Profits from Merger: The Evidence of Fifty Years

Thomas F. Hogarty

PROFITS FROM MERGER: THE EVIDENCE OF FIFTY YEARS†

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The extent, causes, and potential consequences of merger activity have recently been uppermost in the minds of many businessmen, public officials, and contributors to the financial press. This active interest has been due, in large part, to the recent increase in the level of merger activity.

Any attempt to evaluate the significance of current merger activity must consider the profitability of this activity. If mergers are more profitable than alternative forms of investment, then they can be expected to increase significantly in the future, perhaps at an accelerated rate. Similarly, the consequences of mergers for the firms involved and for the economy as a whole also depend on their relative profitability.

Mergers are not new to the American economy and their profitability has been studied intermittently for at least 50 years. This paper will first briefly review the methodology and results obtained in the principal studies of merger profitability which have been published. Secondly, I shall present the results of some of my own work in this area.[1]

I. EARLY STUDIES

The first merger wave, which began after the Civil War and reached its peak around the turn of the century, has been examined extensively. There were four principal studies of the success of mergers which occurred during this period.

The first to appear was a study by Arthur Dewing,[2] measuring the profit experience of 35 major consolidations which had been completed at least 10 years prior to 1914.

Confronted with the problem of measuring merger success, Dewing chose three (separate) standards: (1) the consolidation should produce profits higher than the sum of the firms entering it; (2) the combination should approximately live up to the expectations of its promoters; and (3) the average profits subsequent to the merger should be significantly greater —

1 Two forthcoming studies present a detailed examination of merger profitability from the viewpoint of both the acquiring firm and the acquired firm. *See* Gort & Hogarty, *New Evidence on Mergers* (publication forthcoming in J. LAW & ECON.); Hogarty, *The Profitability of Corporate Mergers* (publication forthcoming in J. BUS.).

2 *See* Dewing, *A Statistical Test of the Success of Consolidations*, 36 Q.J. ECON. 84 (1921).

over a 10 year period — than those immediately preceding or following the combination.

With profits measured as "the net earnings after taxes and depreciation but before the payment of any interest or dividends,"[3] Dewing found that the 35 consolidations performed poorly on all three standards. For example, only 13 of the 35 had higher profits after the merger (10 year average) than before. Not surprisingly, the consolidations did not fulfill the expectations of promoters. In 30 of the 35 cases the profits estimated by the promoters exceeded the average profits actually obtained over the 10 years subsequent to merger.

Dewing's study was followed by an inquiry undertaken by the National Industrial Conference Board, which examined the rate of return and stock price behavior of a group of 48 consolidations for the years 1900-1913.[4] The Board reached conclusions similar to those obtained by Dewing, but also warned against the efficacy of statistical measures in measuring merger success. Thus, the Board reached no substantive conclusions, but its emphasis on rate of return and security price performance as the relevant criteria for judging merger success was to be followed in subsequent examinations of profitability in mergers occurring at the turn of the century.

Shaw Livermore, compiling a master list of mergers which occurred about the turn of the century, undertook a study of 328 major consolidations, which he divided into a primary group of 156 and a secondary group of 172, the first being composed of firms possessing significant market power.[5] He then set up six categories of profitability: early failures, later failures, limping group, rejuvenations, successes, and outstanding successes. Livermore identified the third and fourth groups as not unambiguously successful or unsuccessful. Firms were classified into one of the categories partly according to their rate of return and partly according to survey information on dividend records and company histories. The results were that classes five and six (successes, outstanding successes) comprised 42 percent of the primary group and 47 percent of the secondary group. These results indicated that about one-half of all the consolidations of the period were successful.

As support for his classification scheme, Livermore subsequently compared the aggregate average rate of return for 49 of the successful companies (comprised of firms from classes five and six) from the primary group with Epstein's sample for the years 1919-1932.[6]

Generally speaking, the 49 successful merging companies did at least as well as Epstein's group, although the difference was large only for the subgroup of 10 "outstanding successes."

