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Appendix D. Absolute and Relative Measures of Merger Activity

The distribution of absolute merger activity among industries is influenced by their different sizes. Whether one industry is larger than another by virtue of having more firms of the same size, or the same number of firms of larger size, or a combination of the two, we should expect, other things being equal, to find higher firm disappearances or disappearance capitalizations (or both) in the larger industry.

To remove the effect of varying industry size, merger activity will be expressed as a percentage of industry size. Thus the industrial composition of merger activity can be described in terms of the importance to the industry of its merger activity. A classification based on relative merger activity is more meaningful for making inter-industry comparisons and for analysis of the causes of the merger movement.

The measures of industry size are taken from the special industry studies volume of the 1904 Census of Manufactures, which present capital and number-of-establishments data for forty industries or product groups. Direct comparison of merger activity to industry size, for these two measures of size, was possible for twenty-five of the forty industries at (with seven exceptions) a three-digit industry level of detail. The industries included in the comparisons were found in fifteen of the twenty-one two-digit manufacturing industries categories.[1]

The ratios so computed are subject to a substantial range of error and do not permit measurement of the relative amount of merger activity industry by industry. They are useful, nevertheless, as a basis for an approximate ranking of industries according to degree of merger activity.[2]

[1] The omission of six two-digit industries from the relative size measures probably does not affect the comparison of absolute to relative merger activity very much. Of these six two-digit industries, four (19, 23, 30, 38) exhibited very little absolute merger activity, having only sixty (gross) disappearances among them. One category (39) is a miscellaneous catch-all category; and fabricated metal products (34) had high absolute merger activity with 219 (gross) disappearances.

[2] The merger capital data are not directly comparable to the industry capital data. The census industry capital data were obtained from survey questionnaires sent to manufacturing establishments. Respondents were asked to list the value of their land, plant and equipment, and working capital. The capital thus reported would probably correspond to the balance sheet item "gross assets." The merger capital data gathered in this study, on the other hand, was that of the authorized stock capitalization of the corporations, and it was not possible to break down capitalization into issued and unissued stock. Add to this the incompleteness of reporting acknowledged in the census report, and the varying

The two ratios of merger activity to industry size are presented in Table D-1, where the fourteen included industries are also ranked by relative amount of merger activity. The two lists agree fairly closely on the industries of highest relative merger activity. Six industries—primary metals, transportation equipment, machinery (except electrical), paper and allied products, chemicals, and

TABLE D-1
Ratio of 1895–1907 Merger Activity to 1904 Industry Size for
Fourteen Two-Digit Manufacturing Industries

Industry	Merger Capital as Percentage of Industry Capital		Merger Disappearance as Percentage of Industry Establishments	
	Percentage	Rank	Percentage	Rank
Primary metals (33)	210.0	1	67.16	1
Transportation equipment (37)	75.1	2	30.43	2
Machinery (except 36) (35)	71.9	3	6.94	7
Paper and allied products (26)	56.7	4	16.69	4
Chemicals (28)	50.6	5	8.48	6
Tobacco products (21)	47.6	6	24.15	3
Electrical machinery, etc. (36)	43.8	7	5.36	8
Stone, clay, glass products (32)	40.8	8	3.27	9
Food and kindred products (20)	39.4	9	1.12	12
Leather and products (31)	18.6	10	2.86	10
Textiles (22)	14.5	11	2.24	11
Lumber, wood products (24) and furniture, fixtures (25)	8.2	12	0.41	13
Printing, publishing (27)	4.9	13	0.06	14
Petroleum products (29)	1.5	14	16.33	5

Source: Tables of this study and *Census of Manufactures, 1905*, Vols. III and IV.

amounts of "watered assets" and "watered stock" in both the census and the present compilations, and the comparability of the two sets of data is seen to be limited.

The lack of complete comparability between industry and merger capital does not exclude the possibility of making an interindustry comparison of some value, however. It does not seem unwarranted to assume that the biases in both the census and the data on merger activity are common to all industries in roughly similar degree. While the ratios do not indicate, even approximately, the actual degree of merger activity in a given industry, they do permit a rough ranking of industries in order of relative merger activity.

