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RECESSION AND RECOVERY ANALYSIS

RATIONALE AND APPROACH

PURPOSE AND USES

RECESSION ANALYSIS AND RECOVERY ANALYSIS are two analogous approaches to the understanding of business cycles.[1] They are primarily designed to facilitate the evaluation of prevailing business conditions by comparing current contractions, or current expansions, with corresponding phases in the past. This is done by measuring changes of individual time series from their standing at cyclical turns and comparing current with past changes over a series of widening time spans. All comparisons are based on seasonally adjusted data, if such adjustment is warranted.

Some illustrations will clarify the simple procedures. Table 11 contains percentage changes of nonagricultural employment[2] from business cycle peaks (three-month average, centered at the peak). For each contraction since 1929, changes are shown over successive spans, varying from six months before[3] to thirty months after a business

[1] The basic approach has been developed by Geoffrey H. Moore. See his *Measuring Recessions,* New York, NBER, 1958. This and other books and papers cited in this chapter are recommended to all users who wish to acquire thorough familiarity with the analysis.

[2] As in the earlier parts of this study, the term nonagricultural employment is used as a short designation for "number of employees in nonagricultural establishments," which is the full title of the series collected and published by the Bureau of Labor Statistics, U.S. Department of Labor.

[3] For the spans *before* the peak, the term "percentage change *from* peak" implies the wrong direction. Percentage deviation from peak levels (or from trough levels) would avoid the directional connotation. However, in this study we shall conform to the terminology used in the basic publications.

TABLE

RECESSION ANALYSIS, NONAGRICULTURAL BUSINESS CYCLE

Date of Peak[a]	*Percentage Change (months before peak)*		*Standing at Peak*[b] *(thousands)*	*Percentage Change*			
	6	*3*		*3*	*6*	*9*	*12*
Aug. 1929	−1.9	−0.8	33,222	−1.5	−4.6	−6.5	−9.7
May 1937	−3.2	−1.3	31,904	+0.6	−2.2	−7.1	−9.7
Feb. 1945	−0.1	−0.4	41,740	−1.5	−3.4	−7.0	−6.0
Nov. 1948	−0.9	−0.1	45,077	−1.4	−2.7	−3.5	−4.2
July 1957	−0.3	+0.1	53,011	−0.6	−1.8	−3.9	−3.9
July 1953	−0.6	+0.1	50,378	−0.5	−2.0	−2.7	−3.3
May 1960	−1.6	0	54,407	−0.4	−1.0	−1.9	−1.3
Average	−1.2	−0.3		−0.7	−2.5	−4.7	−5.5
Avg. deviation	0.9	0.4		0.6	0.9	1.9	2.6
Correlation coefficients (Pearsonian) partial vs. total amplitudes				+0.33	+0.85	+0.61	+0.78

Source: Output Tables 3A-3 and 3A-6.

[a] In order of contraction amplitudes (see next to last column).

cycle peak. Only spans in multiples of three are shown. Chart 14 is an equivalent graph of the percentage changes, except that all monthly spans from −6 months to +22 months are charted and the recessions beginning in 1945 and 1948 are omitted.[4] These presentations permit a comparative evaluation of a current cyclical decline in employment against the background of past employment changes during comparable recession periods. As a recession proceeds, the characteristics of a given activity will emerge with increasing clarity. Similar comparisons can, of course, also be made for expansions. In the simplest though not necessarily the most instructive form of recovery analysis, percentage increases are computed from past business cycle troughs

[4] In order to avoid crowding the chart, we omitted the two war-affected recessions. They seemed to be least relevant for the evaluation of recent and prospective contractions.

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EMPLOYMENT, PERCENTAGE CHANGE FROM PEAKS, 1929–63

(*months after peak*)						*Percentage Change to Business Cycle Trough*[b]	*Duration of Recession (months)*
15	*18*	*21*	*24*	*27*	*30*		
−12.3	−14.3	−15.7	−18.2	−21.3	−23.5	−30.7	43
−9.3	−7.1	−6.2	−5.4	−3.8	−1.2	−10.0	13
−1.1	+1.8	+3.6	+4.4	+4.4	+5.1	−7.6	8
−4.2	−1.0	+2.2	+3.5	+5.4	+6.1	−4.1	11
−3.0	−1.1	+0.5	+1.3	+0.4	+2.2	−3.8	9
−3.0	−2.0	−0.5	+1.0	+1.9	+3.0	−3.3	13
−0.3	+0.4	+1.1	+2.0	+2.4	+2.7	−1.8	9
−4.8	−3.3	−2.2	−1.6	−1.5	−0.8	−8.8	15.1
3.5	4.2	5.0	5.8	6.3	6.6	6.6	7.9
+0.85	+0.91	+0.92	+0.94	+0.95	+0.96		−0.96[c]

[b] Three-month average centered at turn.

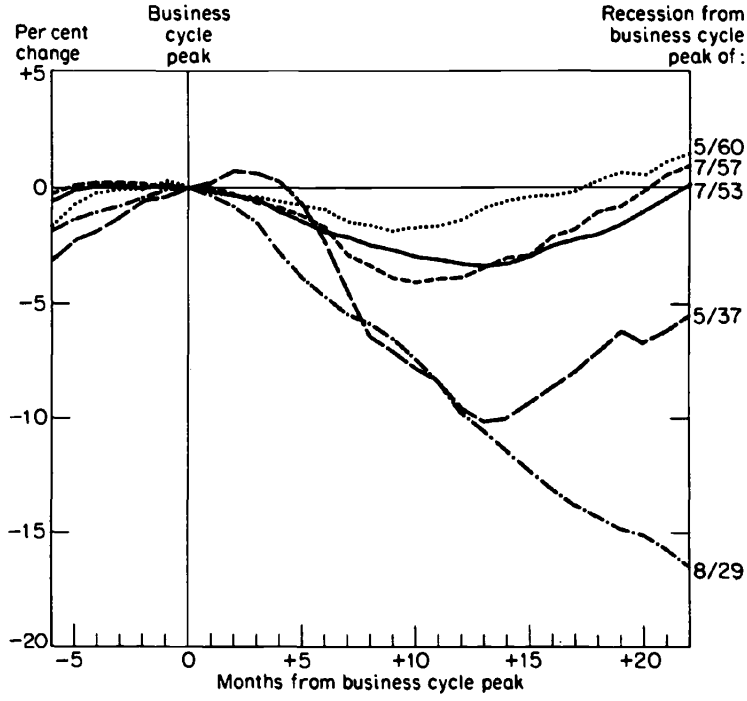
[c] Correlation of duration with recession amplitude.

over successively increasing spans. Comparisons of a current expansion may then be made with preceding expansions, numerically and graphically, as is shown for nonagricultural employment in Table 12 and in Chart 15. The characteristics of a current cyclical upswing in employment, particularly its relative briskness, will become increasingly apparent as the expansion proceeds. A set of such comparisons for a variety of strategic economic activities enables gauging, and perhaps anticipating, the pace of a general economic recovery (or recession) while it is in process.

Recession-recovery analysis, in common with the business cycle analysis described earlier, elucidates the process of cyclical fluctuations in economic activity by a systematic description of the cyclical behavior of many individual time series. In both approaches the descriptive measures are constructed in such a way that economic be-

CHART 14

RECESSION ANALYSIS,
NONAGRICULTURAL EMPLOYMENT,
PERCENTAGE CHANGE FROM BUSINESS CYCLE PEAKS,
1929–62



havior can be observed in each historical business cycle, comparisons can be made among activities and among cycles, and generalizations about cyclical behavior in the economy as a whole can be obtained by summing, averaging, and comparing basic measures.

However, recession-recovery analysis differs from the Bureau's business cycle analysis in the goals set, the assumptions stipulated, and the measures derived. The standard business cycle analysis is a historically oriented research tool, largely designed to bring out the characteristics of the cyclical behavior of diverse economic activities, in the expectation that this will provide insights and generalizations about the cyclical process as a whole. Recession-recovery analysis, by

contrast, aims mainly at the understanding of current business conditions. It is forecasting-and-policy-oriented, and focuses on the identification of the characteristics of a current process as compared to previous cyclical experience.[5] This difference in orientation is reflected in the choice of the units of observation and measurement. In the standard business cycle analysis, the cycle or cycle phase is the unit of observation, and the data are expressed in terms of cycle averages; standings are computed for cycle stages; time is measured and behavior described in terms of fractions of the length of a completed cyclical phase; comparisons are made and summary measures are derived for the same fractions. These measures are well suited to a research approach that puts no particular premium on currency of results, conventionality of measurement, or accessibility of the analysis to nonspecialists. For the purpose of deriving broad generalizations on cyclical behavior, it is no serious loss if one has to wait until a cycle is completed before it can be included in the cyclical averages. In recession-recovery analysis, by contrast, the basic measures are conventional percentage changes, based on original units; they are computed for months and quarters in chronological sequence. The goal, i.e., provision of up-to-date guidance for the evaluation of current business conditions, is reflected in the use of measures that can be computed before a current cycle phase reaches an end. In fact, recession and recovery analyses are specifically designed to evaluate behavior during current incomplete phases. The only prerequisite is the establishment of past cyclical turns.

RECESSION PATTERNS

What insights can be derived from the comparison of a recent recession with prior ones? Table 11 and Chart 14 show the decline in employment during 1960–61 to be mild compared to the declines during other contractions. This mildness becomes apparent as early as four to six months after the business cycle peak of 1960. It is important

[5] The distinction is perhaps too sharply drawn, since business cycle analysis can also be focused on the distinctive characteristics of a particular cycle, and recession-recovery analysis can also be used to emphasize characteristics of an historical cycle or those common to many cycles. However, the uses described in the text are the prevailing ones, which may explain why recession-recovery analysis was developed during a later, more policy-oriented historical period and why, until now, it did not include computation of changes averaged over all corresponding phases.

TABLE

RECOVERY ANALYSIS, NONAGRICULTURAL BUSINESS CYCLE

Date of Trough[a]	*Percentage Change (months before trough)*		*Standing at Trough*[b] *(thousands)*	*Percentage Change*			
	6	*3*		*3*	*6*	*9*	*12*
June 1938	+6.2	+2.3	28,725	+1.5	+4.2	+5.0	+5.9
Mar. 1933	+2.2	+2.2	23,030	+3.8	+11.3	+12.1	+15.8
Feb. 1961	+1.4	+0.7	53,451	+0.4	+1.4	+2.1	+2.9
Oct. 1945	+7.2	+5.4	38,559	+3.0	+5.8	+8.8	+11.5
Oct. 1949	+2.0	+0.6	43,215	+0.6	+2.5	+5.0	+7.7
Aug. 1954	+1.2	+0.3	48,720	+0.8	+1.7	+3.5	+4.6
Apr. 1958	+3.4	+2.1	50,978	0	+0.9	+2.9	+4.5
Average	+3.4	+1.9		+1.4	+4.0	+5.6	+7.5
Avg. deviation	1.9	1.2		1.1	2.7	2.8	3.5
Correlation coefficients (Pearsonian) partial vs. total amplitudes				+0.57	+0.66	+0.52	+0.46

Source: Output Tables 3A-3 and 3A-6.

[a] In order of expansion amplitudes (see next to last column).

[b] Three-month average centered at turn.

that an early manifestation of the relative steepness of a decline is not confined to the most recent contraction. The depths of the contractions of 1929–32 and 1937–38 can be inferred from the low level of the relatives after about four and seven months, respectively, and one can indeed discern a general association between initial and eventual amplitudes—albeit an association that emerges only gradually, that is imperfect, and that is somewhat obscured by irregular movements. Still it exists and can be utilized in conjunction with other approaches to evaluate cyclical prospects.

If a large number of recessions are compared on one chart, the multitude of curves may be confusing, particularly if the activities show a great deal of irregular movement. A device for depicting the relative impact of a current contraction, without presenting the de-

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EMPLOYMENT, PERCENTAGE CHANGE FROM TROUGHS, 1932–66

(*months after trough*)						*Percentage Change to Business Cycle Peak*[b]	*Duration of Expansion (months)*
15	*18*	*21*	*24*	*27*	*30*		
+8.4	+9.9	+10.0	+11.1	+14.5	+18.8	+45.3	80
+17.4	+15.0	+17.3	+19.7	+20.1	+22.2	+38.5	50
+3.8	+4.2	+4.5	+4.8	+5.7	+6.1	+17.2[c]	61[c]
+12.8	+12.8	+13.2	+14.8	+15.8	+15.0	+16.9	37
+9.4	+10.8	+11.0	+10.6	+11.7	+12.2	+16.6	45
+5.7	+7.0	+7.6	+7.7	+8.3	+8.9	+8.8	35
+5.4	+4.4	+6.5	+7.0	+6.3	+5.9	+6.7	25
+9.0	+9.2	+10.0	+10.8	+11.8	+12.7	21.43	47.6
3.6	3.4	3.3	3.8	4.3	5.1	11.01	13.8
+0.54	+0.58	+0.55	+0.58	+0.72	+0.86		+0.81[d]

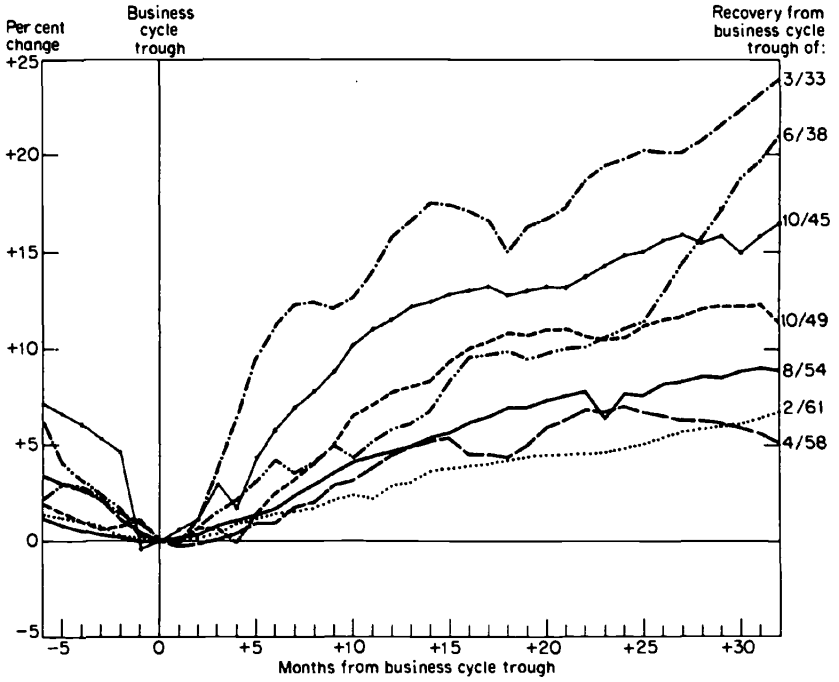
[c] To March 1966, last month included.
[d] Correlation of duration with expansion amplitude.

tailed movements of all previous ones, is shown in Chart 16. The positions of the dots show the relative declines of the same activity in previous contractions; the contractions are numbered on the basis of their eventual severity. The solid line shows the behavior of the 1960–61 decline. For further simplification, relatives are shown for every third month only. The initial comparative mildness of the 1960–61 contraction in employment and the gradual confirmation of this mildness until the end of the decline are readily apparent in this presentation.

Similar comparisons can be carried through for a variety of strategic economic activities. Since the severity of a given contraction tends to be reflected in many activities, it is usually possible to classify a current contraction in business conditions as mild, intermediate, or

CHART 15

RECOVERY ANALYSIS,
NONAGRICULTURAL EMPLOYMENT,
PERCENTAGE CHANGE FROM BUSINESS CYCLE TROUGHS,
1932–63

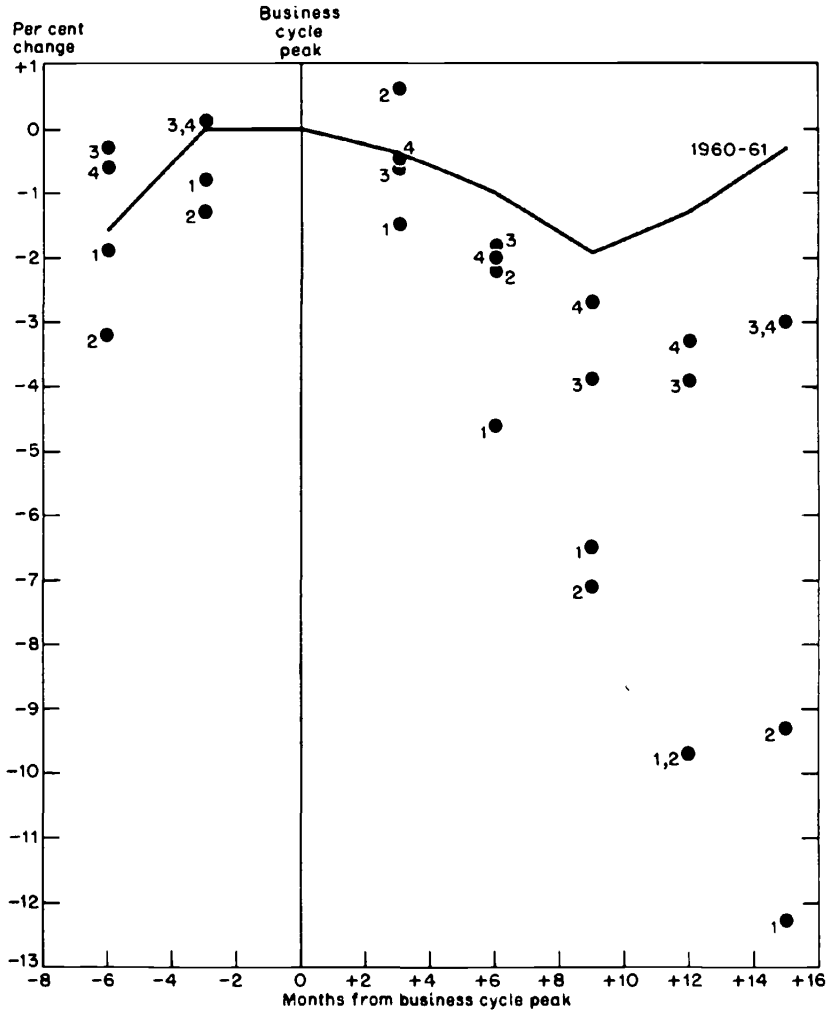


severe—at least for the span over which current observations are available. Historically, initial and full amplitudes tend to be correlated. To the degree that this association is maintained, the rough classification may hold for the recession as a whole.