3 *Id.* at 89.
4 *See* NATIONAL INDUSTRIAL CONFERENCE BOARD, MERGERS IN INDUSTRY (1929).
5 *See* Livermore, *The Success of Industrial Mergers*, 50 Q.J. ECON. 68 (1935).
6 *See* R. EPSTEIN, INDUSTRIAL PROFITS IN THE UNITED STATES (1934). Epstein's sample was a broadly based cross section of American industry.

Ralph Nelson selected a sample of 13 large consolidations formed either in 1899 or 1901.[7] Using the market price of common stock prevailing on the first market day in December of the year of consolidation, together with the market price prevailing nine years later, he computed a crude rate of return in which cash dividends, while included, were assumed to be not reinvested. For the 13 consolidations, the median rate of return was 1.9 percent per annum; the mean return was 5.9 percent per annum using a simple average, and 7.4 percent per annum using a weighted average (weights were determined by authorized capitalization).

Since during this period the dividend commonly offered on preferred stock was 7 percent and that offered on industrial bonds was 5 percent, these average rates of return were unspectacular, considering that common stock typically means greater risk.

All three studies had methodological deficiencies. Dewing's study has limited usefulness since his premerger data included the relatively profitable years of the 1890's, while the postmerger data covered the panics of 1903-1904 and 1907. Livermore's study was handicapped by the fact that, although the combinations he examined were formed at the turn of the century, his comparative rate of return data on these companies pertained to the years 1919-1932. Such a long lag would generally ensure lack of difference between merging and non-merging companies. Nelson's test has a major weakness: by using as an initial (premerger) price the stock price prevailing in December of the year of consolidation, Nelson's results indicate simply that investors' expectations were exaggerated. His findings have no bearing on the question of profitability of mergers, since profitability involves a comparison of what happened after merger with what might have happened in the absence of merger.

II. RECENT STUDIES

While no studies of merger profitability were made for those acquisitions which occurred during 1920-1929, there have been two major studies of the profitability of mergers in the postwar period. The first was by Eamon Kelly.[8] This author selected a sample of 21 firms from the population of the largest 500 industrial firms and the largest 50 merchandising firms. Each of these 21 firms had made acquisitions representing at least a 20 percent increase in sales. He then selected another sample of 21 non-merging firms (no more than a 5 percent increase in sales due to merger) which most closely matched the original 21 in all other respects. The period covered was from 1946 to 1960.

Adopting an agnostic position, Kelly presented five measures of profitability: percentage change in price of common stock, in price earnings ratio, in earnings per share, in net sales per common share, and in profit

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[7] *See* R. NELSON, MERGER MOVEMENTS IN AMERICAN INDUSTRY, 1895-1956, at 96-99 (1959).

[8] *See* E. KELLY, THE PROFITABILITY OF GROWTH THROUGH MERGERS (1967).

margin (cash flow relative to sales). The percentage change was computed from the mean (median) of the premerger period to the mean (median) of the postmerger period. The premerger period was defined as the five years preceding merger; the postmerger period consisted of the five years following merger.

Non-merging companies experienced a slight advantage in profit margin gains and gains in earnings per share; merging companies were dominant in the comparisons based on price-earnings ratios and sales per share. In terms of capital gains (changes in stock prices), neither merging nor non-merging companies had an advantage. Thus, on balance, Kelly's study yielded the conclusion that mergers have a more or less neutral impact on the profitability of acquiring companies.

Kelly's study, while better than some that preceded it, is subject to severe shortcomings. First, his small sample and "matching technique" raise questions about the scope of his analysis and the viability of successfully matching firms. For example, are the National Tea Company and the Great Atlantic and Pacific Tea Company really identical in all respects except merger? Are American Tobacco Company and Philip Morris, Inc.? A preferable procedure would be to assign each company to an industry or some such similar group in order to minimize the possibility of distortions stemming from individual differences. Second, and more important, Kelly's wide array of profitability measures is unsuitable for the task he undertook. Rather than five partially relevant measures, Kelly would have been better off had he computed one crucial measure, namely, the total return to common stockholders from capital gains *and* cash dividends.

