the company's rate of expansion declines. Similarly, if one company's net income is 5.0 percent and another's is 8.0 percent, the second company is likely to have a greater retained income. But again, this may not actually be the case if the second company's stockholders exert a stronger dividend pressure, or if its rate of expansion is lower.

Analysis of intercompany differences indicates the existence of relationships not essentially different from those found by analyzing time fluctuations. As will be seen, the range of variations among individual companies is wide, and the tendency of retained income to vary with net income is not always clear when the two are related in simple scatter diagrams. Yet, when the effect of certain other factors is taken into account (that is, when the *net* relation between retained income and net income is investigated)

a clearly defined pattern of relationship emerges, showing considerable stability from one period to another.

The data used in this chapter are for a relatively small sample of 70 large manufacturing companies, including most of the 45 dealt with in Chapter 4 and others of comparable size.[1] Study of intercompany differences was confined to a few selected years that illustrate widely different economic circumstances.

THE 1925–26 AND 1940–41 PATTERNS

It is interesting to compare the situation in an early part of the interwar period with that characteristic of its late years. Such a comparison may be made on the basis of the data presented in Charts 10 and 11.[2]

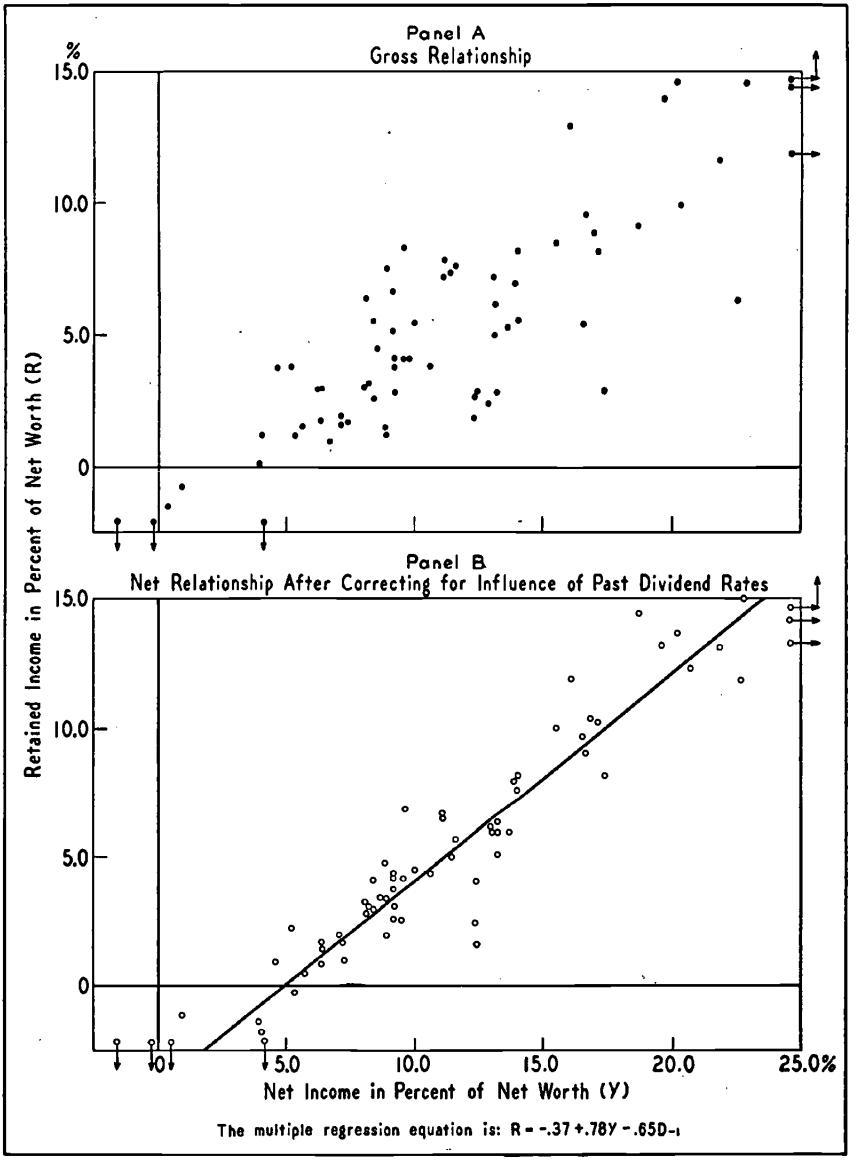
The upper panels of both charts show the gross relation between retained income and net income (without taking into account any other factors); the lower panels display the net regression line and the unexplained residuals. In the gross relationship, the difference between the two periods studied is readily observable. In 1925–26 a general tendency for the more profitable companies to have greater retentions is fairly evident, even though the dispersion of individual observations is quite wide. In 1940–41, on the other hand, the observations are so widely scattered that it is impossible to detect any general tendency. There are a number of companies, particularly within the high profit range, with surprisingly low retentions in these years.

