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Chapter Title: Portents of Discontinuance

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PORTENTS OF DISCONTINUANCE

Credit analysis theory is based on the assumption that since the success of a business enterprise is measured in pecuniary terms it is possible to distinguish between the sound and the unsound, the successful and the unsuccessful, by examining certain "credit" ratios. 1/ That is to say, the theory assumes that if a designated credit ratio falls below or rises above some empirically determined level - depending on the relationship measured by the ratio - that deviation signals financial difficulty and even, if it persists, portends discontinuance of business operations. The data available for use in this study permit an experimental testing of this primary assumption, particularly the assumption that persistent deviation from an empirical norm foretells disappearance of an enterprise from the business scene. Such a testing is subject to limitations, but it can ascertain whether in this particular group of corporations a systematic ratio pattern was exhibited by the discontinuing companies.

For a test of the type to which this chapter is devoted our data should pertain only to the experience of companies that are known to have suffered severe financial difficulties resulting in reorganization or failure. The sample with which we have to work is not, however, of this character. Strictly speaking, all we know is that these companies ceased filing federal corporate income tax returns. Some may have changed to a non-corporate form of organization, and others may have discontinued business voluntarily. But we have reason to believe that the majority were what may be termed involuntary discontinuances.

The data on which this chapter is based were developed as follows. The primary samples for our study consisted of a drawing of about 200 eligible companies in each of the five industries from the 1926 federal income tax returns, and of another, smaller drawing from the 1930 returns. These companies were then traced through

the files for the succeeding ten and six years, respectively. The corporations studied in the foregoing chapters are those from the 1926 drawing that continued to file income tax returns through 1936. The remainder ceased filing returns some time before that year, as did nearly half of the companies in the 1930 drawing. Since companies involved in mergers and consolidations had been eliminated from the samples, and since federal law requires the filing of an income tax return by every active corporation, these companies that ceased filing returns may be assumed to have gone out of business as corporate entities. Presumably they were failures, although, as mentioned above, a few may have left business voluntarily or changed to a non-corporate form of ownership. 2/

The present analysis is based, therefore, on the returns of companies that discontinued after remaining in the sample six years or more. Thus it includes, from the 1926 drawing, the companies that discontinued some time during the years 1932-36, and, from the 1930 drawing, the companies that disappeared in 1936. These discontinuances number 200 in all, distributed among the five industries as follows: baking 47; men's clothing 41; furniture 38; stone-clay 43; machine tool 31. They are referred to as the identical sample of discontinuing companies. While the sample is small, it is, to our knowledge, the only one available for testing, in regard to small manufacturing concerns, the basic assumptions of credit analysis theory.

In studying the financial statements of enterprises that ultimately disappear from the business scene one of the most serious problems is the difficulty of reducing the tabulations to a basis adapted to temporal analysis. If all the disappearances occurred in a single year the problem would not arise, but in the present instance we are dealing with corporations that disappeared severally over a period of five years. A tabulation of their financial statements for a series of calendar years before discontinuance would not permit careful analysis, because the number of companies would change from year to year and in each year some would be nearer discontinuance than others. Therefore we have taken the year of disappearance as the point of reference, regardless of the particular calendar year it happens to be, and have tabulated the financial statements according to the number of years be-

fore discontinuance. 3/ Thus the statements of the 200 companies were grouped into six divisions, according to whether they covered the first, second, third, fourth, fifth or sixth calendar year 4/ before the company in question left the business scene. The statements in each of these divisions were then aggregated to yield a composite balance sheet and income account for each of the six year-before-discontinuance periods. The tabulations could not be carried beyond the sixth year before disappearance, for some of the corporations were in the sample only six years. 5/

FINANCIAL RATIOS AS INDICATORS

In the financial structure of our sample corporations there were many elements that gave advance evidence of ultimate discontinuance, but three ratios proved to be particularly sensitive indicators in this respect: current assets to current liabilities, net worth to total debt, 6/ and net working capital 7/ to total assets. These three were selected by the trial and error method, a large number of possible ratios being tested.