Another author who examined the profitability of mergers in the postwar period was Samuel Reid.[9] This study examined the relationship between profitability and merger activity for large industrial firms and banks. Since the results obtained and methodology used in both cases was similar, I shall consider only the results pertaining to large industrial firms.

Reid began by choosing a sample of 478 large industrial firms from among the group consisting of the 500 largest industrials for 1961. These 478 firms were then classified into 4 groups:

(1) Pure internal growth firms — firms with no reported mergers, 1951-1961.
(2) Occasional acquirers — firms with 1 to 5 reported mergers, 1951-1961.
(3) Moderate acquirers — firms with 6 to 10 reported mergers, 1951-1961.
(4) Active acquirers — firms with 11 or more reported mergers, 1951-1961.

He then compared the relative profit performance of firms in each

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[9] *See* S. REID, MERGERS, MANAGERS, AND THE ECONOMY (1968).

group, utilizing a one-way analysis of variance. There were three measures
of profitability:

(1)
$$\frac{MP_t - MP_{t-1}}{MP_{t-1}}$$

(2)
$$\frac{P_t^\bullet - P_{t-1}^\bullet}{A_{t-1}}$$

(3)
$$\frac{P_t^\bullet - P_{t-1}^\bullet}{S_{t-1}}$$

where:

$$MP = \text{market price of common}$$
$$P_t^\bullet - P_{t-1}^\bullet = P_t \frac{N_{t-1}}{N_t} - P_{t-1}$$
$$P = \text{earnings available for common}$$
$$N = \text{number of shares outstanding}$$
$$A = \text{assets}$$
$$S = \text{sales}$$
$$t,\ t - 1 = 1961 \text{ and } 1951, \text{ respectively}$$

The simple analysis of variance showed that the group means of each
of the profit measures differed significantly (.005 level). The greater the
number of acquisitions, the lower the level of profitability (measured three
ways).

When the 478 firms were classified into 14 industrial groupings, the
negative relationship between profitability and number of mergers was
weakened.

For the first measure of profitability, there was no relation to number
of mergers in 9 of 14 industries; however, in the remaining 5 industries, the
relation was negative and statistically significant at the .10 level or better.

For the second measure of profitability, there was no relation in 6 of 14
industries; of the remaining 8 industries, the relation was negative and
statistically significant at the .10 level or better in all but 2 instances.

For the third measure of profitability, there was no relation in 7 of 14
industries; of the remaining 7, the relation was negative and statistically
significant at the .10 level or better in all but 1 instance.

Since, when any relation between mergers and profitability existed, that
relation was typically negative, Reid's findings definitely show an absence
of any positive relation. On balance, one might say that his results indicate
a weak negative relation; however, his tests are subject to serious deficiencies.

First, the use of number of acquisitions as an index of merger activity
probably weakens the negative relations where they exist and destroys them

where they might have existed. That is, given that number of acquisitions is positively, but weakly, correlated with assets (sales) acquired, use of number of acquisitions as the relevant measure introduces random measurement error, which in turn weakens whatever relationship existed (presumably negative). Moreover, his second and third measures of profit are hard to rationalize. Weighting terminal year profits by the relative amount of shares outstanding in 1951 relative to the number outstanding in 1961 "loads" the test against those firms who rely heavily on external equity financing. Reid justifies this weighting procedure on the grounds that certain mergers will result in dilution of the acquiring firm's earnings. However, this procedure does not enable one to evaluate a merger from the viewpoint of the pre-merger stockholders.

Finally, Reid's failure to consider the total return to stockholders (capital gains and cash dividends) generally invalidates the first measure of profitability; and, the use of earnings change relative to assets and sales seems to be a cumbersome measure. Reid would have been better advised to simply use earnings per share rather than attempt to hold constant the effect of dilution.

