Chapter 5. Merger Movements and Business Cycles, 1895–1956

In the preceding chapter we tested theories of the first merger wave set in the context of historical development, passing over the role of short-run cyclical changes. It was apparent, however, that the business cycle was important in the timing of the first merger movement. Revival of merger activity did not occur until the depressed conditions of the mid-1890's had passed and the prosperous turn-of-the-century years were reached. Also, the merger expansion occurred during a cyclically rising stock market. The infrequency of merger movements indicates that they have not sprung up with every business expansion. However there are several ways in which merger activity might be expected to respond to business cycles.

The acquisition of one firm by another or the consolidation of several firms into one is an act of investment by the initiator of the merger, in many respects the same as other forms of investment. The calculation made by the entrepreneur in balancing the cost of the to-be-acquired firms with the future earnings ability of the merged firm is the same type of calculation he makes in deciding to build another plant, or to organize a new business. Merger activity, viewed as a form of private investment, might be expected to respond, as private investment has been shown by various studies to respond, in a positive and sensitive fashion to the business cycle.[1]

A merger may represent more than an act of pure investment, however. The merged firm may gain greater control over its market and enhanced ability to raise prices, control production, and otherwise exploit the market. The profits of such market control are of course all the greater if the market is expanding. We might thus expect attempts at mergers for market control to occur early in a cyclical expansion, when expectations become favorable. The expectations of the prospective acquirees would also become favorable.[2] however, and their unwillingness to sell out at a sufficiently

[1] For a summary of the sensitivity and conformity of investment activity to the business cycle, see Wesley C. Mitchell, *What Happens During Business Cycles: A Progress Report*, National Bureau of Economic Research, 1951, Table 16, Sections B, C, D, pp. 161–163.

[2] Theoretically the acquiree could hold out for a price that would represent a little less than the discounted value of the difference in the profits of the merged and unmerged acquirer. Moreover, if the would-be acquirer is a leading firm in the industry, the acquiree might decide it would be more profitable to stay out of the merger, and let the big firm set a "monopoly" price at which the small firm could sell all of his output, rather than his pro-rata share of the monopoly output of the merged firm. See George J. Stigler, "Monopoly and Oligopoly by Merger," *Papers and Proceedings of the American Economic Association*, May 1950, pp. 23–25.

low price might prevent such mergers. The desire for merger may be less urgent if the various firms are operating at less than full capacity, and independent, immediate, and profitable expansion may be possible. The merger may be accomplished only when the expansion of the various firms has proceeded to a point at which they are operating at capacity. The opportunity for immediate increase in capacity, coupled with the advantages of market control, may cause the initiator of the merger to offer a premium price to a solicited firm. Such firms may also have reached a receptive mood, if profits can no longer be increased quickly through internal expansion. We might thus expect to find merger activity occurring at the stage in a cyclical expansion when many industries have reached capacity production.

The condition of the capital market may also affect the time pattern of mergers. Firms expanding by merger, as in other forms of firm growth, frequently turn to public sources for the needed extra funds. New capital issues are most common when the acquired firms are purchased for cash; but when the purchase is made by exchange of stock, new securities are frequently issued to increase working capital. Even when a pure stock-for-stock transaction is made, the organizers of the merger are sensitive to the recent trend of the stock market, because ratios of exchange are partly determined by the market prices of the securities of the merging firms. We might expect to find mergers occurring—as with other aspects of corporate financing—when the recent history of stock prices has indicated a strong tendency toward further increase. This is usually some time after the initial faltering stages of stock price recovery, and during a time when the market has exhibited a sustained upward movement. As the end of the expansion is ordinarily not anticipated, merges may occur when stock prices are on the verge of moving downward.

The interval required to conceive, plan, and execute a merger is a complicating factor in the response of mergers to the business cycle. Whether this time lag is longer than that found in the ordinary investment action is open to question. Unlike an ordinary act of investment, the merger requires initial steps that are likely to be complex and time consuming. Permission may have to be obtained from stockholders, minority objections settled, and authorization for corporate charter changes obtained from state commissions or courts. Once arranged, however, the transfer of control may be carried out rapidly, for the "new plant" is already a fully operating business. The construction of a new plant—a type of investment that is quickly arranged—may take a considerable

period of time. If future earnings expectations are assumed to be calculated from the date the enlarged facilities go into operation, the time response of merger "investment spending" may be actually shorter than that of ordinary investment spending.

In the light of the interplay of these factors and circumstances, we might expect to find merger activity at its highest in the expansion phase of the business cycle. The peak of merger activity is not likely to occur very early in the expansion, but just how far the expansion must advance before the merger peak is reached is not clear. Since stock market conditions reflect general business expectations,[3] and in turn directly affect the launching of mergers, it seems likely that the response of merger activity to economic conditions would resemble the response of new business formation. Merger activity thus might correspond quite closely to changes in the number of business incorporations.

With the new 1895–1920 series of mergers and the comprehensive series dating from 1919 through 1954, the stage is set for examining the behavior of merger activity over a number of cycles of business activity. This six-decade period encompasses all the large waves and all but one of the minor flurries of merger activity in manufacturing and mining. A minor merger wave occurred in 1888–1892, but it was so small that its exclusion will not seriously weaken the tests.

The successive sections of the various merger series, though differing from one another in a number of ways, have one measure of merger activity common to all—the number of firm disappearances by merger. Accordingly, this is the measure used in the analyses below. A visual comparison of merger disappearances and the business cycle is presented in Chart 5. The chart also contains quarterly series of industrial production and stock prices to be used later in the chapter.[4]

The merger activity of the past six decades has exhibited high, though not perfect, conformity to changes in general business conditions (Table 55). The National Bureau of Economic Research has recorded fourteen cycles in general business activity between 1897 and 1954. The series of merger disappearances exhibited twelve cycles of activity.[5] Eleven of the twelve merger cycles showed

[3] For a discussion of the relationship between expectations and stock prices, see "An Appraisal of Data and Research on Businessmen's Expectation," *Report of Consultant Committee on General Business Expectations to the Board of Governors of the Federal Reserve System*, Joint Committee of the Economic Report, September 1955, pp. 119–128.