The relationship between full and partial amplitude for various recessions can be described by means of correlation coefficients. Table 11 presents the full decline of nonagricultural employment during each business cycle contraction from 1929 on, in order of severity. The change in employment for each successive span of three, six, nine, and more months is also shown. A positive correlation between partial and full amplitude can be observed throughout. Three months

CHART 16

RECESSION ANALYSIS,
NONAGRICULTURAL EMPLOYMENT,
PERCENTAGE CHANGE FROM BUSINESS CYCLE PEAKS,
SIMPLIFIED PRESENTATION, 1929–62



Note: For the recession beginning in 1929, the symbol is 1; for 1937, 2; 1957, 3; 1953, 4; and for 1960, the solid line.

after the business cycle peak, the correlation is relatively weak (+.33); after six months, however, it becomes strong enough to serve as a basis for analysis and anticipation (+.85). The nine-month span shows a temporary decrease of the correlation (to +.61), but thereafter the coefficient increases, and reaches +.96 thirty months after the business cycle peak. While the general feasibility of anticipating the approximate severity of contractions during their initial phase seems supported by these results, there are reasons for raising some questions. As can be seen from Table 11 and Chart 14, most of the included contractions lasted only about a year, yet increasing correlation coefficients are obtained as the measurement period is extended to thirty months. Moreover, one of the contractions, the Great Depression, is so severe that it may have dominated the results during the greater part of the measurement period. It may be well, therefore, to use measures of correlation that are less affected by extreme values, to wit, measures of rank correlation.

Table 13 shows ranks of the partial and eventual recession amplitudes given in Table 11. The corresponding rank correlation coefficients are reported, together with the Pearsonian correlation coefficients, in the last two lines of the table. Note that the rank correlation increases rapidly and after twelve months comes close to unity (+.99) —a coefficient that becomes less astonishing if one realizes that six of the seven contractions occurring during the time period covered lasted about a year, with a range extending from eight to thirteen months. Changes in employment over spans of more than a year show gradually decreasing rank correlation with full contraction amplitudes, reflecting the fact that these changes are more and more affected by subsequent recoveries. The most interesting aspect of the table is the widely divergent behavior of the two types of correlation coefficients. The rank correlation becomes almost perfect after one year and tapers off to a mere .4 before the end of the second year. By contrast, the Pearsonian coefficient is less than .8 after one year, but gradually increases well beyond .9 thereafter. Chart 17 facilitates the understanding of these drastic differences. Its upper panel shows the scatter of partial vs. total amplitudes for a twelve-month span, a span roughly corresponding to the median duration of the included recessions. Hence, most of the twelve-month changes and their ranks are very similar to those of the total amplitudes. However, on the left side, where magnitudes of percentage changes are presented, the enormous eventual

TABLE 13

RANK CORRELATIONS BETWEEN PARTIAL AND FULL AMPLITUDES, NONAGRICULTURAL EMPLOYMENT, BUSINESS CYCLE RECESSIONS, 1929–65

Business Cycle Contractions[a]	*Total Amplitude*		*Ranks of Partial Amplitudes (months after peak)*									
	Per Cent	*Rank*	*3*	*6*	*9*	*12*	*15*	*18*	*21*	*24*	*27*	*30*
Aug. 1929 – Mar. 1933	−30.7	1	1.5	1	3	1.5	1	1	1	1	1	1
May 1937 – June 1938	−10.0	2	7	4	1	1.5	2	2	2	2	2	2
Feb. 1945 – Oct. 1945	−7.6	3	1.5	2	2	3	6	7	7	7	6	6
Nov. 1948 – Oct. 1949	−4.1	4	3	3	5	4	3	5	6	6	7	7
July 1957 – Apr. 1958	−3.8	5	4	6	4	5	4.5	4	4	4	3	3
July 1953 – Aug. 1954	−3.3	6	5	5	6	6	4.5	3	3	3	4	5
May 1960 – Feb. 1961	−1.8	7	6	7	7	7	7	6	5	5	5	4
CORRELATION COEFFICIENTS, PARTIAL VS. TOTAL AMPLITUDES, ALL CONTRACTIONS												
Rank correlation coefficients			+0.44	+0.86	+0.86	+0.99	+0.78	+0.50	+0.39	+0.39	+0.46	+0.43
Pearsonian correlation coefficients			+0.33	+0.85	+0.61	+0.78	+0.85	+0.91	+0.92	+0.94	+0.95	+0.96

Source: Table 11.

[a] In order of contraction amplitudes.

CHART 17

PARTIAL AMPLITUDES *VS.* TOTAL AMPLITUDES, PERCENTAGE CHANGE AND RANK, NONAGRICULTURAL EMPLOYMENT, BUSINESS CYCLE RECESSIONS, 1929–61

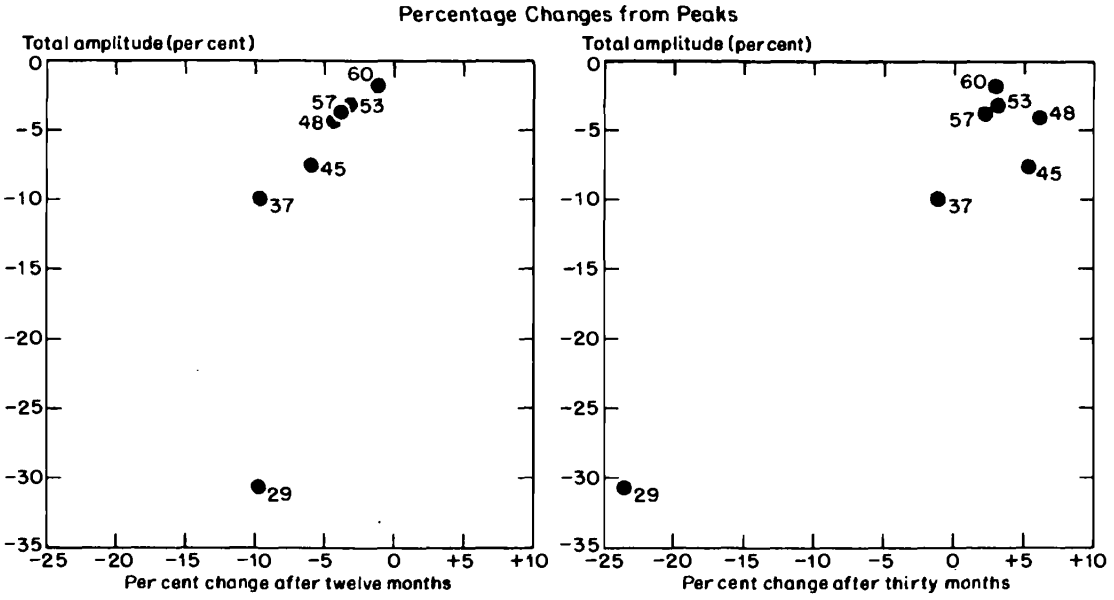
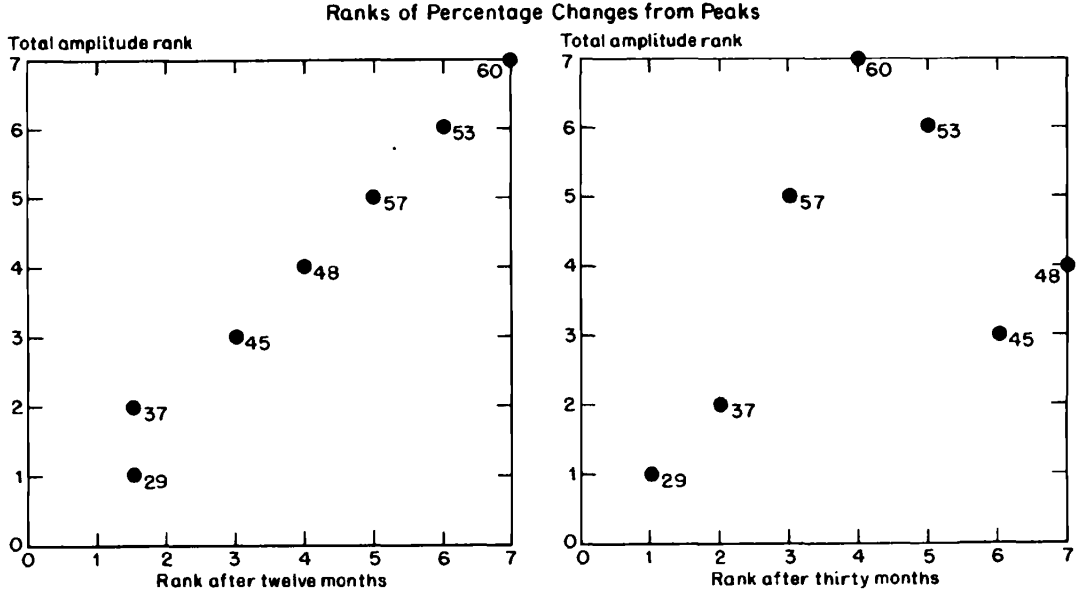


CHART 17

(Concluded)



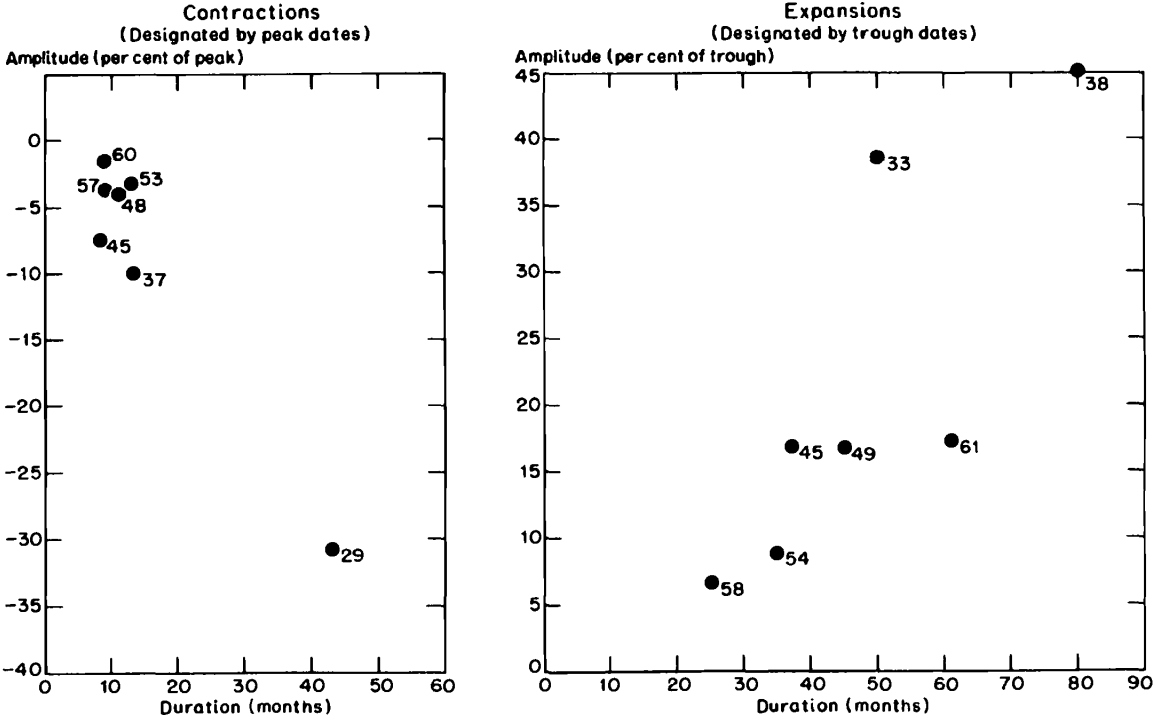
decline of employment during the Great Depression leads to an extreme, nonaligned observation (marked 29–33). It is this observation that limits the Pearsonian correlation coefficient to .8. The ranks, which are not affected by measured extremes, are shown on the right upper panel. They are almost perfectly aligned, except for one tie. This situation is described by the rank correlation coefficient of .99. The picture is markedly different for the thirty-month span, by the end of which most of the included recessions had ended and employment was on the ascent. The lower panels of the chart illustrate the situation. Here, the measured percentage deviations from the preceding peak are small, loosely assorted, and closely bunched for the milder recessions; but the severe declines of the interwar period determine a steep regression line from which the deviations are relatively small, hence the high Pearsonian correlation coefficient of .96. The ranks, by contrast, reflect the haphazard order of the mild deviations (under 10 per cent) and thus lead to a rank correlation coefficient of merely +.43. This demonstrates that summary measures can often be opaque and even misleading if the underlying structure is not analyzed. Comparisons between alternative measures are often highly beneficial and instructive. They not only prevent rash conclusions from either measure but help to elucidate the processes under review. And this elucidation can frequently be obtained at very low incremental costs, once alternative approaches are available in programmed form.

A strong correlation seems to exist between the durations and the amplitudes of recessions. This should be of considerable interest to those who wish to use recession analysis as a forecasting tool. In the present example of nonagricultural employment, the Pearsonian coefficient of correlation between the duration of business cycle contractions and the percentage changes from peaks is as high as −.96. As can be seen in the left panel of Chart 18, the 1929–33 contraction was longest and deepest, that of 1937–38 was second in both respects, and the postwar contractions were shortest and mildest. However, the high correlation coefficient is unduly influenced by the extremely long and deep contraction after 1929. No correlation between durations and amplitudes can be discovered among the mild postwar contractions—both because of their common mildness and because of the increasing role of governmental interference.

The recession-recovery program, in its present form, does not rank percentage changes and total phase amplitudes. Therefore, users in-

CHART 18

PHASE AMPLITUDES *VS.* PHASE DURATIONS,
NONAGRICULTURAL EMPLOYMENT, 1929–61



Source: Tables 7 and 8.

terested in the degree to which the ranking of the phase amplitudes is approximated by the ranking of the partial amplitudes for various time intervals from the peak must derive the ranks from the appropriate tables. The degree of correlation between partial and eventual amplitude should be helpful in attempts to gauge the prospective severity of a current contraction. The described procedure can be carried through easily if rank correlations are to be established for only a few selected spans and for a small number of series. When it is desirable to find the span of highest correlation among many spans for a considerable number of series, a programmed approach becomes clearly preferable.[6] The same is true for Pearsonian correlation coefficients.

In order to illustrate the broad usefulness of this technique for analysis and forecasting of business conditions, let us quote some generalizations, which Geoffrey Moore derived on the basis of its application to many time series.

1. When a business recession begins, most broad indicators of aggregate economic activity (production, employment, income, trade) show relatively slight declines, and during the first six months of the recession the magnitude of the declines bears little relation to the ultimate severity or depth of the recession.

2. About six months after a recession begins, the percentage declines from peak month to the current month in most economic aggregates are smaller in mild recessions than in severe recessions, and this ranking is maintained in succeeding months with little change.

3. When such comparisons are made for types of economic data that typically begin declining before a recession starts (for example, new orders, construction contracts, the average workweek, stock prices) the distinction between mild and severe recessions begins to appear as early as three or four months after the recession begins, and is also substantially maintained in succeeding months.

4. Although frequently both mild and sharp business contractions have ended within about a year, the recovery to the previous peak level has been accomplished much more quickly after mild contractions. Hence the period of depressed activity has been much longer when the contraction proceeded at a rapid rate.

[6] Ranking of changes (for various time spans) and of total phase amplitudes can be added to the program, if demanded by users. Also, rank correlation coefficients and Pearsonian correlation coefficients can be provided. The correlation coefficients used in the present paper were calculated on electronic computers, but with the help of separate programs.

5. While the above conclusions suggest that a rough ordering of recessions according to severity can be made within four to six months after the onset, they do not imply that either the ultimate depth or the duration of recessions can be reliably forecast by this means. Many factors not taken into account by the method, such as governmental measures taken to combat depression, have an important bearing on the severity and duration of business contractions. The method appears useful primarily in providing a yardstick against which a current decline in various aspects of economic activity can be gauged, thereby facilitating a more accurate and enlightened appraisal of what has already taken place. This in itself might facilitate the development of appropriate counter-cyclical programs.