III. FUNCTIONAL ADVANTAGES OF MERGERS

With the possible exception of Dewing's study, all of the studies reviewed above have concentrated on the profitability of mergers from the standpoint of the acquiring firm. However, a complete examination of mergers requires a study of the gains received by the owners of acquired firms and the aggregate gain in profits. In short, the profitability of mergers has three dimensions: overall gains or losses, gains or losses for the acquiring firm, and gains or losses for the acquired firm. I turn now to a consideration of overall, or functional, gains in merger.[10]

A. The Rationale for Functional Gains in Mergers

Generally speaking, a merger or series of acquisitions can result in functional gains if and only if the combined firm is more efficient (profitable) than the firms entering the combination would have been had they remained separate. Various authors have suggested many specific reasons for expecting such gains.[11] However, most of these ad hoc explanations can be reduced to two principal factors: monopoly power and more efficient operation of the acquired firm.[12] If a combination of previously independent firms produces monopoly in some given market, we can surely expect the combined firm to be more profitable than its component parts would have

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10 For an examination of profitability from the viewpoint of acquired firms, see Gort & Hogarty, *supra* note 1. The profitability of acquiring firms is considered in Hogarty, *supra* note 1.

11 *See, e.g.,* J. WESTON, THE ROLE OF MERGERS IN THE GROWTH OF LARGE FIRMS (1961).

12 Clearly, scale economies would be a special case of such "more efficient operation."

been. The same would generally be true of firms which, before merger, were below the minimum efficient size for their industry.

The nature of the more efficient operation or functional gains can vary from situation to situation. Some consolidations might lead to lower production costs, others to a reduction in distribution costs, *etc.* Alternatively, the merger may lead to monopsony in lieu of monopoly power.

Nonetheless, if any of these advantages is to be meaningful, they must result in greater profits.[13] Hence, an attempt to measure the extent of functional gains — from whatever source — can proceed under the assumption that the effects will be manifested in the income statement. Therefore, I shall say that a given merger produced functional gains if the profits of the combined firm were greater than the aggregate profits *predicted* for each of the firms entering the combination.

B. The Determination of Predicted Profits

Any attempt to predict profits in the absence of merger necessarily involves consideration of the determinants of firm growth. Traditionally, economic theorists have devoted scant attention to the problems of firm growth. In a competitive industry, all firms are of optimum size. Any exogenous increase in demand would customarily be captured by new entrants who would also attain optimum size. On the other hand, there have been many attempts in recent years to describe the process of firm growth by means of various stochastic models, such as the lognormal distribution and Markov Chains.[14] In addition to mergers, these studies generally seemed to indicate that reasonably good predictions of firm growth could be obtained by taking into account differing industry growth patterns and differing initial sizes.

These considerations, together with the nature of available data, led to a prediction of the firm's growth based on the growth of the average firm in the industry. Using the growth of the average firm as a benchmark enables one to account for differing industry growth rates and, to a lesser extent, differing firm sizes. In addition, this device provides an approximation to Marshall's "representative firm."[15]

C. The Sample

This analysis was based on a sample of 43 firms selected randomly from the 1965 edition of *Moody's Industrial Manual.* These 43 firms had made acquisitions during 1953-1964 representing at least a 20 percent increase

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13 Increased market share might be an acceptable alternative if the functional gains have a very long gestation period and we presume a low discount rate for the firms' owners.

14 For a summary of recent work based on the lognormal distribution, see Silberman, *On Lognormality as a Summary Measure of Concentration,* 57 AM. ECON. REV. 807 (1967). An example of the use of Markov Chains is seen in Adelman, *A Stochastic Analysis of the Size Distribution of Firms,* 53 J. AM. STAT. ASS'N 893 (1958).