The data on firm disappearances compiled in this study are also not directly comparable to the data on number of manufacturing establishments in the census reports. This is because many firms consist of more than one establishment. Moreover, neither establishment nor firm-disappearance data take account of the sizes of firms or establishments. To justify making interindustry comparisons of ratios of merging firms to total industry establishments would require some drastic assumptions: first, that the proportions of firms of given numbers of plants are the same in the merging-firm group as in the firm population of the industry; second, that the merging firms are representative, as well, in terms of plant size. In view of the wide variations among industries in the number and proportion of small single-establishment firms and large multi-establishment firms, these assumptions are truly extreme. However, a comparison of the ratios of firm disappearances to total industry establishments will permit at least a rough ranking by industry of relative merger activity, and will serve as a check on the ranking made by use of capital data.

tobacco products—are among the seven most active industries in both lists. The coefficient of rank correlation between the two measures of relative merger activity is +0.736, further indicating a reasonably high correspondence between the rankings of the two lists.

Comparison of Absolute and Relative Measures of Merger Activity

The industries with the highest absolute merger activity usually also had the highest relative merger activity. This is demonstrated in Tables D-2 and D-3. Table D-2 compares the absolute and rela-

TABLE D-2

Absolute and Relative Merger Activity Measured by Capital, 1895–1907
(merger capitalizations in thousands of dollars)

| Industry | Absolute Merger Activity | | Relative Merger Activity | |
	Adjusted merger capitalizations	Rank	Percentage	Rank
Primary metals (33)	3,168.4	1	210.0	1
Food and kindred products (20)	937.8	2	39.4	9
Machinery (except 36) (35)	404.0	3	71.9	3
Transportation equipment (37)	391.0	4	75.1	2
Tobacco products (21)	314.3	5	47.6	6
Chemicals (28)	245.3	6	50.6	5
Textiles (22)	213.5	7	14.5	11
Stone, clay, glass products (32)	160.5	8	40.5	8
Paper and allied products (26)	157.4	9	56.7	4
Electrical machinery, etc. (36)	78.8	10	43.8	7
Petroleum products (29)	74.0	11	1.5	14
Leather and products (31)	45.2	12	18.6	10
Lumber, wood products (24) and furniture, fixtures (25)	42.3	13	8.2	12
Printing, publishing (27)	18.9	14	4.9	13

Sources: Tables B-3 and D-1.

tive merger activity, as measured by capital in the fourteen industries for which comparisons were possible. The coefficient of rank correlation is +0.736,[3] indicating a fairly high correspondence between absolute and relative merger activity. Five industries—primary metals, machinery (except electrical), transportation equipment, tobacco products, and chemicals and allied products—are found in the six most active industries in both groups of fourteen.

A somewhat lower degree of correspondence between absolute and relative merger activity is found if the firm disappearance—

[3] This is coincidentally the same as the rank correlation between the two measures of .relative merger activity.

establishments ratio is used to express relative merger activity. The comparison of absolute numbers of firm disappearances with the relative measures of firm disappearances is presented in Table D-3.

TABLE D-3

Absolute and Relative Merger Activity Measured by Firm Disappearances, 1895–1907

Industry	Absolute Merger Activity		Relative Merger Activity	
	Firm disappearances	Rank	Percentage	Rank
Food and kindred products (20)	671	1	1.12	12
Primary metals (33)	554	2	67.16	1
Chemicals (28)	252	3	8.48	6
Stone, clay, glass products (32)	211	4	3.27	9
Machinery (except 36) (35)	192	5	6.94	7
Tobacco products (21)	172	6	24.15	3
Transportation equipment (37)	153	7	30.43	2
Paper and allied products (26)	127	8	16.69	4
Textiles (22)	106	9	2.24	11
Lumber, wood products (24) and furniture, fixtures (25)	79	10	0.41	14
Electrical machinery, etc. (36)	42	11	5.36	8
Petroleum products (29)	41	12	16.33	5
Leather and products (31)	30	13	2.86	10
Printing, publishing (27)	15	14	0.06	14

Source: Tables B-7 and D-1.

The coefficient of rank correlation between absolute and relative activity in this case is $+0.363$, only a moderate correspondence. However, five industries—the same five just described—are found among the seven most active industries in both groups of fourteen.

Whether measured in relative or in absolute terms, the leading industries in merger activity seem to be primary metals, machinery (except electrical), transportation equipment, tobacco products, and chemicals and allied products. One other industry, food and kindred products, may belong among the leaders. In absolute merger activity it ranks first in disappearances and second in capitalizations. Its low ranking in the relative listings probably derives from two factors. First, sectors described in the industry studies of the 1904 Census accounted for only two-fifths of food products merger activity; the major share of merger activity lay outside the comparison. Second, the sectors of the industry entering into the comparison were characterized by many small establishments and many multiplant firms (meat packing, canning and preserving, dairy products, and grain mill products). In such industries we would expect considerable understatement in relative merger activity when using these measures.