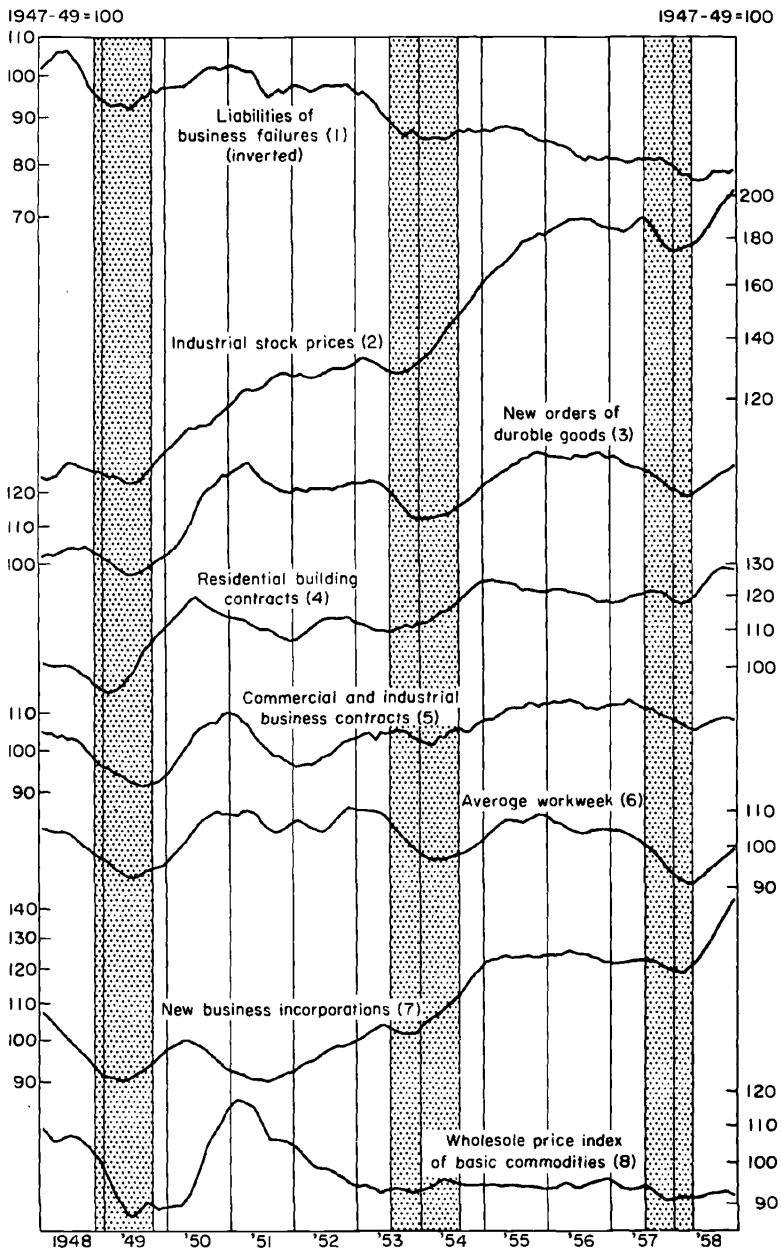


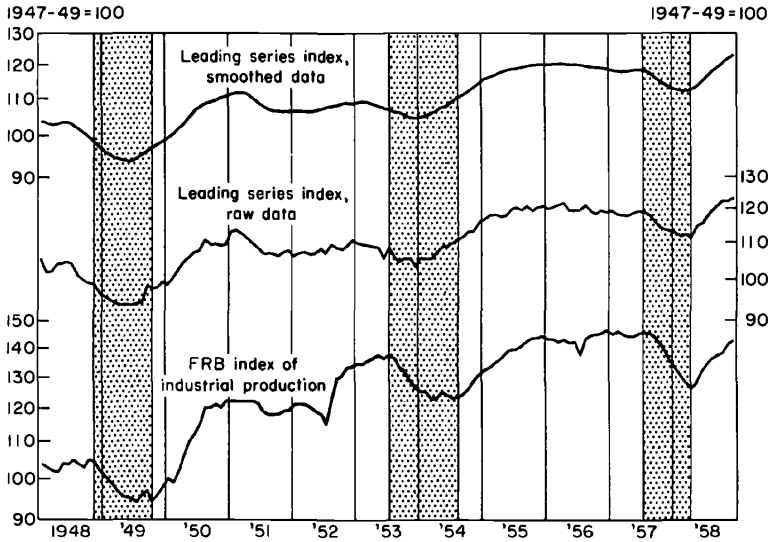
CHART 3.3
 Leading Indicators, Adjusted for Cyclical Amplitude and Smoothed,^a
 1948-58



Ratio scales.

SELECTION AND INTERPRETATION OF INDICATORS

CHART 3.3 (concluded)



Ratio scales.

^a The span of the moving average used to smooth each series is shown in Table 3.3. Shaded areas represent business contractions; unshaded areas, expansions.

disappear if they are combined in an index number. Such an index would enable us to judge the performance of an entire group of indicators. One of the problems, however, in constructing an index is to prevent those indicators that typically move in large cyclical swings, such as new orders, from completely swamping those that move in small swings, such as the average workweek. A solution to this problem is illustrated in Chart 3.3.

Each of the eight leading indicators is adjusted so that it has approximately the same cyclical amplitude, on the average, as one of the coincident indicators, the Federal Reserve Board index of industrial production. The adjusted series are also smoothed by moving averages, though this is not essential. The amplitude adjustment converts the cyclical swings in the several indicators to roughly the same average size, but does not alter the relative magnitudes of the successive swings in each indicator. The adjusted series are then combined into an index, as shown. Since the adjusted series have roughly equal cyclical amplitudes, their cyclical influence on the index is roughly equal. The index broadly parallels the production index, but leads it by intervals in the neighborhood of four to six months.¹³

¹³ For further discussion of this index, see Chapter 19. For another type of amplitude adjustment, see Chapter 18.

Diffusion Indexes of Business Indicators

Another device that can be used to summarize the movements of groups of series is a diffusion index, as shown in Chart 3.4. This is a simple scheme for counting the directions of change in a group of indicators and producing a sort of index number. The idea is merely to count the number of items in any group that are rising at any given time, and to take this as a percentage of the total number in the group. This is the percentage expanding. If more series in the group are rising than falling, the percentage will be above 50; if more are falling than rising, it will be below 50. The percentage is called a diffusion index because it shows how widely diffused expansion movements are in the sector observed.¹⁴

In some instances it will do to say that a series is rising if this month's figure, seasonally adjusted, is higher than last month's. But if the series is very erratic, it is better to take a longer view, and see whether this month's figure is higher than, say, three or six months ago. This way there is a better chance that cyclical movements will dominate the result. Unfortunately, however, the farther back we look, the less current our observation on the cyclical movement is likely to be, at least at the turning points. If inventories today are lower than they were a year ago, that *may* mean they are still declining, but it may not. Perhaps they turned up a month or two ago. When a series behaves in symmetrical fashion around its turning point, comparisons with the same month of the preceding year may tell us what the direction of cyclical movement was six months ago, not necessarily what it is now.¹⁵

For this reason it is desirable to "center" the observations on directions of change in the middle of the interval between the months compared, and bring them up to date by tentative approximations. In the case of an erratic series like liabilities of business failures, we determine its direction of change by comparing figures six months apart; smooth series, like manufacturers' inventories, are taken on a month-to-month basis.¹⁶ This in itself tends to produce a smoother diffusion index; if the same interval were used for each series, erratic factors that may affect a number of series at once, such as a strike, would have a greater effect on the result.

The results of this process are recorded in Table 3.3. where the centered directions of change for each indicator are shown. This gives a vivid picture of how the recession of 1957-58 and the subsequent recovery spread to different economic activities at different times. Despite the

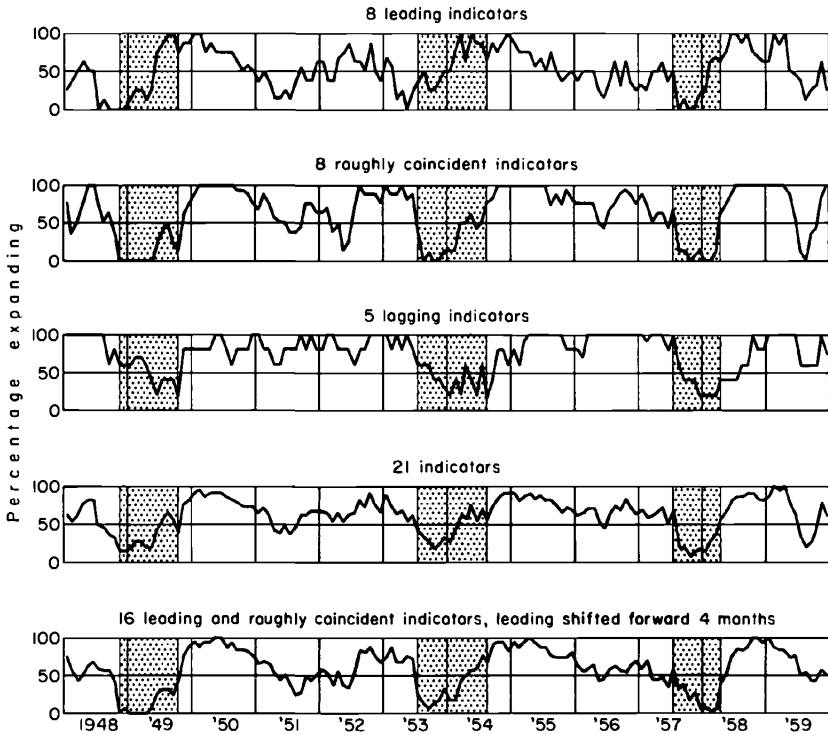
¹⁴ For the series that usually decline when business rises and vice versa (e.g. business failures, unemployment), we reverse the observed direction of change in determining the number expanding. When a series shows no change, it is counted as one-half rising.

¹⁵ For further discussion of this point, see Chapter 17.

¹⁶ For the method of determining these intervals, see Chapter 7. For another method, which yields somewhat shorter intervals, see Chapter 17.

SELECTION AND INTERPRETATION OF INDICATORS

CHART 3.4
Diffusion Indexes of Business Indicators, 1948-59



Computed from directions of change in centered moving averages applied to each seasonally adjusted indicator; the number of rising indicators is taken as a percentage of the total number in the group.

Shaded areas represent business contractions; unshaded areas, expansions.

smoothing devices used, the diffusion indexes for the three groups of indicators are erratic.¹⁷ Nevertheless, they furnish useful information about the movements of the indicators from which they are constructed. The

¹⁷ Another way to present the information contained in a diffusion index is to compute what we call the cumulated net percentage expanding, by taking the net excess of the percentage expanding (+) over the percentage contracting (-) and cumulating these figures from month to month from the initial date of the index (or from any arbitrary date). The resulting index is usually relatively smooth, and it reaches its peaks and troughs when the ordinary diffusion index (percentage expanding) crosses the 50 per cent line.

Still another method of constructing a diffusion index is termed the average duration of run and is explained in Chapter 20. This type of index is ordinarily somewhat smoother than the percentage expanding, but it is more complicated to compute and to explain, and it often lags a month or two behind the latter (see Chapter 9).