15 *See* Frisch, *Alfred Marshall's Theory of Value,* 64 Q.J. ECON. 495 (1950).

in sales (assets). The firms' acquisitions consisted primarily of publicly-held corporations with published income statements and balance sheets. Secondly, these 43 firms were widely dispersed in terms of initial size and nature of primary activity (principal industry). Finally, there was a minimum of two years between the year in which the (first) acquisition was completed and 1964, the terminal year of this study.

D. Two Measures of Functional Gains in Mergers

Given the above definition of functional gains (the profits of the combined firm must exceed the aggregate profits predicted for each of the component firms), and the above prediction technique, my (primary) index of functional gains (for a merger of two firms in the same industry) was:

$$(1) \qquad FG_1 = A_1/[B_0(I_1/I_0) + S_0(I_1/I_0)]$$

where:

> A = profits of the combined firm
> B = profits of the buyer
> S = profits of the seller
> I = profits of average firm in industry
> $1, 0$ = time subscripts referring to 1964 and the year preceding the merger, respectively.

The measure of profits used was net income before taxes.[16] These profit data were obtained from *Moody's Industrial Manual* in the case of the firms, and from the *Internal Revenue Service Sourcebook, Statistics of Income, Corporation Income Tax Returns* in the case of the industry. These unpublished industry data were used to obtain profits of the average firm by dividing net income before taxes by number of returns.[17] In addition, since all but a negligible fraction of the firms in the sample were above $1 million in assets, I also defined the industries in question as consisting of firms above $1 million in assets.

Mergers may be subject to a long gestation period. That is, a firm might initially concentrate on increasing its market share (tending toward a more efficient size) and hence, the benefits of the merger might not mean early increases in profits. On the other hand, this is not a very plausible argument. A more credible reason for expecting mergers to produce increased market share is that the managers of the corporation pursue a goal

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[16] I also attempted alternatives such as net income plus interest paid and cash flow, but, as things turned out, the nature of the firm data was such that only an insignificant number of cases had reliable data for these additional measures. If a particular acquiring or acquired firm had negative premerger profits, I defined its predicted profits as zero. All firms contained in the sample had positive *aggregate* premerger profits.

[17] Number of returns provides only an approximation of the number of firms in an ownership sense. For further details, see the Appendix.

of sales maximization (perhaps subject to a minimum profit constraint).[18]
If sales maximization is the main goal of corporate managers and if mergers
are a means to this end, one might expect some tendency for mergers to
demonstrate functional gains in terms of market share.

In computing this alternative index, however, a slightly different pro-
cedure was chosen; *i.e.*, a merger was considered to have resulted in func-
tional gains if the actual sales of the combined firm were greater than the
aggregate sales which could reasonably have been expected from the com-
ponent firms in the absence of merger. The criterion used was that the
firms entering the combination could have been expected to maintain their
respective "market shares." In more specific terms, the second index (again,
for a merger of two firms in the same industry) is:

(2) $$[FG_2 = a_1/[b_0(i_1/i_0) + s_0(i_1/i_0)]$$

where:

a = sales of the combined firm
b = sales of buyer
s = sales of seller
i = total industry sales
1, 0 = time subscripts referring to 1964 and the year preceding the
merger, respectively.

For both indexes, a particular merger must have a value in excess of
unity to be considered an example of functional gains due to merger. The
"scores" achieved by the firms in the sample will be presented after a con-
sideration of the relationship of the two indexes to some alternative
measures.

E. The Relationship of the Two Indexes to Some Alternative Measures

With regard to the main index, FG_1, I was interested in the effects of
two basic changes: (1) What would have happened if the index were based
on all firms in the industry, and not just those above $1 million in assets?
(2) Would it have mattered if merely total industry profits were used in-
stead of the profits of the average firm in the industry?