This difference between the two periods becomes much more pronounced when the average data for the 11 industries represented by our sample are considered. An inspection of the upper panels of Charts 12 and 13 reveals that in 1925–26 interindustry differences were relatively small. Food and tobacco industries had rather low retentions, considering their high net income rates, while in the petroleum and rubber industries retentions were relatively high. In neither case, however, were the deviations from the pattern shown by the other industries especially pronounced. In sharp contrast, the years 1940–41 reveal very substantial differences among individual industries. Food, and particularly tobacco com-

[1] See Appendix A for a list of the companies included.

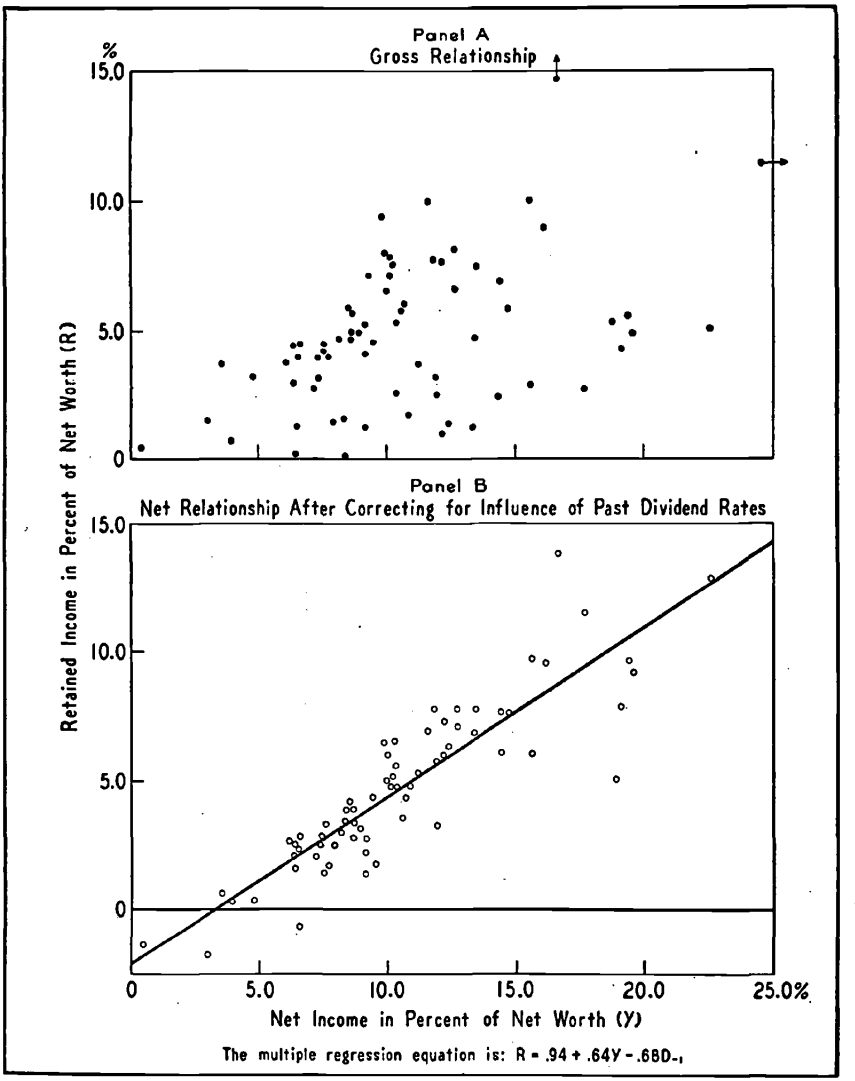
[2] The earliest years of the interwar period could not be used for this analysis because data prior to 1923 were lacking for some of the companies in our sample. The years 1925–26 were selected for the reason that they are more nearly comparable to 1940–41 in respect to the profitability of large manufacturing corporations. The use of two-year periods rather than single years is explained by the desire to have more accurate measures of the dividend and expansion requirements (see Chapter 5, footnote 4).