SELECTION AND INTERPRETATION OF INDICATORS

TABLE 3.3 (continued)

Indicator	Span in Mos.	1957												D			
		J	F	M	A	M	J	J	A	S	O	N					
Leading Group																	
1. Business failures, liabilities, inverted	6	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	-
2. Industrial stock prices	4	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
3. New orders, durable goods mfrs.	6	-	+	+	-	-	+	+	+	+	+	+	+	+	+	+	-
4. Constr. contracts, residential, fl. sp.	6	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
5. Constr. contracts, comm. & indus., fl. sp.	6	+	-	+	-	-	+	+	+	+	+	+	+	+	+	+	-
6. Aver. workweek, mfg.	4	0	-	+	-	-	+	+	+	+	+	+	+	+	+	+	-
7. New incorporations, no.	6	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
8. Prices, basic	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Roughly Coincident Group																	
9. Employment, nonagr., BLS	2	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	-
10. Unemployment, inverted	5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
11. Bank debits outside NYC	6	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
12. Carloadings	5	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	-
13. Production, FRB	2	0	0	-	+	+	+	+	+	+	+	+	+	+	+	+	0
14. Prices, wholesale, exc. farm & food	2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
15. Corp. profits after taxes (Q)	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
16. GNP (Q)	3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Lagging Group																	
17. Personal income	2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
18. Retail sales	4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
19. Consumer instalment debt	1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
20. Manufacturers' inventories	1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
21. Bank rates on business loans (Q)	3	+	0	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Leading group																	
Roughly coincident group		31.2	25.0	50.0	50.0	62.5	62.5	62.5	62.5	62.5	37.5	37.5	37.5	0	12.5	0	18.8
Lagging group		81.2	68.8	50.0	62.5	62.5	62.5	62.5	62.5	56.2	56.2	56.2	56.2	12.5	0	6.2	12.5
16 leading & roughly coincident series with leading shifted forward 4 mos.		100.0	90.0	100.0	100.0	100.0	100.0	100.0	100.0	80.0	100.0	100.0	100.0	60.0	40.0	40.0	20.0
21 indicators		56.2	65.6	43.8	50.0	46.9	43.8	43.8	53.1	31.2	37.5	18.8	21.9	6.2	6.2	11.9	16.7
		66.7	57.1	61.9	66.7	71.4	57.1	59.5	19.0	19.0	19.0	9.5	11.9	9.5	11.9	16.7	

DIFFUSION INDEXES (PERCENTAGE RISING)

TABLE 3.3 (concluded)

Indicator	Span in Mos.	1958												D				
		J	F	M	A	M	J	J	A	S	O	N						
Leading Group																		
1. Business failures, liabilities, inverted	6	-	+	-	-	-	+	+	+	+	+	+	+	+	+	+	-	
2. Industrial stock prices	4	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
3. New orders, durable goods mfrs.	6	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4. Constr. contracts, residential, fl. sp.	6	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
5. Constr. contracts, comm. & indus., fl. sp.	6	-	-	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+
6. Aver. workweek, mfg.	4	-	-	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+
7. New incorporations, no.	6	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
8. Prices, basic	3	+	+	+	-	-	+	+	+	+	+	+	+	+	+	+	+	-
Roughly Coincident Group																		
9. Employment, nonagr., BLS	2	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+
10. Unemployment, inverted	5	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+
11. Bank debits outside NYC	6	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
12. Carloadings	5	-	-	-	0	+	+	+	+	+	+	+	+	+	+	+	+	+
13. Production, FRB	2	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
14. Prices, wholesale, exc. farm & food	2	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
15. Corp. profits after taxes (Q)	3	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
16. GNP (Q)	3	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Lagging Group																		
17. Personal income	2	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
18. Retail sales	4	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
19. Consumer instalment debt	1	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20. Manufacturers' inventories	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21. Bank rates on business loans (Q)	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leading group																		
Roughly coincident group		25.0	62.5	68.8	62.5	75.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Lagging group		0	0	12.5	68.8	75.0	87.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
16 leading & roughly coincident series with leading shifted forward 4 mos.		20.0	20.0	20.0	40.0	40.0	40.0	40.0	30.0	30.0	60.0	60.0	100.0	100.0	80.0	80.0	80.0	80.0
21 indicators		6.2	0	6.2	43.8	50.0	75.0	84.4	81.2	87.5	100.0	100.0	100.0	100.0	93.8	93.8	93.8	93.8
		14.3	28.6	35.7	59.5	66.7	81.0	83.3	85.7	85.7	90.5	90.5	90.5	83.3	83.3	83.3	83.3	83.3

DIFFUSION INDEXES (PERCENTAGE RISING)

SELECTION AND INTERPRETATION OF INDICATORS

diffusion indexes make it plain that the three groups have moved in sequence.

Chart 3.4 also shows a diffusion index based on all twenty-one series and, at the bottom, an index based on the eight leading and eight roughly coincident series with the leading group shifted forward four months, which was the average lead of this group in the prewar record. One of the merits of this last arrangement is that it spreads the impact of short-run fluctuations which may affect many series at the same time; the result is a smoother diffusion index. Also, of course, since the leading series are moved ahead by the amount of their average lead, the resulting diffusion index should move in a fashion approximately synchronous with the diffusion index for the roughly coincident series.

A further test of the behavior of the twenty-one indicators is shown in Chart 3.5. Here we show the several diffusion indexes as they stood at intervals during the 1957-58 and 1953-54 recessions and recoveries.¹⁸ Bear in mind that the chart shows the picture as it looked toward the close of the months designated, which usually means that the latest available data were for the preceding month. In January 1958, three months before the business cycle trough was reached, nearly all the twenty-one indicators were moving down. At this point the latest data available were for December, in most instances, and there was no sign in these figures that the contraction was near its end. In this respect the situation looked less favorable than it did in May 1954, three months before the August 1954 upturn. By that time more than half of the leading indicators and a few of the coinciding ones had begun to rise.

By April 1958, when March figures were available, there was evidence of modest improvement in some of the leading series, but all of the coinciding and the lagging series were moving down. Again the situation in terms of these series looked much less favorable than it did at the August 1954 turn.

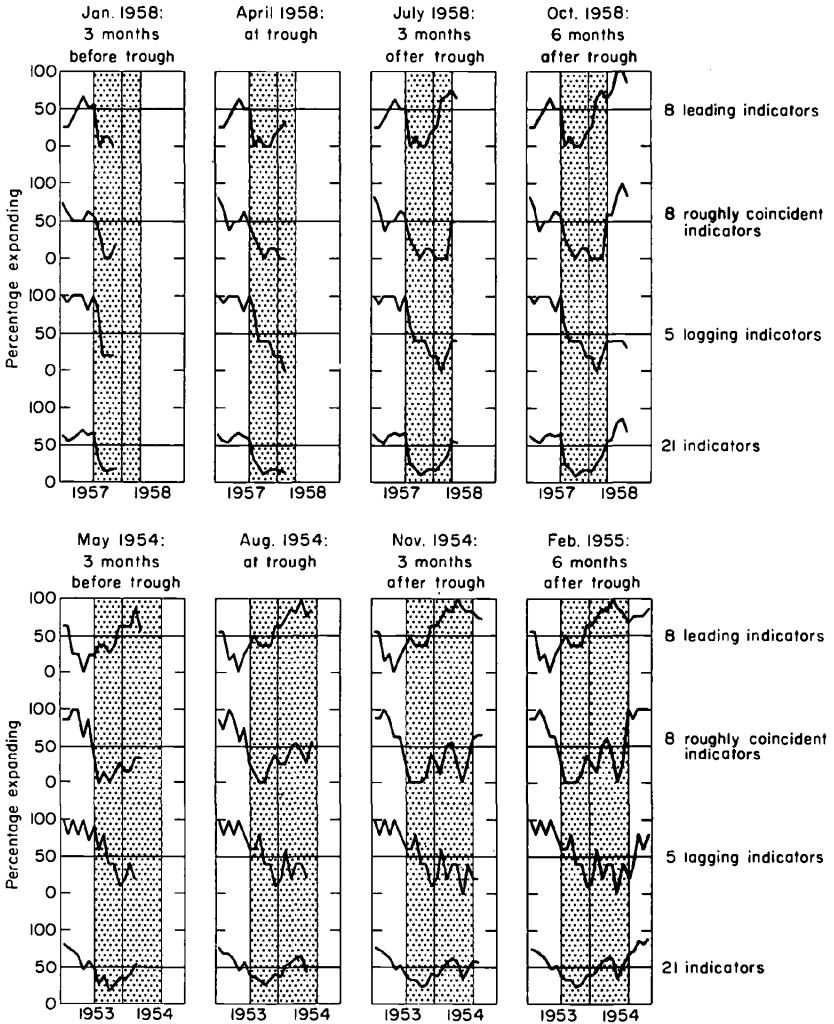
During the next three months further improvement occurred, so that by July 1958 more than half the leaders had been rising for several months, and exactly half the coinciding indicators were rising. By October, expansion had become general, with all the leaders rising, nearly all the coincident indicators rising, and about half the lagging indicators rising. The 1958 reversal clearly came about much more swiftly than that of 1954. In this respect it resembled the sharp upturns in 1938 and 1924.

¹⁸ The curves in successive panels differ slightly from one another and from those in Chart 3.4 for three principal reasons: (1) revised data for individual series subsequently became available; (2) seasonal adjustments for certain individual series were subsequently revised; (3) preliminary estimates of changes in moving averages of individual series, used to compute the percentage expanding, were revised when later data became available. For the same reasons, the contemporary record in Chart 3.5 differs slightly from that shown in Table 3.3.

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CHART 3.5

Diffusion Indexes of Business Indicators During Recession and Revival, 1953-54, 1957-58



Each panel is based on the figures that were available toward the close of the month indicated, which in most instances means figures for the preceding month. Shaded areas represent business contractions; unshaded areas, expansions.

SELECTION AND INTERPRETATION OF INDICATORS

It is important to be clear about what these results do *not* mean, as well as what they do mean. They do not mean that one can get much advance notice that a general business contraction is beginning or is coming to an end. They do help one to recognize these events at about the time they occur.¹⁹ Even then there is some risk of error. For Chart 3.4 shows, and the other charts provide additional evidence, that the economy undergoes what might be called abortive movements that are fairly general and show some of the same symptoms, yet do not develop into the longer, deeper, and more general swings that we recognize as business cycles.

Properties of Diffusion Indexes

We have constructed and examined a large number of diffusion indexes, and have learned something about their properties and what they have to tell about the condition of the economy. Chart 3.6 contains a sprinkling of these indexes for the postwar period and Chart 3.7 carries the story back to 1919. Let me enumerate some of the conclusions of our studies, and illustrate them by reference to both charts.

1. Cyclical movements in the economy are general, but far from perfectly general. For example, in the industrial production figures in Chart 3.6, in only two months during the recession of 1953–54 were more than three-quarters of the twenty-six major industry components of the FRB index declining from one month to the next. Since 1949, expansion has reached more than three-fourths of the industries at once in only a few scattered months in 1950, 1952, 1954–56, and 1958.

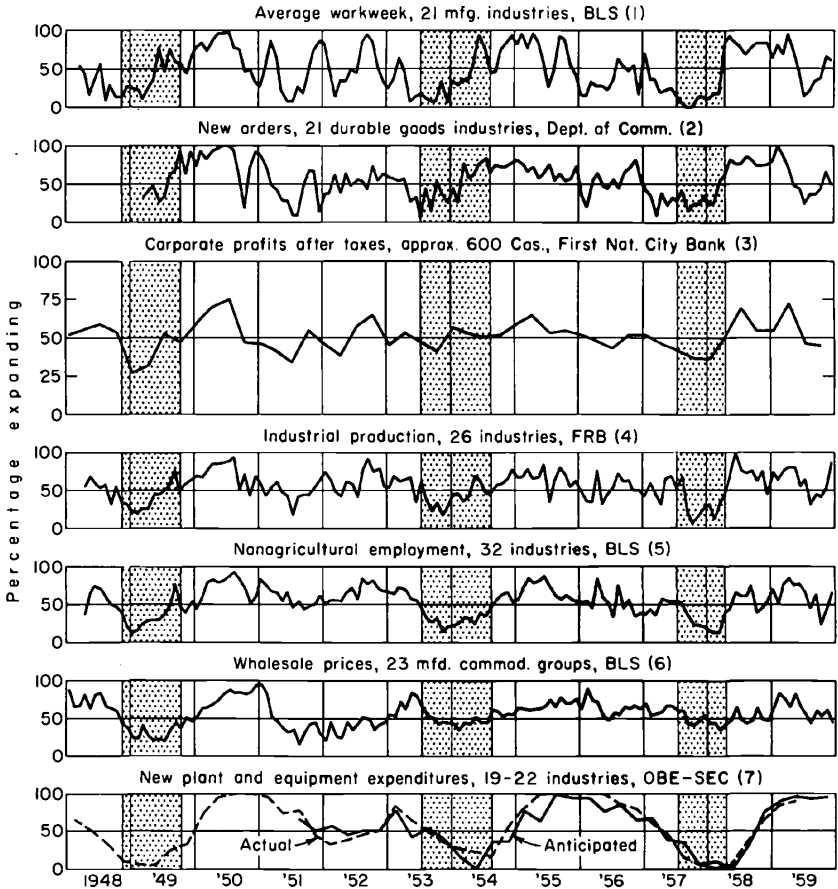
2. There is little evidence that cyclical movements have become either more or less general in recent years, i.e. that there has been a long-run *trend* one way or the other. Chart 3.7 provides some evidence on this point. The curve labeled “business indicators” is the same as the bottom curve on Chart 3.4, the combination of leading and coincident indicators with the former shifted forward four months. The curve labeled “153 series” is based on a sample of series representing a fair cross section of different types or aspects of economic activity. It is constructed by taking the directions of change in each series over a twelve-month interval—the familiar comparison with the same month of the preceding year. The result is plotted in the middle of the interval. For example, the most recent figure is plotted in June 1954, and it is based on a comparison, for each series, of December 1954 with December

¹⁹ It is of interest to note, for example, that the July 1954 issue of *Business in Brief*, published by the Chase National Bank, contained the following statement: “At present all the leading indicators [selected by the National Bureau] point up, and half the coincident ones show an expanding trend. On this basis, the indicators point definitely to an upturn in business activity.” The business cycle trough was subsequently dated August 1954.