[4] For a detailed description of the various merger series, see Chapter 3.

[5] I am indebted to Victor Zarnowitz of the National Bureau for much thoughtful advice on the treatment of the cyclical relationships.

TABLE 55

Relationship between Reference Cycles and Merger Cycles, 1897–1954

Turning Point	Quarter Year: Reference cycle	Quarter Year: Merger cycle	Merger Cycle Lead (−) or Lag (+) in Quarters	Rank in Amplitude and Duration: Fourteen reference cycle expansions: Amplitude	Fourteen reference cycle expansions: Duration	Fourteen reference cycle contractions: Amplitude	Fourteen reference cycle contractions: Duration
Trough	II '97	III '96	−3				
Peak	III '99	III '99	0	5	7		
Trough	IV '00	II '00	−2			10.5	7.5
Peak	IV '02	IV '01	−4	13	8.5		
Trough	III '04	III '04	0			10.5	3
Peak	II '07	III '05	−7	8	6		
Trough	II '08	I '09	+3			5	11
Peak	I '10	I '10	0	6	10.5		
Trough	IV '11					13	3
Peak	I '13			14	13		
Trough	IV '14	II '14	−2			6	3
Peak	III '18	I '17	−6	4	3		
Trough	II '19	IV '18	−2			7	13.5
Peak	I '20	I '20 II ('20)[a]	0 (+1)	9	14		
Trough	III '21					4	5
Peak	II '23			3	10.5		
Trough	III '24	III '23	−4			8	7.5
Peak	III '26	I '26	−2	10	8.5		
Trough	IV '27	I '27	−3			14	7.5
Peak	II '29	I '29	−1	11	12		
Trough	I '33	IV '33	+3			1	1
Peak	II '37	I '36	−5	2	2		
Trough	II '38	III '39	+5			2	11
Peak		II '40		1	1		
Trough		III '42					
Peak	I '45	II '44	−3				
Trough	IV '45	II '45	−2			3	13.5
Peak	IV '48	II '46	−10	12	5		
Trough	IV '49	II '49	−2			9	11
Peak	II '53			7	4		
Trough	III '54					12	7.5

TIMING SEQUENCE, MERGER CYCLES RELATIVE TO REFERENCE CYCLES

	Peaks	*Troughs*
Number of leads	8	8
Number of coincidences	2	1
Number of lags	1	3
Average lead (−) or lag (+) in quarters	−3.4	−0.8

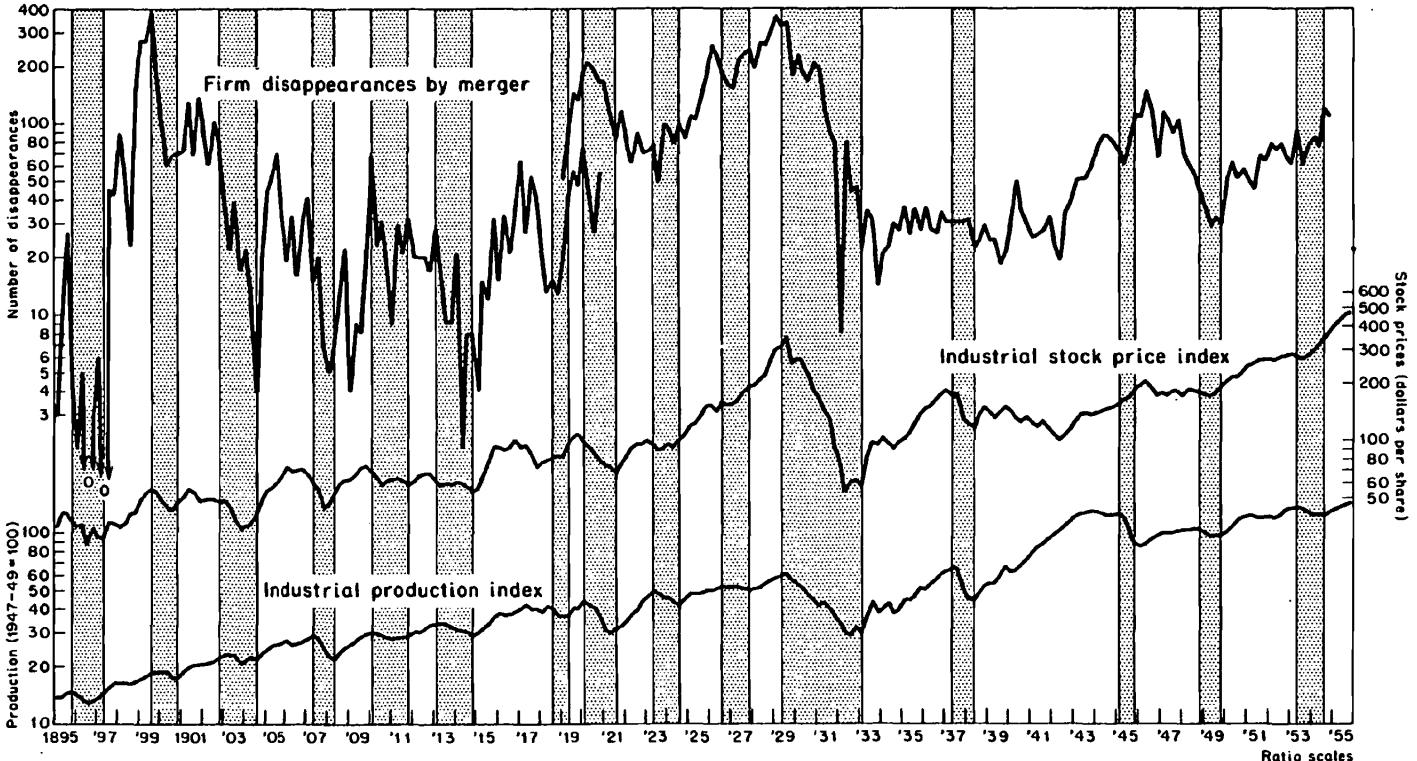
[a] Figures in parentheses show second segment of the series, included in count and averages.