The answer to both questions is no. As shown in Table I, it would
have made almost no difference if the index had been based on total profits
instead of profits for the average firm. Excluding firms below $1 million in
assets had a greater impact. This was largely due to the fact that the lowest
size classes contain marginal firms, many of which may operate in regional
markets and/or are minor subsidiaries of larger firms. In addition, cor-
porations are given the option of consolidating or not consolidating sub-
sidiaries.[19] It is impossible to ascertain the net impact of this option given

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[18] For an argument along these lines, see W. BAUMOL, BUSINESS BEHAVIOR, VALUE, AND
GROWTH (1959).
[19] This fact is discussed in the Appendix.

TABLE I
SIMPLE CORRELATION COEFFICIENTS BETWEEN FG_1 AND ALTERNATIVE MEASURES

Name of alternative measure	Number of observations[1]	Correlation coefficient
(1) FG_1[2] except that profits of the average firm are computed so as to include all firms in industry, regardless of size.	41	.80
(2) FG_1[3] except that total industry profits for firms above \$1 million in assets are used in lieu of profits of the average firm.	41	.96

[1] The number of observations was reduced because two firms had negative *pretax* profits in the terminal year. All other firms had positive *aggregate* profits for both premerger and terminal years. If a particular firm had negative profits in the premerger year, I defined its predicted profits as zero.

[2] FG_1, the primary index of functional gains, consists of profits of the combined firm divided by aggregate profits predicted for each of the firms entering the combination. Predicted profits were obtained by assuming that each of the component firms would have grown at the same rate as the average firm in its respective industry. Profits for the average firm were based on total profits divided by the number of firms — *excluding those firms having \$1 million or less in total assets.*

[3] *Id.*

to reporting corporations, but my experience leads me to believe that the universe of firms above \$1 million in assets is the more meaningful one.

For the secondary index, FG_2, the effect of the size cutoff was more pronounced (see Table II). However, even in this case, the correlation coefficient was high.

TABLE II
SIMPLE CORRELATION COEFFICIENT BETWEEN FG_2 AND ALTERNATIVE MEASURE

Name of alternative measure	Number of observations[1]	Correlation coefficient
FG_2[2] except that industry sales are defined to exclude firms below \$1 million in assets.	41	.73

[1] Two firms were excluded because they seemed to represent instances of vertical integration.

[2] FG_2, the functional gains index based on sales, consists of sales of the combined firm divided by aggregate sales predicted for each of the firms entering the combination. Predicted sales were obtained by assuming that each of the component firms would have grown at the same rate as its respective industry. In short, I assume that each of the firms entering the combination would have maintained its market share in the absence of merger. Industry sales were defined so as to include all firms regardless of size.

F. *The Extent of Functional Gains in Mergers*

As can be observed from equations 1 and 2, the indexes of functional gains have been set up so that unity represents the break-even point. In this context 20 out of 41 firms achieved functional gains in terms of profits and 15 out of 41 in terms of sales.[20] Thus, in this regard one might figura-

[20] For the latter result, the "z" value was —1.72, which is significant at the .10 level for an hypothesized probability of .50 in a two-tail test.

tively say that mergers are a "zero sum game" in terms of profits and a "negative sum game" in terms of sales.

To further examine the distribution of these indexes, I divided the firms in the sample into three groups:[21] those showing functional losses, those which were ambiguous, and those demonstrating functional gains. As shown in Table III, the firms in the sample gave some evidence of func-

TABLE III
DISTRIBUTION OF FUNCTIONAL GAINS INDEXES

	FG_1[1]			FG_2[2]
Losses	19			24
Ambiguous	5			9
Gains	17			8
Median:	0.97		Median:	0.86
Mean:	1.17		Mean:	0.96
Standard deviation:	0.92		Standard deviation:	0.48
	$r = .22$	with		$n = 39$[3]

The category limits were as follows:

$0.00 < FG_1 < 0.90$　　　　　Losses
$0.90 \leqslant FG_1 \leqslant 1.10$　　　　　Ambiguous
$1.10 < FG_1$　　　　　　　　Gains

Where FG_i = index of functional gains (i = 1, 2).