Chart 10—CORRELATION OF NET INCOME AND RETAINED INCOME RATES FOR 70 LARGE CORPORATIONS, 1925–26



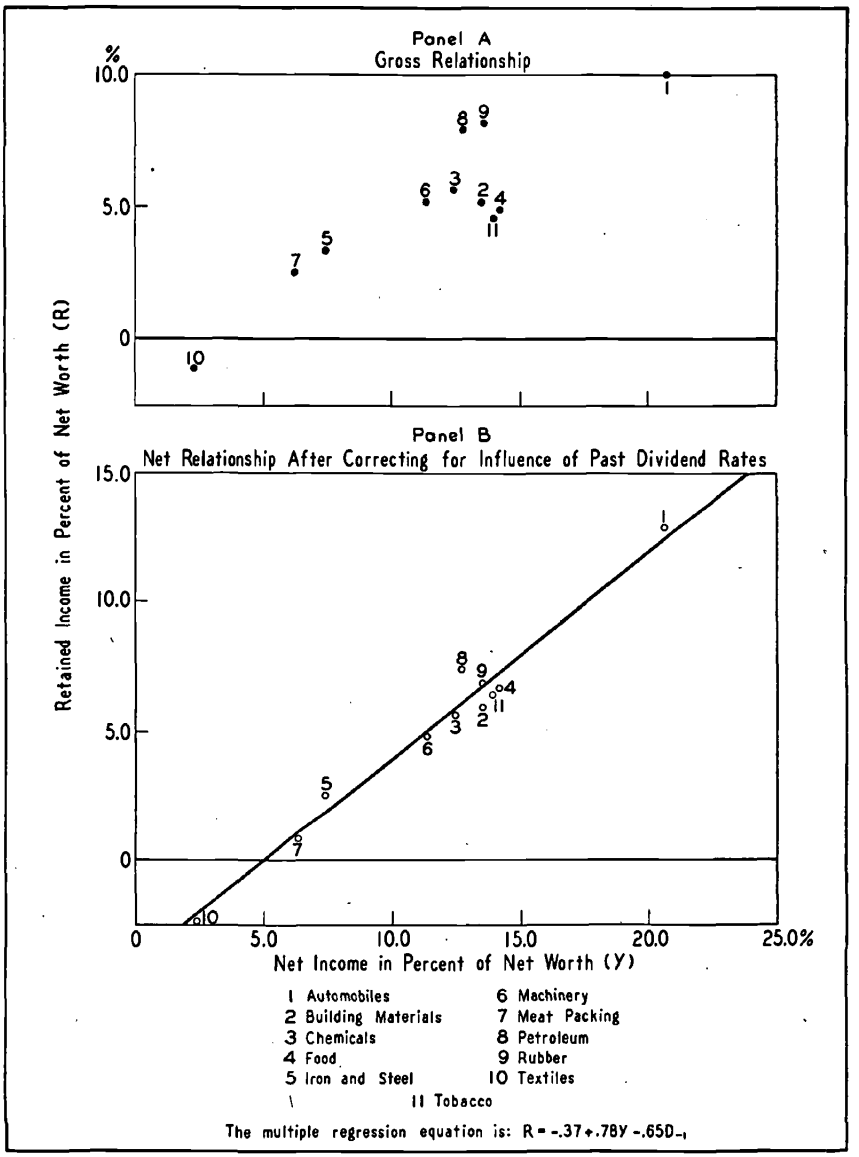
A direct relation between net income and retained income rates is shown by both panels, but the relation is much closer when a correction is made for the influence of past dividend rates.

Chart 11—CORRELATION OF NET INCOME AND RETAINED INCOME RATES FOR 70 LARGE CORPORATIONS, 1940–41



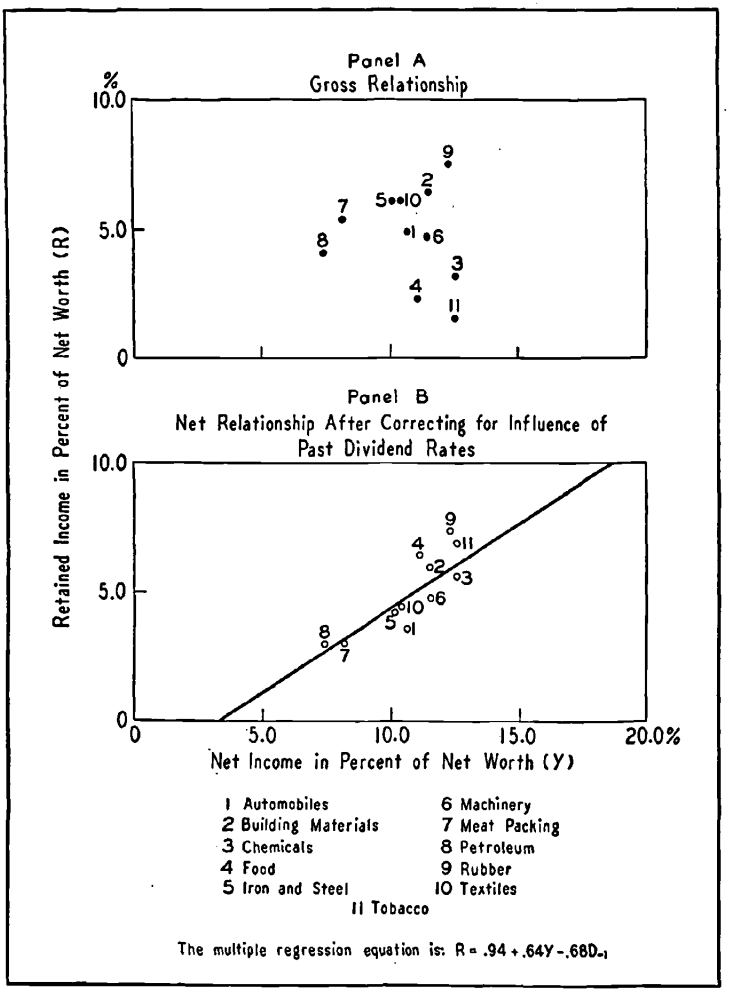
The data for 1940–41 show wide dispersion, but the relationship between net income and retained income rates is essentially the same as in 1925–26, when a correction for past dividend rates is made.

