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Volume Author/Editor: Charles L. Merwin

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Chapter Author: Charles L. Merwin

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D

DATA ON THE SAMPLES OF DISCONTINUING COMPANIES, AND TECHNIQUES OF ANALYSIS

It was explained in Chapter 4 that the year-before-discontinuance analysis of financial ratios makes it necessary to compute an "estimated normal" if the data for disappearing companies are to be effectively compared with those for surviving companies. This procedure is needed because each year before discontinuance represents a different assortment of calendar years, each with its own cyclical implication. Table D-1 shows, for the five industries, the number of times each of the calendar years 1926-35 was represented in each of the six year-before-discontinuance periods.

The method of calculating the estimated normal $\frac{1}{2}$ may be illustrated by showing how it was used for the baking companies' ratio of current assets to current liabilities. For the 81 surviving baking corporations as a whole this ratio was as follows during the 1926-35 period: $\frac{2}{3}$

1926	1.18	1931	1.27
1927	1.28	1932	1.22
1928	1.15	1933	1.19
1929	1.23	1934	1.24
1930	1.35	1935	1.18

From Table D-1 it may be observed that for the sample of 47 discontinuing bakeries the calendar years represented were as follows: 1926, 15 times; 1927, 6 times; 1928, 7 times; 1929, 9 times; 1930, 10 times. The other calendar years did not appear at all in the sixth year before discontinuance for the present sample.

If the surviving corporations' current ratios for these various calendar years are weighted by the number of times each calendar year appears in the given year before discontinuance it is possible to ascertain what

Table D-1 - SAMPLES OF DISCONTINUING CORPORATIONS IN FIVE INDUSTRIES: Number of Firms Each Calendar Year is Represented in Each Year Before Discontinuance a/

<u>Industry and</u> <u>Year Before</u> <u>Discontinuance</u>	<u>1926</u>	<u>1927</u>	<u>1928</u>	<u>1929</u>	<u>1930</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>	<u>1935</u>
Baking										
(47 companies)										
Sixth	15	6	7	9	10	-	-	-	-	-
Fifth	-	15	6	7	9	10	-	-	-	-
Fourth	-	-	15	6	7	9	10	-	-	-
Third	-	-	-	15	6	7	9	10	-	-
Second	-	-	-	-	15	6	7	9	10	-
First	-	-	-	-	-	15	6	7	9	10
Men's Clothing										
(41 companies)										
Sixth	14	6	10	2	9	-	-	-	-	-
Fifth	-	14	6	10	2	9	-	-	-	-
Fourth	-	-	14	6	10	2	9	-	-	-
Third	-	-	-	14	6	10	2	9	-	-
Second	-	-	-	-	14	6	10	2	9	-
First	-	-	-	-	-	14	6	10	2	9
Furniture										
(38 companies)										
Sixth	11	8	10	4	5	-	-	-	-	-
Fifth	-	11	8	10	4	5	-	-	-	-
Fourth	-	-	11	8	10	4	5	-	-	-
Third	-	-	-	11	8	10	4	5	-	-
Second	-	-	-	-	11	8	10	4	5	-
First	-	-	-	-	-	11	8	10	4	5
Stone-Clay										
(63 companies)										
Sixth	12	10	6	4	11	-	-	-	-	-
Fifth	-	12	10	6	4	11	-	-	-	-
Fourth	-	-	12	10	6	4	11	-	-	-
Third	-	-	-	12	10	6	4	11	-	-
Second	-	-	-	-	12	10	6	4	11	-
First	-	-	-	-	-	12	10	6	4	11
Machine Tool										
(31 companies)										
Sixth	4	6	7	6	8	-	-	-	-	-
Fifth	-	4	6	7	6	8	-	-	-	-
Fourth	-	-	4	6	7	6	8	-	-	-
Third	-	-	-	4	6	7	6	8	-	-
Second	-	-	-	-	4	6	7	6	8	-
First	-	-	-	-	-	4	6	7	6	8

a/ Based on TWSC Monograph 15 (previously cited) Tables 6-A to 6-E in Appendix F.

their aggregate current ratio would have been under the year-before-discontinuance chronology. This theoretical current ratio for the bakeries in the sixth year before discontinuance is thus calculated from the following data:

<u>Calendar Years Represented</u>	<u>Current Ratio, 81 Surviving Cos.</u>	<u>Weighted Current Ratio</u>
1926 - 15 times	1.18	17.70
1927 - 6 times	1.28	7.68
1928 - 7 times	1.15	8.05
1929 - 9 times	1.23	11.07
1930 - 10 times	1.35	13.50
TOTAL 47		58.00

Division of 58.00 by 47 gives 1.2, the estimated normal current ratio for the sixth year before discontinuance. That is to say, if the current ratio of the 47 disappearing companies, taken together, had been the same as that of the 81 surviving companies, it would have been 1.2 in the sixth year before discontinuance.

The estimated normals for the other year-before-discontinuance periods, and for the other ratios, are calculated in the same way. It is obvious that any estimated normal is applicable only to the particular ratio, sample and time period under consideration. For practical reasons this theoretical ratio has been calculated only for financial relationships which appear to be early and definite indicators of approaching discontinuance. These are the three ratios analyzed in Chapter 4, and their estimated normals are presented in Table D-2 for each of the five industries and each of the six years before discontinuance.