[1] For this index two firms were excluded because of negative profits. FG_1 consists of the profits of the combined firm divided by aggregate predicted profits of firms entering the combination. Predicted profits are obtained by assuming a growth rate for the component firms equal to that of the average firm in their respective industries.

[2] For this index two observations were eliminated because they represented instances of vertical integration. FG_2 consists of the sales of the combined firm divided by aggregate predicted sales, which are obtained by assuming that, if no merger had occurred, each of the component firms would have maintained its respective market share.

[3] The two eliminations from each of the index measures did not overlap, thus resulting in a net correlation sample of 39 observations.

tional gains in terms of profit but none in terms of sales. In addition, the correlation between the two indexes was only .22.

Losses and gains are just about the same for the index based on profits, whereas for the index based on sales the losses outnumber the gains by three to one. Thus there appears to be no tendency for corporate mergers to result in greater gains in sales than in profits. In fact, the opposite appears to be true.

Even more interesting is the fact that both distributions are highly skewed (to the right). This skewness is especially noticeable in the case of the index based on profits (FG_1). From this index it is clear that, while the typical merger produces no functional gains, a few mergers are extremely profitable.

[21] I chose a classification scheme in which a deviation of 10 percentage points from unity was considered indeterminate because experience with the data indicated that this approximated the maximum amount of error. In any event, experimentation demonstrated that alternative cutoff points made little difference.

IV. CONCLUSIONS

What can fifty years of research tell us about the profitability of mergers? Undoubtedly the most significant result of this research has been that *no one* who has undertaken a major empirical study of mergers has concluded that mergers are profitable, *i.e.*, profitable in the sense of being "more profitable" than alternative forms of investment. A host of researchers, working at different points in time and utilizing different analytic techniques and data, have but one major difference: whether mergers have a neutral or negative impact on profitability.

Not all this evidence is contradictory. For example, given that mergers do not produce functional gains, the tendency of acquiring firms to pay substantial premiums to effect mergers would generally ensure losses for the acquirer and gains for the acquired firm. Hence, mergers can be regarded as both negative and neutral with respect to profits, depending on whether one is speaking of merger profitability overall or from the standpoint of the acquiring firm.[22]

But if mergers are not profitable, why do they occur? More to the point, why have they increased dramatically in 1967-1968?

First of all, the results of my tests of functional gains in merger indicate that sales are not pursued at the expense of profits. Hence, these results give no indication of sales maximization as a goal of corporate management. Assuming that sales maximization and other non-profit goals would be correlated, it appears that mergers are not a significant vehicle for the pursuit of non-profit goals.

I showed above that: (1) the average merger produces zero functional gains and (2) some mergers produce extraordinary profits. Hence, mergers can be thought of as a "zero sum, risky game." Thus, mergers would be an attractive form of investment for those firms whose managers are "risk-takers."[23] Assuming that the number of "risk-takers" in the economy remains more or less constant over time, one can expect a more or less constant level of merger activity. Thus, mergers will occur at a more or less constant rate even in the absence of functional gains.

But what of the recent rise in the merger rate?[24] The general answer to this question is contained in a recent article by Michael Gort.[25] Briefly, Gort shows that mergers occur in response to "disturbances" in the economy, such as rapid increases in stock prices and accelerated technical change. Accordingly, merger activity can be expected to exhibit sporadic bursts in response to (unanticipated) disturbances in the economy. The specific dis-

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[22] For details and relevant evidence, see Gort & Hogarty, *supra* note 1.

[23] This seems an apt description of the managers of the so-called "conglomerates," who have played such a colorful role in the recent merger movement.

[24] The number of mergers has increased almost continuously for many years, but the merger rate (number of firms acquired relative to the population of firms) increased dramatically only in 1967-1968. *See* Gort & Hogarty, *supra* note 1.

[25] *See* Gort, *An Economic Disturbance Theory of Mergers*, 83 Q.J. ECON. 624 (1969).

turbances which generated the current merger wave are a subject for future inquiry.