Chart 12—CORRELATION OF NET INCOME AND RETAINED INCOME RATES FOR 11 INDUSTRIES, 1925–26



Only minor interindustry differences in income retention are observed in 1925–26.

Chart 13—CORRELATION OF NET INCOME AND RETAINED INCOME RATES FOR 11 INDUSTRIES, 1940–41



Interindustry differences were much wider in 1940–41 than in 1925–26, but the net relation between net income and retained income rates was quite similar in both periods.

panies, retained only minor proportions of their respective net incomes, despite their continued high profitability. The chemical industry also registered a much lower retained income than that of the other industries with

comparable net income rates. At the other end of the range are the petroleum and rubber industries, which continued to retain very substantial portions of their net income.

Thus, it may be stated that corporate policies with respect to income retention were much more diversified in 1940–41 than in 1925–26. This difference between the two periods, however, is not surprising, once it is recalled that they are separated by the severe depression of the early thirties, which affected the various sectors of the corporate economy unequally,[3] and by the years in which the undistributed profits tax (1936–37) was in force, with its unequal effect upon different groups of corporations. These disturbing factors are reflected, to some extent, in the additional variables introduced into the analysis in the following section, and it will be seen that the dissimilarity between the two periods is substantially reduced when these additional variables are taken into account.

RELATIVE IMPORTANCE OF PROFITABILITY AND SOME OTHER FACTORS AFFECTING INCOME RETENTIONS

The factors other than net income, introduced into our cross-section analysis, are the same as those studied in connection with time variations in Chapter 4, namely, reserve, expansion, and dividend requirements.

Multiple correlation tests have been made, on the basis of the data for the individual companies included in our sample of large manufacturing corporations, for the periods 1925–26 and 1940–41.[4] The following variables have been employed:

[3] It is interesting to note that the food and tobacco industries suffered much less than the others from the cyclical contraction of 1930–33. Net income in these two industries declined relatively little, which permitted them to continue payment of dividends at levels close to those of the predepression years without incurring substantial net dissaving. The chemical industry likewise experienced a relatively mild cyclical contraction.

[4] It seems probable that averages for two-year periods provide better measures of dividend and expansion requirements than data for single years.

No data are available for use as a direct measure of the variation in dividend pressure to which different companies are subject in a given year, but it seems reasonable to assume that for a company with a given net income, current dividend requirements will be higher—and current propensity to retain net income lower—the greater the amount of dividends paid in the preceding period. Differences among companies with respect to the preceding period's dividends may, therefore, be taken to represent approximately the differences in their current dividend requirements. There is no simple rule that would determine the length of the period to be considered in this connection, but it seems that the data for the two years are fairly adequate to indicate intercompany differences with respect to dividend pressure.

Similarly, it may be expected that the range of discrepancies between planned and actual asset expansion is reduced if data for two-year periods rather than for single-year periods are used.

R = retained income in percent of average net worth;
Y = net income in percent of average net worth;
D_{-1} = dividends in the preceding two-year period in percent of average net worth;
E = operating asset expansion in percent of operating assets at the beginning of the period; [5]
S_{-1} = surplus and reserves at the end of the preceding period, in percent of net worth at the end of the preceding period.