6. Measures of the strength of various counter-cyclical factors (for example, unemployment compensation payments, increased governmental expenditures, easier credit terms, lower taxes) at similar stages of recession might be developed on the same plan as described here. . . . Such measures might be of assistance in judging the prospects for further business contraction or for a resumption of economic expansion.

7. Several months before a recession comes to an end and an upturn in aggregate activity occurs, a progressive narrowing of the scope of contraction ordinarily becomes visible. Fewer activities continue to decline, more begin to rise. It appears first in series of the "leading" type. The more extensive and more sustained this reduction in the scope of the contraction is, the more likely that it marks the real end of recession rather than an abortive recovery. Information of this sort may help to identify an upturn in aggregate activity at about the time it occurs or shortly thereafter.[7]

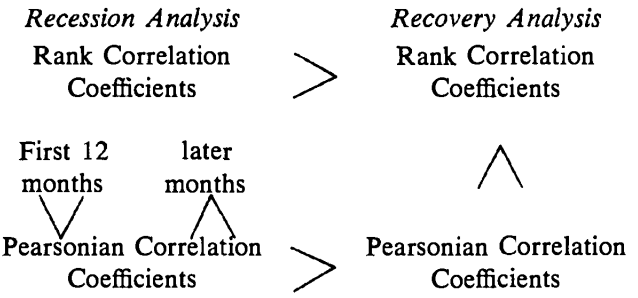
RECOVERY PATTERNS

Recoveries can be analyzed in much the same way as recessions. That is, one can measure the percentage changes of individual time series from cyclical trough levels over spans of increasing length and observe how a current expansion fares in comparison with preceding ones. This procedure was illustrated in Table 12 and Chart 15. Note that the percentage rises of employment during the early months were closely related to their eventual amplitudes during the expansions. After three or four months the 1933–37, 1938–45, and 1945–48 employment expansions began to emerge as relatively vigorous, the 1954–57 and 1958–60 expansions as mild. That this compares fairly well with the

[7] Moore, *Measuring Recessions,* p. 264. This paper is reprinted in Moore (ed.), *Business Cycle Indicators,* Vol. I, Chapter 5. See also Appendix C to that volume.

eventual amplitudes can be seen in the last lines of Tables 12 and 14 which present Pearsonian correlation coefficients and rank correlation coefficients describing the relationship between partial and full amplitudes of expansions in employment, during business cycle expansions.

The rank correlation coefficients during the diagnostically crucial period of six to twelve months after the turn were markedly lower than those for comparable contraction spans. This is the case whether the measures are computed for all recoveries after 1933, or whether the currently incomplete expansion, starting with 1961, is left out. The comprehensive rank correlation coefficient reached +.64 six months after the trough. However, this level is deceptive, since thereafter it declines to +.44 and +.36. The Pearsonian coefficients are, except for the three-month interval, a bit higher than the rank coefficients; they also are appreciably lower than the Pearsonian coefficients for contractions (given in Table 13). The differences between the recession and the recovery relationships can perhaps be best summarized in schematic form. Some of the described relationships apply only to the particular activity examined. However, the lower correlation between partial and total expansion amplitudes, compared with recession amplitudes, tends to predominate widely.



The relationship between durations and amplitudes is less close in expansions than in recessions. For nonagricultural employment, the Pearsonian coefficient of correlation between the durations of business cycle expansions and employment amplitudes during the same period is +.81, as compared to the corresponding measure of −.96 for contractions. However, the correlation for expansions is more pervasive and less affected by extreme observations, as can be seen in the right panel of Chart 18. Since expansion rates during the mild postwar

TABLE 14

RANK CORRELATIONS BETWEEN PARTIAL AND FULL AMPLITUDES (MEASURED FROM TROUGHS), NONAGRICULTURAL EMPLOYMENT, BUSINESS CYCLE EXPANSIONS, 1933–66

Business Cycle Expansions[a]	*Total Amplitudes*		*Ranks of Partial Amplitudes (months after trough)*									
	Per Cent	*Rank*	*3*	*6*	*9*	*12*	*15*	*18*	*21*	*24*	*27*	*30*
June 1938 – Feb. 1945	45.3	1	3	3	3.5	4	4	4	4	3	3	2
Mar. 1933 – May 1937	38.5	2	1	1	1	1	1	1	1	1	1	1
Feb. 1961 – Mar. 1966[b]	17.2	3	6	6	7	7	7	7	7	7	7	6
Oct. 1945 – Nov. 1948	16.9	4	2	2	2	2	2	2	2	2	2	3
Oct. 1949 – July 1953	16.6	5	5	4	3.5	3	3	3	3	4	4	4
Aug. 1954 – July 1957	8.8	6	4	5	5	5	5	5	5	5	5	5
Apr. 1958 – May 1960	6.7	7	7	7	6	6	6	6	6	6	6	7
CORRELATION COEFFICIENTS, PARTIAL VS. TOTAL AMPLITUDES												
Rank correlation coefficients for all expansions			+0.61	+0.64	+0.44	+0.36	+0.36	+0.36	+0.36	+0.50	+0.50	+0.75
Rank correlation coefficients for expansions excl. 1961–66			+0.77	+0.83	+0.76	+0.66	+0.66	+0.66	+0.66	+0.83	+0.83	+0.94
Pearsonian correlation coefficients for all expansions			+0.57	+0.66	+0.52	+0.46	+0.54	+0.58	+0.55	+0.58	+0.72	+0.86

Source: Table 12.

[a] In order of expansion amplitudes.

[b] Last month included.

cycles were observed to be closely clustered, it would follow that expansions with longer duration also tend to have larger amplitudes. This relationship is closer than that between amplitudes of expansion and amplitudes of preceding contractions, or that between total and partial expansion amplitudes.

The relatively low correlation between partial and full expansion amplitudes implies that the latter cannot be very successfully anticipated by measuring the vigor during their early stages whether the expansions occur in individual series or in economic activity at large. This is, however, no reason to despair of the possibility of anticipating business conditions during recovery periods. After all, the attempt to anticipate amplitudes of expansions that may last five years or more by observing them during the first six months or so should be regarded prima facie as an unreasonably optimistic endeavor. By shortening the forecasting period and modifying the approach, some meaningful generalizations can be developed about the process of economic recovery from cyclical declines.

Let the expansion period be divided into two segments, the portion until a given activity reaches preceding peak levels (recovery segment) and that from these recovery levels to the next peak (growth segment), and then concentrate on the first portion. Furthermore, let recovery levels be expressed in terms of the peak preceding the recovery, rather than the initial trough. The procedure is illustrated in Table 15 and in Chart 17. In this chart, the vertical axis measures the deviation of the series from the preceding reference *peak* levels in percentage of these peaks.[8] The horizontal axis is calibrated in months, measuring increasing spans from the respective trough months. Table 15 and, perhaps more effectively, Table 16 (which removes the percentage base bias caused by differential trough levels) show that employment expansions tended to be more vigorous after severe contractions. If the amplitude of preceding contractions was large (last column), employment tended to increase more sharply during the first two years or so. Table 16 shows a pronounced tendency for the recovery percentages, at any given month, to be higher after contractions of severe amplitudes. However, after severe contractions it took longer to regain previous peak levels (recovery levels) than after mild con-

[8] Here the series cannot be expected to converge at the initial trough of the recovery, as is the case when the trough level itself is made the base for the calculations. The differences in the levels of the starting point reflect, of course, the differing severities of the preceding declines.

TABLE 15

RECOVERY ANALYSIS, NONAGRICULTURAL EMPLOYMENT, PERCENTAGE CHANGE FROM PRECEDING BUSINESS CYCLE PEAK LEVELS, 1932–64

Date of Trough[a]	*Standing at Previous Peak*[b] *(thousands)*	*Percentage Change (months before trough)*		*Percentage Change at Trough*	*Percentage Change (months after trough)*										*Amplitude of Preceding Contraction*[b]
		6	*3*		*3*	*6*	*9*	*12*	*15*	*18*	*21*	*24*	*27*	*30*	
Mar. 1933	33,222	−29.2	−29.1	−31.3	−28.1	−22.9	−22.3	−19.7	−18.6	−20.3	−18.7	−17.0	−16.7	−15.3	−30.7
June 1938	31,904	−4.4	−7.9	−10.2	−8.6	−6.2	−5.5	−4.7	−2.4	−1.0	−1.0	0	+3.0	+7.0	−10.0
Oct. 1945	41,740	−1.0	−2.7	−7.8	−4.8	−2.2	+0.5	+3.0	+4.2	+4.2	+4.6	+6.1	+7.0	+6.2	−7.6
Oct. 1949	45,077	−2.3	−3.6	−5.0	−3.6	−1.8	+0.7	+3.2	+4.9	+6.2	+6.4	+6.1	+7.1	+7.6	−4.1
Apr. 1958	53,011	−0.6	−1.8	−3.9	−3.9	−3.0	−1.1	+0.5	+1.3	+0.4	+2.2	+2.9	+2.3	+1.8	−3.8
Aug. 1954	50,378	−2.1	−3.0	−3.3	−2.5	−1.6	+0.1	+1.1	+2.3	+3.5	+4.0	+4.1	+4.7	+5.3	−3.3
Feb. 1961	54,407	−0.4	−1.0	−1.9	−1.3	−0.3	+0.4	+1.1	+2.0	+2.4	+2.7	+3.0	+3.8	+4.3	−1.8
Average		−5.7	−7.0	−9.1	−7.5	−5.4	−3.9	−2.2	−0.9	−0.7	0	+0.7	+1.6	+2.4	−8.8
Average deviation		6.7	6.6	6.7	6.2	5.2	5.7	5.7	5.5	5.7	5.6	5.3	5.2	5.2	6.6

Source: Output Tables 3A-3 and 3A-8.

[a] In order of amplitudes of preceding contractions (see last column).

[b] Three-month average centered at turn.

TABLE 16

RECOVERY ANALYSIS, NONAGRICULTURAL EMPLOYMENT, CHANGE FROM BUSINESS CYCLE TROUGHS AS A PERCENTAGE OF LEVELS AT PRECEDING BUSINESS CYCLE PEAKS, 1932–64

Date of Trough[a]	*Standing at Trough (thousands)*	*Standing at Previous Peak (thousands)*	*Percentage Change (months before trough)*		*Percentage Change (months after trough)*										*Amplitude of Preceding Contraction*[b]
			6	*3*	*3*	*6*	*9*	*12*	*15*	*18*	*21*	*24*	*27*	*30*	
Mar. 1933	23,030	33,222	+1.5	+1.5	+2.6	+7.8	+8.4	+11.0	+12.1	+10.4	+12.0	+13.7	+13.9	15.4	−30.7
June 1938	28,725	31,904	+5.6	+2.9	+1.4	+3.8	+4.5	+5.3	+7.5	+9.0	+9.0	+10.0	+13.0	17.0	−10.0
Oct. 1945	38,559	41,740	+6.7	+4.9	+2.8	+5.4	+8.2	+10.7	+11.8	+11.8	+12.2	+13.7	+14.6	13.8	−7.6
Oct. 1949	43,215	45,077	+1.9	+0.5	+0.6	+2.4	+4.8	+7.3	+9.0	+10.4	+10.5	+10.2	+11.2	11.7	−4.1
Apr. 1958	50,978	53,011	+1.1	+0.3	+0.8	+1.6	+3.3	+4.2	+5.3	+6.4	+7.0	+7.1	+7.6	8.2	−3.8
Aug. 1954	48,720	50,378	+3.4	+2.1	0.0	+0.9	+2.9	+4.5	+5.4	+4.5	+6.4	+7.1	+6.4	6.0	−3.3
Feb. 1961	53,451	54,407	+1.4	+0.7	+0.4	+1.4	+2.1	+2.8	+3.7	+4.1	+4.5	+4.7	+5.6	6.0	−1.8

Source: Computed from Output Table 3A-5.

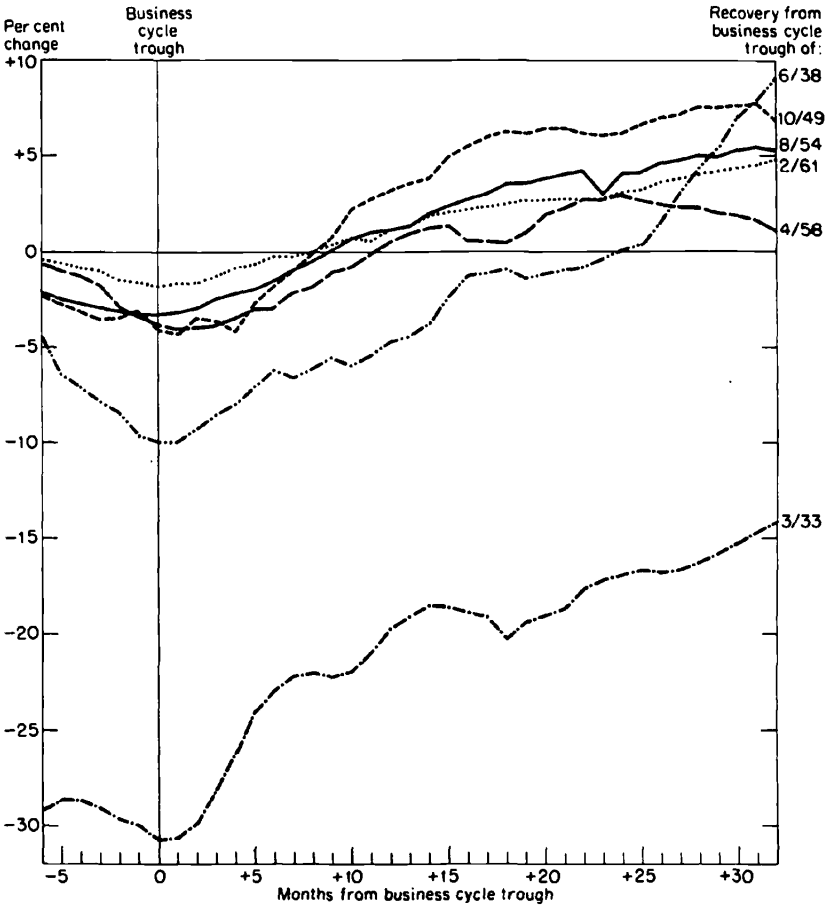
[a] In order of amplitudes of preceding contractions (see last column).

[b] Three-month average centered at turn.

tractions. This appears clearly in Chart 19. One or two years after the trough the levels of employment were still, by and large, in an order similar to that of the amplitudes of the preceding contractions. Table 15 contains averages and average deviations for the measured percentage changes. Note that, over the included cycles, previous peak

CHART 19

RECOVERY ANALYSIS, NONAGRICULTURAL EMPLOYMENT, PERCENTAGE CHANGE FROM PRECEDING BUSINESS CYCLE PEAK, 1932–63



levels were reached after about twenty-one months, on the average. The average deviation of the relative levels showed a mild tendency to decrease—in keeping with the observation that the vigor of expansions is inversely related to the depth of the preceding decline.

If the time span that contains a contraction and the subsequent recovery to the preceding peak level[9] is designated as a period of "depressed activity," some further characteristics of cyclical recoveries in employment may be described. Table 17 shows durations and amplitudes of employment cycles in terms of contraction, recovery, depressed activity, growth, and total expansion—all based on employment levels at initial business cycle peaks. The length of the period of depressed activity is correlated with the severity of the initial decline; this correlation is indeed closer than that between the duration and the severity of the decline itself. By contrast, the amplitude and duration of the growth segment are less closely related to the preceding decline. There exists, historically, some inverse relationship between the depth of a contraction and the amplitude of the growth segment of the following expansion. After the deepest contraction (1929–33) included in the sample, the amplitude of the growth segment was smallest; after the mildest contraction (1960–61), the growth amplitude was largest;[10] after contractions of intermediate severity, the growth was moderate. However, within the middle group, covering four recessions, the inverse correlation does not prevail, perhaps because the differences between recession amplitudes are so small. The broad inverse relationship suggests that stability breeds stability: The absence of violent downward adjustments helps to pre-

[9] The measure of recovery to past peak levels should be determined in such a way that the result is cyclically significant and not due to erratic movements. A three-month moving average was used to establish the termination of the recovery phase; that is, the recovery phase was regarded as concluded when a three-month average of the series reached or exceeded the previous peak standing, also a three-month average. For more erratic series a longer moving average might be desirable. It should be noted that the recovery to previous peak employment levels is not a measure that fits precisely into the reference analysis framework. The relevant recovery measure, in that framework, would relate to employment levels reached when *general business activity* regained previous peak levels. Since these dates are not established and since their establishment lies beyond the scope of the present study, the measure described above was used.

[10] This ignores the growth experience that includes the expansion during World War II—an expansion that could not possibly be related to the 1937–38 decline in business activity.