Source: Reference cycle chronology for 1897–1919 is from Geoffrey H. Moore, *Statistical Indicators of Cyclical Revivals and Recessions*, Occasional Paper 31, National Bureau of Economic Research, 1950, p. 6, Table 1; for later years from Standard Reference Dates for Business Cycles, United States, 1919–1954 (NBER, mimeographed)

Merger turning points were dated by the business cycle staff of the NBER. The merger series was deseasonalized in the UNIVAC program, and the deseasonalized series was used in dating the turning points. Amplitude measures were derived from NBER worksheets, and were based on the American Telephone and Telegraph, Persons, and Ayres indexes of business cycles. A low rank number signifies that the given expansion or contraction was among the largest in amplitude among the fourteen expansions or contractions of the period.

CHART 5

Quarterly Series of Firm Disappearances by Merger, Industrial Stock Price Index, and Industrial Production Index, 1895–1955



Shaded periods are contractions in business activity.
Source: Table C-7.

a definite timing relationship to the turning points of reference cycles.

The reference cycle phases skipped over by the merger series were usually either of short duration or of moderate amplitude. There were two reference expansions for which there was no corresponding merger expansion, 1911–1913 and 1921–1923. These were among the shortest of the fourteen reference cycle expansions of the period, and the 1911–1913 expansion was among the mildest of the reference expansions.

The expansion of 1921–1923 was vigorous, however, and it is not clear why merger activity did not respond. A possible explanation is the relative shortness of the expansion (7 quarters as against an average expansion period of 10.7 quarters). Another explanation might be that the sharp revival of industrial production was not matched by an equally sharp rise in stock prices (Chart 5). The absence of merger revival may thus signify that the rise in production might not have been accompanied by an equally strong increase in business optimism as reflected in stock prices.

There was one reference cycle contraction that had no corresponding merger contraction—1953–1954, one of the mildest contractions in the six-decade period. One merger contraction had no corresponding reference cycle contraction—that of 1940–1942. This downturn in mergers accompanied a downturn in stock prices, even though general business conditions and industrial production were expanding.[6]

The response of merger activity to business conditions from 1933 through 1945 suggests possible additional factors required for the revival of merger activity. The economic expansion of 1933–1937, while large and protracted, did not result in the restoration of the high production levels of the late 1920's, nor was there a substantial increase in merger activity. It was not until the greater expansion of 1938–1945, especially after the wartime expansion following 1941, that merger activity rose substantially above the low levels of the 1930's. This suggests that the reappearance of merger activity may require not simply a cyclical expansion but one that has attained a substantial recovery of employment and production.

Peaks of merger activity most commonly preceded the peaks of the reference cycle. The average merger lead for the eleven peaks common to both cycles was 3.4 quarters. The longest leads, with the exception of the 1901 secondary peak on the huge wave, occurred in times of generally low merger activity. The high merger peak of 1899 coincided with the reference cycle peak, while

[6] See Table 56.

that of 1929 led the reference peak by only one quarter. Near-coincidence in timing also characterized the sharp, though lesser, peak of 1920. This suggests that the periods of extremely high merger activity may be more prolonged than periods of more restrained merger activity.

The time sequence for troughs was somewhat less consistent than that for peaks. Merger troughs preceded reference troughs, on the average, by only 0.8 quarters, and lagged them on three occasions. This irregular time sequence probably indicates that economic forces in a depression are likely to be diffuse and weak, compelling no great uniformity in the response of merger activity.

TIME SEQUENCE OF MERGER-RELATED CYCLES

The general business cycle is a composite of many economic series. The cyclical time pattern of each of the various series is to some degree unique, and the patterns differ, among other ways, in the timing of their turning points. For many series this timing pattern is consistently related to that of other series and to that of the general business cycle. Some series experience turning points that precede those of most other series, while others coincide with or follow the majority of turning points.

We shall examine the time sequence of the merger cycle relative to other cycles, to determine whether a consistent sequence exists between mergers and other presumably related series. Five series will be compared: the reference cycle; industrial stock prices; the volume of stock trading; business incorporations; and industrial production. They were chosen because of indications, discussed earlier, that they are representative of forces likely to be related to mergers, and because requisite data were available. Such factors as cycles in technological innovation and in industrial reorganization were not included because they were not reducible to quantitative form.

The turning points in the merger series were in quarterly form. For use with the other series, they were converted into monthly form by taking as the turning point the center month of the appropriate quarter. The monthly turning points for merger activity and related series are shown in Table 56.