PART ONE

CHART 3.6

Diffusion Indexes for Selected Economic Activities, 1948-59

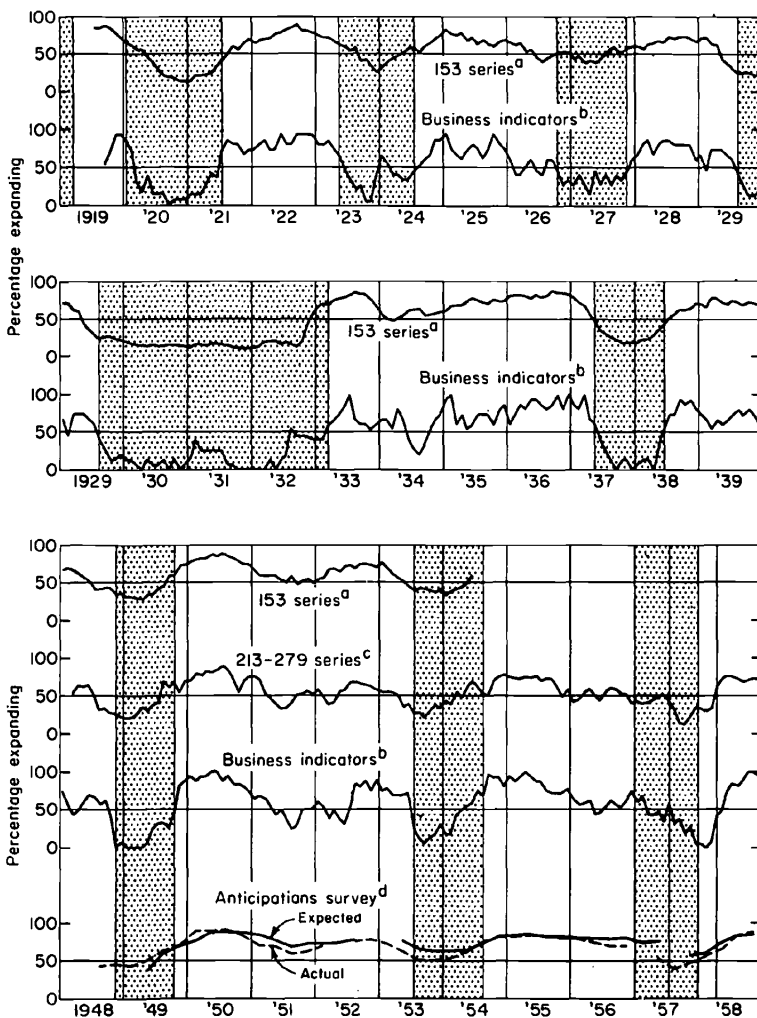


Indexes (4), (5), and (6) are based on directions of change in the component series from the preceding month; (3) on changes from the preceding quarter; (1), (2), and (5) over 3-month spans; and (7) over 4-quarter spans. Each index is plotted at the midpoint of the span (or when the midpoint falls between 2 months, at the second month). Based on seasonally adjusted components except (3) and (6), where the percentage expanding is adjusted, and (7), which requires no adjustment because a 4-quarter span is used.

Shaded areas represent business contractions; unshaded areas, expansions.

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CHART 3.7
Four Types of Diffusion Index, 1919–39, 1948–58



^a Based on directions of change from same month of preceding year, centered.

^b Based on directions of change in centered moving averages of leading and roughly coincident series, with leading series shifted forward four months.

^c Based on directions of change during three-month spans, centered. See Chapter 18.

^d Dun and Bradstreet survey: manufacturers' sales. Based on directions of change from same quarter of preceding year, centered.

Shaded areas represent business contractions; unshaded areas, expansions.

1953. The point is that both of the diffusion indexes that cover the interwar period seem to be undergoing much the same sort of swing since the war that they did before the war. And when the interwar cycles are compared with those before World War I (cf. Chapter 7, Chart 7.3), it is clear that the phenomenon of imperfectly diffused cyclical movements is of long standing.

3. The leads or lags that certain types of aggregates or indexes exhibit relative to one another are usually reflected in diffusion indexes constructed from the components of the aggregates (see Chapters 8, 14, and 15). In Chart 3.6, for example, the diffusion index for the workweek in twenty-one manufacturing industries shows a rather consistent lead over the diffusion index for employment in all nonagricultural industries. Changes in the workweek become diffused throughout industry more promptly than changes in employment. A similar statement can be made about diffusion indexes for new orders compared with those for production. Plant and equipment expenditures, on the other hand, show a distinct lag, and so do prices.

4. The scope of a business cycle expansion diminishes before the peak in aggregate activity is reached, and the scope of a contraction diminishes before the trough in aggregate activity is reached. The shaded areas in the several charts represent our best judgment on the location of the contractions in aggregate economic activity. There seems to be a tendency, in most of the diffusion indexes we have constructed, for the indexes to reach their peaks and troughs some six to twelve months ahead of these peaks and troughs in aggregate activity, although the lead intervals have sometimes been shorter than six months and occasionally longer than twelve. A long historical record and an extensive array of data support this observation as Charts 3.6 and 3.7 show (see also Chapter 8). The latest illustration occurred in 1957–58. Most of the diffusion indexes in our collection reached troughs and began rising late in 1957 or early in 1958, indicating a decline in the scope of the contraction. But none of the principal aggregative measures of activity, such as income, employment, or production, reached their troughs before February 1958, and many continued to decline until April or later.

5. Once expansion in the economy has become *general*, when measured by a wide variety of factors bearing on the economic well-being of the country and in such a way that the *cyclical* movements in the factors are exposed, it stays general for a considerable period. These periods are usually longer than those in which contraction is general. The proviso about measurement is important, for it is also true that there are shorter swings that are often quite general, especially when the directions of change are measured over brief intervals of a month or two.

Chart 3.7 makes this point emphatically. The top line is based on

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153 series covering such items as production and transportation, employment and hours of work, domestic and foreign trade, new orders and construction contracts, commodity prices, inventories, wage rates and earnings, interest rates, and financial activities. And each series is viewed in the perspective provided by a comparison with its level a year earlier. Over such an interval, broad cyclical swings are likely to dominate, especially if observation is confined to directions of change. And when the results are put together for the whole collection of series, this is what we find: the diffusion index remained above 50 per cent from August 1921 to August 1923, i.e. 25 months; from May 1924 to May 1926, again 25 months; from August 1927 to April 1929, 21 months; from December 1932 to April 1937, with a one-month interruption (in March 1934), 53 months; and from September 1949 to May 1953, again with an interruption of one month (in September 1951), 45 months. The index moved above 50 per cent again in June 1954. Similar broad swings are displayed by the diffusion index going back to 1885 in Chapter 7 (Chart 7.3), which is based not on the movements of the component series over uniform twelve-month intervals, but on movements between cyclical peaks and troughs identified historically in each series.

On the other hand, the diffusion index based on business indicators (Chart 3.7, third line) takes a shorter-run view. The current month's level of each indicator is compared with that of the preceding month or a few months earlier. Despite the fact that this index covers a rather wide variety of information (though it contains a much smaller number of separate series than the other indexes), and despite the smoothing effect produced by postdating the leading series, the index flutters around a good deal, and crosses above and below the 50 per cent line quite frequently. So, too, does the index (Chart 3.7, second line) comprised of nearly 300 series, which is based on a three-month span. The same is true of those indexes in Chart 3.6 which are based on short-run comparisons.

These considerations pose a dilemma. In order to detect major turns in the business cycle when they occur, one must take a short-run view; otherwise the turn will be discovered only long after the event. But the short-run view is likely to uncover minor as well as major turns.

One possible way out of the dilemma is suggested by the bottom curve on Chart 3.7, the anticipations survey. The Dun and Bradstreet survey of manufacturing concerns, wholesalers, and retailers inquires whether sales, orders, employment, prices, profits, and inventories are up or down in the most recent quarter compared with a year ago. The percentage of companies reporting increases in sales is the line labeled "actual." The survey also asks about expected results in the second quarter ahead compared with the same quarter a year earlier. The actual and expected

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points are each plotted in the middle of the year to which they refer, although the expected figure was available six months earlier than the actual.²⁰ Both the actuals and the expecteds trace a smooth course broadly similar to that followed by the other diffusion indexes. However, the expecteds appear to lag behind the actuals by about one quarter. Except for the lag, one could say that the expectations offer a way of bringing comparisons based on a yearly interval virtually up to date. For another example, see the actual and expected diffusion indexes for plant and equipment expenditures in Chart 3.6.

What the analyst must do to get out of the dilemma caused by the short-run ups and downs in economic activity is to seek, and wait for, *confirmation*. There are many ways of seeking it in the materials discussed, as well as in other materials. When we know more about the economics of the short-run swings, we may be better able to recognize them as and when they occur. A last resort—and indeed the only sure way out—is to wait for confirmation in the course of events. For example, in the spring of 1954 there was a fair amount of evidence in the kinds of data presented here that the business contraction, which until then had pursued a relatively moderate course, would be short-lived. This conclusion turned out to be correct, but at the time it was certainly conceivable that it could have been wrong. By midsummer there was stronger support for this conclusion. If the opposite conclusion had been reached originally, the evidence for it would have become weaker, and it might then have been abandoned. Still later in the year, after the recovery had actually got under way, there was still some uncertainty about whether the recovery would be abortive and the contraction would resume its course. Later on, even that uncertainty was dissipated. Similar remarks might be made about the upturn in 1958.

The business forecaster operates in a continuum, and the evidence for or against the judgments he must make from time to time accumulates month after month. This must be recognized if one is to take a responsible attitude toward policy, whether private or public. Flexible and relatively inexpensive policies can be undertaken promptly, before there is a heavy preponderance of evidence in their favor, for they can be reversed if the evidence turns against the forecast. Decisions on policies that are irreversible and expensive should wait until the evidence in their favor has accumulated; if it fails to accumulate a costly mistake will have been avoided.

²⁰ For example, the point on the "expected" curve based on the survey taken in April 1955 covering expected changes between III 1954 and III 1955 is plotted in February 1955, the midmonth of the year referred to. The "actual" figure obtained in the *same survey* shows changes between I 1954 and I 1955, and is plotted in August 1954; the expected figure for I 1954 to I 1955 was obtained in the survey taken in September 1954.

6. The scope of a contraction shortly after it begins is correlated, though often only loosely, with the severity of the contraction. The significance of this association, however, must still be assessed from both an economic and a statistical point of view. Our studies of it have not gone sufficiently far to yield a clear answer.²¹ On the statistical level, the association is relatively slight when diffusion is measured by short-run direction of change, apparently because such indexes are relatively unstable. The association is considerably closer when diffusion is measured by longer-run directions of change. For example, the 153-series index in Chart 3.7 crossed from above to below the 50 per cent line on ten occasions in the 28 years 1919–38, 1947–54. There were only seven business cycle contractions in this period; the three “extra” movements occurred in 1926–27, 1934, and 1951. Next, consider the level that the index reached three months after it crossed below the 50 per cent line. It reached a level around 30 per cent in three instances, a level of 35–45 per cent in five instances, and rose above 50 per cent in the other two instances. Now the three occasions when the index fell to 30 per cent at this stage occurred in 1921, 1929, and 1937; and these were the three most severe depressions that we have had since 1919. The five occasions when the index fell to 35–45 per cent occurred in 1923, 1926–27, 1948, and 1953; these were relatively mild or moderate contractions. And the two occasions when the index rose promptly above 50 per cent after having fallen below it occurred in 1934 and 1951, where we have not seen fit to recognize a business contraction at all.