The first and third of these ratios reflect the "freezing" of working capital, the first by comparing the two determinants of working capital with each other, and the third by comparing the difference between these two components with the total assets of the company. The second ratio - net worth to total debt - reflects the relative positions of the owners and creditors in the enterprise. When the capital of an enterprise becomes less and less liquid, and the creditors' claims persist in increasing, in relation to the owners' equity, we have what are here called portents of discontinuance. It is significant that the profit ratio was a less sensitive and reliable indicator than any of the three ratios listed above. In the present chapter these three "indicator" ratios, computed for each year before discontinuance, are compared with the corresponding ratios for the continuing companies. 8/

In this comparison certain obvious difficulties have had to be surmounted. In the first place, the ratios for the surviving companies pertain to given calendar years, while those for the discontinuing companies cover given

years before discontinuance, each of which represents a different assortment of calendar years. And in the second place, a change in a ratio between, say, the fifth and the third year before discontinuance cannot be wholly attributed to the fact that the time of disappearance was drawing nearer: some of the change may have been due to the dominance of generally prosperous years in the fifth, and of generally unprosperous years in the third, year before discontinuance.

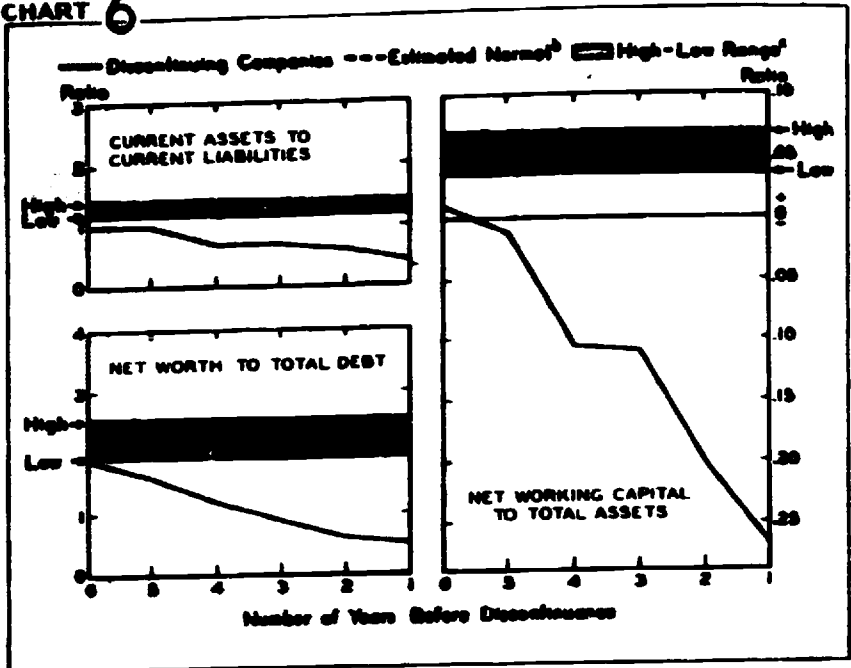
A rather crude means of solving these problems is to determine, for the surviving companies, the high-low range of each ratio's variation during all the years 1926-35. When this method is followed any given ratio for the discontinuing companies is not regarded as out of line until it has passed outside that ratio's high-low range as established by the surviving companies. For some purposes of comparison, however, this method of correction is too conservative, because in relatively prosperous or relatively depressed years a ratio for the discontinuing companies may be dangerously high or low and still fall within the high-low range for the continuing corporations. Therefore a standardizing technique has been applied to the three selected ratios in order to derive, for each of them, the "estimated normal," that is, a ratio for the surviving companies which pertains to the same combination of calendar years that is contained in each year before discontinuance. 9/

Although both of these bases of comparison give consideration to the cyclical factor they serve different purposes. The high-low range indicates the maximum cyclical variation and hence is particularly useful in determining when the level of the disappearing companies' ratio is out of line. The estimated normal allows roughly for the cyclical influences operative in each given year before discontinuance, and thus can be used to test the direction of movement as well as the level of the disappearing companies' ratio.

In Charts 6 to 10 the three ratios mentioned above - current assets to current liabilities, net worth to total debt, and net working capital to total assets - are presented for the discontinuing companies in each industry, and for each year before discontinuance, and are compared with the estimated normal and with the high-low range es-

47 DISCONTINUING AND 81 CONTINUING BAKING CORPORATIONS: Three Selected Ratios, by Number of Years Before Discontinuance^a