Comparison of the turning point dates of the reference cycle and of cycles in specific series suggests a consistent sequence of events (Table 57). The pattern is different for peaks and troughs. In expansions the peak in stock trading is reached first, followed by merger activity, stock prices, business incorporations, the reference cycle, and industrial production, in that order. In contractions

TABLE 56

Cyclical Turning Points of Merger Series and Five Related Series, 1896–1954

	Month and Year of Turning Point					
	Merger cycle	*Reference cycle*	*Industrial production*	*Stock prices*	*Stock trading*	*Incorporations*
Trough	8/96	6/97	9/96	...	5/97	9/96
Peak	...	...	...	...	...	9/97
Trough	...	...	...	...	...	5/98
Peak	8/99	6/99	2/00	9/99	1/99	7/99
Trough	5/00	12/00	10/00	9/10	8/00	2/00
Peak	11/01	9/02	7/03	6/01	5/01	5/01
Trough	...	...	...	...	...	9/01
Peak	...	...	...	...	...	2/03
Trough	8/04	8/04	12/03	11/03	5/04	4/04
Peak	8/05	5/07	5/07	1/06	1/06	1/07
Trough	2/09	6/08	5/08	11/07	11/07	12/07
Peak	2/10	1/10	3/10	11/09	6/09	11/09
Trough	...	1/12	1/11	7/10	4/11	7/10
Peak	...	1/13	1/13	9/12	9/11	7/12
Trough	5/14	12/14	11/14	12/14	12/14	12/14
Peak	2/17	8/18	5/17	11/16	9/16	1/17
Trough	11/18	4/19	3/19	12/17	4/18	11/18 (9/18)[a]
Peak	2/20 (5/20)	1/20	2/20	10/19	7/19	12/19
Trough	...	7/21	7/21	8/21	10/21	1/21
Peak	...	5/23	6/23	3/23	2/23	4/23
Trough	8/23	7/24	7/24	10/23	10/23	8/24 (6/24)
Peak	2/26	10/26	3/27	....	11/25	10/25
Trough	2/27	11/27	11/27	...	5/26	12/26
Peak	2/29	6/29	8/29	9/29	10/29	1/29
Trough	11/33	3/33	7/32	6/32	3/33	...
Peak	...	...	...	2/34	7/33	...
Trough	...	...	...	9/34	3/35	12/34 (12/34)
Peak	2/36	5/37	7/37	2/37	2/36	12/36
Trough	8/39	6/38	5/38	4/38	...	9/39
Peak	5/40	...	...	10/39	...	4/40
Trough	5/42	...	...	4/42	5/42	5/42
Peak	5/44	2/45	11/43	5/46	...	4/46
Trough	5/45	10/45	2/46	...	...	...
Peak	5/46	11/48	10/48	...	1/46	...
Trough	5/49	10/49	10/49	6/49	1/49	4/49
Peak	...	7/53	7/53	1/53	1/51	5/50
Trough	...	8/54	8/54	9/53	8/52	6/51

[a] Dates in parentheses are beginning turning points in the more recent of overlapping series, and are used in making timing comparisons.

Sources: Turning-point dates of reference cycle, stock prices, and stock trading were taken from business cycle files of the National Bureau of Economic Research. Industrial production series used are the Babson index from 1896 to 1917, and the Federal Reserve Board index from 1919 to 1954, both deseasonalized, and dated by the NBER. Incorporations turning points for 1896–1940 were taken from George H. Evans, Jr., *Business Incorporations in the United States, 1800–1943*, National Bureau of Economic Research, 1948, p. 85, Table 41; for 1942–1951 the turning points are those of Dun's series for forty-eight states. The merger series was deseasonalized and dated by the NBER business cycle unit; this quarterly series was converted to monthly by taking the center month of the turning point of the quarterly series as the monthly turning point.

TABLE 57

Timing of Turning Points in Merger Activity, Stock Trading, Stock Prices, Business Incorporations, and Industrial Production, Compared with the Reference Cycle, 1899–1949

Series	*Average Lead (−) or Lag (+), Months*		*Average Deviation of Leads and Lags*	
	Peaks	*Troughs*	*Peaks*	*Troughs*
Number of shares sold, New York Stock Exchange	−10.5	−6.3	7.0	3.4
Merger activity	−7.6	−3.9	8.4	4.5
Industrial stock prices (Dow Jones)	−6.8	−6.9	8.3	3.9
Business incorporations	−5.6	−4.6	4.4	2.5
Industrial production (FRB)	+1.3	−1.9	4.4	1.8

Source: Table 56. There are eight peaks and seven troughs common to all of these series in the period 1899–1949.

the trough in stock prices is reached first, followed by stock trading, business incorporations, merger activity, industrial production, and the reference cycle. The implication is that in prosperity, merger activity tends to correspond most closely to capital market conditions, while in depression it corresponds most closely to industrial activity and general business conditions. This suggestion is confirmed by the correlation between merger activity, stock prices, and industrial production, presented later.

A simple ranking of turning points by order of occurrence alters the sequence somewhat from that indicated by the average leads in Table 57. As shown by Table 58, a simple average rank in order of sequence places the peak in stock trading first, followed by business incorporations, stock prices, merger activity, the reference cycle, and industrial production. In both Tables 57 and 58, however, peaks in merger activity bear a closer timing relationship to stock prices than to any other series. The sequence for cyclical troughs is essentially the same whether based upon average lags or upon average rank order of occurrence.

The merger series is directly compared in Table 59 to the three specific economic series that revealed the closest timing relationship to mergers in the reference cycle comparison—stock trading, stock prices, and business incorporations. As the comparison shows, all three series are closely related to the merger series at both peaks and troughs, the average lag or lead in no instance being more than 2.9 months.

Merger activity exhibits the closest average lag or lead to stock prices at peaks, and to business incorporations at troughs. Con-

TABLE 58

Sequence of Cyclical Turning Points in Merger Activity, Stock Prices, Stock Trading, Business Incorporations, Industrial Production, and the Reference Cycle 1899–1949

Reference Cycle Turning Point	*Rank in Order of Sequence*					
	Stock trading	*Stock prices*	*Business incorporations*	*Merger activity*	*Industrial production*	*Reference cycle*
Peaks:						
6/99	1	5	3	4	6	2
9/02	1.5	3	1.5	4	6	5
5/07	2.5	2.5	4	1	6	5
1/10	1	2.5	2.5	5	6	4
8/18	1	2	3	4	5	6
1/20	1	2	3	6	5	4
6/29	6	5	1	2	4	3
5/37	1.5	4	3	1.5	6	5
Troughs						
12/00	3	4	1	2	5	6
8/04	4	1	3	5.5	2	5.5
6/08	1.5	1.5	3	6	4	5
12/14	4.5	4.5	4.5	1	2	4.5
4/19	2	1	3	4	5	6
7/24	2.5	2.5	4	1	5.5	5.5
10/49	1	4	2	3	5.5	5.5
	AVERAGE RANK					
Peaks	1.9	3.3	2.6	3.4	5.5	4.3
Troughs	2.6	2.6	2.9	3.2	4.1	4.6

Source: Table 56.