Now there is no magic in the three-month interval. There is a modest degree of correlation at two months, and somewhat more at four, five, or six months. However—and this is a very important qualification—the level of this particular index three months after it reached 50 per cent could not be observed *at that time*, because it is centered. For example, it reached the 50 per cent line in May 1953; three months later would be August. But the figure entered in August is based on a comparison of February 1953 with February 1954. Data for February 1954 would have been required to compute the index, and it would have taken at least another month to get most of the figures. By that time, of course, the contraction was well under way.

It is difficult, therefore, to attribute much significance to this correlation from a forecasting point of view. It may be of value in situations in which the character of the decline in business activity is still uncertain after a considerable period, i.e. nine or ten months, has elapsed. This may have been the case in 1954 and 1949, perhaps even 1930, as those who recall public discussions of the matter in the early months of those

²¹ For a review of the evidence, see Chapter 8. See also Henry Platt, “An Analysis of the Structure of National Income with a View to Short-Run Forecasting,” Ph.D. dissertation, Columbia University, 1957.

years can testify. It was certainly not the case in 1937, when conditions deteriorated rapidly, and probably not in 1921. To sum up, the relationship serves to confirm or modify judgments reached at an early stage in a developing situation. Also, by careful use of anticipatory surveys, it may be possible to obtain the result faster. More work needs to be done both to explain the hypothesis that the scope of a business contraction in its early stages has a significant bearing on its later development, and to make practical use of this hypothesis if it stands up under examination.²²

Depressions have at least three dimensions, not just two: depth, duration, and diffusion. This last dimension has long figured in practical discussions of the business outlook, when, for instance, references are made to a *broad* recovery, or to *widespread* depression, or to *localized* unemployment. A diffusion index simply provides a measure for it, one that can be compiled currently and studied historically. The accuracy with which most of our diffusion indexes mirror economic developments emphasizes the importance of this dimension in any analysis of the business situation. Further, our results underline the importance of policies that have a *general* effect upon the economy. By the same token, they make apparent the need to find out how general the effects of different policies are. Perhaps they provide a tool that will help us to obtain that knowledge.

Measuring the Vigor of a Business Recovery

Let us return once more to the twenty-one indicators and some additional measures constructed from them (Table 3.4). These measures illustrate how current developments during a recovery period, like that of 1954–55, can be put in a useful perspective.²³ Like the indicators themselves, the measures are a by-product of the National Bureau's study of business cycles.

The table was drawn up originally to test the common view that the strength of a recovery in its early stages depends upon the level from which it starts. An appropriate measure of that level is provided by the magnitude of the preceding contraction. In other words, it might be expected that moderate contractions would give rise to moderate recoveries, severe contractions to vigorous recoveries. Consequently the columns in the table are arranged from left to right according to the severity of the preceding contraction: the recovery beginning in November 1927, on the left-hand side, followed the mildest contraction in our business cycle chronology; the recovery beginning in March 1933, on the right-hand side, followed the greatest contraction of them all. The 1953–54

²² For further work on the identification of severe contractions, not only by diffusion indexes but also by another approach, see Chapter 5.

²³ Unlike the other materials in this paper, Table 3.4 has been left as it was when presented in April 1955. For a fuller and more up to date presentation, covering recessions as well as revivals, see Appendix C.

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TABLE 3.4
Percentage Change in Twenty-one Indicators in the First Seven Months of Revival, Arrayed by Severity of Preceding Contraction

Series	Nov. 1927	Aug. 1954	Oct. 1949	July 1924	June 1938	Mar. 1933
	to June 1928	to Mar. 1955	to May 1950	to Feb. 1925	to Jan. 1939	to Oct. 1933
Leading Group						
1. Business failures, liabilities	-3.3	-2.8	+1.7	-18.1	+3.4	-40.1
2. Industrial stock prices ^a	+9.5	+22.7	+18.9	+21.9	+15.5	+59.4
3. New orders, durable goods mfrs. ^b	+6.2	+21.9	+18.5	+12.2	+34.2	+69.0
4. Constr. contracts, residential, fl. sp.	+11.9	+29.4	+27.7	+20.5	+51.4	+26.4
5. Constr. contracts, comm. & indus., fl. sp.	+40.8	+36.4	+57.3	+12.9	+32.3	+34.4
6. Av. workweek, mfg.	+1.5	+2.5	+2.3	+7.4	-0.2	-7.9
7. New incorporations, no.	+9.5	+18.6	+13.3	+21.2	-0.2	-9.0
8. Prices, basic ^a	-2.1	-1.1	+8.5	+10.4	+2.3	+34.8
Roughly Coincident Group						
9. Employment, nonagr., BLS	c	+1.6	+3.0	c	+4.4	+12.3
10. Unemployment	c	-15.7	-18.0	c	-10.4	-14.3
11. Bank debits outside NYC	+8.3	+10.9	+11.5	+11.8	+6.1	+8.1
12. Carloadings ^a	+4.6	+9.3	+25.4 ^d	+8.9	+8.2	+11.8
13. Production, FRB	+6.0	+9.8	+14.6	+17.1	+25.0	+30.0
14. Prices, wholesale, exc. farm & food ^e	-0.8	+1.1	+2.2	+5.2	-1.4	+17.5
15. Corp. profits after taxes ^e (Q)	+13.0	+11.0	+4.0	+42.0	+81.0	(+) ^f
16. GNP _p (Q)	-0.7	+3.8	+8.0	+10.0	+8.7	+11.4
Lagging Group						
17. Personal Income ^b	+0.7	+2.3	+7.0	+6.3	+4.0	+11.2
18. Retail sales	0	+5.3	+6.2	+2.9	+10.1	+13.6
19. Consumer installment debt ^b	c	+14.9	+14.9	c	+3.1	+3.1
20. Manufacturers' inventories ^b	+0.8	-0.7	+0.9	h	-5.8	+5.6
21. Bank rates on business loans (Q)	+9.4	-0.6 ⁱ	-1.1 ^j	-1.4	+0.3	-9.7

NOTE: The base for each percentage change is the three-month average centered on the trough month of the business cycle. All except series (2), (8), (14), and (21) are seasonally adjusted.

^a Change during first 8 months of revival, e.g. to Apr. 1955, July 1950, etc.

^b Change during first 6 months of revival, e.g. to Feb. 1955, May 1950, etc.

^c Data not available before 1929.

^d This is considerably affected by the coal and steel strikes, Sept.-Nov. 1949, which reduced carloadings sharply, especially in October. The percentage change using the average of Sept. and Nov. as base was +17.8.

^e Change during first quarter of revival, e.g. to IV 1954, I 1950, etc.

^f Figure for trough (I 1933) negative; hence percentage increase cannot be computed.

^g Change during first two quarters of revival, e.g. to I 1955, II 1950, etc.

^h Data not available before 1927.

ⁱ Change from Sept. 1954 to Mar. 1955.

^j Change from Sept. 1949 to Mar. 1950.

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contraction ranks next to the mildest, followed closely by 1948–49.²⁴ Now it is interesting to observe that the recoveries in the FRB production index, on line 13 in the table, rank in precisely the order of the severity of the preceding contractions. In this respect, the FRB index is virtually unique, but many of the other series show a roughly similar pattern, and the hypothesis underlying the table is substantially supported. Judged on this scale, the 1954–55 recovery, after the first seven months, seemed to be more or less in line with what one would expect in view of the moderate contraction that preceded it.

Further investigation of business cycle recovery periods suggests the following tentative conclusions:

1. Recoveries in output, employment, and profits have usually been faster after severe depressions than after mild contractions.

2. Despite the faster pace after severe contractions, recovery to the previous peak level has taken longer when the preceding contraction has been severe.

3. Nearly every business expansion has carried total output, employment, and profits beyond the level reached at the preceding peak.

4. The rate of growth in output, employment, and profits has usually been largest at the initial stages of a business expansion. Thereafter, slower growth has been the rule, especially after the preceding peak level has been regained.

5. Stock prices, unlike output, employment, or profits, have advanced more rapidly after mild recessions than after severe contractions.

Chart 3.8 shows how long it has taken for industrial production to get back to its pre-recession level after each of seven business cycle contractions since 1920. The mildest contraction, judged not by production alone but by several indicators, is at the top, the most severe at the bottom. Recoveries took six to nine months after the mildest contractions, fifteen or sixteen months after the severe contractions of 1921 and 1938, and nearly four years after the 1929–33 catastrophe.

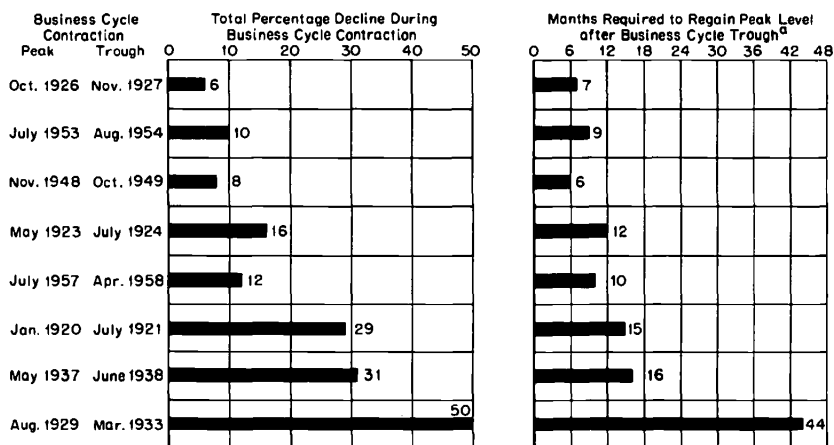
These intervals apply to industrial production, not necessarily to other measures of economic activity. For example, by the end of the first six months of the recovery that began in April 1958, four of the eight leading indicators (stock prices, residential building contracts, commercial and industrial building contracts, and new incorporations) had already recovered to the level on which they stood when the recession began in July 1957. Two of the eight roughly coincident indicators (bank debits and wholesale prices) and one of the five lagging indicators (personal income) had also recovered to this extent. The remaining fourteen

²⁴ This ranking depends in part on the particular measure used to obtain it, and is tentative and provisional. For further analysis, see Chapter 5. For a listing of cyclical amplitudes of three indexes of business activity during 25 business cycles, 1854–1958, see Table 3.6.

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CHART 3.8

Months Required to Regain Previous Peak Level of Industrial Production after Business Cycle Contractions of Different Severity



^a Interval from the business cycle trough to the first month in which the Federal Reserve Board index of industrial production equaled or exceeded its three-month average centered on the preceding business cycle peak. See Chapter 5, Table 5.9.

indicators were still below their mid-1957 levels, though most of them had recovered to some extent.²⁵

From Chart 3.9, which is arranged in the same way as Chart 3.8, we find that recoveries in industrial production proceed at a faster percentage rate after severe contractions. This is true whether one looks at the rates of growth for the first six months (shaded bars) or for the first two years following business cycle trough (white bars). Note that the percentage rates are computed on the base of the preceding peak figure, rather than in the usual fashion with the trough figure as the base (which is used in Table 3.4). This method reduces the calculated rates of recovery from severe contractions, since in such instances the preceding peak is much higher than the trough. Hence the recovery rates following severe and mild contractions become more nearly alike, although the tendency for higher rates to follow severe contractions is still perceptible.