CHART 6



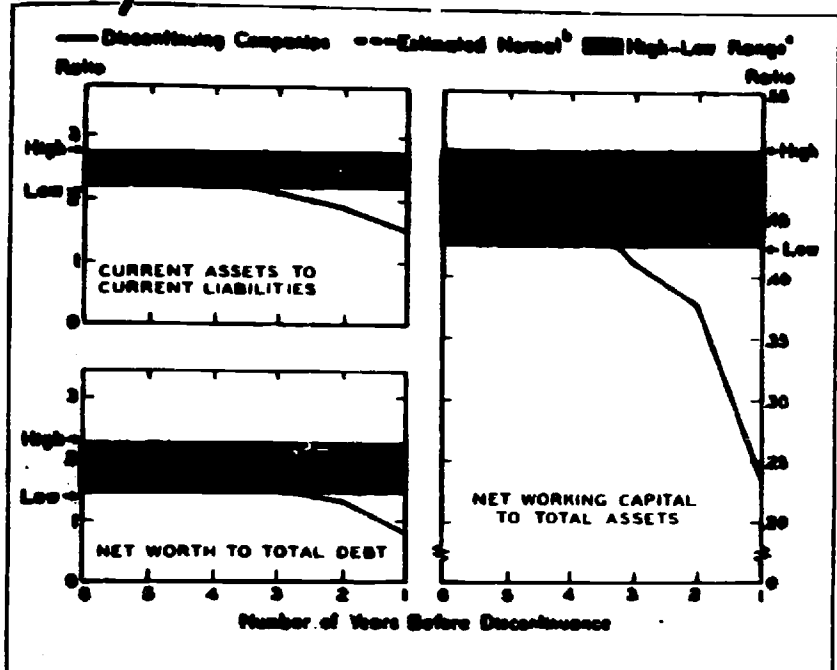
^a Based on Table D-2 in Appendix D and Table B-22 in Data Book (see footnote 16 of Chapter 1).

^b Weighted average of the continuing companies' ratios for the various calendar years contained in each year before discontinuance; for method of estimate see Appendix D.

^c Range of 1926-35 annual ratios for sample of continuing companies.

41 DISCONTINUING AND 46 CONTINUING
MEN'S CLOTHING CORPORATIONS: Three Se-
lected Ratios, by Number of Years Be-
fore Discontinuance^a

CHART 7

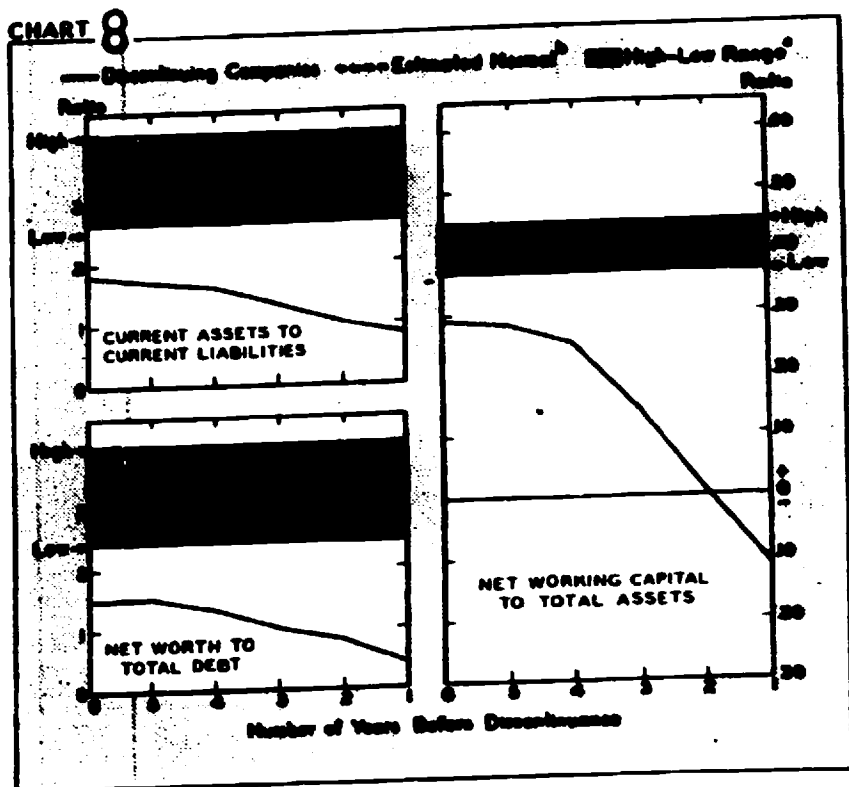


^a Based on Table D-2 in Appendix D and Table B-23 in Data Book (see footnote 16 of Chapter 1).