TABLE 59

Timing of Cyclical Turning Points in Stock Trading, Stock Prices, and Business Incorporations Compared with Merger Activity 1899–1949

Series	*Average Lead (−) or Lag (+), Months*		*Average Deviation of Leads and Lags*	
	Peaks	*Troughs*	*Peaks*	*Troughs*
Number of shares sold, New York Stock Exchange	−2.9	−2.4	5.4	5.5
Industrial stock prices (Dow Jones)	+0.9	−2.7	5.4	6.3
Business incorporations	+1.3	−0.4	6.2	5.8
Average	−0.2	−1.8	5.7	5.9

Source: Table 56.

versely, the average deviation of lag or lead is greatest for incorporations at peaks, and for stock prices at troughs. Thus stock prices appear to be the most consistent immediate factor at merger peaks, while business incorporations are the most consistent

immediate factor at merger troughs. Stock trading consistently leads merger activity at both peaks and troughs.

The relationship of merger activity to the three economic series is somewhat higher at peaks than at troughs. The over-all average lag or lead of the three series is smaller at peaks than at troughs; also, the over-all average deviation of lag or lead is slightly smaller at peaks than at troughs. This suggests that mergers more closely paralleled the indicated economic factors in times of high merger activity than in times of low merger activity.

The coincidence of cyclical turning points, alone, cannot be taken as conclusive evidence that capital market conditions are the main immediate cause of increased merger activity. Coincidence in timing may be as much an indication that merger activity responded in the same manner to underlying economic conditions as it is an indication that the capital market is the cause and mergers are the effect. Whatever the causal connection, it seems that the more significant developments are those associated with merger peaks. As the greater dispersion of lags and leads at troughs suggests, the influence of external economic changes in periods of low merger activity is apt to be diffuse and erratic. Their influence in periods of high merger activity, by contrast, is more consistent. Accordingly the greater coincidence of merger peaks with those of the capital market encourages us to look more closely into the behavior of the capital market for clues to the causes of merger revivals.

Correlation with Stock Prices and Industrial Production

Ideally, in bringing correlation analysis to bear, one would examine a variety of factors, each in detail and depth. Practically, it was necessary to restrict the number of analyses, and we shall focus on stock prices and industrial production—series suggested by previous tests as representative of two major types of merger-related forces.

The stock price series was chosen, in preference to the series on the volume of stock trading, as a more direct indicator of the condition of the capital market. The movement of stock prices would seem to be the less equivocal indicator of changes in investor psychology, although both series exhibit high conformity to the reference cycle (see Table 56). For example, it is possible to give a more meaningful interpretation to a rising stock price index in a period of constant trading activity than to a rising volume of trading activity in a period of level stock prices.

The index of industrial production was selected as an appropriate indicator of changes in the real level of industrial activity. Short-run changes in the physical volume of output reflect changes in employment and to some degree changes in the applications of technology. The physical volume of industrial production also directly affects the sectors of the economy to which the merger series relate, whereas more comprehensive measures of real economic activity (e.g., deflated gross national product) would be less directly applicable.

Quarterly series of stock prices and of industrial production were computed from available monthly series (Chart 5); they are presented in Table C-7 with a brief description of the method of computation. Their quarterly changes form the basis of correlation analyses for the period 1895–1954.

The stock prices and industrial production series exhibit strong and consistent upward secular trends over the sixty-year period. To avoid "swamping" cyclical movements by trend the two series were adjusted to remove the trend component. The remaining cyclical component was taken as the ratio of the actual value to the trend value for the given quarter. Exponential trends were fitted by use of the least squares method. The underlying straight line shape of the two series, as plotted on semi-logarithmic graphs, indicated this to be a satisfactory form.

The merger series exhibited no clear trend. Indeed, the discontinuous pattern of merger activity suggests that the concept of a secular trend may be inapplicable to mergers. Mergers more strongly reflected the absence than the presence of continuously strong underlying forces, upon which the trend concept is based. This is especially true for the upper stratum of the merger population which our sample represents. We might expect a secularly growing number of mergers of all sizes combined reflecting the growth of the business population. However, it is not likely that the explosive pattern of our series of large mergers is a faithful reflection of the time pattern of mergers among smaller business firms. Moreover, had we tried to specify a trend, the problem of splicing the 1895–1920 and 1919–1954 series would have been formidable.[7] Accordingly no trend-fitting was attempted. As the measure of the "cyclical" pattern of mergers the ratio of the given quarterly value to the average quarterly value for 1895–1920 (or 1919–1954) was used, in the belief that it would provide a satisfactory series of cyclical variations, permitting comparable correlation analyses through the sixty-year period.

[7] On this see Chapter 2.