TABLE 17

CHARACTERISTICS OF RECOVERIES RELATED TO PRECEDING RECESSIONS, NONAGRICULTURAL EMPLOYMENT, REFERENCE CYCLE ANALYSIS, 1929–66

Date of				Duration (in months)					Amplitudes (in per cent of initial peak levels)							
									Total				Per Month			
Initial Peak	Trough	Reaching Previous Peak Level	Terminal Peak	Contraction	Recovery	Depressed Activity	Growth Segment	Total Expansion	Contraction	Recovery	Growth Segment	Total Expansion	Contraction	Recovery	Growth Segment	Total Expansion
8/29	3/33	10/40	5/37	43	91	134	—	50	−30.7	+30.8	−4.1	26.7	−0.71	0.34	—	0.53
5/37	6/38	7/40	2/45	13	25	38	55	80	−10.0	+10.6	30.2	40.8	−0.77	0.42	0.55	0.51
2/45	10/45	7/46	11/48	8	9	17	28	37	−7.6	+8.3	7.3	15.6	−0.95	0.92	0.26	0.42
11/48	10/49	7/50	7/53	11	9	20	36	45	−4.1	+5.0	10.9	15.9	−0.37	0.56	0.30	0.35
7/57	4/58	4/59	5/60	9	12	21	13	25	−3.8	+4.2	2.3	6.5	−0.42	0.35	0.18	0.26
7/53	8/54	5/55	7/57	13	9	22	26	35	−3.3	+3.4	5.1	8.5	−0.25	0.38	0.20	0.24
5/60	2/61	11/61	3/66[a]	9	9	18	52	61	−1.8	+2.0	15.2	17.2	−0.20	0.22	0.29	0.28
ALL CYCLES																
Average				15.1	23.4	38.6	—	47.6	−8.76	9.19	9.56	18.74	−0.524	0.456	—	0.370
Average deviation				7.9	19.7	27.3	—	13.8	6.63	6.58	7.89	8.57	0.245	0.163	—	0.100
Weighted average													−0.576	0.392	—	0.392
ALL CYCLES EXCL. 1929–37																
Average				10.5	12.2	22.7	35.0	47.2	−5.10	5.58	11.83	17.42	−0.493	0.475	0.297	0.343
Average deviation				1.8	4.3	5.1	12.7	15.5	2.47	2.58	7.24	7.80	0.244	0.177	0.086	0.084
Weighted average													−0.484	0.458	0.338	0.368

[a] Last month included.

vent crass distortions and subsequent overcorrections; it tends to improve foresight, engender confidence, discourage speculative excesses, and facilitate managerial and governmental guidance. While the described tendencies are not reliable enough to form a safe basis for anticipations, they provide another example of the manifold advantages of cyclical stability.[11]

From all this it follows that the correlation between total expansion and the preceding contraction tends to be high when the recovery forms a substantial portion of the total expansion (as often occurs after deep contractions), and low if the portion is small (as in the expansion that started in 1961). Recognition of these relationships helps in the interpretation of recovery patterns.

The observed regularities transcend the recovery patterns of nonagricultural employment and may indeed characterize cyclical behavior in general.[12] Recovery analysis, carried out by Geoffrey Moore for employment, output, profits, and stock prices, led to the following generalizations:

1. Recoveries in output, employment, and profits have usually been faster [i.e., growth rates have been higher] 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.[13]

[11] Geoffrey H. Moore called attention to the inverse relationship between contraction amplitudes and subsequent growth in "Business Indicators—What They Tell Us," a paper presented at the *Tenth Annual Conference on the Economic Outlook,* University of Michigan, 1962.

[12] See also Chart 6 and the related comments in Chapter 3.

[13] Geoffrey H. Moore, "Leading and Confirming Indicators of General Business Changes," in Moore (ed.), *Business Cycle Indicators,* Vol. I, Chapter 3, p. 92. This chapter, particularly the section "Measuring the Vigor of a Business Recovery," is important for users of recovery analysis.

The broad usefulness of recovery patterns for current business conditions analysis has been succinctly described as follows: "The method 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 notion of its probable course and duration and to check the reasonableness of forecasts derived by other means, always remembering that typical rates of recovery and patterns of change vary from one economic activity to another."[14]

Although the generalizations cited above refer largely to the recovery segment, the values of comparative analysis are not restricted to this portion of the total expansion. Prior expansions (including their growth phases) can be used as a "grid" against which the behavior of a current expansion can be judged, at least until it outlasts the duration of previous expansions. Since the contraction of 1960–61 was short and mild, previous peak levels were reached by many activities early in the expansion—in the case of nonagricultural employment, indeed, before the end of the year 1961. Recovery analysis along the described lines extends, of course, beyond that date and permits identification of the major characteristics of the following expansion.[15]

VARIANTS OF USES AND APPROACHES

NONFORECASTING USES

The recession-recovery analysis technique lends itself to applications other than the rough classification of current expansions and contractions as mild or strong. As mentioned earlier, it can be used to bring out the salient qualitative characteristics of a current cycle phase. The analysis may, for example, show that prices have risen sharply but production and employment only mildly, in contrast to some earlier

[14] *Ibid.*, p. 88.

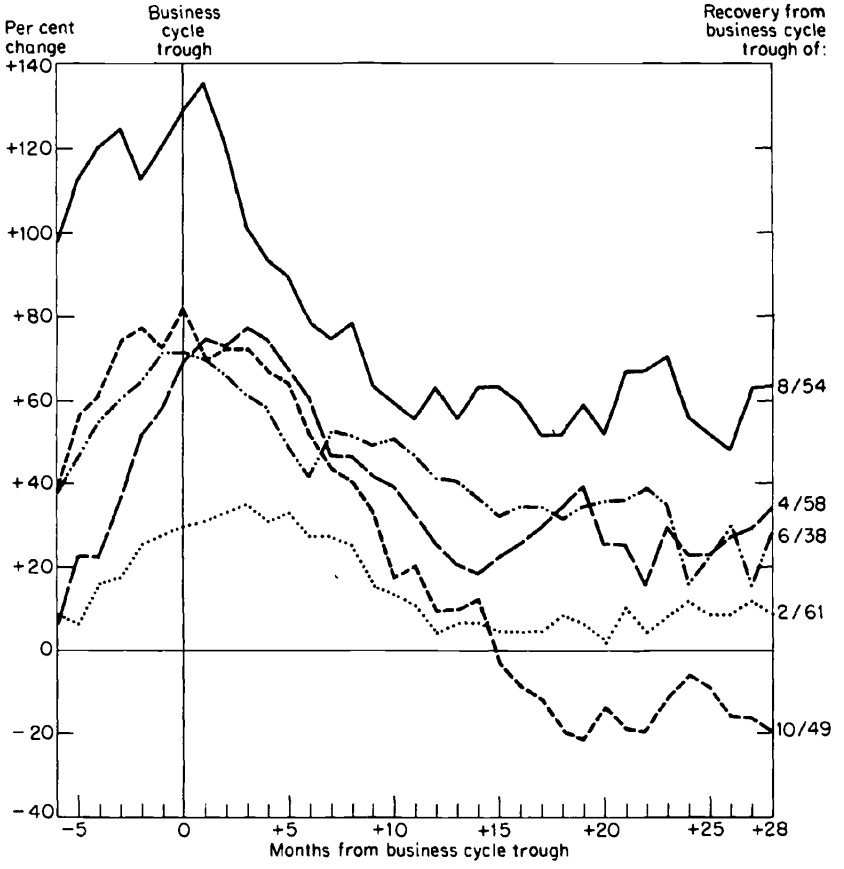
[15] For selected business cycle indicators, recovery analysis is regularly performed and published in the monthly periodical *Business Conditions Digest* (formerly *Business Cycle Developments*), U.S. Department of Commerce, Bureau of the Census. During an expansion period in general business conditions, use is made of recovery analysis; during a contraction period, the tables and charts reflect the recession analysis approach. Use of recovery analysis for the characterization of the expansion starting February 1961 was made in Julius Shiskin's articles published in the January 1965 issue of *Business Cycle Developments*, and in the January 1970 issue of *Business Conditions Digest*.

expansion in which a different, even the reverse, situation may have prevailed.

Second, the analysis can be used to classify and characterize historical rather than current expansions and contractions; that is, it can be used for historical analysis, as a supplement or alternative to business cycle analysis. In Chart 20, the reduction of unemployment dur-

CHART 20

RECOVERY ANALYSIS, UNEMPLOYMENT RATE, PERCENTAGE CHANGE FROM PRECEDING BUSINESS CYCLE PEAK, 1933–63



ing business cycle expansions is shown relative to unemployment levels at preceding business cycle peaks (zero levels on chart). Following the 1948–49 contraction, the unemployment rate was reduced to previous prosperity levels after about fifteen months, that is, by January 1951. In none of the other postwar expansions did the reduction of unemployment lead to the rate prevailing at the preceding business cycle peaks within the twenty-eight months depicted in the chart. That is, none of the lines (except that starting in 1949) ever touched the zero line, and during the three last recoveries the degree to which previous prosperity unemployment was approximated (within two and a half years) varied with the height of the unemployment rate during the preceding contraction, as reflected by the position of the lines at the business cycle trough. In general, unemployment rates show fast declines after business cycle troughs for a period of a year or a year and a half; thereafter they tend to decrease only mildly or maintain their levels. Note also that there is an historical sequence in the amplitudes of unemployment during business cycle contractions: The contractions gradually became milder. However, these remarks are all based on changes in relatives, that is, they do not consider whether the unemployment rate was high or low in terms of the labor force, and what the changes were in these terms. If a user finds this analysis inadequate, a variant based on original units should be selected (see the next section). Use of the recession-recovery approach for the historical analysis of business cycles is important since it is at least possible that certain regularities of cyclical behavior may be as effectively or more effectively described in terms of conventional chronological time than in terms of phase fractions.

Third, the analysis can be used for interregional, interindustry, or other cross-sectional comparisons. This can be done in a variety of ways. One obvious possibility is simply to use the technique to compare, for a given activity, the cyclical changes in, say, different states, so that one may see how a recession in New York compares with that in neighboring states. But the analysis becomes more instructive, and stays at the same time closer to its original design, if cross-classification and historical analysis are combined. One may choose to apply the standard approach to cyclical indicators for states or regions and to observe how the characteristics of a given recession in one state (shown against a grid of earlier recessions) compare

with those observable in other states or in the nation as a whole.[16] This would emphasize the regional variations in the historical peculiarities of a given recession. Chart 21 shows, for instance, that employment in Florida increased rapidly during the 1953–54 and 1957–58 recessions, while in Texas, West Virginia, and the United States as a whole, it dropped markedly. During the more recent 1960–61 contraction, by contrast, Florida's employment levels rose only mildly in spite of the fact that this recession brought less substantial declines of employment in the United States or the other two states. Moreover, while employment in West Virginia showed the beginnings of a vigorous recovery after the 1953–54 contraction (a recovery that continued beyond the period included in the chart), there was little recovery from the 1958 and, for a while, from the 1961 trough levels—in spite of the fact that in the nation and in most other states employment rose promptly from recession levels. As the present interest of this study lies in the illustration of various uses of recession-recovery analysis rather than in a discussion of state employment cycles, the above comments on Chart 21 may well suffice. It is possible to go one step further, however, in analyzing regional differences. Employment changes in highly industrialized states have a good deal of family resemblance, which makes it difficult to distinguish between them. Differential behavior can perhaps be brought out of first "adjusting" the activities for the national changes (dividing the relatives for the state by those for the nation) and then applying the analysis.

Finally, recovery analysis and recession analysis may find applications as a tool for market analysis, sales analysis, and similar endeavors. In general recovery analysis, the attempt is usually made to evaluate the vigor of a recovery by comparing a current expansion with past expansions. Similarly, an industry can gauge its recovery—perhaps relative to other industries or to broad industrial aggregates—by observing how its employment, output, prices, profits, etc., fared in a particular expansion as compared to earlier ones. An analogous approach can be used for recession analysis. And the general technique may lend itself to comparative analyses of company and industry performance, if there is sufficient cyclical responsiveness in company operations to make such comparisons meaningful.

[16] For an example of such use, see the authors' *Economic Indicators for New Jersey*, New Jersey Department of Labor and Industry, Division of Employment Security, 1964, Charts A to I.

CHART 21

COMPARATIVE RECESSION ANALYSIS, NONAGRICULTURAL EMPLOYMENT IN TEXAS, FLORIDA, WEST VIRGINIA, AND THE UNITED STATES, PERCENTAGE CHANGE DURING BUSINESS CYCLES, 1952–62

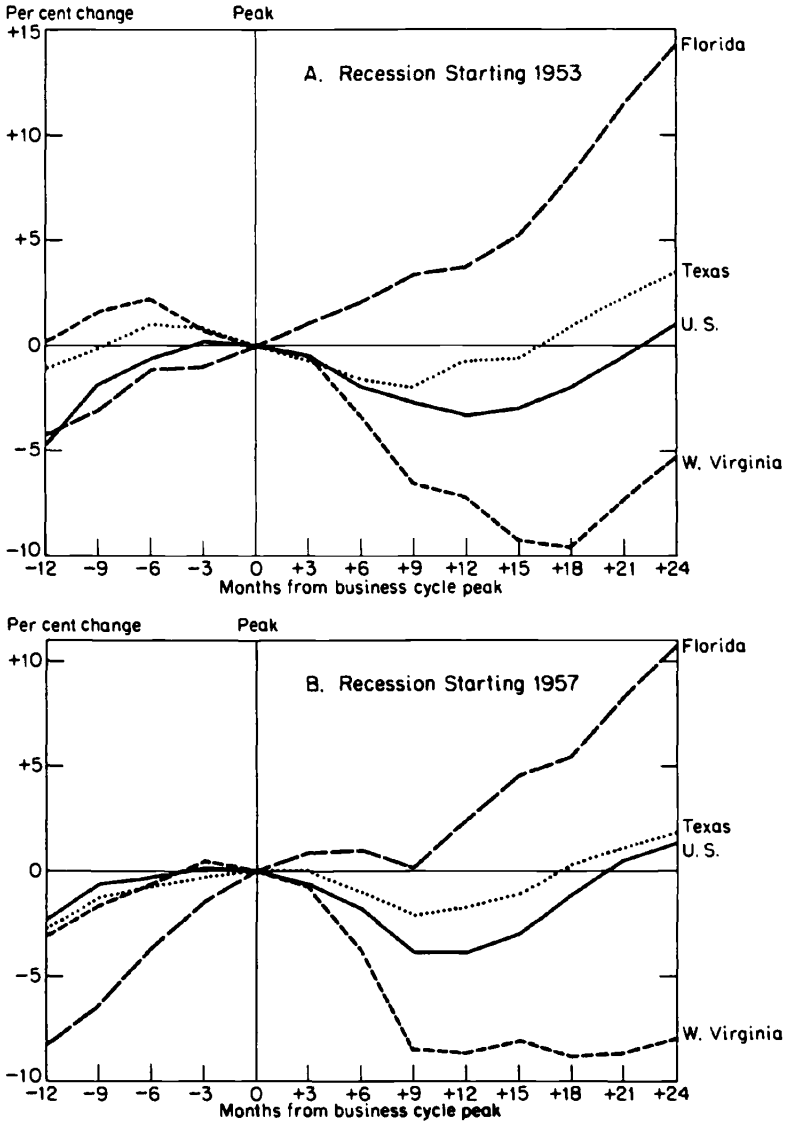


CHART 21
(Concluded)