^b Weighted average of the continuing companies' ratios for the various calendar years contained in each year before discontinuance; for method of estimate see Appendix D.

^c Range of 1926-35 annual ratios for sample of continuing companies.

38 DISCONTINUING AND 66 CONTINUING FURNITURE CORPORATIONS: Three Selected Ratios, by Number of Years Before Discontinuance^a

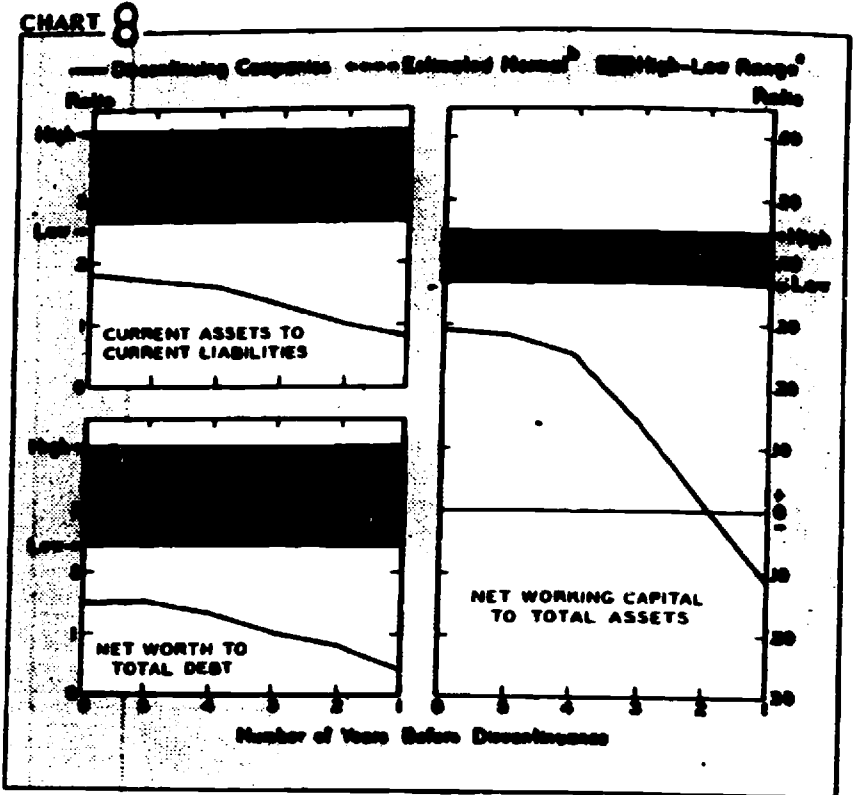


^a Based on Table D-2 in Appendix D and Table B-24 in Data Book (see footnote 16 of Chapter 1).

^b Weighted average of the continuing companies' ratios for the various calendar years contained in each year before discontinuance; for method of estimate see Appendix D.

^c Range of 1926-35 annual ratios for sample of continuing companies.

38 DISCONTINUING AND 66 CONTINUING FURNITURE CORPORATIONS: Three Selected Ratios, by Number of Years Before Discontinuance^a



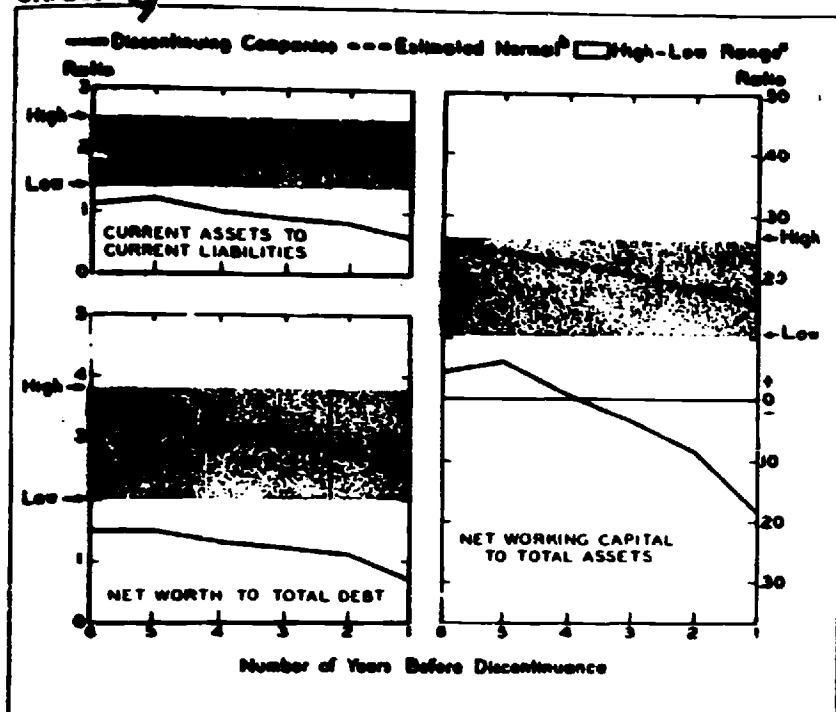
^a Based on Table D-2 in Appendix D and Table B-24 in Data Book (see footnote 16 of Chapter 1).