The correlations between merger disappearances on the one hand and stock prices and industrial production on the other are presented in Table 60. The correlation for the whole sixty-year period

TABLE 60

Simple and Partial Correlation Coefficients among Merger Activity, Stock Prices, and Industrial Production, Quarterly Series of Cyclical Components, 1895–1920

Period and Length of Period	r_{12}	r_{13}	$r_{12.3}$	$r_{13.2}$	r_{23}
1895–1954 (60 years)	+0.469	+0.084	+0.470	+0.085	+0.019
1895–1904 (10 years)	+0.376	+0.304	+0.287	+0.173	+0.421
1905–1918 (14 years)	+0.399	+0.452	+0.013	+0.263	+0.705
1919–1931 (13 years)	+0.713	+0.305	+0.733	+0.384	+0.050
1932–1942 (11 years)	−0.235	−0.124	−0.230	−0.098	+0.114
1943–1954 (12 years)	+0.342	−0.140	+0.317	+0.037	−0.496

X_1 = Cyclical component of merger disappearances series.
X_2 = Cyclical component of industrial stock price series.
X_3 = Cyclical component of industrial production series.

1895–1954 indicates that merger activity paralleled stock-price changes to a much greater degree than it paralleled changes in industrial production.[8] Indeed, the correlation between mergers

[8] Tests of the significance of the departure of observed correlation coefficients from zero, for the 5 per cent and 1 per cent levels of significance, are here summarized:

	5 per cent level of significance				*1 per cent level of significance*			
Period	r_{12}	r_{13}	$r_{12.3}$	$r_{13.2}$	r_{12}	r_{13}	$r_{12.3}$	$r_{13.2}$
1895–1954	S	N	S	N	S	N	S	N
1895–1904	S	N	N	N	N	N	N	N
1905–1918	S	S	N	N	S	S	N	N
1919–1931	S	S	S	S	S	N	S	S
1932–1942	N	N	N	N	N	N	N	N
1943–1954	S	N	S	N	N	N	N	N

S = Significant departure from zero.
N = Not a significant departure from zero.

In reviewing the stock price series, Sophie Sakowitz of the National Bureau discovered that the splicing ratio used to lower the level of the pre-1914 series to that of the post-1914 series was incorrect. It should have been 0.756 instead of 0.709, as she explained:

"The ratio Nelson used was based on the overlapping period, January 1915–December 1917. However the figures for November 1916 to December 1917 of the second segment had already been raised to the level of the first segment by a ratio based on the figures for October 1916, only. Unfortunately, October 1916 of the first segment was estimated in such a way as to make it very dubious. Therefore all figures based on the ratio using it are equally dubious. The procedure we should use is to lower the segment 1895–1914 (twelve stocks) by the ratio of the following segment (twenty stocks) by the ratio of the actual overlapping data for the period December 1914 to September 1916. This ratio is 0.756."

The pre-1914 series, as corrected by her, is presented in Table C-7. The trend for stock prices and the correlation measures involving stock-price data were not, however,

and industrial production is low enough to raise doubts about the existence of any short-run relationship at all. In part, the low correlation can be attributed to differences in the timing of turning points demonstrated in Tables 56 and 57, which record in another way the lack of short-run parallelism between mergers and industrial production.

The sixty-year period was divided into five subperiods, each at least a decade long, chosen to compare the pattern of response in periods of consistently high merger activity with that in periods of consistently low activity. In periods of low activity we might expect the factor most closely related to the large waves of mergers to exhibit lower correlation with mergers than in periods of high merger activity. As sharp bursts of activity reduce correlations in high-merger periods, the shift between high- and low-activity periods is best examined by comparison with the correlation of the other merger-related variable.

As Table 59 indicates, mergers were more positively correlated to stock-price changes than to changes in industrial production in the three periods of high merger activity—1895–1904, 1919–1931, and 1943–1954. Conversely, in the two periods of low merger activity, 1905–1918 and 1932–1942, industrial production exhibited a higher positive (or lesser negative) relationship to mergers than stock prices did. This suggests that capital market conditions or their underlying causes were of leading importance in periods of high merger activity, and that their role in times of low merger activity was not important. While industrial production was the more important factor in times of low merger activity, the correlations were so low that no strong cause-and-effect connection is suggested.

Brief descriptions of each of the subperiods follow:

1895–1904

The relatively low correlations between mergers and both stock prices and industrial production derive mainly from the difference

recomputed, since it is doubtful that the findings would be changed appreciably. The increase of less than 7 per cent in the level of the pre-1914 data would have a progressively smaller effect on the trend values for the later part of the period. The effect for the period 1895–1914 would, of course, be small, as both the trend and the data would be altered in approximately the same degree.

The Standard Statistics index of industrial production was used in the correlation measures for the period 1895–1918, where it was spliced to the Federal Reserve Board index. Subsequent investigation revealed that the Babson index of business conditions was a somewhat better measure for this early period; it has been substituted for the above measures in Table C-7 and in the turning point comparisons. Again, recalculation of the correlation measures was avoided in the belief that the effects on the findings would not justify the added time and expense.

between the large bursts of merger activity in 1899 and 1901. The 1899 burst was characterized by the merger of many medium-sized firms, while the 1901 burst was characterized by the merger of fewer and larger firms. If the capitalization rather than the number of firms had been the measure used, the merger series would have paralleled more exactly the twin peaks in the production and stock price series. This would have produced higher correlations.

The stock price–merger correlation is higher than the industrial production–merger correlation principally because of the post-1901 time pattern. Industrial production continued to climb through 1902 and into 1903, while both merger activity and stock prices declined steadily from 1901 to late 1903. This suggests that the large merger wave ended not so much in response to an adverse turn in the underlying level of production as to an adverse turn in the condition of the stock market.

The sharp later stage of the decline in stock prices beginning in early 1903 was popularly known as "the rich man's panic." As the name implies, it represented the end of a bull market that had become over-saturated with high-priced securities held largely by a relatively few large investors and speculators. It reflected no serious business depression comparable to that of 1907–1908. The huge merger wave, it is true, exhausted merging opportunities in a number of important industries, and was slowing partly on that account. At any rate, it seems likely that the collapse of the stock market effectively foreclosed remaining merger opportunities, whether many or few.