A test of statistical significance was applied to the year-before-discontinuance data analyzed in Chapter 4. This procedure, Friedman's test of ranks, ^{3/} makes it possible to appraise the significance of the observed widening of the gap between the estimated normals and the ratios for the discontinuing companies as time of discontinuance drew near.

Table D-3 shows the ranking of the differences between the two groups of ratios. For each ratio and each industry these differences have been given a value, the smallest difference being valued at 6 and the largest

at 1, $\frac{1}{4}$ and the values have been ranked by year before discontinuance, from small to large. The purpose of the test is to determine the probability that this arrangement would occur by chance.

The first step in the procedure tests whether the ranks in all five industries follow the same pattern. This is done by comparing the actual distribution of ranks with the distribution to be expected if the ranks

Table D-3 - SAMPLES OF CONTINUING CORPORATIONS CORRESPONDING TO SAMPLES OF DISCONTINUING CORPORATIONS IN FIVE INDUSTRIES
Estimated Normals for Three Selected Ratios
in Six Years Before Discontinuance a/

<u>Ratio and Year Before Discontinuance</u>	<u>Baking</u>	<u>Men's Clothing</u>	<u>Furniture</u>	<u>Stone-Clay</u>	<u>Machine Tool</u>
<u>Current Assets b/ to Current Liabilities</u>					
Sixth	1.2	2.3	2.9	2.4	2.1
Fifth	1.3	2.4	3.1	2.3	2.1
Fourth	1.2	2.4	3.4	2.1	2.0
Third	1.2	2.4	3.6	2.0	1.8
Second	1.3	2.6	3.6	1.9	1.7
First	1.2	2.4	3.4	1.7	1.6
<u>Net Worth to Total Debt c/</u>					
Sixth	2.3	1.7	2.8	3.5	2.7
Fifth	2.4	1.7	2.9	3.3	2.7
Fourth	2.3	1.9	3.2	3.2	2.6
Third	2.4	1.8	3.5	3.0	2.4
Second	2.3	2.0	3.7	2.8	2.2
First	2.2	1.9	3.5	2.5	2.0
<u>Net Working Capital d/ to Total Assets</u>					
Sixth	.050	.47	.42	.26	.24
Fifth	.056	.47	.42	.24	.22
Fourth	.047	.47	.42	.22	.20
Third	.049	.47	.43	.20	.18
Second	.054	.48	.41	.18	.16
First	.048	.46	.39	.16	.16

a/ Based on Tables B-1 to B-5 and B-22 to B-26 in Data Book (see footnote 2 of Appendix A, above) and Table D-1 above. The estimated normal ratio is the weighted average of the continuing companies' ratios for the various calendar years contained in each year before discontinuance.

b/ Exclusive of government bonds.

c/ Current liabilities plus long-term debt.

d/ Current assets minus current liabilities.

Table D-3 - SAMPLES OF DISCONTINUING AND CONTINUING CORPORATIONS IN FIVE INDUSTRIES: Application of Friedman's Test of Ranks to Three Selected Ratios for Six Years Before Discontinuance a/

Ranking of Differences Between Estimated Normal and Ratio of Discontinuing Companies in Six Years Before Discontinuance b/

<u>Ratio and Industry</u>	Sixth	Fifth	Fourth	Third	Second	First
<u>Current Assets to Current Liabilities</u>						
Baking	6	5	3.5	3.5	1.5	1.5
Men's clothing	6	4.5	4.5	3	2	1
Furniture	6	5	4	3	1.5	1.5
Stone-clay	1	4	4	4	4	4
Machine tool	5	5	2	5	2	2
TOTAL	24	23.5	19	18.5	11	10

Probability that this ranking would occur by chance: less than 1 in 100

Net Worth to Total Debt

Baking	6	5	4	3	1.5	1.5
Men's clothing	6	5	4	3	2	1
Furniture	6	5	4	3	2	1
Stone-clay	1	4	2	4	6	4
Machine tool	4.5	6	3	4.5	1.5	1.5
TOTAL	23.5	25	17	17.5	13	9

Probability that this ranking would occur by chance: less than 1 in 100

Net Working Capital to Total Assets

Baking	6	5	4	3	2	1
Men's clothing	6	5	4	3	2	1
Furniture	6	5	4	3	2	1
Stone-clay	5	6	4	3	2	1
Machine tool	6	5	3	4	2	1
TOTAL	29	26	19	16	10	5

Probability that this ranking would occur by chance: less than 1 in 100

a/ Based on Tables B-22 to B-26 in Data Book (see footnote 2 of Appendix A, above) and Table D-2 above.

b/ The smallest difference is represented by 6, the next largest difference by 5, and so forth.

were drawn at random. Under the condition of random drawings the totals of all columns would be expected to be equal; the test therefore consists in measuring the probability of these totals' deviating from equality. The second part of the test compares the order of the average ranks, or column totals, with the order 6, 5, 4, 3, 2, 1; in other words, it determines the degree to which the sixth year before discontinuance shows the least difference between the estimated normals and the discontinuing companies' ratio, the fifth year before discontinuance the next smallest difference, and so forth. The last step combines these two procedures to show the probability that, for the five industries combined, the observed increase in the divergence would occur by chance as time of discontinuance approached. It was found that for all three ratios this probability was less than one chance in a hundred.

The basic data on the identical sample of discontinuing companies, for the last six years before discontinuance, are presented in the Data Book (see footnote 2 of Appendix A, above), Tables B-22 to B-26, which also show the 1926-35 high-low range for the corresponding data on the identical sample of surviving companies.