^b Weighted average of the continuing companies' ratios for the various calendar years contained in each year before discontinuance; for method of estimate see Appendix D.

^c Range of 1926-35 annual ratios for sample of continuing companies.

43 DISCONTINUING AND 70 CONTINUING
STONE AND CLAY CORPORATIONS: Three
Selected Ratios, by Number of Years
Before Discontinuance^a

CHART 9



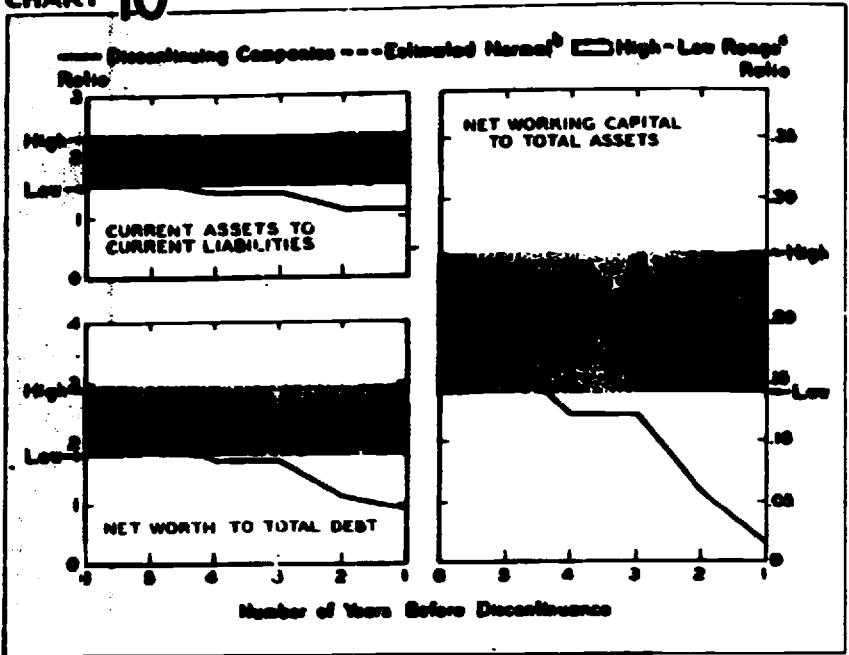
^a Based on Table D-2 in Appendix D and Table B-25 in Data Book (see footnote 16 of Chapter 11).

^b Weighted average of the continuing companies' ratios for the various calendar years contained in each year before discontinuance; for method of estimate see Appendix D.

^c Range of 1926-35 annual ratios for sample of continuing companies.

31 DISCONTINUING AND 118 CONTINUING
MACHINE TOOL CORPORATIONS: Three
Selected Ratios, by Number of Years
Before Discontinuance^a

CHART 10



^a Based on Table D-2 in Appendix D and Table B-26 in Data Book (see note 16 of Chapter 1).

^b Weighted average of the continuing companies' ratios for the various calendar years contained in each year before discontinuance; for method of estimate see Appendix D.

^c Range of 1926-35 annual ratios for sample of continuing companies.

established by the surviving companies over the period 1926-35. 10/ From these charts it can be observed that except in men's clothing all three ratios were below the estimated normal as early as the sixth year before discontinuance. And in three of the industries they were out of line that early even if we adopt the very conservative standard of the high-low range for the continuing companies; here machine tool and again men's clothing are the exceptions.