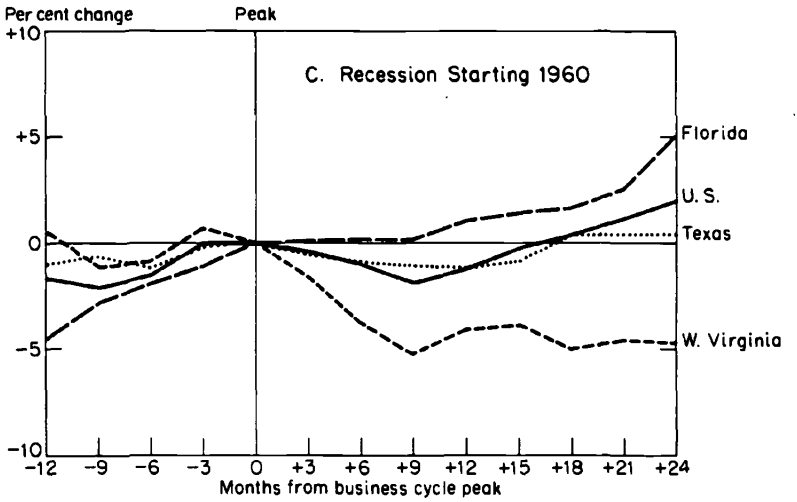
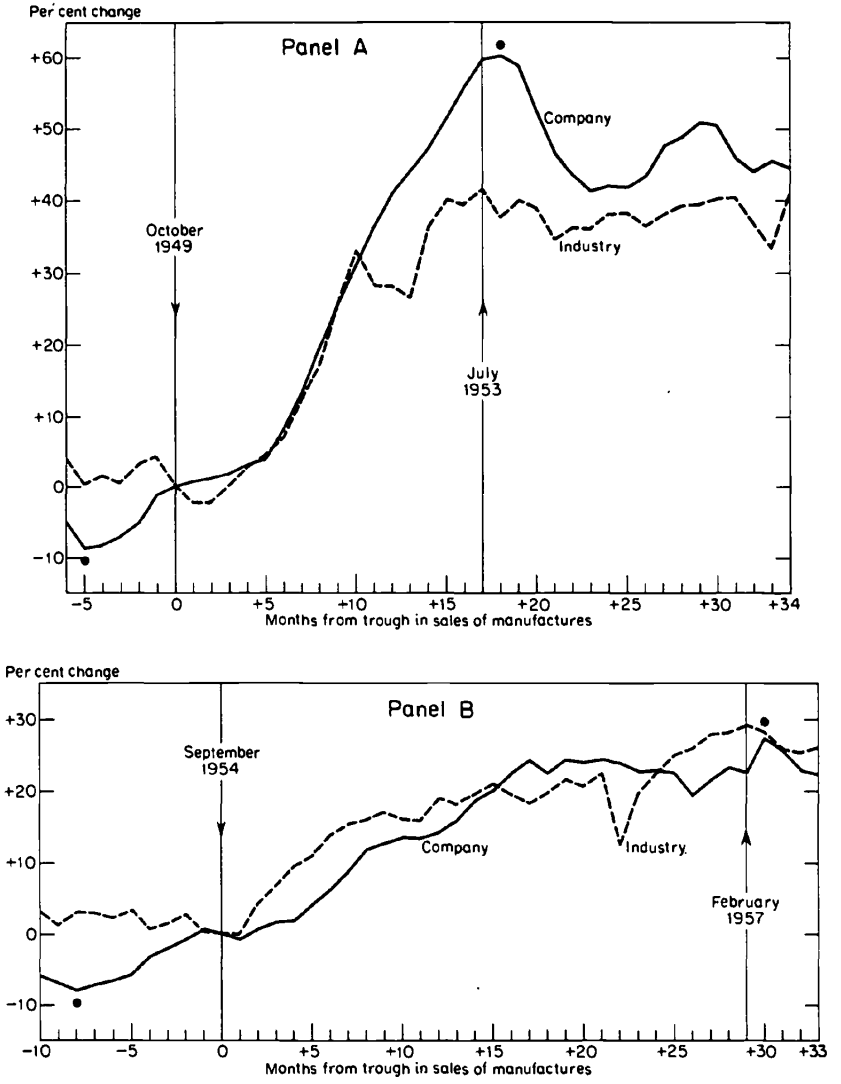


Chart 22 and Table 18 illustrate the application of recovery analysis to company performance; they compare the sales experience of a fairly diversified manufacturing enterprise with that of all manufacturing in the United States. The company representatives were under the impression that the company's sales (after adjustment for mergers, acquisitions, and the like) were remarkably similar to those of manufacturing in general. While a cursory examination might convey this impression—cycles correspond and long-term trends are upward—the more detailed comparison afforded by recession-recovery analysis leads to some modification of this view. It is true that during cyclical recoveries company and industry sales correspond rather well, although company sales tend to turn up earlier and to rise above their previous trough levels, in expansions, by more percentage points than do industry sales (see the two last columns of Table 18). Chart 22 shows that the only case in which drastic divergence between company and industry experience occurs is during 1950–51, when the company responded to the Korean War conditions quite differently than did manufacturing as a whole (second year of panel A). During contraction periods, rather systematic differences exist. The sales experiences of the company contrast favorably with those of manufacturing. Chart

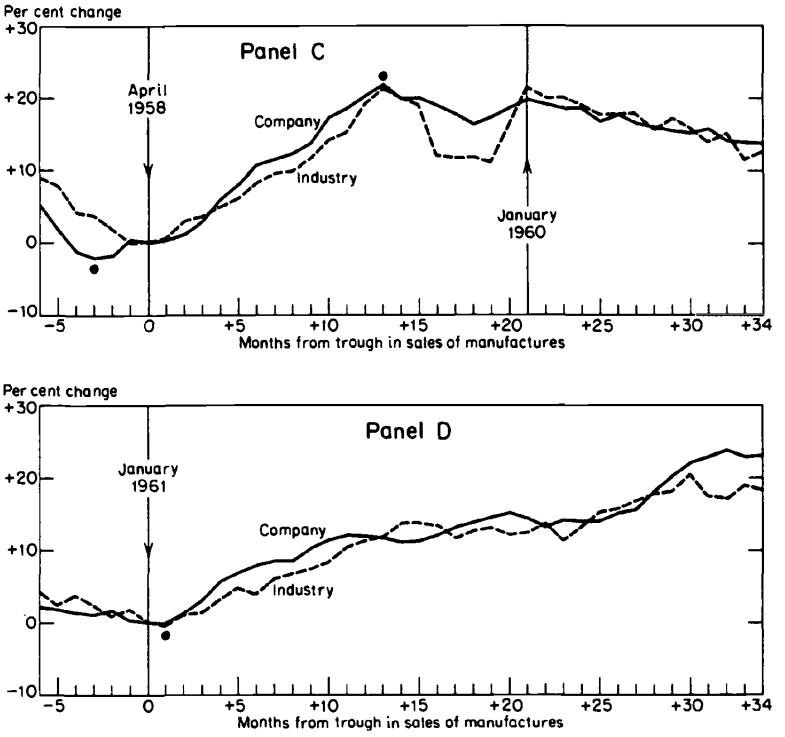
CHART 22

RECOVERY ANALYSIS, COMPANY SALES AND SALES OF MANUFACTURES, PERCENTAGE CHANGE FROM TROUGH IN SALES OF MANUFACTURES, 1949–63



Note: Vertical lines denote months of cyclical turns in sales of manufactures; percentage changes are computed from three months averages centered around the trough (peak). Circles denote cyclical turning points in the company series.

CHART 22
(Concluded)



23 and Table 19 show that downswings in company sales tend to be shorter and milder than those of industry at large. In one case (1960–61), the company contraction appears to have lasted longer than the industry contraction. This is due to a double peak in company sales. If the later peak were recognized, timing and duration of company and industry sales would be virtually the same. The analyst of company sales will, of course, be interested in determining the conditions under which the company does better or worse than its industry, and he will attempt to utilize the resultant insights for forecasting and, perhaps, for suggestions to management.

Thus the described techniques of intercyclical comparisons of recessions and recoveries have wide applications. It is obvious that these applications are greatly facilitated by the availability of electronic

TABLE 18

COMPARATIVE CYCLICAL BEHAVIOR DURING FOUR RECOVERIES, SALES OF A MANUFACTURING COMPANY AND SALES OF ALL MANUFACTURES, 1949–65

Recovery Starting[a]	*Timing, Company Compared to Industry, Leads (−), Lags (+), Coincidences (0), in Months*		*Duration of Specific Expansion (months)*			*Amplitudes in Percentage of Trough Levels*[b]		
						Company		*Industry*
	At Initial Trough	*At Subsequent Peak*	*Company*	*Industry*	*Company minus Industry*	*Industry Dates*	*Company Dates*	*Industry Dates*
10/49	−5 months	−3 months	47	45	+2	+55	+70	+61
9/54	−8 months	+1 month	38	29	+9	+24	+35	+28
4/58	−3 months	−8 months[c]	16	21	−5	+19	+23	+20
1/61[d]	+1 month					+53	+52	+36

[a] These dates are troughs of sales in all manufacturing.

[b] Three-month average at peak minus three-month average at trough, as percentage of the former. Peak and trough dates are those of manufacturing sales for the first and the last column; they refer to turning points in company sales for the middle column.

[c] Double peak; use of the second high would lead to coincident timing.

[d] Measured to December 1965, last available date.

CHART 23

RECESSION ANALYSIS,
COMPANY SALES AND SALES OF MANUFACTURES,
PERCENTAGE CHANGE
FROM PEAK IN SALES OF MANUFACTURES, 1948–61

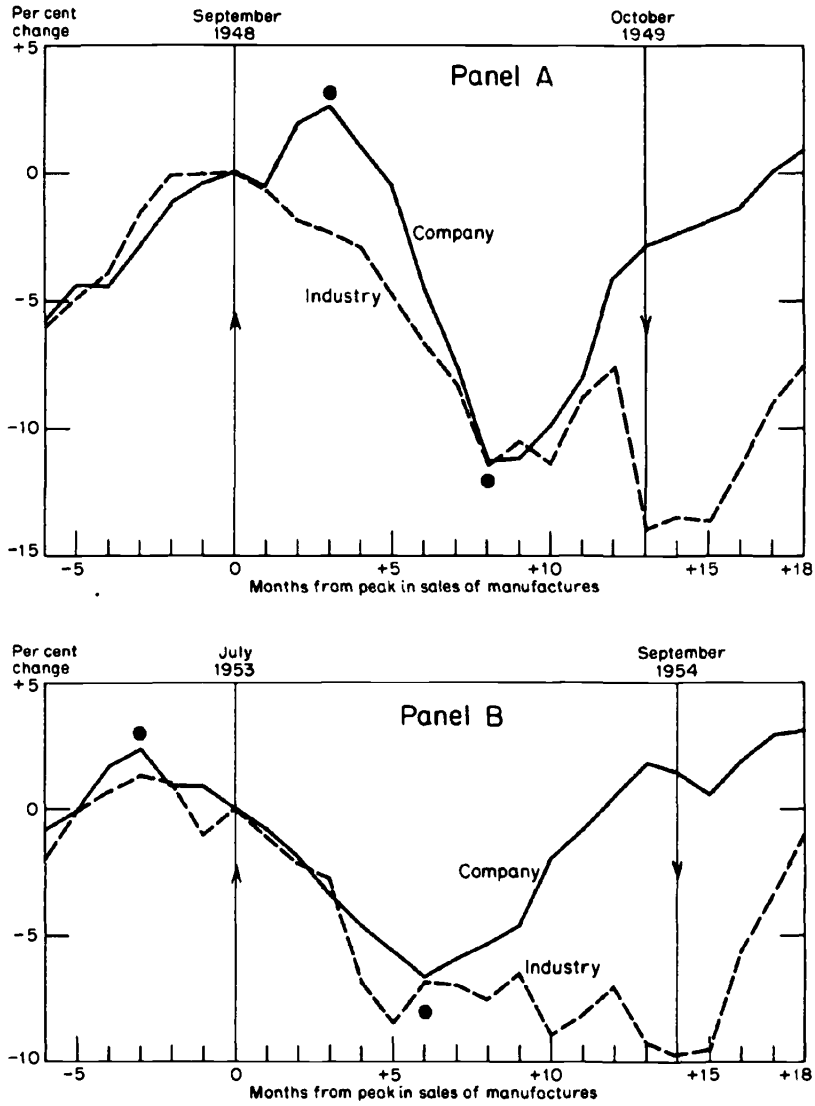
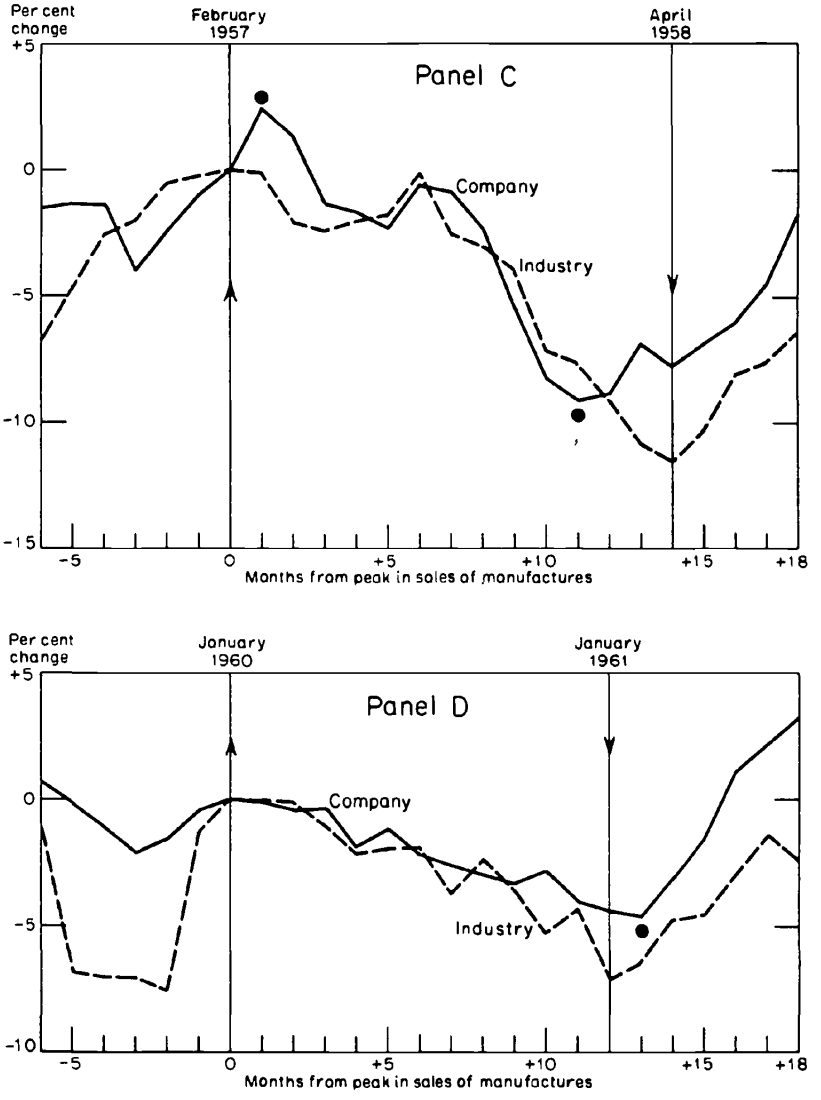


CHART 23

(Concluded)



Note: Vertical lines denote months of cyclical turns in sales of manufactures; percentage changes are computed from three months averages centered around the trough (peak). Circles denote cyclical turning points in the company series.

TABLE 19

COMPARATIVE CYCLICAL BEHAVIOR DURING FOUR RECESSIONS, SALES OF A MANUFACTURING COMPANY AND SALES OF ALL MANUFACTURES, 1948–62

Recession Starting[a]	*Timing, Company Compared to Industry, Leads (−), Lags (+), Coincidences (0), in Months*		*Duration of Specific Contraction (months)*			*Amplitudes in Percentage of Peak Levels*[b]		
						Company		*Industry*
	At Initial Peak	*At Subsequent Trough*	*Company*	*Industry*	*Company minus Industry*	*Industry Dates*	*Company Dates*	*Industry Dates*
9/48	+3 months	−5 months	5	13	−8	−3	−10	−12
7/53	−3 months	−8 months	9	14	−5	+1	−8	−10
2/57	+1 month	−3 months	10	14	−4	−7	−9	−11
1/60	−8 months[c]	+1 month	21	12	+9	−4	−5	−6

[a] These dates are peaks of sales in all manufacturing.

[b] Three-month average at trough minus three-month average at peak, as percentage of the former. Peak and trough dates are those of manufacturing sales for the first and the last column; they refer to turning points in company sales for the middle column.

[c] Double peak; use of the second high would lead to coincident timing.

computer programs. Electronic processing becomes almost indispensable if the analysis is carried through with several variants used in conjunction with each other.

VARIANTS OF ANALYSIS

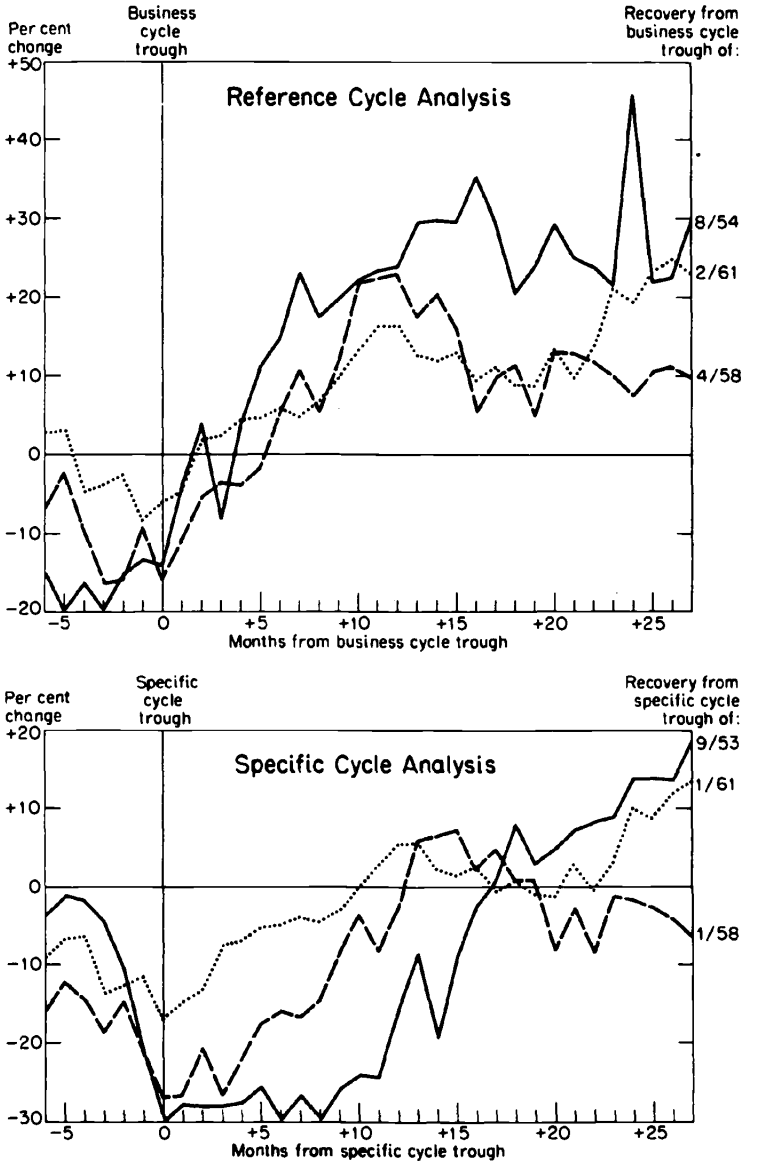
In the previous discussion, percentage changes were computed for increasing spans, measured from business cycle turns. This means that a common reference cycle framework was used for the analysis of all individual activities. For certain purposes it is preferable to compute cyclical changes from turning points of the series themselves, i.e., from their specific turns. Broadly speaking, the reference cycle version of recession-recovery analysis is preferable when the interest centers on the contribution of various activities to cyclical changes in business conditions at large, or when comparisons among a variety of activities are facilitated by analyzing each of them in a common framework. The specific cycle version provides a more relevant and more fruitful focus if interest is centered on the cyclical characteristics, sensitivity, or prospects of an individual activity—be it the fortunes of an industry, the profits of a company, or the sales of a product. In many cases, both types of analysis may be of interest; some measures resulting from the two types of analysis will be compared below.