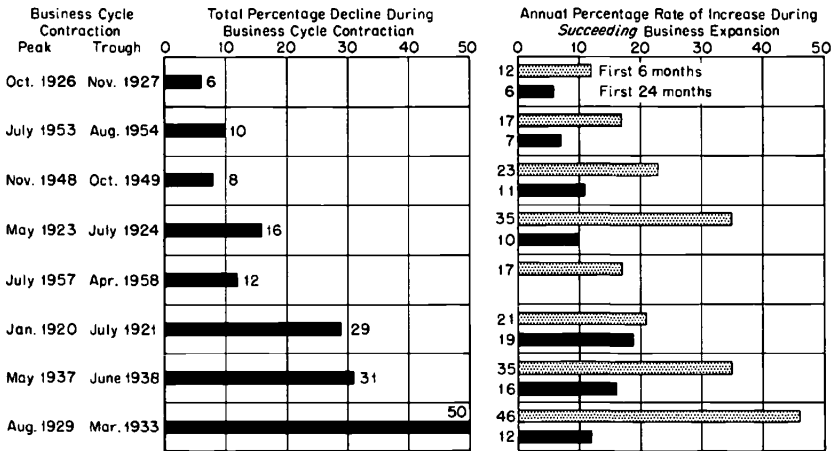
A striking feature of Chart 3.9 is that the rate of growth during the first six months of each recovery is much greater than during the first two years, usually about twice as great. This may be partly attributable to the ease with which output can be expanded from a low level by increasing the workweek, hiring previously unemployed or partly

²⁵ For additional illustrations of the timing of recovery in this sense, see Chapter 5.

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CHART 3.9

Rates of Increase in Industrial Production Following Business Cycle Contractions of Different Severity



Percentage declines and increases are computed on the base of the three-month average centered on the business cycle peak.

Based on Federal Reserve Board index of industrial production, adjusted for seasonal variation.

employed workers, and utilizing unused plant capacity. It may also be attributable to the lower level to which costs (labor costs per unit of output, material prices, interest rates) have usually fallen, both absolutely and relative to finished goods prices, and to the demand for output to fill up inventory pipelines. Once physical limitations begin to impose themselves, and costs begin to mount, and inventory accumulation is less pressing, the rate of growth of output tends to slacken.

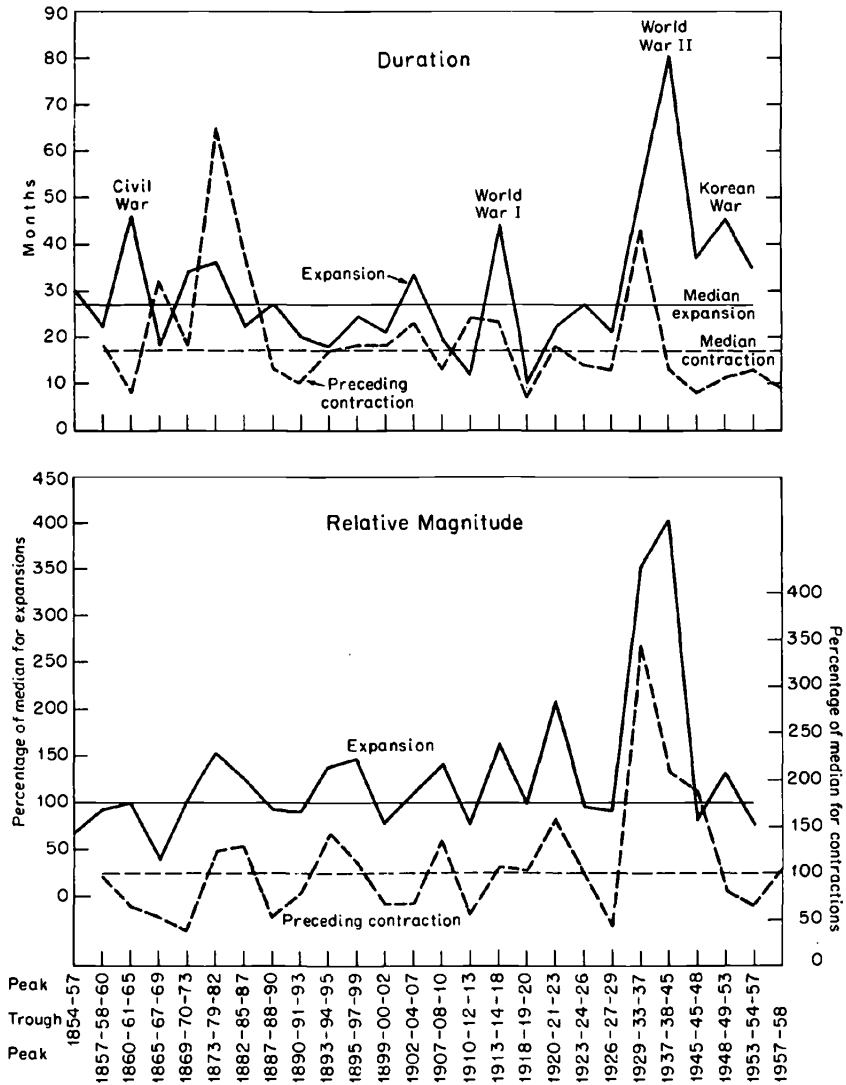
It should not be inferred from Charts 3.8 and 3.9 either that business expansions stop when output has regained its pre-recession level, or that they always last two years, no more and no less. Chart 3.10 shows that the median duration of business cycle expansions since 1854 has, in fact, been about two years (twenty-seven months), but variations have been wide. Few expansions have been shorter than a year and a half, and few longer than three years, except when a major war intervened. But the range is not narrow enough to be of much help in saying how long any given expansion will last when it has just begun. The same can be said of contractions, although they have typically been shorter than expansions, especially in recent years.

Chart 3.10 also tells us that the relationship between the decline

SELECTION AND INTERPRETATION OF INDICATORS

CHART 3.10

Duration and Magnitude of Business Expansions and Contractions in the United States, 1854-1958



Duration is measured from monthly business cycle trough to peak and peak to trough (see Appendix A).

Relative magnitude is based on the average rise or fall in three indexes of business activity (see Table 3.6 in the appendix to this chapter).

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during a business contraction and the rise during the succeeding expansion has been a longstanding one—witness the roughly parallel movements of the two lines at the bottom of the chart.

History teaches that every business cycle can be different, can develop unprecedented or at least unusual features. It behooves us, therefore, to be in a position continuously to re-examine and reappraise the situation as it develops. We should be prepared not only for the surprises that are unquestionably in store, but also to distinguish the surprises from the developments that are more or less to be expected. The method illustrated in Table 3.4 can be used to appraise a business cycle recovery month by month as it develops; to measure its vigor, scope, and unusual features; to derive some rough notions of its probable course and duration; and to check the reasonableness of forecasts constructed by other means, always remembering that typical rates of recovery and patterns of change vary from one measure of economic activity to another. The figures can be graphed and kept up to date on the plan used in Chart 3.11, which compares the 1958–59 recovery with other business recoveries since 1920.

The chart is constructed by converting each indicator, starting at the business cycle trough month (or quarter), to a percentage of its level (three-month average) at the preceding business cycle peak. This preceding peak level is not necessarily the highest point reached by the indicator itself, since some indicators will have begun to decline before the business cycle peak and others afterwards. Similarly, the business cycle trough is not necessarily the lowest level reached by the particular indicator. The initial ratio for each series and for each recovery period simply measures the level of the indicator when the recovery started relative to its level when the contraction began. These positions are plotted in the first column of points at the left of the chart. The points are numbered from (1) to (8) in order of the severity of the preceding contraction, starting with the mildest (see Chapter 5). Except for the 1958–59 recovery (5), the points are plotted only every six months to simplify the chart; the intervening points can be filled in if needed from the tables given in Appendix C. Like-numbered points can be connected by straight lines to show rates of increase during each recovery.

The chart makes clear once more that the severity of the business contraction is one of the principal factors affecting both the length of time required to regain the pre-recession level of output, employment, or profits, and the position attained relative to this level at any given time during the recovery period. The tendency for slower growth after an initial upsurge is also shown. Forecasts based on the growth rates that prevailed during, say, the first two years of recovery would usually understate the increases achieved during the first six or twelve months. Correspondingly, an extrapolation of initial rates of increase would usually

SELECTION AND INTERPRETATION OF INDICATORS

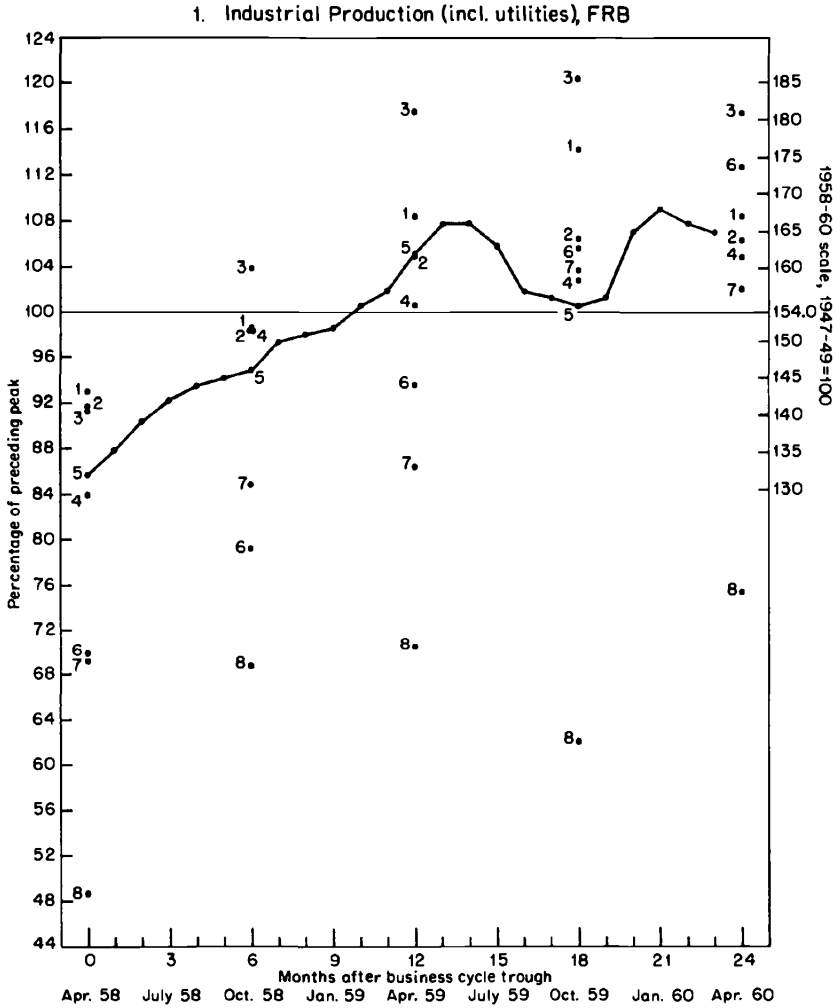
overshoot the mark actually attained by the end of two years. This type of retardation has been sharper in the workweek than in employment, sharper in industrial production than in gross national product, sharper in profits than in production, and barely perceptible in stock prices.

The stock price chart (panel 7) has some interesting features. The left-hand column of points shows that in a recession the market has tended to react more or less in line with other indications of the recession's severity, since the points are in rough numerical order. However, in each of the four milder recessions (nos. 1, 2, 3, and 4), by the time the low in business activity had been reached, the stock price index had more than recovered the level on which it stood when the recession began. Further, the market tended to react with confidence during the recovery after a mild recession and with much less confidence after a severe one. The largest increases in stock prices over their pre-recession levels have occurred after mild recessions.

Although an analysis of the type illustrated in these charts provides a useful perspective and a convenient way to measure the progress of recovery, it is nevertheless only a beginning. Economic change cannot be understood in terms of global figures such as industrial production, total employment, or aggregate profits alone. Moreover, one of the implications of the charts, that the character of a recovery depends on the kind of recession that preceded it, is only a partial truth. Developments during the recovery itself will certainly influence its course and progress, and so will developments during the expansion that preceded the recession.