The regression equation obtained for the years 1925–26 is:

$$R = -0.22 + 0.74Y - 0.65D_{-1} + 0.05E + 0.0005S_{-1} \quad (1)$$
$$\pm 0.05 \quad \pm 0.09 \quad \pm 0.03 \quad \pm 0.02$$

and the equation for the years 1940–41 is: [6]

$$R = 1.72 + 0.69Y - 0.68D_{-1} - 0.06E - 0.02S_{-1} \quad (2)$$
$$\pm 0.05 \quad \pm 0.06 \quad \pm 0.02 \quad \pm 0.01$$

Thus, we find that in both periods current net income (Y) and the preceding period's dividends (D_{-1}) exerted a significant effect upon retained income (R), the relationship to R being direct in the case of Y and inverse in the case of D_{-1}. The regression coefficients of these two factors show only a slight change from one period to the other. In both instances, a difference of 1.0 percentage point in the rate of net income, other things being equal, was associated with a difference of approximately 0.7 percentage point in the rate of retained income, while a difference of 1.0

[5] Operating assets include all assets other than cash and marketable securities.

[6] The coefficients of multiple correlation and the coefficients of simple correlation between the variables involved are as follows for 1925–26:

$R_{1.2345} = 0.930$

	R	Y	D_{-1}	E	S_{-1}
R	1.000	0.861	0.239	0.591	0.251
Y		1.000	0.596	0.615	0.257
D_{-1}			1.000	0.376	0.121
E				1.000	0.295
S_{-1}					1.000

and for 1940–41:

$R_{1.2345} = 0.896$

	R	Y	D_{-1}	E	S_{-1}
R	1.000	0.383	−0.405	0.239	−0.447
Y		1.000	0.586	0.344	0.066
D_{-1}			1.000	−0.072	0.370
E				1.000	+0.009
S_{-1}					1.000

percentage point in the dividend rate of the preceding period, other things being equal, was associated with a difference close to —0.7 percentage point in the rate of retained income.

The results are inconclusive for the other two factors—operating asset expansion and surplus. In 1925–26, the standard errors of coefficients of E and S_{-1} are too large for the coefficients to be considered significant. In 1940–41, on the other hand, the coefficients may be considered significant.[7] The relationship between S and R is inverse, as one would expect it to be: a greater surplus, indicating a stronger reserve position, tended to bring retentions down. The relationship between E and R is found to be inverse too, which, in this case, is contrary to what one would expect and contrary, also, to the result apparent in 1925–26. It appears that companies that expanded their operating assets more rapidly made smaller rather than greater retentions at given income levels; however, the effect of expansion on retained income, as indicated by our equation for 1940–41, was relatively small: retentions varied to the extent of only 6 cents (per $100 of net worth) for every $1 change (per $100 of net worth) in asset expansion.

It is difficult to account adequately for this inverse relationship between corporate retained income and asset expansion in 1940–41; but it should be pointed out that, as already mentioned, corporate retention policies became widely diversified after the period of severe depression in the early thirties and the years of the undistributed profits tax. The differences were particularly pronounced among the concerns with high profit rates—which were generally the ones with high asset expansion rates. Some of these companies pursued retention policies in 1940–41 essentially similar to those witnessed in the twenties, but many others made only minor retentions. It should also be noted that the results obtained with respect to asset expansion may have been affected by intercorrelation between this variable and the rate of net income.

If asset expansion and surplus are omitted from the computation, the coefficients of multiple correlation and the regression coefficients of the other two independent variables (Y and D_{-1}) are changed only slightly. The results obtained are given below:

For the years 1925–26:

$$R = -0.37 + 0.78Y - 0.65D_{-1} \qquad (3)$$
$$\pm 0.04 \quad \pm 0.09 \qquad R_{1.23} = 0.926$$

[7] In the case of S_{-1} the coefficient is significant at a 5 percent probability level, but not at a 1 percent probability level.

For the years 1940–41:

$$R = 0.94 + 0.64Y - 0.68D_{-1} \qquad (4)$$
$$\pm 0.05 \quad \pm 0.05 \qquad R_{1.23} = 0.866$$

The relationships indicated by Equations 3 and 4 are illustrated graphically in Charts 10 and 11. As already observed, the upper panels of both charts present the gross correlation between net income and retained income (without taking any other factors into account). The dispersion of observations is wide in both cases, particularly in 1940–41. The lower panels show (1) the net regression of retained income on net income, when the effect of the preceding period's dividends is held constant, and (2) the residuals (measured by the vertical distances between the dots and the net regression line) after the effects of both Y and D_{-1} have been taken into account. The improvement of correlation, resulting from the introduction of D_{-1} into the analysis, is clear when the upper and lower panels are compared.