1905–1918

This period was one of generally low merger activity, and of closely parallel movements in stock prices and industrial production. Perhaps doubly influenced by the reinforcing effects of the two economic forces, merger activity exhibited a fairly high response to their changes. This is reflected both in the timing comparisons made above, and in the moderate positive correlations presented in Table 61, below. Had the merger series been smoothed rather than used in its unsmoothed form, the correlations would have been higher.

Merger activity diminished the sharp business recession of 1907–1908, in which both industrial production and stock prices underwent steep declines. It revived sharply during the recovery in business conditions that reached its peak in 1910. The merger series also closely followed the downward movements of production

and stock prices in 1913 and 1914, and responded with equal sensitivity to the 1914–1918 expansion.

Mergers exhibited no strong immediate response to the major anti-trust Supreme Court decisions of 1911, by which the oil, tobacco, and explosives monopolies were dissolved. The merger-depressing effect of these decisions may have been offset by the expansion of stock prices, stock trading, and industrial production that characterized 1911. That the Court decisions may have exerted some inhibiting effect on merger activity is suggested by the fact that these expansions were part of the only set of cycles in these series between 1899 and 1920 for which there was no corresponding merger cycle. But that the Court decisions did not seriously discourage mergers is suggested by the time pattern of merger activity. The years 1911 and 1912 exhibited no sharp decline in merger activity. Rather the decline was very gradual until the second quarter of 1913, by which time declines in stock prices and industrial production were well advanced. It was not until then that merger activity dropped off sharply.

1919–1931

Merger activity increased along with the post-World War I increase in stock prices and industrial production. It reached a peak in 1920, in the same month as the peak in industrial production, and four months after the peak stock-price month. Following this peak, merger activity experienced a protracted three and one-half year decline. This occurred despite the sharp though short cycle in both stock prices and industrial production that was registered in this period. No satisfactory explanation why mergers did not exhibit a cycle comes to mind. The differences in time pattern between the industrial production and stock prices cycles were so small that comparisons were unconvincing. For what it is worth, the stock price cycle was less sharp than the industrial production cycle, and may have been small enough to have had little effect on mergers.

From 1924 through 1929 stock prices increased greatly while industrial production increased only moderately. The merger series more closely followed stock prices. The cyclical component of stock prices, measured as the ratio of the actual value of the series to the trend, rose from a value of 0.90 in mid-1924 to 2.90 in mid-1929, an increase of 193 per cent. In the same period the "cyclical" component of merger disappearances rose from 0.87 to 4.10, an increase of 370 per cent. The cyclical component of industrial production rose from 0.94 to 1.26, an increase of only 28 per cent.

In these five years, the period of the greatest revival of merger activity since the turn of the century, the correlation between stock prices and mergers was higher than at any time in merger history. The correlation between mergers and industrial production was much lower, the moderate increase in industrial production over these five years exhibiting very little relation to the expansion of merger activity.

Comparison of cycles in the three series also attests the importance of stock prices in the late 1920's merger wave. The National Bureau did not designate a cycle in stock prices between 1923 and 1929; however there was a short, sharp peak in stock prices at the end of 1925. This was accompanied by a peak in merger activity in the second quarter of 1926. The corresponding peak in industrial production was not reached until the third quarter of 1927, and roughly coincided with a trough in merger activity.

Following the stock market crash of 1929, the three series declined in roughly parallel fashion. The industrial production series did not decline as sharply as mergers and stock prices; however, its decline was large and unbroken in the manner of the other two. The time patterns of 1929–1932 probably should be regarded as no more than a part of the large and protracted decline in general business activity that dominated these years.

1932–1942

This eleven-year period was noted for the absence of merger activity. It was not until 1942 that merger activity began to revive in any substantial degree. As the correlation measures indicate (Table 59), the response of mergers to the economic forces studied was very small and, if anything, opposite to its response in the three subperiods from 1895 to 1932. The negative correlations are probably more a matter of statistical error than an indication of a meaningful shift in the causal relationship. In this period of very low merger activity we might expect the random appearance of small bursts of merger activity to dominate the correlation measures. This would make a negative and a positive correlation equally probable.

The period can be divided into two parts, each containing unique movements in stock prices and industrial production. The first, spanning the years 1932–1938, is the period of substantial though incomplete recovery from the deep depression of the early 1930's, followed by the sharp, short recession of 1937–1938. In this period stock prices and industrial production were closely parallel, mirroring the business recovery and recession. Merger activity did

not respond to these changes with any degree of sensitivity, thus supporting the hypothesis that a serious depression will produce an ebb in merger activity unresponsive even to marked changes in the specific factors related to it.

The second part of this period spans the years 1938–1942, in which the economy underwent a strong protracted recovery to the full and over-full employment levels of World War II. Stock prices and industrial production took divergent courses, however. Stock prices declined moderately and with fair regularity, while industrial production increased markedly and with great regularity. Merger activity remained constant, at the same low levels of 1932–1938, exhibiting no clear tendency either to rise or fall. It was not until the second quarter of 1942, when the stock price index turned up, that merger activity began the protracted rise to its late-1945 peak. In 1942 business activity had apparently revived sufficiently to enable mergers to respond to the stimulus of rising stock prices. The 1937 revival had evidently not been great enough to do so.

1943–1954

The most recent of the five periods is marked by the restoration of merger activity to a sustained level substantially above that of 1932–1942. In only one year, 1949, did the number of merger disappearances fall below that of the most active year of 1932–1942. The average annual number of disappearances for the period 1932–1942 was 125, while that for 1943–1954 was 289.