Since employment is a well-conforming series and shows only short leads and lags relative to business cycle turns,[17] the difference between the reference version and the specific version of the analysis is not substantial. However, it may be very marked if the analysis is performed on series with long and irregular leads or lags. The difference between the two versions is illustrated in Chart 24, which shows comparative recovery behavior of new orders for durable goods during business cycle and specific cycle expansions. At first glance the two panels seem to have little in common. In the specific cycle version (lower panel) the recovery patterns vary widely. The recovery from the 1961 trough proceeds vigorously for about a year, stalls during the second year, and is resumed thereafter; the recovery after the 1953 trough, by contrast, does not really get under way for a year, and then shows good vigor for the rest of the reported period; in the recovery after 1958, an initial hesitance, very fast progress to the sixteenth month, and marked decline thereafter can be observed. By

[17] See pp. 80 ff.

CHART 24

RECOVERY ANALYSIS,
NEW ORDERS FOR DURABLE GOODS,
PERCENTAGE CHANGE FROM
PRECEDING REFERENCE AND SPECIFIC CYCLE PEAK,
1954–64



contrast, the reference cycle analysis (upper panel) shows rather similar recovery movements of new orders for about a year and a tendency toward reversals for the better part of the next year. Only thereafter can strikingly different developments be seen. A close look at the comparative behavior of new orders during the expansion starting about 1954 will be helpful. In the upper panel (which shows recovery from business cycle troughs, relative to preceding business cycle peak levels), new orders recover early and fast, reach previous peak levels soon,[18] and continue to rise at a more rapid rate than that shown during the other two recoveries. By contrast, in the lower panel (which shows recovery from the lowest level of new orders themselves, relative to their own preceding peak levels) the comparative performance looks quite different. New orders, after their own low, scarcely recover at all during the first eight months; they reach and exceed previous peak levels only after the sixteenth month. At the twenty-eighth month the expansion is still in full swing, while the other two depicted expansions lasted thirteen and fifteen months. Which presentation tells the true story about comparative performance? Obviously neither. Both show different aspects of cyclical behavior, and the very difference of the patterns demonstrates how unsatisfactory it might be to base one's evaluation on only one of the versions.

Let us pursue the comparison a bit further. The two representations vary in only two respects—the base for the computation of relatives and the way in which the series are chronologically aligned. The differences of the percentage bases (levels at business cycle peaks compared with those at specific cycle peaks) are usually not very large, even if there are relatively long leads or lags. This is due to the base being at similar long-term and, usually, at roughly similar cyclical levels. In the example, new orders at the 1953 reference peak amount to $12.1 billion, at the corresponding specific peak to $13.8 billion, about 14 per cent higher. The apparent performance is more importantly affected by the change in chronological alignment. In the reference cycle version, the analysis aligns the series so that the months of the reference turns (peaks for recession and troughs for recovery analysis) are at the origin of the horizontal scale; in the specific cycle analysis, the same holds for the cyclical turns of the series itself. This may lead to substantial differences in alignment between the two

[18] This occurs when the deviations from previous peak levels become zero.

analyses. New orders experienced their own trough in September 1953, eleven months before the business cycle trough in August 1954. This long lead, together with less drastic leads at the other troughs, accounts for the strong differences in comparative recovery patterns. This situation highlights a problem that has been discussed earlier in a different context,[19] that is, the sensitivity of cyclical analysis to the determination of turning points—particularly when flat-bottom troughs of substantial duration are experienced. The second panel of Chart 24 shows that new orders maintained a low level from September 1953 (0 on the scale) to May 1954 (+8 on the scale). There is no doubt that the September 1953 level was lower and correctly chosen as the specific trough. But how significant was the difference, in view of the considerable random fluctuations exhibited by the series? The choice of May 1954 as the specific trough would have substantially affected the analysis of comparative behavior. The specific recovery would have been very much more favorable, compared to the later ones. The moral of this discussion is, of course, that recession-recovery analysis —as any other analytical tool—must not be used mechanically. The electronic computer output provides sufficient information for recognizing the effects of marginal decisions and (if necessary) for evaluating the effects of alternatives. It is very inexpensive to run recession-recovery analysis for alternative sets of chronologies once the basic input has been prepared.

Although for many purposes the comparative analysis is best made in the form of percentage changes or relatives, this is not necessarily always the case. In certain circumstances, the changes may be computed and compared in "absolute" form, that is, in terms of the units in which the original values are stated. The reasons for preferring the absolute form are varied. One is purely technical: If the series contains negative numbers (as is likely, for instance, in a series of budget surpluses and deficits or a series on inventory change), percentage changes cannot be computed, or they may become awkwardly large. Also, when the units have independent meaning and are easily evaluated against a standard (length of the average workweek), absolute changes may be desirable. For series that are components of a total (such as the components of GNP), comparisons of the absolute changes may be of interest. Finally, if the original units are already in ratio

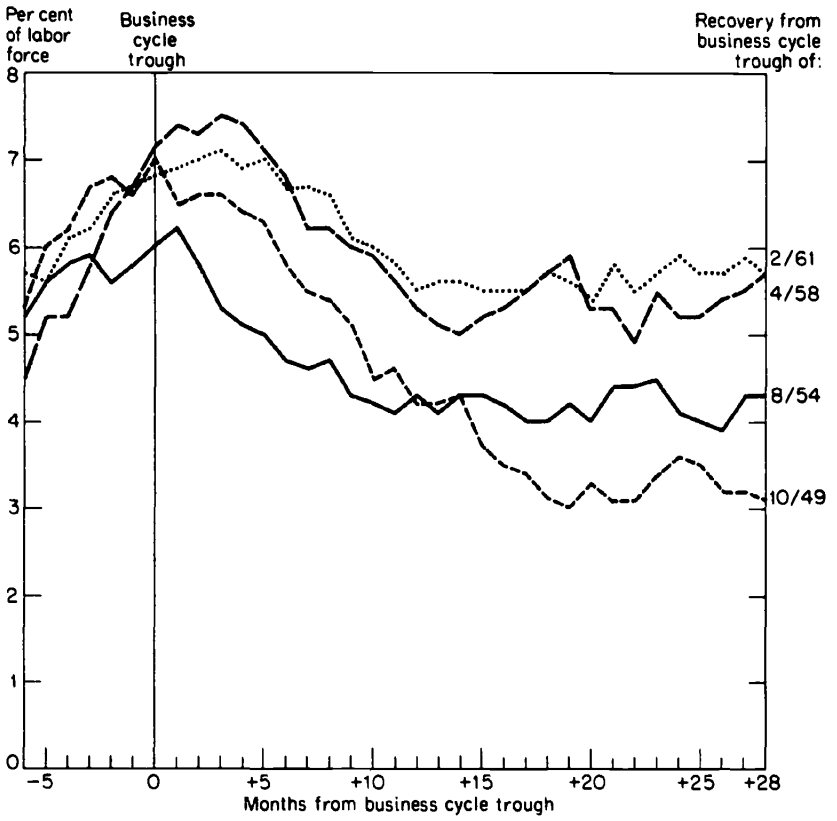
[19] See pp. 12 ff.

form (as in the case of unemployment rates, capacity utilization rates, or interest rates), the percentage-change analysis may be less instructive than the analysis in terms of the rates themselves. Here, both the absence of strong trends and the presence of strong benchmark standards make changes in the absolute units directly comparable. Except for series containing negative numbers, the case for absolute differences is not really hard and fast. There is, of course, always the possibility of performing the analysis in both ways, a possibility that has become more attractive with the availability of an electronic computer program for both versions of the analysis.

On occasion, one may wish to perform the comparative analysis of cyclical behavior on the basis of levels rather than changes. Chart 25 illustrates this version for the unemployment rate during recent expansions. The vertical scale shows unemployment as a percentage of the labor force in the original units of the analyzed series (in contrast to Chart 18, where this scale shows percentage deviations from previous peak levels). This presentation is distinguished from that of a conventional time series merely by alignment around business cycle troughs. Note that the unemployment rate, after about two years of recovery in general business conditions, showed a historical sequence of increasingly higher levels. This is the inverse order of the comparable lines on Chart 20, which showed the degree to which previous prosperity levels were approximated. Again the computer program, which provides all versions of recession-recovery analysis, permits a view of many aspects of cyclical behavior.

Comparative analysis by the described techniques is easily impaired if the original series exhibit strong irregular movements. This tends to occur when sensitive activities (such as construction contracts, new orders, business failures, and similar indicators) are the raw material for the analysis. It may be a still more serious problem if the analysis is applied to data of rather narrow coverage, such as industry or company information. A first step in reducing the undesired preponderance of the irregular element is to compute changes only for selected spans (three, six, nine, or four, eight, twelve months, etc.) so that the cyclical forces have a chance to assert themselves, over given intervals, against the irregular ones. This is, however, more an expository than an analytical device. It reduces confusion but does not reduce the absolute size of the random component of the observation, and for current analysis it prevents use of the most recent information. In

CHART 25
RECOVERY ANALYSIS, UNEMPLOYMENT RATE, ABSOLUTE LEVELS, ARRANGED AROUND BUSINESS CYCLE TROUGHS, 1949–63



many cases, the use of a short smoothing term[20] provides an answer, and the resultant loss of "currency" of the analysis may be a small cost compared to the greater cyclical significance of the computed measures. Also, the unsmoothed data can always be used side by side with the smoothed data.

[20] Some programmed seasonal adjustment procedures provide a smoothed version of the adjusted series.

INTERPRETATION OF OUTPUT

The major goal of this part of the study is to offer guidance for the understanding and use of the programmed versions of two closely related analytical techniques. An exposition of the general approach and the major versions of recession-recovery analysis has been provided; now it is time to turn to the programmed output. The output tables for recession analysis are found in Appendix 4A, for recovery analysis in Appendix 4B. Both appendixes contain tables pertaining to reference analysis (R) and specific analysis (S). The designation of output tables specifies the appendix number, the table number, and the type of analysis (R or S).

The first table of Appendix 4A (Output Table 4A-1-R) presents the time series being analyzed in original units.[21]

Output Table 4A-2-R contains reference phase amplitudes in absolute form, which in the present case means changes in employment during reference contractions and expansions. Output Table 4A-3-R contains analogous information, in terms of percentage changes relative to previous turns. The importance of these tables is that they permit investigation of the degree to which the incomplete amplitudes of recessions, i.e., the amplitudes for specified chronological portions of recessions, reported in the main table of the analysis (Output Table 4A-5-R on absolute and 4A-6-R on relative changes), are associated with the full amplitudes reported here.

Readers of the first part of this book, on the standard business cycle analysis, must be cautioned not to mistake the amplitude measures used here for those of the standard analysis. The phase amplitudes of recession analysis are conventional percentage changes from the three-month average centered on the peak month to the corresponding average at the subsequent trough. These amplitudes will usually deviate a bit from the relative change from peak standing to trough month, as reported in later tables. The reason is that the later tables show the decline to the trough *month* rather than to the three-month average centered at the trough. Observe that the reference amplitude of employment during the Great Depression, 1929–33, is −30.7 per cent

[21] The table presents the data input for analysis. A seasonally adjusted series is used if such adjustment was deemed necessary. Otherwise the unadjusted series, or possibly a smoothed version of the adjusted or unadjusted series, is used and printed.

according to Output Table 4A-3-R, and the corresponding decline from the 1929 peak to March 1933 amounts to 31.3 per cent according to Output Table 4A-6-R.[22] The latter measure is comparable to the measures for other spans. The usefulness of the phase amplitudes for comparison with the cyclical declines of shorter duration will be demonstrated later on.

The next table (Output Table 4A-4-R) contains some of the same data as Output Table 4A-1-R, but they are ordered according to their chronological relation to the relevant cyclical turns—which, in the present case, are business cycle peaks (reference cycle peaks). The data are still in original units. The first panel contains the data for the eleven months preceding each peak.[23] The provision of data for some period before peaks is particularly valuable in the case of reference cycle analysis because it permits the user to be informed about the behavior of a series in the entire neighborhood of a turn in general business conditions. In the case of specific analysis, it would be known at least that the movement before the peak was upward (or sideways), which of course is not very precise information. In the case of reference analysis, nothing would be known about the movement before the turn, in the absence of prior data. The data for eleven months before the turn may frequently include the upper turn of leading series but not, of course, the turns of series with leads of one year or more.

The programmed recession analysis can provide data for up to five years after each cyclical peak. This may seem inordinately long, in view of the fact that the duration of reference recessions since World War I averages only about fifteen months. However, the 1929–33 recession lasted forty-three months; lagging series may continue to decline for many months after business cycle troughs; and the durations of contractions in specific activities can markedly exceed those in general business conditions.[24] However, since cycle phases are often

[22] The reference trough, forty-three months after the reference peak, is marked by an asterisk. The given value, 68.7, is 31.3 per cent below the preceding peak level.

[23] A period of eleven, rather than the more plausible twelve, months before the turn was selected for technical convenience, i.e., to accommodate the value for the turn itself (the zero month) on the same table.

[24] Changes in consumer instalment debt, for example, declined for fully three years between 1955 and 1958, a period four times as long as the associated business cycle decline from July 1957 to April 1958. Also, for series that bear an inverted relation to business activity (such as the unemployment rate), the specific cycle declines correspond to business expansions and are frequently quite long.

shorter, the user can decide whether he wants information for more than two years. Of course, as the interval becomes longer, the meaningfulness of the comparison in terms of its relation to the starting date becomes more dubious.

The next tables, Output Tables 4A-5-R and 4A-6-R, present the key measures of recession analysis, the changes from peak levels. These changes may be in absolute form (4A-5-R) or in terms of percentages (4A-6-R).[25]

Some entries on Output Tables 4A-5-R and 4A-6-R have asterisks. These asterisks identify the values at the cyclical turn following the initial turn (upon which the analysis is based). In the example, the asterisks show the values at the reference troughs following the reference peaks from which the declines were measured. The identification is valuable because it helps to delineate periods that may be important for the comparisons intended—in the present case the asterisks denote the termination of the reference contractions.

Each panel of these two tables ends with some lines giving totals, averages, and average deviations. These measures refer to the changes from reference peaks, as printed in the panel. The totals are merely intermediate computational results which are printed out to facilitate modification of the averages (for instance, by excluding cycles). The averages are unweighted means of the previously reported changes. They also contain, of course, rises (or relatives above 100) which become increasingly frequent after some of the contraction phases have reached their end. This averaging process does not stop after the duration of the shortest business cycle contraction, so that, after a while, the reported averages include more and more experience reaching into cyclical expansions. Consequently, the behavior of these averages must be interpreted with great care. Reference to the asterisks in the body of the percentage change table will help in this interpretation. The last line of each change panel provides average deviations of the changes (or relatives) from the reported means. These average deviations are small in the neighborhood of the initial peak and tend to increase as the differential paths of the various recessions become more pronounced. They serve in the evaluation of the representativeness of the averages and might also help in comparing the efficiency

[25] Output Table 4A-6-R is expressed in terms of relatives, with the peak standing as base. The difference is, of course, purely formal, since percentage changes are simply relatives minus 100.

of the standard business cycle analysis with that of recession-recovery analysis for the purpose of describing typical behavior.

Appendix 4A also contains the specific cycle version of recession analysis. The output tables are numbered from 4A-1-S to 4A-6-S. Since the output is presented in the same format as that for the reference cycle version, comments will be brief. The absolute and percentage changes (or relatives) measure the changes from the specific peak relative to the levels at that peak, for increasing spans. The asterisks in Output Tables 4A-5-S and 4A-6-S refer to the subsequent specific troughs. These tables show that before the specific-peak date, the reported standings were generally below the peak standings—a fact that distinguishes these tables from Output Table 4A-4-R, where, during some of the shorter spans before the reference peak, the standings were above peak standings.[26] Otherwise, comparison between the two tables reveals resemblances rather than differences—due largely to the close timing relationship between cyclical peaks in nonagricultural employment and cyclical peaks in general business activity.