Similar results are revealed in Charts 12 and 13, where the average data by industry are presented.[8]

INCOME RETENTIONS IN 1935 AND 1936

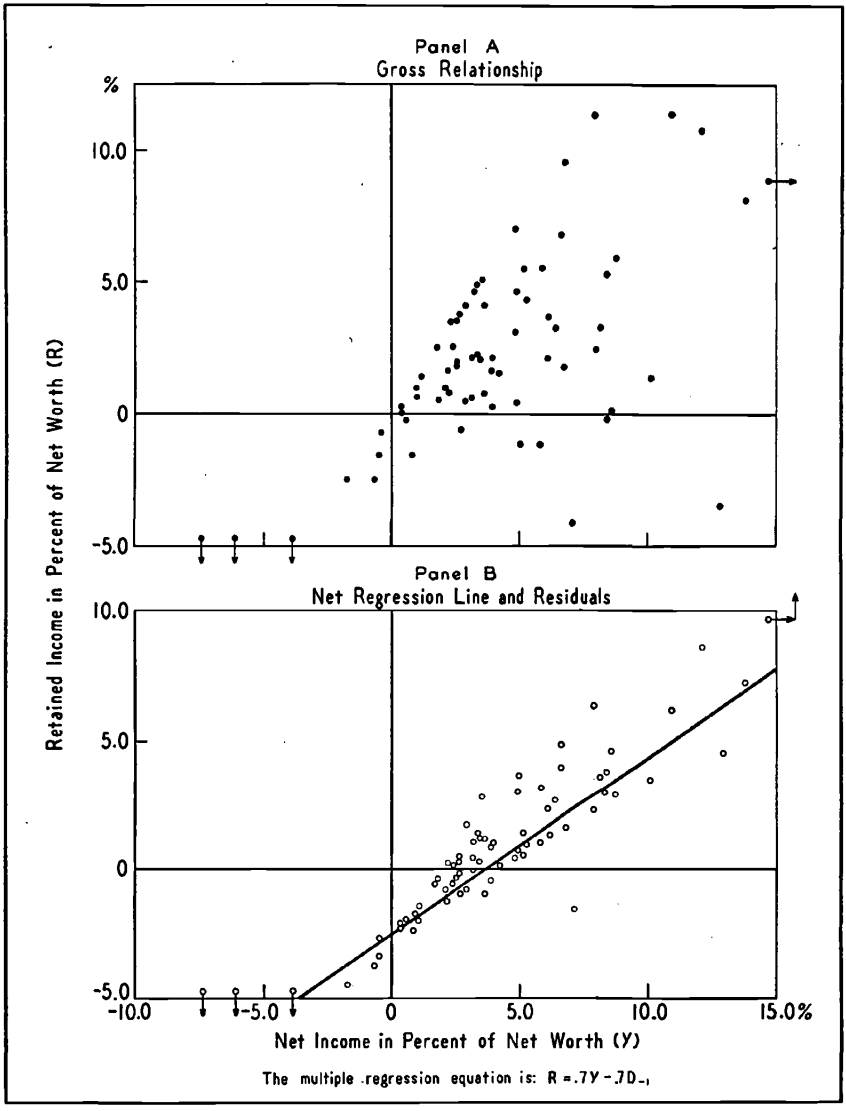
The preceding analysis has revealed considerable similarity between the periods 1925–26 and 1940–41 in so far as the net relation between retained income and net income is concerned. The question naturally arises as to whether similar patterns of relationship characterized the intervening years. To throw some light on this problem we have tested the results obtained for the years 1925–26 and 1940–41 on the data for two other years, namely, 1935—the last year prior to the imposition of the undistributed profits tax—and 1936—the first year in which the tax was enforced. Since the equations for 1925–26 and 1940–41 are quite similar, and since we are here applying results obtained for two-year periods to single years, we use a rough average of the regression equations previously obtained, namely,

$$R = .7Y - .7D_{-1}.$$

The tests are presented in Charts 14 and 15. Panels A in both charts again illustrate the gross relation between retained income and net income. As can be seen, the dispersion of observations is very wide in both