It is useful to divide the period 1943–1954 into two parts. The first part, 1943–1946, represents a continuation of the wartime divergence in stock prices and industrial production begun in 1938. In a division of merger history according to whether stock prices and industrial production moved in parallel or divergent patterns, the period 1939–1946 would stand out as the period of greatest divergence. Merger activity remained generally low and unresponsive to both stock prices and industrial production until 1942, during a protracted three and one-half year rise in industrial production and an equally protracted fall in stock prices. The 1942 revival of stock prices brought with it the revival of merger activity, and both series began an expansion, which ended in late 1945 for mergers and in early 1946 for stock prices. From 1943 to 1946 both series ran opposite to the decline in industrial production.

The second part of the period, 1947–1954, exhibited a more normal relationship between stock prices and industrial production. There was sufficient divergence between the two series,

however, to permit contrasts in the response of merger activity. From 1946 through 1949 mergers followed the small decline in stock prices, running counter, for thirty-three months, to the 1946–1948 rise in industrial production. Following the 1949 trough mergers mirrored the rise in both stock prices and industrial production until 1953. At that time mergers increased sharply, after the manner of stock prices.

1955–1956

Although no quarterly merger series for 1955 and 1956 were available at the time of writing, rough annual comparisons can be made (Table 61). These comparisons indicate that recent merger

TABLE 61

Annual Number of Merger Disappearances, Stock Price Index, and Industrial Production Index, 1954–1956

	Mergers	*Industrial Stock Prices*	*Industrial Production* (1947–1949=100)
1954	387	334	125
1955	525	443	139
1956	537	493	143
	PERCENTAGE CHANGE		
1954–1955	+36	+32	+11
1955–1956	+2	+11	+3
1954–1956	+39	+47	+14

Merger disappearances for 1954 are from *Report on Corporate Mergers and Acquisitions*, Federal Trade Commission, May 1955. For 1955 and 1956, from FTC press releases dated June 18, 1956 and February 14, 1957.

Industrial stock prices: arithmetic average of Dow Jones monthly index published in *Survey of Current Business*, February 1955, 1956, and 1957.

Industrial production index: from the *Federal Reserve Bulletin*, February 1957.

activity corresponded more closely to changes in stock prices than to changes in industrial production. While crude, this finding is consistent with that of the analysis of the quarterly movements in the sixty-year merger history.

Interpretation

Comparison of cyclical turning points indicated that peaks of merger activity were more nearly simultaneous with peaks in stock prices and stock trading, while they led peaks in the reference cycle and industrial production. Merger troughs, on the other hand,

showed greater simultaneity with troughs in reference cycles and industrial production, and lagged the troughs of the capital markets series. The indicated greater correlation of mergers with stock prices in periods of high merger activity and of mergers with industrial production in periods of low merger activity may thus have been caused partly by this shift in time sequence. Other things being equal, the correlation of two series with simultaneous turning points will be greater than that of two series with a consistent lead or lag in turning points.

To reduce the bias from this source the subperiods were selected so that each would encompass an integral number of complete cycles in as many of the series as possible. The five periods into which the sixty-year merger history was divided were each sufficiently long to encompass several peaks and troughs (Table 62).

TABLE 62

Number of Peaks and Troughs in Each of Five Subperiods, for Mergers, Stock Prices, and Industrial Production, 1895–1954

	Mergers		*Stock Prices*		*Industrial Production*	
Subperiod	*Peaks*	*Troughs*	*Peaks*	*Troughs*	*Peaks*	*Troughs*
1895–1904	2	3	2	3	2	3
1905–1918	3	3	4	4	4	3
1919–1931	2	1	3	2	4	4
1932–1942	0	1	3	4	1	2
1943–1954	1	1	2	2	2	2

No means are at hand for knowing the precise effect of these systematic shifts in timing on the correlation measures, nor the extent to which the selection of subperiods reached this bias, if at all.

The time sequence and the correlation analyses presented above tend to confirm the hypothesis that merger activity was more responsive to economic forces underlying changes in the capital market than to those underlying changes in the level of production. That hypothesis was further confirmed by a detailed examination of short-run changes in mergers and in the two series analyzed, which indicated that the statistical timing and correlation measures were reasonably accurate indicators of the response of mergers to the two kinds of economic change.

The findings do not conclusively demonstrate, however, that underlying industrial factors were not an ultimate factor in merger behavior. It is possible that merger movements represent a burst

of industrial reorganization toward which underlying economic and technological developments have been accumulating a long time. A favorable capital market may, under these circumstances, trigger the massive reorganization. Thus, while the findings of the study may have demonstrated clearly the importance of the capital market as a proximate factor in merger movements, they have not so clearly demonstrated its importance as an ultimate cause.

In certain cases it is probably correct to regard the long-run secular trend in an economic series as independent of its short-run cyclical variation. When the cycles are short and relatively small in amplitude, they may be taken as largely "surface phenomena," having no significant effect on underlying growth factors. However, when the series is marked by the infrequent appearance of large bursts of activity, these "cycles" dominate the time pattern and may make inappropriate the concept of gradual underlying forces of change. As infrequent large bursts of activity are likely to be the effect of the equally infrequent appearance of certain short-lived conditions, the cumulative total of activity may be different from that which would result from the smoothing out of the time patterns.

As has been documented in this study, the time series of mergers was characterized by large bursts of activity separated by lengthy intervals of very low activity. Therefore it cannot be claimed that the cumulative amount of merger activity would have been the same if the merger series had behaved like a more normal cycles-on-trend series; nor can it be determined from our data whether the cumulative amount would have been larger or smaller. What does seem certain is that merger activity would have been a good deal less colorful had it followed a more normal time pattern.

The frenzied construction of industrial empires during the large merger waves and their sometimes painful "shaking-down" in the readjustment periods that have followed may or may not have had important effects on the structure and performance of our industrial system. The task in this chapter has been to describe merger patterns and to suggest possible avenues to follow in exploring these questions. The important and interesting job of providing answers remains to be done.