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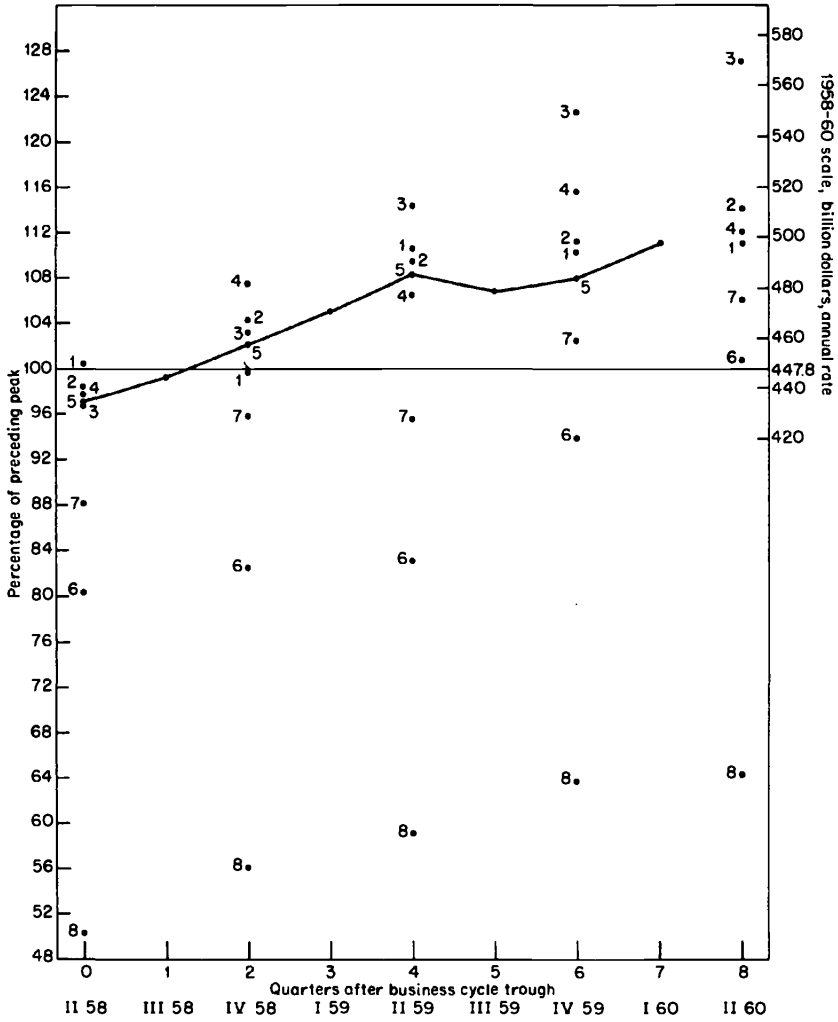
CHART 3.11
Business Recovery Patterns



SELECTION AND INTERPRETATION OF INDICATORS

CHART 3.11 (continued)

2. Gross National Product, in current prices



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CHART 3.II (continued)

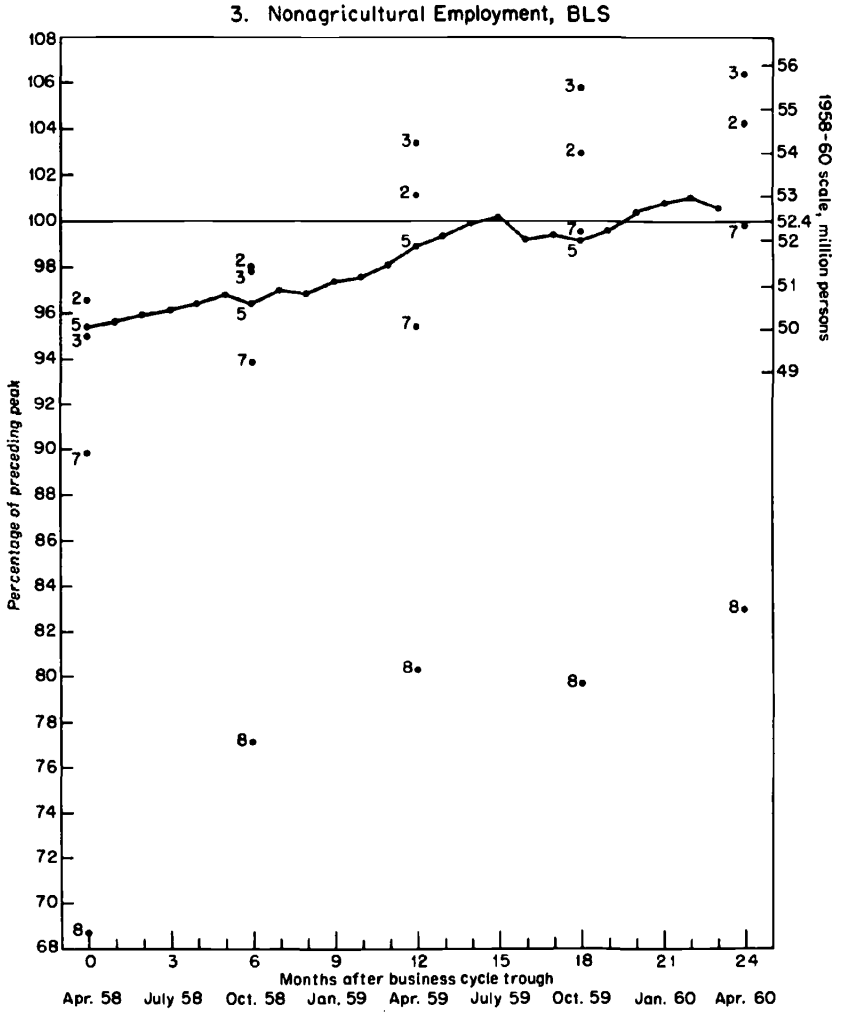
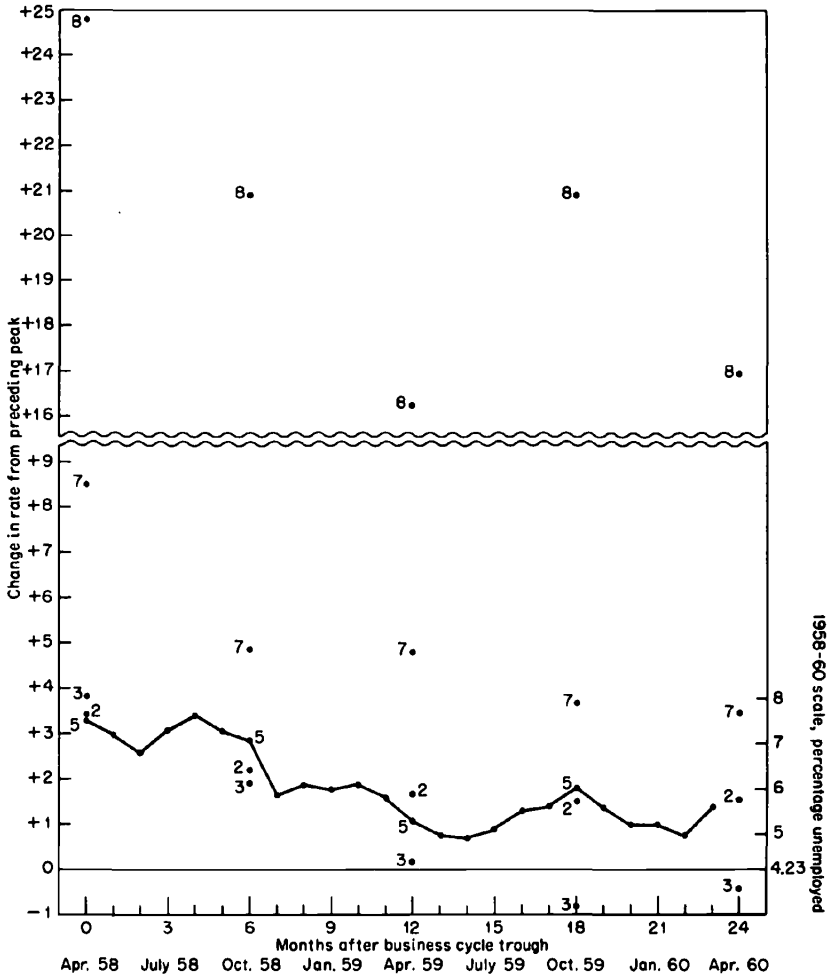


CHART 3.11 (continued)

4. Unemployment Rate



Data not available for periods (1), (4), and (6).

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CHART 3.11 (continued)

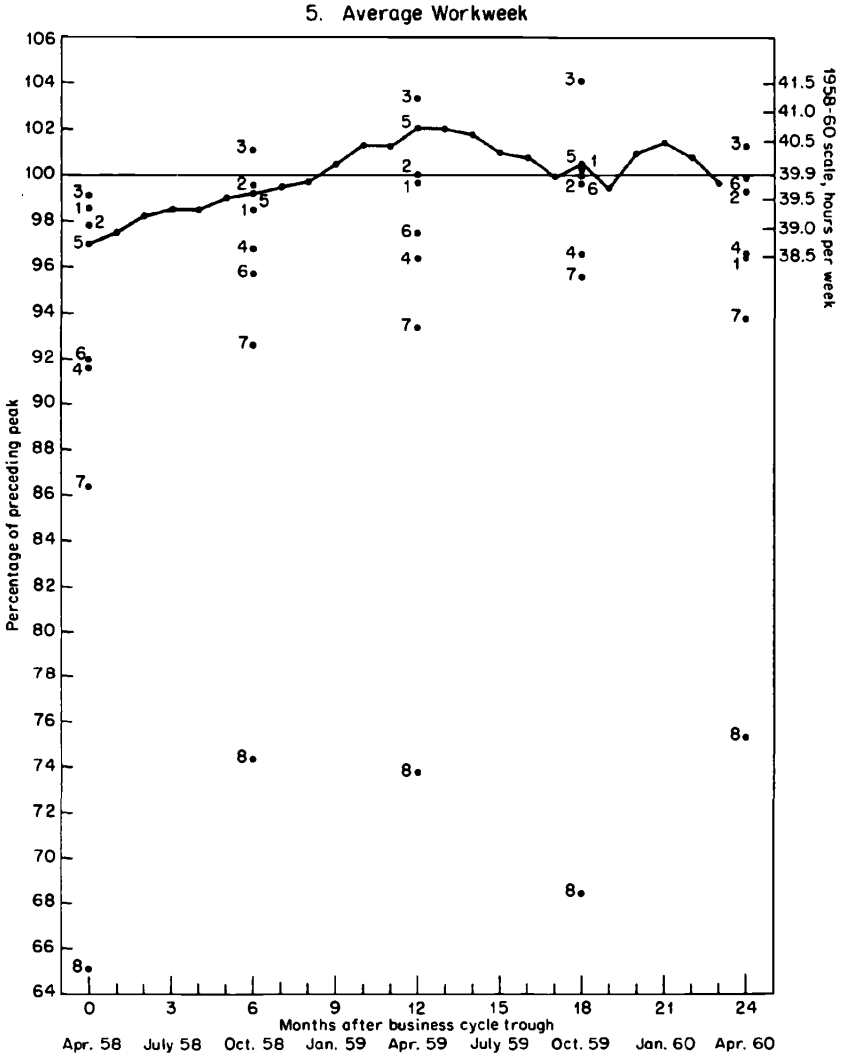
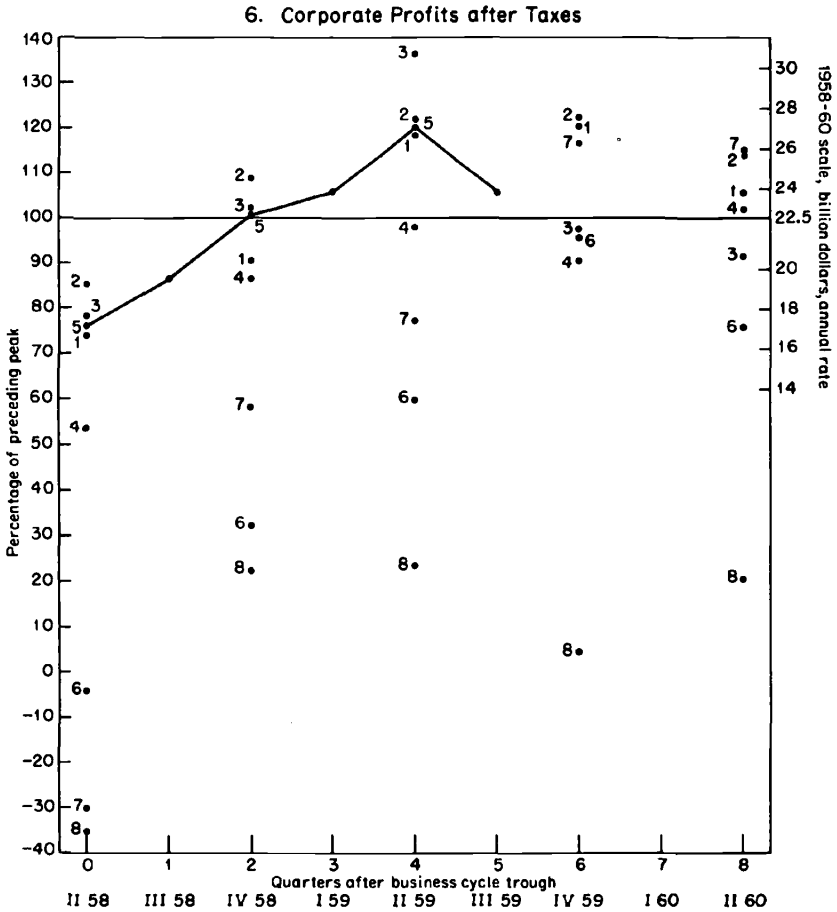