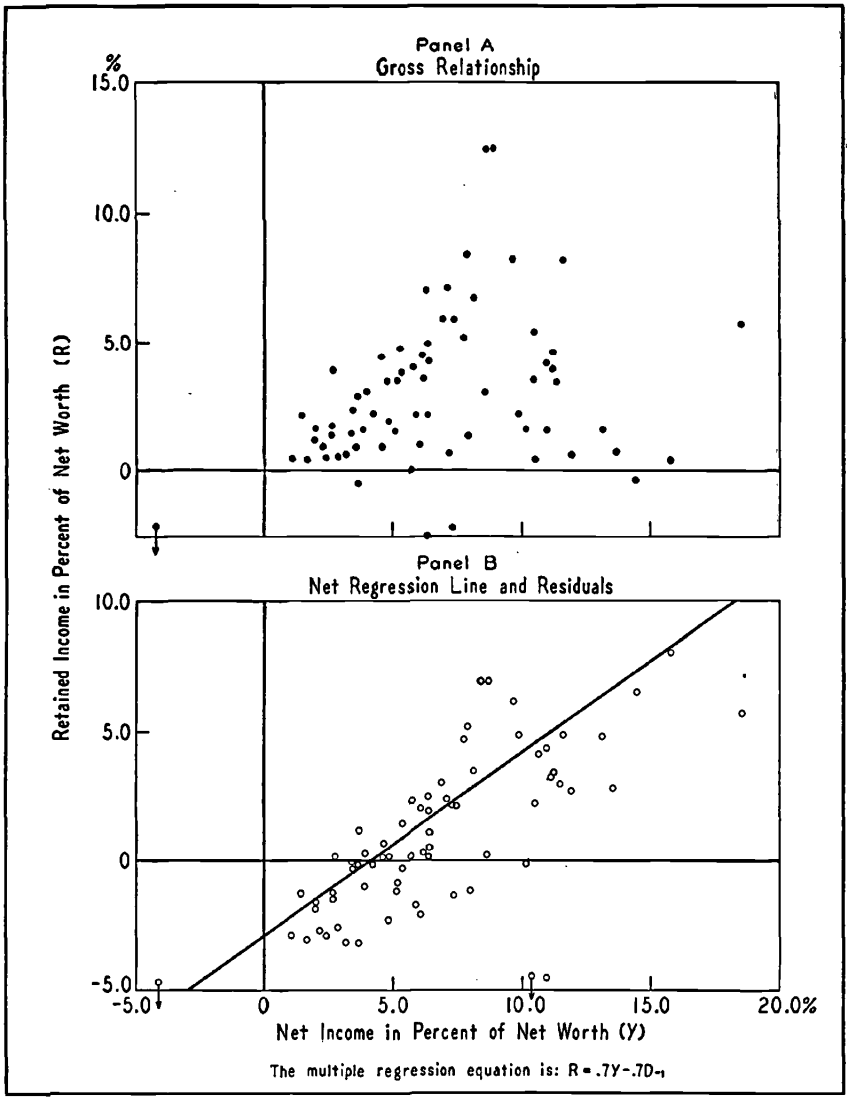
[8] The regression lines drawn in the lower panels of these two charts are the same as those drawn in Charts 10 and 11.

Chart 14—CORRELATION OF NET INCOME AND RETAINED INCOME RATES FOR 70 LARGE CORPORATIONS, 1935



The relation between net income and retained income rates in 1935 was not essentially different from that observed in 1925–26, when a correction is made for the influence of past dividend rates.

Chart 15—CORRELATION OF NET INCOME AND RETAINED INCOME RATES FOR 70 LARGE CORPORATIONS, 1936



Income retentions of most large companies were low in 1936, when compared with the patterns obtained for 1925–26 and 1940–41.

cases, but in 1936 we find a particularly large number of companies with high net income rates but low retentions. This peculiarity of 1936 stands out even more clearly when the lower panels of the charts giving the net regression line and the residuals are considered.

It will be noted that while the majority of the residuals are positive (above the regression line) for 1935, negative residuals (below the regression line) are clearly predominant in 1936. A statistical test (chi-square) indicates that the upward concentration of the residuals in 1935 is not sufficiently pronounced to be considered significant. We may conclude, therefore, that the retentions of large corporations in that year approximately conformed to the general pattern characteristic of the inter-war period. In contrast, when a similar test is applied to the 1936 data it is found that the retentions of large corporations in that year were significantly below the levels indicated by the general pattern.

The deviations found in 1936 illustrate the impact of the undistributed profits tax on the retention policies of large concerns. One interesting fact in this connection is that the companies in the highest net income range exhibit particularly strong downward deviations. Actually, as Chart 15 shows, the residuals are negative (below the regression line) for all companies with net income rates of 10 percent and over, while both negative and positive residuals are found at lower net income rates.

The difference between the companies with high profit rates and those with low and moderate profit rates becomes even more clear when the movements of net income and retained income from 1935 to 1936 are compared. Most corporations enjoyed higher profitability in 1936 than in 1935, and many cases in which an increase in net income was accompanied by a decrease in retained income are found among the highly profitable concerns, though not among the less profitable ones.[9]

This difference in the reaction to the tax cannot be attributed to its progressive scale. While the rate of the undistributed profits tax was higher in cases where a greater proportion of income was retained, it was not directly related to the profitability of the taxpaying corpora-

[9] This is borne out by a count of individual company changes, which shows that among companies with net income rates of less than 10 percent an increase in the rate of net income from 1935 to 1936 was associated with an increase in the rate of retained income in 81 percent of all cases; for companies with net income rates of 10 percent and over, the corresponding figure was 57 percent. If the dividing line is drawn at a net income rate of 15 percent, the difference between the two groups of companies becomes even sharper; in the lower income group, 80 percent of all concerns, and in the higher income group only 40 percent, showed higher rates of retained income at higher rates of net income.

tion.[10] The reasons for the lesser reaction by companies with relatively low rates of net income are not, therefore, entirely clear. Differences in cash position may have been an important factor: companies of relatively low profitability tend to be in a less favorable cash position, and in many instances may have been unable to increase dividends in order to avoid the tax in question. Differences pertaining to external financing were probably significant, too: companies with higher profits, being in a better position to attract funds from external sources, were less pressed to retain income at the cost imposed by the tax.