Appendix 4B refers to recovery analysis. Tables 4B-1-R to 4B-6-R for reference analysis correspond to the similarly numbered tables of the recession analysis. The analogous Tables 4B-1-S to 4B-6-S for specific analysis are not included in the Appendix. Changes are computed from initial troughs, reference or specific. Appendix 4B also contains Output Tables 4B-7 and 4B-8, showing changes computed in terms of the levels of the preceding peak, reference (R) or specific (S). In all output tables for recovery analysis, provision is made for comparisons up to five years after the reference or specific trough dates. This extends, of course, considerably beyond the recovery period proper, as previously defined, and is actually designed to permit comparison throughout most complete expansion periods. Most expansions in the United States have lasted less than five years. Since many expansions had considerably shorter durations, the percentage changes extending into the subsequent contraction phase may be without interest. Asterisks show the end of the expansion phases. The user may disregard the later data. He can also specify the number of years, after troughs, to be covered by the analysis.

[26] Note that in the change tables, relatives below 100 *before* the peak denote *rises to* the peak; *after* the peak, they denote *declines from* the peak. Analogously, negative entries before the peak denote rises: after the peak they denote declines.

POSTSCRIPT

During the latter part of the 1960's, recession-recovery analysis fell into disuse. The reasons are simple enough. After the 1961 trough there was no decline in the economy prompting the questions which recession analysis is designed to answer. And the long boom soon outlasted other postwar expansions with which meaningful comparisons could be made. Thus, for recession analysis there was no recession to be dealt with and for recovery analysis there were no recoveries to be compared to. All this changed with the onset of the slowdown which started late in 1969. Some of the classical questions were asked in new form: Is there going to be a recession—mini, midi, or perhaps even maxi? Whatever it is, how long will it last? Was there an upper turning point, and if so, when did it occur? Recession analysis came into vogue again, at least as a tool of observation.

Doubts about recession analysis as a forecasting tool arose, since the future of this man-made slowdown seemed to be so highly dependent on the mix of monetary, fiscal, and other policies. However, it turned out that neither the time lags nor the magnitudes of the effects of these policies can be foretold with any precision. Furthermore, economic fortunes are substantially modified by private sector decisions, which are only loosely related to the federal policies. Thus, the questions of how the economy would behave were wide open and, in fact, subject to spirited debate. These circumstances brought recession analysis into use again, and the requests for data, programs, and procedural guidance mounted.

At the time of this writing—September 1970—it looks as if recovery analysis may soon become the appropriate tool. In spite of our proprietary interest in its application, we would not mind if it again lost its applicability by our running out of expansions with comparable durations.

APPENDIX TO CHAPTER 4

A

SAMPLE RUN, RECOVERY ANALYSIS

Output Table 4A-1R

NBER RECESSION-RECOVERY ANALYSIS

REFERENCE ANALYSIS

EMPLOYEES IN NONAG ESTABLISHMENTS

HUNDRED THOUSAND PERSONS 8268

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1929	326.0	326.0	328.0	329.0	330.0	331.0	332.0	333.0	331.0	330.0	327.0	323.0
1930	319.0	317.0	314.0	313.0	311.0	308.0	304.0	300.0	297.0	294.0	291.0	289.0
1931	286.0	285.0	283.0	282.0	280.0	277.0	275.0	272.0	268.0	265.0	262.0	260.0
1962	547.0	550.0	552.0	554.0	555.0	556.0	557.0	557.0	558.0	558.0	559.0	559.0
1963	559.0	560.0	562.0	564.0	565.0	566.0	568.0	568.0	569.0	571.0	571.0	573.0

Output Table 4A-2R

ABSOLUTE CHANGES BETWEEN CYCLICAL TURNS

PEAK	TROUGH	PEAK	PEAK	TROUGH	PEAK	FALL	RISE
1929 8	1933 3	1937 5	332.0	230.0	319.3	-102.0	89.3
1937 5	1938 6	1945 2	319.3	287.3	417.7	-32.0	130.3
1945 2	1945 10	1948 11	417.7	385.7	451.0	-32.0	65.3
1948 11	1949 10	1953 7	451.0	432.3	503.7	-18.7	71.3
1953 7	1954 8	1957 7	503.7	487.0	530.0	-16.7	43.0
1957 7	1958 4		530.0	509.7		-20.3	
TOTAL						-221.7	399.3
AVERAGE						-36.9	79.9
AVERAGE DEVIATIONS						21.7	24.0

OMIT THE FOLLOWING CYCLES

1945 2 1945 10 1948 11

TOTAL	-189.7	334.0
AVERAGE	-31.6	66.8
AVERAGE DEVIATIONS	18.3	22.9

Output Table 4A-3R

RELATIVE CHANGES BETWEEN CYCLICAL TURNS

PEAK	TROUGH	PEAK	PEAK	TROUGH	PEAK	FALL	RISE
1929 8	1933 3	1937 5	332.0	230.0	319.3	-30.7	38.8
1937 5	1938 6	1945 2	319.3	287.3	417.7	-10.0	45.[illegible]
1945 2	1945 10	1948 11	417.7	385.7	451.0	-7.7	16.9
1948 11	1949 10	1953 7	451.0	432.3	503.7	-4.1	16.5
1953 7	1954 8	1957 7	503.7	487.0	530.0	-3.3	8.8
1957 7	1958 4		530.0	509.7		-3.8	
TOTAL						-59.7	126.5
AVERAGE						-9.9	25.3
AVERAGE DEVIATIONS						6.9	13.4

OMIT THE FOLLOWING CYCLES

1945 2 1945 10 1948 11

TOTAL	-52.0	109.5
AVERAGE	-8.7	21.9
AVERAGE DEVIATIONS	6.4	11.8

Output Table 4A-4R

EMPLOYEES IN NONAG ESTABLISHMENTS

HUNDRED THOUSAND PERSONS 8268

REFERENCE ANALYSIS

DATE OF PEAK	STANDING AT PEAK	STANDINGS ONE YEAR BEFORE PEAK -11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	-5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1929 8	332.00	0.	0.	0.	0.	326.	326.	328.	329.	330.	331.	332.	333.
1937 5	319.33	298.	301.	303.	305.	306.	309.	312.	313.	315.	317.	318.	320.
1945 2	417.67	422.	419.	418.	417.	417.	417.	416.	416.	416.	417.	418.	418.
1948 11	451.00	446.	447.	445.	447.	443.	447.	449.	451.	450.	451.	451.	451.
1953 7	503.67	487.	491.	499.	497.	500.	501.	503.	504.	504.	504.	504.	504.
1957 7	530.00	525.	524.	527.	528.	529.	529.	531.	531.	531.	530.	530.	530.

Output Table 4A-5R

DATE OF PEAK	STANDING AT PEAK	ABSOLUTE CHANGE ONE YEAR BEFORE PEAK -11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	-5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1929 8	332.00	0.0	0.0	0.0	0.0	-6.0	-6.0	-4.0	-3.0	-2.0	-1.0	0.0	1.0
1937 5	319.33	-21.3	-18.3	-16.3	-14.3	-13.3	-10.3	-7.3	-6.3	-4.3	-2.3	-1.3	0.7
1945 2	417.67	4.3	1.3	0.3	-0.7	-0.7	-0.7	-1.7	-1.7	-1.7	-0.7	0.3	0.3
1948 11	451.00	-5.0	-4.0	-6.0	-4.0	-8.0	-4.0	-2.0	0.0	-1.0	0.0	0.0	0.0
1953 7	503.67	-16.7	-12.7	-8.7	-6.7	-3.7	-2.7	-0.7	0.3	0.3	0.3	0.3	0.3
1957 7	530.00	-5.0	-6.0	-3.0	-2.0	-1.0	-1.0	1.0	1.0	1.0	0.0	0.0	0.0
TOTAL		-43.7	-39.7	-33.7	-27.7	-32.7	-24.7	-14.7	-9.7	-7.7	-3.7	-0.7	2.3
AVERAGE		-8.7	-7.9	-6.7	-5.5	-5.4	-4.1	-2.4	-1.6	-1.3	-0.6	-0.1	0.4
AVE DEVIATION		8.2	6.1	4.6	4.0	3.7	2.7	2.1	2.1	1.4	0.7	0.4	0.3

OMIT THE FOLLOWING CYCLES

1945 2 1945 10 1948 11

TOTAL		-48.0	-41.0	-34.0	-27.0	-32.0	-24.0	-13.0	-8.0	-6.0	-3.0	-1.0	2.0
AVERAGE		-12.0	-10.2	-8.5	-6.7	-6.4	-4.8	-2.6	-1.6	-1.2	-0.6	-0.2	0.4
AVE DEVIATION		7.0	5.3	4.0	3.8	3.4	2.7	2.5	2.5	1.6	0.9	0.5	0.3

Output Table 4A-6R

DATE OF PEAK	STANDING AT PEAK	RELATIVE STANDING ONE YEAR BEFORE PEAK -11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	-5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1929 8	332.00	0.0	0.0	0.0	0.0	98.2	98.2	98.8	99.1	99.4	99.7	100.0	100.3
1937 5	319.33	93.3	94.3	94.9	95.5	95.8	96.8	97.7	98.0	98.6	99.3	99.6	100.2
1945 2	417.67	101.0	100.3	100.1	99.8	99.8	99.8	99.6	99.6	99.6	99.8	100.1	100.1
1948 11	451.00	98.9	99.1	98.7	99.1	98.2	99.1	99.6	100.0	99.8	100.0	100.0	100.0
1953 7	503.67	96.7	97.5	98.3	98.7	99.3	99.5	99.9	100.1	100.1	100.1	100.1	100.1
1957 7	530.00	99.1	98.9	99.4	99.6	99.8	99.8	100.2	100.2	100.2	100.0	100.0	100.0
TOTAL		489.0	490.0	491.3	492.8	591.2	593.2	595.7	597.0	597.7	598.9	599.7	600.7
AVERAGE		97.8	98.0	98.3	98.6	98.5	98.9	99.3	99.5	99.6	99.8	100.0	100.1
AVE DEVIATION		2.2	1.7	1.4	1.2	1.1	0.9	0.7	0.6	0.4	0.2	0.1	0.1

OMIT THE FOLLOWING CYCLES

1945 2 1945 10 1948 11

TOTAL		388.0	389.7	391.3	392.9	491.3	493.4	496.1	497.4	498.1	499.0	499.6	500.6
AVERAGE		97.0	97.4	97.8	98.2	98.3	98.7	99.2	99.5	99.6	99.8	99.9	100.1
AVE DEVIATION		2.0	1.6	1.5	1.4	1.0	1.0	0.8	0.7	0.5	0.3	0.1	0.1

Output Table 4A-4R

EMPLOYEES IN NONAG ESTABLISHMENTS

HUNDRED THOUSAND PERSONS 8268

REFERENCE ANALYSIS

DATE OF PEAK	STANDING AT PEAK	STANDINGS +1 MO	+2 MO	STANDING +3 MO	+4 MO	+5 MO	+6 MO	FIRST YEAR AFTER PEAK +7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1929 8	332.00	331.	330.	327.	323.	319.	317.	314.	313.	311.	308.	304.	300.
1937 5	319.33	320.	321.	321.	320.	317.	312.	305.	299.	296.	294.	292.	288.
1945 2	417.67	417.	413.	411.	409.	406.	403.	384.	385.	388.	390.	397.	392.
1948 11	451.00	451.	446.	444.	442.	441.	438.	436.	435.	435.	437.	428.	432.
1953 7	503.67	503.	502.	501.	498.	497.	494.	493.	491.	490.	489.	488.	487.
1957 7	530.00	530.	528.	527.	525.	523.	521.	515.	512.	509.	508.	509.	509.

Output Table 4A-5R

DATE OF PEAK	STANDING AT PEAK	ABSOLUTE CHANGE +1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	FIRST YEAR AFTER PEAK +7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1929 8	332.00	-1.0	-2.0	-5.0	-9.0	-13.0	-15.0	-18.0	-19.0	-21.0	-24.0	-28.0	-32.0
1937 5	319.33	0.7	1.7	1.7	0.7	-2.3	-7.3	-14.3	-20.3	-23.3	-25.3	-27.3	-31.3
1945 2	417.67	-0.7	-4.7	-6.7	-8.7	-11.7	-14.7	-33.7	-32.7*	-29.7	-27.7	-20.7	-25.7
1948 11	451.00	0.0	-5.0	-7.0	-9.0	-10.0	-13.0	-15.0	-16.0	-16.0	-14.0	-23.0*	-19.0
1953 7	503.67	-0.7	-1.7	-2.7	-5.7	-6.7	-9.7	-10.7	-12.7	-13.7	-14.7	-15.7	-16.7
1957 7	530.00	0.0	-2.0	-3.0	-5.0	-7.0	-9.0	-15.0	-18.0	-21.0*	-22.0	-21.0	-21.0
TOTAL		-1.7	-13.7	-22.7	-36.7	-50.7	-68.7	-106.7	-118.7	-124.7	-127.7	-135.7	-145.7
AVERAGE		-0.3	-2.3	-3.8	-6.1	-8.4	-11.4	-17.8	-19.8	-20.8	-21.3	-22.6	-24.3
AVE DEVIATION		0.5	1.7	2.4	2.8	3.1	2.8	5.4	4.5	4.0	4.6	3.5	5.4

OMIT THE FOLLOWING CYCLES

1945 2 1945 10 1948 11

TOTAL	-1.0	-9.0	-16.0	-28.0	-39.0	-54.0	-73.0	-86.0	-95.0	-100.0	-115.0	-120.0
AVERAGE	-0.2	-1.8	-3.2	-5.6	-7.8	-10.8	-14.6	-17.2	-19.0	-20.0	-23.0	-24.0
AVE DEVIATION	0.5	1.4	2.2	2.7	3.0	2.6	1.7	2.3	3.3	4.5	3.7	6.1

Output Table 4A-8R

DATE OF PEAK	STANDING AT PEAK	RELATIVE STANDING +1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	FIRST YEAR AFTER PEAK +7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1929 8	332.00	99.7	99.4	98.5	97.3	96.1	95.5	94.6	94.3	93.7	92.8	91.6	90.4
1937 5	319.33	100.2	100.5	100.5	100.2	99.3	97.7	95.5	93.6	92.7	92.1	91.4	90.2
1945 2	417.67	99.8	98.9	98.4	97.9	97.2	96.5	91.9	92.2*	92.9	93.4	95.1	93.9
1948 11	451.00	100.0	98.9	98.4	98.0	97.8	97.1	96.7	96.5	96.5	96.9	94.9*	95.8
1953 7	503.67	99.9	99.7	99.5	98.9	98.7	98.1	97.9	97.5	97.3	97.1	96.9	96.7
1957 7	530.00	100.0	99.6	99.4	99.1	98.7	98.3	97.2	96.6	96.0*	95.8	96.0	96.0
TOTAL		599.6	597.0	594.8	591.4	587.7	583.2	573.8	570.6	569.0	568.0	565.9	562.9
AVERAGE		99.9	99.5	99.1	98.6	97.9	97.2	95.6	95.1	94.8	94.7	94.3	93.8
AVE DEVIATION		0.1	0.4	0.7	0.8	0.9	0.8	1.6	1.7	1.8	1.9	1.9	2.4

OMIT THE FOLLOWING CYCLES

1945 2 1945 10 1948 11

TOTAL	499.8	498.1	496.4	493.4	490.5	486.7	481.8	478.5	476.1	474.7	470.8	469.1
AVERAGE	100.0	99.6	99.3	98.7	98.1	97.3	96.4	95.7	95.2	94.9	94.2	93.8
AVE DEVIATION	0.1	0.4	0.6	0.8	0.9	0.8	1.1	1.4	1.6	2.0	2.1	2.8

Output Table 4A-4S

EMPLOYEES IN NONAG ESTABLISHMENTS

HUNDRED THOUSAND PERSONS 8268

SPECIFIC ANALYSIS

DATE OF PEAK	STANDING AT PEAK	STANDINGS ONE YEAR BEFORE PEAK -11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	-5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1929 8	332.00	0.	0.	0.	0.	326.	326.	328.	329.	330.	331.	332.	333.
1937 7	320.67	303.	305.	306.	309.	312.	313.	315.	317.	318.	320.	320.	321.
1943 11	426.33	418.	421.	423.	424.	424.	424.	426.	424.	425.	424.	426.	427.
1948 7	450.00	439.	441.	443.	443.	446.	447.	445.	447.	443.	447.	449.	451.
1953 7	503.67	487.	491.	495.	497.	500.	501.	503.	504.	504.	504.	504.	504.
1957 3	531.00	523.	524.	525.	518.	525.	524.	527.	528.	529.	529.	531.	531.
1960 4	544.67	535.	536.	537.	532.	533.	532.	535.	541.	542.	544.	544.	546.