Equally significant is the movement of the discontinuing companies' ratios as the year of discontinuance draws near. In all five industries they declined persistently, in most instances sharply, from the sixth to the first year before discontinuance, thereby increasing their divergence from the estimated normal. For the five industries combined this increasing divergence is found to be statistically significant: in each of the three ratios the probability that chance alone would account for this persistent divergence is less than one out of a hundred. 11/

Of the three ratios shown in Charts 6 to 10, that of net working capital to total assets provides the most definite indications of ultimate discontinuance. 12/ In each industry its downward movement was sharp - more so than that of either of the other ratios - and virtually uninterrupted. It was the only one of the three to fall decisively below the high-low range in the men's clothing sample. In the stone-clay and machine tool groups its downward movement was accompanied by a decline in the estimated normal, but its decline was greater than that of the estimated normal and its level was decidedly lower.

The ratios plotted in Charts 6 to 10 are ratios of aggregates, against which it may be argued that the influence of the larger companies in the sample has more weight than that of the smaller, and that the relative influence of an individual company may vary significantly during the period. While these ratios of aggregates are, in essence, the properly weighted averages of the ratios for the individual companies, the relative weights may vary somewhat through the period. Ratios of aggregates were employed here because the open-end classes in the available frequency distributions precluded the calculation of the correct mean ratio. Medians were similar-

ly indeterminate because of the necessity of interpolating within frequency distribution classes.

There are several reasons for believing, however, that the movements shown by the ratios plotted in these charts are representative not only of the sample companies in the aggregate, but also of the particular enterprises. In the first place, the companies in the samples are all relatively small; most had total assets between \$50,000 and \$150,000, with only a few over the \$200,000 level. Therefore there was not the opportunity - found in some simple aggregations of financial statements - for the influence of one or a few companies to outweigh that of a great many other-concerns in the group. It is this factor, incidentally, which provides the basis for the representativeness of much of the analysis in the preceding chapters of this study.

Secondly, a special tally of the ratios of the particular companies in the samples of discontinuances revealed that the great majority in each group evidenced a downward movement similar to that shown in the charts. A count was made of the number of companies in each sample for which the given ratio fell with no more than two interruptions from the sixth to the first year before discontinuance; for some of the companies there was no interruption, and the majority had only one. The results, expressed as a percentage of the number of companies in each sample, are presented herewith. It can be seen that the proportion of companies recording what may be called a persistent decline ranged from 51 percent (net worth to total debt in the men's clothing group) to 76 percent (net working capital to total assets in furniture). In most of the samples from three-fifths to three-fourths of the companies experienced the indicated decline. The comparatively small proportions for the men's clothing sample accord with our earlier observation, based on the

	<u>Current Assets to Current Liabilities</u>	<u>Net. Worth to Total Debt</u>	<u>Net Working Capital to Total Assets</u>
Baking (47 cos.)	62%	68%	68%
Men's clothing (41 cos.)	54	51	68
Furniture (38 cos.)	66	71	76
Stone-clay (43 cos.)	70	53	72
Machine trol (31 cos.)	61	65	61

charts, that the portents for this group were less well marked than those for the other samples.

For the companies that showed more than two interruptions the given ratio sometimes declined markedly, sometimes remained fairly stable and occasionally rose in the fifth and fourth years before discontinuance and then plunged downward. In each sample a handful of companies experienced a persistent rise in the ratio, indicating that these discontinuances were the voluntary liquidations mentioned earlier. There appear to have been four or five of these companies in each sample. If it could be established that they, and they alone, were voluntary liquidations, their elimination from these samples would further sharpen the contrasts pictured in Charts 6 to 10.

A final reason for trusting the movements shown by the ratios in these charts is provided by the fact that crudely calculated mean ratios give a similar picture. These mean ratios are characterized as "crudely calculated" because the assumed midpoint of the open-end class was held constant. Thus calculated, the mean ratios decline slightly less than the ratios of aggregates shown in the charts. But if the midpoints of the open-end and next lower classes had been moderately adjusted downward as the last year before discontinuance approached, the mean ratios would have fallen equally as sharply as the ratios of aggregates; and there is every reason to believe that the central tendencies of these upper classes in the frequency distributions actually underwent such a decline.

The fact that the mean ratios declined commensurately with the ratios of aggregates shown in the charts indicates merely that the downward movement was not brought about solely by the large companies. It would still be theoretically possible for the mean ratios to decline and the particular company ratios to fluctuate erratically over the distribution. That this did not occur is indicated by the foregoing tabulation, showing that the ratios for the majority of companies declined persistently.