The undistributed profits tax remained in effect only two years—1936 and 1937. After its repeal in 1938, corporate income retentions, in general, increased,[11] but there was considerable dissimilarity in the reaction of individual companies to the repeal of the tax, just as there was considerable dissimilarity in their reactions to its imposition in 1936. Some companies reverted to the policy of retaining substantial proportions of their net income; others, with comparable profit records, continued to distribute the bulk of their net income as dividends. As our chart for the period 1940–41 shows, a large number of the firms with net income rates of 15 percent and over retained only one-third or less of their respective net incomes.[12]

The fact that some corporations with relatively high profit rates continued to keep retentions down was probably accounted for, in part, by a change in the governmental attitude toward corporate retained income. To prevent "unjustified" retentions, the government attempted to apply rigorously Section 102 of the Revenue Code, which provided for a penalty tax on corporations whose retentions were greater than required by their actual financial needs.[13] After the repeal of the undistributed profits tax,

[10] The tax was graduated from 7 percent of the portion of the undistributed net income which was not over 10 percent of the adjusted net income to 27 percent of the portion of the undistributed net income which was over 60 percent of the adjusted net income. See U. S. Treasury Department, *Statistics of Income, 1936*, Part 2, pp. 12 and 13.

There was a special allowance for corporations with net income not exceeding $50,000, but this was of no consequence for the large corporations in our sample.

[11] See Chart 6 in Chapter 4.

[12] Scatter diagrams for 1938 and 1939 (showing the gross relation only) were prepared and found to be generally similar to the one for 1940–41.

[13] The provision was first enacted in 1913 and was amended several times in later years, but remained unimportant until 1938. Its main purpose was to prevent the avoidance of personal income taxes through corporate retentions, but its practical application was severely limited by the difficulty of establishing a clear dividing line between a retention made for legitimate financial needs and a retention made to diminish the stockholders' tax burden. In 1938 the position of the tax authorities was made easier by a shift to corporations of the burden of proof in doubtful cases.

revenue agents were on the lookout for cases where retentions amounted to more than 30 percent of net income.[14] Companies were asked to justify such retentions. The 30 percent mark, however, was not the sole criterion. The penalty tax was not to be imposed, even when retentions exceeded 30 percent, if they were justified by the company's expansion requirements; on the other hand, the tax could be imposed where less than 30 percent of net income was retained, if the retentions were deemed unjustified. This element of uncertainty may have made many companies hesitate to retain substantial portions of their net income, in particular large and highly profitable corporations subject to heavy penalties.

Another factor which tended to lower the proportion of 1940 net income retained was a considerable accumulation of certain other funds—mainly accruals for income tax purposes. As corporate income tax rates advanced, accumulation of these accrued funds by companies with high net incomes reduced their need for both retained income and long-term external financing. The data show that most companies in the upper net income range registered accumulations of accrued liabilities in 1940–41 far in excess of net income retentions and new financing through financial markets.

SUMMARY OF CONCLUSIONS

1. In the middle twenties, companies with higher profit rates were characterized by higher income retentions than less profitable concerns. In contrast, at the end of the interwar period a large number of highly profitable corporations had surprisingly low retentions.

2. The sharp contrast between different parts of the period disappears, however, when account is taken of some factors other than profitability. When the *net* relation between net income and retained income is studied, the data for 1925–26 and 1940–41 indicate that in both cases a difference of 1 percentage point in the rate of net income, other things being equal, was associated with a difference of approximately 0.7 percentage point in the rate of retained income. The analysis further indicates that in both cases a difference of 1 percentage point in the preceding period's dividend rate, other things being equal, was associated with a difference of approximately —0.7 percentage point in the rate of retained income.

[14] In July 1939, instructions (TD 4914) were issued to revenue agents which contained the first reference to the "70 percent" principle. In 1944 further instructions (TD 5398) regarding permissible and nonpermissible practices connected with retained income were sent out. The rates of the penalty tax under Section 102 vary from 25 to 35 percent of the amount retained.

3. The data for individual companies in 1935 and 1936 indicate that the undistributed profits tax had its greatest effect on the income retention policies of corporations of relatively high profitability and that it had relatively little consistent effect on the policies of less profitable concerns.