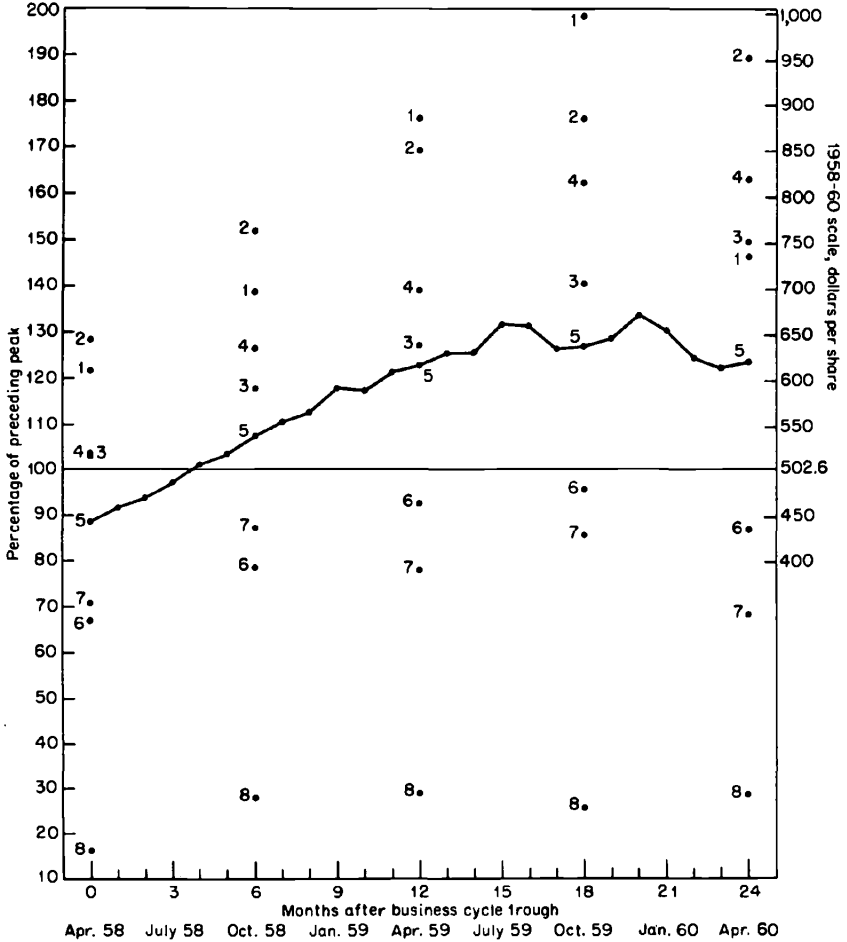
CHART 3.11 (continued)



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CHART 3.11 (concluded)

7. Industrial Stock Prices, Dow-Jones



Numerals identify business cycle recovery periods, arrayed in order of the severity of the preceding contraction (mildest first). The monthly and quarterly trough dates with which the recoveries begin are: (1) Nov. 1927, IV; (2) Aug. 1954, III; (3) Oct. 1949, IV; (4) July 1924, III; (5) April 1958, II; (6) July 1921, III; (7) June 1938, II; (8) March 1933, I. For the preceding peak dates, see Appendix A.

SOURCE: Appendix C.

Appendix

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TABLE 3.5
Prewar and Postwar Timing of Twenty-one Indicators,
Peaks and Troughs Separately

	8 Lead- In- dica- tors (1)	8 Roughly Coinci- dent In- dica- tors (2)	5 Lag- ing In- dica- tors (3)	21 In- dica- tors (4)	8 Lead- In- dica- tors (5)	8 Roughly Coinci- dent In- dica- tors (6)	5 Lag- ing In- dica- tors (7)	21 In- dica- tors (8)
	PREWAR BUSINESS CYCLE PEAKS (TO 1937) ^a				THREE POSTWAR BUSINESS CYCLE PEAKS (1948-57)			
1. Total business cycle turns covered ^b	86	68	19	173	24	24	15	63
2. Total specific cycle turns covered ^c	85	59	18	162	22	23	14	59
3. Business cycle turns not matched	10	11	2	23	6	3	2	11
4. Specific cycle turns not matched	9	2	1	12	4	2	1	7
	<i>Timing Comparisons</i>							
5. Total timing comparisons:	76	57	17	150	18	21	13	52
6. Leads, 4 months & over	40	9	2	51	17	8		25
7. Leads, 1-3 months	20	7	0	27		6	1	7
8. Exact coincidences	2	12	2	16	1	4	2	7
9. Rough coincidences ^d	31	38	6	75	1	13	7	21
10. Lags, 1-3 months	9	19	4	32		3	4	7
11. Lags, 4 months & over	5	10	9	24			6	6
12. Consistent timing comparisons ^e	61	38	14	113	17.5	13	11	41.5
13. Inconsistent timing comparisons	15	19	3	37	0.5	8	2	10.5
	<i>Average Lead (-) or Lag (+) (in months)</i>							
14. Consistent timing comparisons	-8.0	+0.7	+4.9		-18.8	-0.6	+3.8	
15. Inconsistent timing comparisons	+3.9	-9.9 ^f	-2.8		0	-14.0 ^f		
16. All timing comparisons	+5.6	+7.7 ^g	+3.6	-2.4	-18.3	-5.7	+3.0	-7.9

SELECTION AND INTERPRETATION OF INDICATORS

TABLE 3.5 (continued)

	8				8			
	Lead- In- dica- tors (1)	Roughly Coinci- dent In- dica- tors (2)	5 Lag- ging In- dica- tors (3)	21 In- dica- tors (4)	Lead- In- dica- tors (5)	Roughly Coinci- dent In- dica- tors (6)	5 Lag- ging In- dica- tors (7)	21 In- dica- tors (8)
	PREWAR BUSINESS CYCLE TROUGHS (TO 1938) ^a				THREE POSTWAR BUSINESS CYCLE TROUGHS (1949-58)			
1. Total business cycle turns covered ^b	90	70	22	182	24	24	15	63
2. Total specific cycle turns covered ^c	91	63	20	174	24	23	14	61
3. Business cycle turns not matched	7	8	3	18	4	3	2	9
4. Specific cycle turns not matched	8	1	1	10	4	2	1	7
	<i>Timing Comparisons</i>							
5. Total timing comparisons:	83	62	19	164	20	21	13	54
6. Leads, 4 months & over	50	17	2	69	13	3	2	18
7. Leads, 1-3 months	14	17	4	35	4	6	3	14
8. Exact coincidences	8	17	2	27	2	8	1	10
9. Rough coincidences ^d	26	43	11	80	7	17	7	31
10. Lags, 1-3 months	4	9	5	18	1	3	3	7
11. Lags, 4 months & over	7	2	6	15		1	4	5
12. Consistent timing comparisons ^e	68	43	12	123	18	17	7.5	43
13. Inconsistent timing comparisons	15	19	7	41	2	4	5.5	11
	<i>Average Lead (-) or Lag (+) (in months)</i>							
14. Consistent timing comparisons	-6.4	-0.3	+7.5		-4.8	-0.4	+4.1	
15. Inconsistent timing comparisons	+5.5	+5.5 ^g	-3.6		+1.0	+4.0 ^g	-3.0	
16. All timing comparisons	-4.3	-2.4	+3.4	-2.7	-4.2	-1.0	+1.1	-1.7

NOTE: The business cycle peak of February 1945 and trough of October 1945 and specific cycle turns during 1939-45 are omitted.

^a Includes all specific and business cycle turns covered by each indicator or its historical equivalent through 1937 (peaks) or 1938 (troughs). See Appendix B.

^b Sum of lines 3 and 5.

^c Sum of lines 4 and 5.

^d Includes leads of 1-3 months (line 7), exact coincidences (line 8), and lags of 1-3 months (line 10).

^e For leading indicators, number of leads plus one-half the exact coincidences. For roughly coincident indicators, number of rough coincidences. For lagging indicators number of lags plus one-half the exact coincidences.

^f Leads longer than 3 months.

^g Lags longer than 3 months.

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TABLE 3.6
Average Amplitude of Rise and Fall in Three Indexes of Business
Activity During Twenty-five Business Cycles, 1854-1958

EXPANSIONS				CONTRACTIONS			
<i>Business Cycle</i>		Average Per- centage Rise	Index (per cent of median rise)	<i>Business Cycle</i>		Average Per- centage Fall ^a	Index (per cent of median fall)
Trough	Peak			Peak	Trough		
Dec. 1854	June 1857	12.3	68	June 1857	Dec. 1858	21.0	96
Dec. 1858	Oct. 1860	16.8	93	Oct. 1860	June 1861	14.1	65
June 1861	Apr. 1865	18.1	100	Apr. 1865	Dec. 1867	11.4	52
Dec. 1867	June 1869	6.9	38	June 1869	Dec. 1870	7.9	36
Dec. 1870	Oct. 1873	18.4	102	Oct. 1873	Mar. 1879	26.9	123
Mar. 1879	Mar. 1882	27.6	152	Mar. 1882	May 1885	27.9	128
May 1885	Mar. 1887	22.7	125	Mar. 1887	Apr. 1888	11.2	51
Apr. 1888	July 1890	16.6	92	July 1890	May 1891	17.0	78
May 1891	Jan. 1893	16.3	90	Jan. 1893	June 1894	30.7	141
June 1894	Dec. 1895	25.3	140	Dec. 1895	June 1897	24.3	111
June 1897	June 1899	26.6	147	June 1899	Dec. 1900	14.4	66
Dec. 1900	Sep. 1902	14.2	78	Sep. 1902	Aug. 1904	14.4	66
Aug. 1904	May 1907	20.2	112	May 1907	June 1908	29.5	135
June 1908	Jan. 1910	25.6	141	Jan. 1910	Jan. 1912	12.0	55
Jan. 1912	Jan. 1913	13.6	75	Jan. 1913	Dec. 1914	23.2	106
Dec. 1914	Aug. 1918	29.8	165	Aug. 1918	Mar. 1919	22.0	101
Mar. 1919	Jan. 1920	17.9	99	Jan. 1920	July 1921	34.7	159
July 1921	May 1923	38.0	210	May 1923	July 1924	21.8	100
July 1924	Oct. 1926	17.8	98	Oct. 1926	Nov. 1927	9.3	43
Nov. 1927	Aug. 1929	16.7	92	Aug. 1929	Mar. 1933	75.1	344
Mar. 1933	May 1937	63.7	352	May 1937	June 1938	45.4	208
June 1938	Feb. 1945	72.7	402	Feb. 1945	Oct. 1945	41.0	188
Oct. 1945	Nov. 1948	14.7	81	Nov. 1948	Oct. 1949	17.5	80
Oct. 1949	July 1953	23.9	132	July 1953	Aug. 1954	14.3	66
Aug. 1954	July 1957	13.9	77	July 1957	Apr. 1958	22.7	104
Median rise, 1854-1957		18.1	100	Median fall, 1857-1958		21.8	100

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Footnotes to Table 3.6

NOTE: Since 1879, the figures are averages based on three trend-adjusted indexes: American Telephone and Telegraph Company index of business activity, index of industrial production and trade constructed by Warren M. Persons and continued by Barron's Publishing Company, and Ayres' index of business activity compiled by the Cleveland Trust Company. Before 1879, the entries are for Ayres' index alone. The rise from the specific cycle trough to specific cycle peak in each index is taken as a percentage of the average level of the index during the full specific cycle (trough to trough), and the fall from specific peak to specific trough is taken as a percentage of the same base. The amplitudes of the three indexes were considered sufficiently alike to warrant averaging; for the period 1879-1949 the average rise during specific cycle expansions was 27.3 (AT&T), 26.8 (Persons), and 25.9 (Ayres); the corresponding averages for contractions were 26.9, 25.8, and 25.8. This table is an extension of Table 156 in Burns and Mitchell, *Measuring Business Cycles*, p. 403.