Thus far we have seen that for the discontinuing companies as a group the three ratios were lower, at least from the fifth year and usually from the sixth year be-

fore discontinuance, than the estimated normals for the surviving companies as a group. But these comparisons can tell nothing about the range of variation in the ratios of the companies within each group. Such information is presented in Chart 11, which shows, for each ratio and each industry, how the discontinuing companies were distributed in the last year before discontinuance according to various ratio levels, and also the percentage distribution of the continuing companies according to the corresponding estimated normals. It is evident, as would be expected, that a greater proportion of discontinuing than of continuing companies had the more adverse ratios - those in the lowest two levels distinguished here.

But it should not be overlooked that there is a considerable area of overlap between the two groups of companies. In men's clothing, for example, about 40 percent of the discontinuing companies had a ratio of current assets to current liabilities ranging between 1 and 4, while only slightly more than 50 percent of the continuing companies had estimated normal ratios falling within this range; and two-fifths of these discontinuing companies had a ratio as high as 0.4 or more for net working capital to total assets, while as high a proportion of continuing as of discontinuing men's clothing companies had positive net working capital below the 0.4 level. In other words, there is no clearly marked dividing line between the ratios for the continuing and the discontinuing companies. Some companies in the samples survived through 1936 with relatively poor ratios, while others with relatively good ratios went out of existence before that year.

An obvious inference that might be drawn from the foregoing analysis is that these three ratios may provide an acceptable criterion for a credit analyst in evaluat-

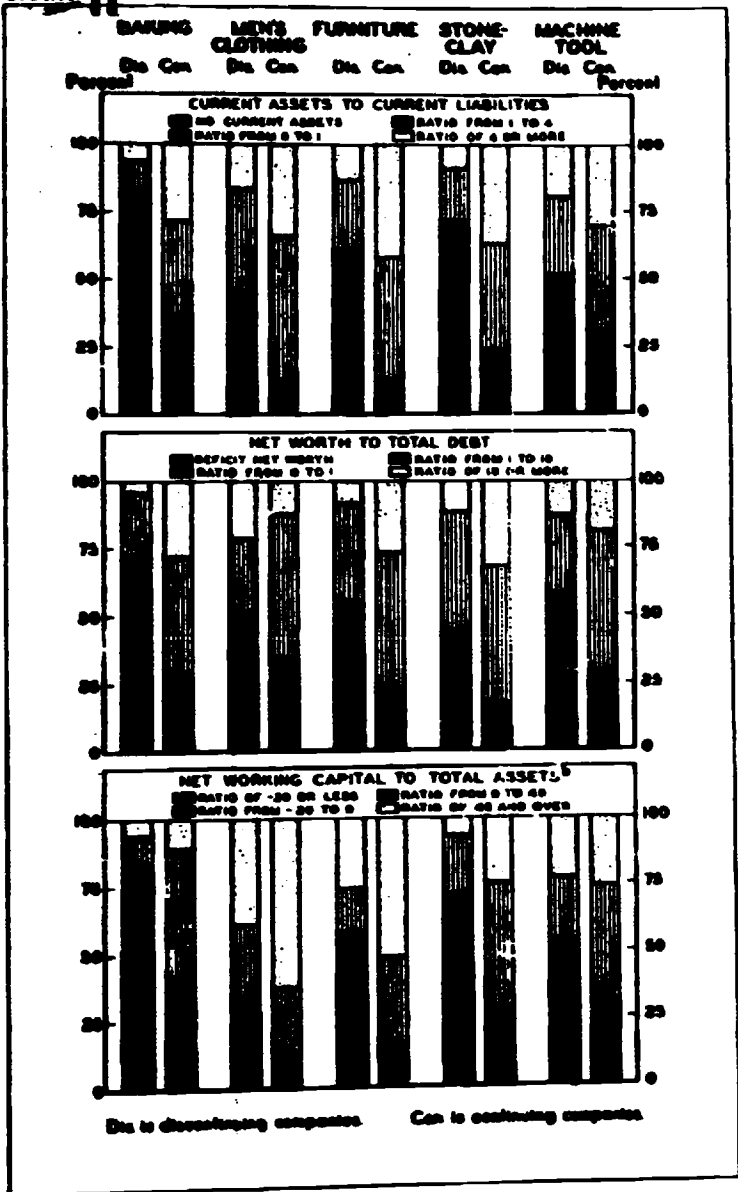
FOOTNOTES FOR CHART 11

a/ Based on unpublished tables prepared by the Income Tax Study, a WPA project sponsored by the Treasury Department. The estimated normal ratio, which forms the basis for each distribution of continuing companies, is the weighted average of these companies' ratios for the various calendar years contained in the first year before discontinuance; for method of estimate see Appendix D.

b/ The stone-clay and machine tool distributions of discontinuing companies are exclusive of a few corporations that reported neither current assets nor current liabilities.