APPENDIX

FIRM DATA

Anyone who has worked with published income statements is aware of the many pitfalls usually encountered. All those firms with especially low quality data were eliminated from the sample.

There were two general sources of such low quality data. The first involved lack of information about selling firms. However, there were some further problems even among firms that acquired publicly held corporations, the principal one being comparability of income statement figures over time. For example, some firms initiated a practice of consolidating foreign subsidiaries after the merger. In part, this may have reflected a basic change in their operating condition, but in some cases the transition was so great and so abrupt as to be questionable. The ad hoc procedure I adopted was to drop those firms in which the altered consolidation basis seemed at least partly arbitrary. With doubtful cases I used the profits as stated. This gave a small margin of benefit to the firms in question, because I also adopted the practice of ignoring all foreign acquisitions, whether consolidated or not.

INDUSTRY DATA

The source for the industry data used in developing the indexes of functional gains was the *Internal Revenue Service Sourcebook, Statistics of Income, Corporation Income Tax Returns.* These unpublished data consist of income statement and balance sheet figures for all 3-digit industries classified by asset size classes.

These industry data present two main problems, neither of which I could solve in any ideal fashion. First, the raw data were uncorrected for industry reclassifications, especially the major one in 1958-1959. Secondly, firms are given the option of consolidating or not consolidating subsidiaries when filing tax returns.[26] Therefore, the data on profits and number of returns are subjected to some spurious variation. Partially as a byproduct of this, the data are also characterized by considerable heterogeneity.

In handling both of these problems, I closely adhered to the procedure used earlier by Stigler and set out in Appendixes A and E of his book.[27] In the absence of transition tables,[28] Stigler and his co-worker, Claire Friedland, utilized Census of Manufactures data on value added[29] in order to reallocate IRS data among the affected industries. For example, if industry 1111 were taken from industry group 111 and reclassified into industry group 112, then both industry groups would receive adjusted figures based upon the percentage contribution of industry 1111.

If a particular 3-digit industry had been subjected to violent reclassification (*e.g.*, greater than 15 percent of receipts), then 2-digit data was used in its place. An additional and related procedure was the combining of various 3-digit industries. In fact, combination of 3-digit industries and resort to 2-digit industries were the principal methods of adjustment used.

The fact that corporations could report on either a consolidated or unconsolidated basis turned out to be a more intractable problem. In an attempt to cope with this difficulty, I examined the size class data in each of the industries in the hope of discovering erratic shifts. Other than combination or elimination of industries, however, no satisfactory method of combating the problem was found.

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26 Since World War II most firms have filed on a deconsolidated basis. Hence, number of return often means little if one defines firms strictly on an ownership basis. However, the main problem has to do with comparability over time.

27 *See* G. STIGLER, CAPITAL AND RATES OF RETURN IN MANUFACTURING INDUSTRIES 107-202, 220-26 (1963).

28 The Internal Revenue Service provided transition tables for the reclassification of its 1948-1949 data. No such tables were provided for the 1958-1959 changes.

29 U.S. BUREAU OF THE CENSUS OF MANUFACTURERS: INDUSTRY STATISTICS, GENERAL SUMMARY C19-C36 (1958).

There were some additional, albeit minor, problems. For one thing, there were no *Sourcebook* data for 1952-1953. The solution of this problem consisted of mere interpolation.[30] Also, there was the additional difficulty that the industry data are not on a calendar-year basis. For this minor problem there was a two-stage procedure. First of all, some of the firms in the sample used a "fiscal year" of one sort or another. In those cases I used fiscal year data ending in the calendar-year in question. For example, if a firm's accounts were stated in terms of a fiscal year ending in June, I treated the profits for July 1963 through June 1964 as calendar 1964 profits. The second stage amounted to using (for those firms with accounts on a calendar-year basis) an average of 1963 and 1964 profits, together with 1963-1964 industry profits.

[30] For 1962-1963 there were no size class data. Interpolation was used to resolve this problem also.