The indexes of business activity from which the amplitude measures are derived are adjusted for long-term trend. For most purposes amplitude measures based on unadjusted data would be preferable, but only one of the three indexes (AT&T) is available in unadjusted form, and this only since 1900. The principal effect of the use of trend-adjusted indexes is to increase the amplitude of contractions relative to that of expansions. Hence the percentage declines in the table are roughly the same size as the percentage rises, whereas in unadjusted data the declines would generally be smaller than the rises.

Since the percentage rise in each index is computed on the base of the average level of the index during a specific cycle, it is smaller than if it had been computed in the usual way with the initial (trough) figure as base. Similarly, the percentage fall is larger than if it had been computed with the peak as base. However, as computed, the percentage rise is comparable with the succeeding percentage fall, since both are computed on the same base.

The amplitude measures pertain to the total rise or fall in the indexes, not to the rate of change per month or year. For some purposes the rate may be the more significant figure. Such rates can be approximated by dividing the total change by the duration of the business cycle expansion or contraction, but the approximation is rough because the total changes are based on specific cycles.

The amplitude measures depend importantly on the cycle chronology. If some of the milder contractions had been omitted, for example, the amplitude of the expansions which they interrupt would be much greater.

The amplitude figures shown here have serious limitations as measures of the severity of business cycles, besides those just mentioned. The composition of each of the indexes of business activity has changed from time to time, and these changes may have affected their amplitude. Other measures of aggregate economic activity may be more precisely defined conceptually and more precisely estimated statistically, especially in recent cycles. Some such alternative measures, covering contractions since 1920, are provided in Chapter 5, Tables 5.2 and 5.14.

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TABLE 3.7
Convenient Sources of Current Data for Twenty-six Indicators (1960 List)

Indicator	Survey of Current Business Weekly Monthly Supp.	Federal Reserve Bulletin, Monthly	Economic Indicators, Monthly	Press Release or Other Primary Source ^a
Leading Group				
1.0 Average workweek, mfg.	U	U	U	BLS, <i>Monthly Report on the Labor Force, Employment, Unemployment, Hours and Earnings</i> (S)
2.0 Gross accession rate, mfg.	U	n.a.	n.a.	BLS, <i>Factory Labor Turnover</i>
3.0 Layoff rate, mfg.	U	n.a.	n.a.	Same as 2.0
4.0 New orders, durable goods mfg. industries, value	S	n.a.	n.a.	OBE, <i>Business News Reports, Manufacturers' Sales, Orders, and Inventories</i>
5.0 Housing starts, no. of new dwelling units	S	S	S	Census, <i>Housing Starts, Construction Reports</i> , No. C 20.
6.0 Commercial & industrial building contracts, floor space	n.a.	n.a.	n.a.	F. W. Dodge Corporation, <i>Construction Contracts, United States Summary</i> (U)
7.0 Net change in no. of operating businesses (Q)	S	n.a.	n.a.	OBE, <i>Survey of Current Business</i>
8.0 Business failures, liabilities, indus. & comm.	U	n.a.	n.a.	Dun and Bradstreet, Inc., <i>Business Economics Department, Business Trend News, Monthly Failures.</i>
9.0 Corporate profits after taxes (Q)	S	S	S	OBE, <i>Business News Reports, National Income and Corporate Profits</i> ^b
10.0 Common stock price index, industrials, rails, and utilities	U*	U*	n.a.	Standard and Poor's Corporation, <i>Trade and Securities Statistics, Current Statistics.</i>
11.0 Change in business inventories (Q)	S	S	S	OBE, <i>Business News Reports, Gross National Product</i> ^b
12.0 Industrial raw materials price index	n.a.	n.a.	n.a.	BLS, <i>Daily Indexes and Spot Market Prices</i> (U*)
Roughly Coincident Group				
13.0 Employment in nonagric. establishments	S	S	S	See 1.0
14.0 Unemployment rate	S	S	S	See 1.0

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15.0 Industrial production index	S	S	S	S	FRB, <i>Business Indexes</i> (No. G.12.3)
16.0 GNP, in current dollars (Q)	S	S	S	S	See 11.0 ^b
17.0 GNP, in constant (1954) dollars (Q)	S	n.a.	S	S ^c	OBE, <i>Survey of Current Business</i>
18.0 Bank debits outside NYC	U	U	S	n.a.	FRB, <i>Bank Debits</i> (No. G.6)
19.0 Personal Income	S	S	S	S	OBE, <i>Business News Reports, Personal Income</i>
20.0 Sales by retail stores	S	S	n.a.	S	Census, <i>Advance Retail Sales Report</i>
21.0 Wholesale price index, excl. farm products & foods	U	U	U	U	BLS, <i>Wholesale Price Index</i> (weekly release)
Lagging Group					
22.0 Plant & equipment expenditures, total (Q)	S	n.a.	d	S	OBE, <i>Business News Reports, Plant and Equipment Survey</i>
23.0 Wage & salary cost per unit of output, mfg.	n.a.	n.a.	n.a.	n.a.	See 15.0 and 19.0 for sources of component series; NBER divides manufacturing wage and salary disbursements by index of manufacturing production (both components seasonally adjusted)
24.0 Manufacturers' inventories, book value (end of month)	S	S	n.a.	S	See 4.0
25.0 Consumer instalment debt (end of month)	U	U	U	U	FRB, <i>Consumer Credit, Short- and Intermediate-Term</i> (No. G.19)
26.0 Bank interest rates on business loans (last month of quarter)	U*	n.a.	U*	n.a.	FRB, <i>Federal Reserve Bulletin</i>

S = available in seasonally adjusted form in the source. these sources do not ordinarily provide revised figures for earlier dates, U = available only in seasonally unadjusted form; seasonal which the monthly periodicals listed at the left do.

U* = available only in seasonally unadjusted form; seasonal
^b Advance figures are published in *Economic Indicators*.
^c *Economic Indicators* furnishes series in 1958 dollars.
^d Shown seasonally unadjusted only.

n. a. = not available. BLS = Bureau of Labor Statistics
^eThe sources cited are those in which the current figures are first FRB = Federal Reserve Board
released, sometimes in rounded or preliminary form. Note, however, that OBE = Office of Business Economics

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TABLE 3.8
Measures of Erratic Movements and Smoothing Periods, Twenty-six Indicators (1960 List)

Indicator	Av. Dur. of Run, Seas. Adj. Data, 1947-58 ^a (1)	Av. Per Month Percentage Change in		Ratio, I/C (4)	Months for Cyclical Dominance, MCD (5)	I/C for MCD Span Average CI (6)	Av. Dur. of Run	
		Irregular Component, I (2)	Trend-Cycle Component, C (3)				MCD Moving Average (7)	Seas. Adj. Data, CI (8)
Leading Group								
1.0 Average workweek, mfg., BLS	3.0	0.3	0.2	1.5	2	.74	4.6	2.9
2.0 Gross accession rate, mfg., BLS	2.3	5.0	2.2	2.3	3	.78	5.8	2.4
3.0 Layoff rate, mfg., BLS	2.4	11.0	5.6	2.0	3	.65	6.4	2.5
4.0 New orders, durable goods mfg. indus., value, Census-OBE	2.0	4.6	2.0	2.3	3	.75	3.6	1.9
5.0 Housing starts, no. of new dwelling units, Census	2.5	2.3	1.4	1.6	3	.65	5.6	2.3
6.0 Commercial & indus. building contracts, fl. sp., Dodge	1.6	12.8	2.8	4.5	5	.84	3.3	1.6
7.0 Net change in no. of operating businesses, OBE (Q)	17.6	12.0	6.9	1.7	n.a.	n.a.	n.a.	n.a.
8.0 Business failures, liabilities, indus. & comm., Dun and Bradstreet	1.5	15.1	3.1	4.9	6	.88	2.9	1.6
9.0 Corporate profits after taxes, OBE (Q)	7.8	3.2	2.2	1.4	n.a.	n.a.	n.a.	n.a.
10.0 Common stock price index, industrials, rails, and utilities, Standard and Poor's	2.5	1.5	1.4	1.0	2	.60	4.6	2.4
11.0 Change in business inventories, OBE (Q)	5.9	7.1	3.4	2.1	n.a.	n.a.	n.a.	n.a.
12.0 Industrial raw materials spot market price index, BLS	2.5	1.4	1.6	0.9	1	.87	3.2	3.2
Roughly Coincident Group								
13.0 Employment in nonagric. establish., BLS	3.2	0.2	0.3	0.7	1	.69	3.6	3.6

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14.0	Unemployment rate, BLS	2.3	3.7	2.9	1.3	2	.73	3.1	2.4
15.0	Total indus. production index (incl. utilities), FRB	4.6	0.7	0.7	1.0	2	.51	3.6	3.6
16.0	GNP, in current dollars, OBE (Q)	15.7	0.5	0.6	0.9	n.a.	n.a.	n.a.	n.a.
17.0	GNP, in constant dollars, OBE (Q)	9.4	0.4	0.4	1.1	n.a.	n.a.	n.a.	n.a.
18.0	Bank debits outside NYC, FRB	2.0	3.0	0.8	4.0	3	.77	3.0	1.4
19.0	Personal income, OBE	3.2	0.5	0.6	0.9	1	.93	2.7	2.7
20.0	Sales by retail stores, Census	1.9	1.7	0.6	3.0	3	.97	3.3	1.7
21.0	Wholesale price index, excl. farm products and foods, BLS	6.8	0.2	0.4	0.4	1	.41	8.3	8.3
Lagging Group									
22.0	Plant & equipment expenditures, total, OBE-SEC (Q)	12.8	1.3	1.1	1.2	n.a.	n.a.	n.a.	n.a.
23.0	Wage and salary cost per unit of output, mfg., OBE and FRB	2.8	0.5	0.4	1.1	2	.64	4.2	2.5
24.0	Manufacturers' inventories, book value, Census-OBE	8.9	0.2	0.9	0.3	1	.28	11.3	11.3
25.0	Consumer instalment debt, FRB	11.0	0.3	1.6	0.2	1	.19	13.8	13.8
26.0	Bank interest rates on business loans, FRB (Q)	9.4	0.9	0.8	1.1	n.a.	n.a.	n.a.	n.a.

NOTE: The periods covered in cols. 2-8 vary from series to series, but start in 1946-48 (except series 5.0, which starts in 1951) and end in 1957-59. The seasonally adjusted data used in cols. 2-8, derived from the electronic computer program described in Chapter 17, differ in some instances from those used in col. 1 (and shown in Volume II). In particular, seasonal factors are eliminated by the program, regardless of whether they are believed to exist in the series (cf. note a) or if they have already been eliminated by the compilers. In these cases, although the seasonal factors have relatively small amplitudes, their elimination smooths the data, reducing I (col. 2) and I/C (col. 4). Except for this and the differences in periods covered, cols. 1 and 8 would be identical. The number of months for cyclical dominance (MCD , col. 5) represents the span of moving average required to reduce I/C to less than 1.00 (see col. 6). On the assumption that I is reduced proportionately as the span is increased while C remains constant (both computed on a per month basis), MCD can be closely estimated from I/C (col. 4), by the formula $MCD = I/C + 0.5$. For further explanation of terms, see Chapter 17. The moving average periods in col. 5 are usually shorter by one or two (occasionally three) months than those selected according to the criterion developed in Chapter 20 (cf. Table 3.3).

a The "incomplete" runs at the beginning and end of the data are included in the averages. Seasonally adjusted data are used except where seasonal is not believed to exist, as in series 10.0, 12.0, and 26.0.