SAMPLES OF DISCONTINUING AND CONTINUING CORPORATIONS IN FIVE INDUSTRIES: Percentage Distribution in First Year Before Discontinuance, by Three Selected Ratios for Discontinuing Companies and by Corresponding Estimated Normal Ratios for Continuing Companies^a

CHART 11



Footnotes on opposite page

ing the tendencies exhibited by an individual enterprise. Such an inference, however, cannot be fully substantiated from the data in their available form. To justify such a conclusion the material presented here should be supplemented by a more detailed study based on individual company ratios rather than on aggregates. It seems probable that values of the ratios lower than the estimated normal may be accepted as portents of discontinuance. But it has not been possible to determine whether the proportion of companies exhibiting a persistent decline differs significantly between the continuing and the discontinuing groups.

Chart 11 brings out still another point that should be stressed at this juncture to avoid misinterpretation of our analysis. It will be seen that in each industry there was some small proportion of discontinuing companies with credit ratios that are high under customary standards of credit appraisal. The companies with these high ratios may have been the ones that discontinued operations voluntarily. We stressed at the outset that for the present samples there was no means of distinguishing the voluntary from the involuntary discontinuances. Because of this absence of information on the reason for discontinuance, it seemed unduly arbitrary to eliminate these companies from the sample. While their presence in the sample calls for caution in interpreting the findings, it strengthens the contention that the adverse movements of the three "sensitive" credit ratios are significant portents of discontinuance. Chart 11 also indicates that some of the continuing companies had amazingly poor credit ratios. Whether such conditions persisted is not known, but they may well have done so in some instances. In other words, a poor credit ratio is no more a sufficient than it is a necessary condition of discontinuance.

In spite of all the necessary qualifications there are important implications in the foregoing analysis. The present samples give clear evidence that in general the financial structure of the discontinuing companies as a group began to deviate from that of the surviving companies as early as six years before actual disappearance. Moreover, most of these deviations between the two groups of companies became increasingly marked as the time of disappearance approached. The indications of disappearance were relatively definite in four of the indus-

tries, but not so marked in the remaining industry, men's clothing. This exception is probably due to the fact that the existence of small-scale men's clothing companies is generally precarious. The demand for their products is whimsical if not capricious, and style and fabric changes are introduced too suddenly for the comfort of the entrepreneur. And after one or two unsuccessful seasons a clothing company is near exhaustion, for resistance to forces of economic contraction or deflation is not so sustained as in, say, the baking industry, where the owners' equity and the investment in fixed property are comparatively large.

So far as credit analysis theory is concerned - the primary assumptions of which it has been the purpose of this chapter to test - our analysis has led to the conclusion that deviation of certain credit ratios from an empirically-determined level has definite diagnostic value. In other words, if the ratio persists in moving in an adverse direction, that movement is portentous of business discontinuance. This does not mean that a company having this financial experience will inevitably and necessarily discontinue operations. It does signify, however, that an unhealthy condition is developing which, unless corrected, will result in business discontinuance.*

The length of the period during which the financial structure of these companies gave indications of approaching discontinuance is a factor of particular importance for business cycle analysis because it reflects the ex-

*Note by Donald W. Knauth, Director - The sample contains companies that discontinued voluntarily as well as companies that discontinued involuntarily. Even if the voluntarily-discontinuing companies were eliminated, this analysis does not establish that any company experiencing an unfavorable movement of any or all of these three "sensitive" credit indicators is necessarily destined to discontinue operations. The author does not stress sufficiently that when unfavorable developments occur many things can happen in a company to reestablish a normally-functioning enterprise. Per contra, it happens at times that a company changes from solvency to insolvency with startling rapidity. Unrecognized weaknesses uncover each other and spiral with increasing speed.

All that can properly be deduced from the data presented is that credit ratios are an important element in forecasting the continuance or discontinuance of individual enterprises; and that weak companies frequently show signs of distress several years in advance of their formal discontinuance. These facts are already generally recognized, and the further partial corroboration offered in this chapter does not materially add to our knowledge of the subject.