Output Table 4A-5S

DATE OF PEAK	STANDING AT PEAK	ABSOLUTE CHANGE ONE YEAR BEFORE PEAK -11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	-5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1929 8	332.00	0.0	0.0	0.0	0.0	-6.0	-6.0	-4.0	-3.0	-2.0	-1.0	0.0	1.0
1937 7	320.67	-17.7	-15.7	-14.7	-11.7	-8.7	-7.7	-5.7	-3.7	-2.7	-0.7	-0.7	0.3
1943 11	426.33	-8.3	-5.3	-3.3	-2.3	-2.3	-2.3	-0.3	-2.3	-1.3	-2.3	-0.3	0.7
1948 7	450.00	-11.0	-9.0	-7.0	-7.0	-4.0	-3.0	-5.0	-3.0	-7.0	-3.0	-1.0	1.0
1953 7	503.67	-16.7	-12.7	-8.7	-6.7	-3.7	-2.7	-0.7	0.3	0.3	0.3	0.3	0.3
1957 3	531.00	-8.0	-7.0	-6.0	-13.0	-6.0	-7.0	-4.0	-3.0	-2.0	-2.0	0.0	0.0
1960 4	544.67	-9.7	-8.7	-7.7	-12.7	-11.7	-12.7	-9.7	-3.7	-2.7	-0.7	-0.7	1.3
TOTAL		-71.3	-58.3	-47.3	-53.3	-42.3	-41.3	-29.3	-18.3	-17.3	-9.3	-2.3	4.7
AVERAGE		-11.9	-9.7	-7.9	-8.9	-6.0	-5.9	-4.2	-2.6	-2.5	-1.3	-0.3	0.7
AVE DEVIATION		3.5	3.0	2.5	3.6	2.4	2.8	2.2	0.9	1.4	1.0	0.4	0.4

OMIT THE FOLLOWING CYCLES

TOTAL		-71.3	-58.3	-47.3	-53.3	-42.3	-41.3	-29.3	-18.3	-17.3	-9.3	-2.3	4.7
AVERAGE		-11.9	-9.7	-7.9	-8.9	-6.0	-5.9	-4.2	-2.6	-2.5	-1.3	-0.3	0.7
AVE DEVIATION		3.5	3.0	2.5	3.6	2.4	2.8	2.2	0.9	1.4	1.0	0.4	0.4

Output Table 4A-6S

DATE OF PEAK	STANDING AT PEAK	RELATIVE STANDING ONE YEAR BEFORE PEAK -11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	-5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1929 8	332.00	0.0	0.0	0.0	0.0	98.2	98.2	98.8	99.1	99.4	99.7	100.0	100.3
1937 7	320.67	94.5	95.1	95.4	96.4	97.3	97.6	98.2	98.9	99.2	99.8	99.8	100.1
1943 11	426.33	98.0	98.7	99.2	99.5	99.5	99.5	99.9	99.5	99.7	99.5	99.9	100.2
1948 7	450.00	97.6	98.0	98.4	98.4	99.1	99.3	98.9	99.3	98.4	99.3	99.8	100.2
1953 7	503.67	96.7	97.5	98.3	98.7	99.3	99.5	99.9	100.1	100.1	100.1	100.1	100.1
1957 3	531.00	98.5	98.7	98.9	97.6	98.9	98.7	99.2	99.4	99.6	99.6	100.0	100.0
1960 4	544.67	98.2	98.4	98.6	97.7	97.9	97.7	98.2	99.3	99.5	99.9	99.9	100.2
TOTAL		583.5	586.4	588.8	588.2	690.1	690.4	693.2	695.6	695.9	697.8	699.4	701.1
AVERAGE		97.3	97.7	98.1	98.0	98.6	98.6	99.0	99.4	99.4	99.7	99.9	100.2
AVE DEVIATION		1.1	1.0	0.9	0.8	0.7	0.7	0.6	0.2	0.4	0.2	0.1	0.1

OMIT THE FOLLOWING CYCLES

TOTAL		583.5	586.4	588.8	588.2	690.1	690.4	693.2	695.6	695.9	697.8	699.4	701.1
AVERAGE		97.3	97.7	98.1	98.0	98.6	98.6	99.0	99.4	99.4	99.7	99.9	100.2
AVE DEVIATION		1.1	1.0	0.9	0.8	0.7	0.7	0.6	0.2	0.4	0.2	0.1	0.1

Output Table 4A-4S

EMPLOYEES IN NONAG ESTABLISHMENTS

HUNDRED THOUSAND PERSONS 8268

SPECIFIC ANALYSIS

STANDINGS

DATE OF PEAK	STANDING AT PEAK	+1 MO	+2 MO	STANDING +3 MO	+4 MO	+5 MO	+6 MO	FIRST YEAR AFTER PEAK +7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1929 8	332.00	331.	330.	327.	323.	319.	317.	314.	313.	311.	308.	304.	300.
1937 7	320.67	321.	320.	317.	312.	305.	299.	296.	294.	292.	288.	287.	287.
1943 11	426.33	426.	425.	424.	422.	419.	418.	417.	417.	417.	416.	416.	416.
1948 7	450.00	450.	451.	451.	451.	451.	446.	444.	442.	441.	438.	436.	435.
1953 7	503.67	503.	502.	501.	498.	497.	494.	493.	491.	490.	489.	488.	487.
1957 3	531.00	531.	530.	530.	530.	530.	528.	527.	525.	523.	521.	515.	512.
1960 4	544.67	544.	543.	542.	542.	541.	540.	539.	536.	535.	534.	535.	535.

Output Table 4A-5S

ABSOLUTE CHANGE

DATE OF PEAK	STANDING AT PEAK	+1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	FIRST YEAR AFTER PEAK +7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1929 8	332.00	-1.0	-2.0	-5.0	-9.0	-13.0	-15.0	-18.0	-19.0	-21.0	-24.0	-28.0	-32.0
1937 7	320.67	0.3	-0.7	-3.7	-8.7	-15.7	-21.7	-24.7	-26.7	-28.7	-32.7	-33.7*	-33.7
1943 11	426.33	-0.3	-1.3	-2.3	-4.3	-7.3	-8.3	-9.3	-9.3	-9.3	-10.3	-10.3	-10.3
1948 7	450.00	0.0	1.0	1.0	1.0	1.0	-4.0	-6.0	-8.0	-9.0	-12.0	-14.0	-15.0
1953 7	503.67	-0.7	-1.7	-2.7	-5.7	-6.7	-9.7	-10.7	-12.7	-13.7	-14.7	-15.7	-16.7
1957 3	531.00	0.0	-1.0	-1.0	-1.0	-1.0	-3.0	-4.0	-6.0	-8.0	-10.0	-16.0	-19.0
1960 4	544.67	-0.7	-1.7	-2.7	-2.7	-3.7	-4.7	-5.7	-8.7	-9.7	-10.7*	-9.7	-9.7
TOTAL		-2.3	-7.3	-16.3	-30.3	-46.3	-66.3	-78.3	-90.3	-99.3	-114.3	-127.3	-136.3
AVERAGE		-0.3	-1.0	-2.3	-4.3	-6.6	-9.5	-11.2	-12.9	-14.2	-16.3	-18.2	-19.5
AVE DEVIATION		0.4	0.7	1.3	3.0	4.6	5.1	5.8	5.7	6.1	6.9	7.2	7.6

OMIT THE FOLLOWING CYCLES

TOTAL	-2.3	-7.3	-16.3	-30.3	-46.3	-66.3	-78.3	-90.3	-99.3	-114.3	-127.3	-136.3
AVERAGE	-0.3	-1.0	-2.3	-4.3	-6.6	-9.5	-11.2	-12.9	-14.2	-16.3	-18.2	-19.5
AVE DEVIATION	0.4	0.7	1.3	3.0	4.6	5.1	5.8	5.7	6.1	6.9	7.2	7.6

Output Table 4A-6S

RELATIVE STANDING

DATE OF PEAK	STANDING AT PEAK	+1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	FIRST YEAR AFTER PEAK +7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1929 8	332.00	99.7	99.4	98.5	97.3	96.1	95.5	94.6	94.3	93.7	92.8	91.6	90.4
1937 7	320.67	100.1	99.8	98.9	97.3	95.1	93.2	92.3	91.7	91.1	89.8	89.5*	89.5
1943 11	426.33	99.9	99.7	99.5	99.0	98.3	98.0	97.8	97.8	97.8	97.6	97.6	97.6
1948 7	450.00	100.0	100.2	100.2	100.2	100.2	99.1	98.7	98.2	98.0	97.3	96.9	96.7
1953 7	503.67	99.9	99.7	99.5	98.9	98.7	98.1	97.9	97.5	97.3	97.1	96.9	96.7
1957 3	531.00	100.0	99.8	99.8	99.8	99.8	99.4	99.2	98.9	98.5	98.1	97.0	96.4
1960 4	544.67	99.9	99.7	99.5	99.5	99.3	99.1	99.0	98.4	98.2	98.0*	98.2	98.2
TOTAL		699.5	698.3	695.8	692.0	687.5	682.5	679.5	676.8	674.6	670.7	667.6	665.4
AVERAGE		99.9	99.8	99.4	98.9	98.2	97.5	97.1	96.7	96.4	95.8	95.4	95.1
AVE DEVIATION		0.1	0.2	0.4	0.9	1.5	1.8	2.1	2.1	2.3	2.6	2.8	2.9

OMIT THE FOLLOWING CYCLES

TOTAL	699.5	698.3	695.8	692.0	687.5	682.5	679.5	676.8	674.6	670.7	667.6	665.4
AVERAGE	99.9	99.8	99.4	98.9	98.2	97.5	97.1	96.7	96.4	95.8	95.4	95.1
AVE DEVIATION	0.1	0.2	0.4	0.9	1.5	1.8	2.1	2.1	2.3	2.6	2.8	2.9

APPENDIX TO CHAPTER 4

B

SAMPLE RUN, RECESSION ANALYSIS

Output Table 4B-1S

NBER RECESSION-RECOVERY ANALYSIS

SPECIFIC ANALYSIS

EMPLOYEES IN NONAG ESTABLISHMENTS

HUNDRED THOUSAND PERSONS 8268

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1929	326.0	326.0	328.0	329.0	330.0	331.0	332.0	333.0	331.0	330.0	327.0	323.0
1930	319.0	317.0	314.0	313.0	311.0	308.0	304.0	300.0	297.0	294.0	291.0	289.0
1931	286.0	285.0	283.0	292.0	280.0	277.0	275.0	272.0	268.0	265.0	262.0	260.0
1961	535.0	534.0	535.0	535.0	537.0	539.0	541.0	542.0	542.0	543.0	546.0	547.0
1962	547.0	550.0	552.0	554.0	555.0	556.0	557.0	557.0	558.0	558.0	559.0	559.0
1963	559.0	560.0	562.0	564.0	565.0	566.0	568.0	568.0	569.0	571.0	571.0	573.0

Output Table 4B-2S

ABSOLUTE CHANGES BETWEEN CYCLICAL TURNS

PEAK	TROUGH	PEAK	PEAK	TROUGH	PEAK	FALL	RISE
1929 8	1933 3	1937 7	332.0	230.0	320.7	-102.0	90.7
1937 7	1938 6	1943 11	320.7	287.3	426.3	-33.3	139.0
1943 11	1945 9	1948 7	426.3	390.7	450.0	-35.7	59.3
1948 7	1949 10	1953 7	450.0	432.3	503.7	-17.7	71.3
1953 7	1954 8	1957 3	503.7	487.0	531.0	-16.7	44.0
1957 3	1958 5	1960 4	531.0	508.7	544.7	-22.3	36.0
1960 4	1961 2		544.7	534.7		-10.0	
TOTAL						-237.7	440.3
AVERAGE						-34.0	73.4
AVERAGE DEVIATIONS						19.9	27.6

Output Table 4B-3S

RELATIVE CHANGES BETWEEN CYCLICAL TURNS

PEAK	TROUGH	PEAK	PEAK	TROUGH	PEAK	FALL	RISE
1929 8	1933 3	1937 7	332.0	230.0	320.7	-30.7	39.4
1937 7	1938 6	1943 11	320.7	287.3	426.3	-10.4	48.4
1943 11	1945 9	1948 7	426.3	390.7	450.0	-8.4	15.2
1948 7	1949 10	1953 7	450.0	432.3	503.7	-3.9	16.5
1953 7	1954 8	1957 3	503.7	487.0	531.0	-3.3	9.0
1957 3	1958 5	1960 4	531.0	508.7	544.7	-4.2	7.1
1960 4	1961 2		544.7	534.7		-1.8	
TOTAL						-62.8	135.6
AVERAGE						-9.0	22.6
AVERAGE DEVIATIONS						6.6	14.2

Output Table 4B-4R

EMPLOYEES IN NONAG ESTABLISHMENTS

HUNDRED THOUSAND PERSONS 8268

REFERENCE ANALYSIS

STANDINGS

DATE OF TROUGH	STANDING AT TROUGH	-11 MO	-10 MO	STANDING -9 MO	-8 MO	-7 MO	-6 MO	ONE YEAR BEFORE TROUGH -5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0. MO
1933 3	230.00	246.	242.	238.	234.	233.	235.	237.	237.	235.	234.	232.	228.
1938 6	287.33	321.	321.	320.	317.	312.	305.	299.	296.	294.	292.	288.	287.
1945 10	385.67	416.	417.	418.	418.	417.	413.	411.	409.	406.	403.	384.	385.
1949 10	432.33	451.	451.	446.	444.	442.	441.	438.	436.	435.	435.	437.	428.
1954 8	487.00	502.	501.	498.	497.	494.	493.	491.	490.	489.	488.	487.	487.
1958 4	509.67	530.	530.	530.	530.	528.	527.	525.	523.	521.	515.	512.	509.

Output Table 4B-5R

ABSOLUTE CHANGE

DATE OF TROUGH	STANDING AT TROUGH	-11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	ONE YEAR BEFORE TROUGH -5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1933 3	230.00	16.0	12.0	8.0	4.0	3.0	5.0	7.0	7.0	5.0	4.0	2.0	-2.0
1938 6	287.33	33.7	33.7	32.7	29.7	24.7	17.7	11.7	8.7	6.7	4.7	0.7	-0.3
1945 10	385.67	30.3	31.3	32.3	32.3	31.3	27.3	25.3	23.3	20.3	17.3	-1.7	-0.7
1949 10	432.33	18.7	18.7	13.7	11.7	9.7	8.7	5.7	3.7	2.7	2.7	4.7	-4.3
1954 8	487.00	15.0	14.0	11.0	10.0	7.0	6.0	4.0	3.0	2.0	1.0	0.0	0.0
1958 4	509.67	20.3	20.3	20.3	20.3	18.3	17.3	15.3	13.3	11.3	5.3	2.3	-0.7
TOTAL		134.0	130.0	118.0	108.0	94.0	82.0	69.0	59.0	48.0	35.0	8.0	-8.0
AVERAGE		22.3	21.7	19.7	18.0	15.7	13.7	11.5	9.8	8.0	5.8	1.3	-1.3
AVE DEVIATION		6.4	7.2	8.8	9.4	9.1	7.1	5.9	5.7	5.2	3.8	1.7	1.2

OMIT THE FOLLOWING CYCLES

1945 10 1948 11 1949 10

TOTAL	103.7	98.7	85.7	75.7	62.7	54.7	43.7	35.7	27.7	17.7	9.7	-7.3
AVERAGE	20.7	19.7	17.1	15.1	12.5	10.9	8.7	7.1	5.5	3.5	1.9	-1.5
AVE DEVIATION	5.2	5.8	7.5	7.9	7.2	5.3	3.8	3.1	2.8	1.4	1.3	1.4

Output Table 4B-6R

RELATIVE STANDING

DATE OF TROUGH	STANDING AT TROUGH	-11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	ONE YEAR BEFORE TROUGH -5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1933 3	230.00	107.0	105.2	103.5	101.7	101.3	102.2	103.0	103.0	102.2	101.7	100.9	99.1
1938 6	287.33	111.7	111.7	111.4	110.3	108.6	106.1	104.1	103.0	102.3	101.6	100.2	99.9
1945 10	385.67	107.9	108.1	108.4	108.4	108.1	107.1	106.6	106.1	105.3	104.5	99.6	99.8
1949 10	432.33	104.3	104.3	103.2	102.7	102.2	102.0	101.3	100.8	100.6	100.6	101.1	99.0
1954 8	487.00	103.1	102.9	102.3	102.1	101.4	101.2	100.8	100.6	100.4	100.2	100.0	100.0
1958 4	509.67	104.0	104.0	104.0	104.0	103.6	103.4	103.0	102.6	102.2	101.0	100.5	99.9
TOTAL		637.9	636.2	632.6	629.2	625.3	622.0	618.8	616.2	613.0	609.7	602.2	597.7
AVERAGE		106.3	106.0	105.4	104.9	104.2	103.7	103.1	102.7	102.2	101.6	100.4	99.6
AVE DEVIATION		2.5	2.6	3.0	3.0	2.8	2.0	1.5	1.3	1.1	1.0	0.4	0.4

OMIT THE FOLLOWING CYCLES

1945 10 1948 11 1949 10

TOTAL	530.1	528.1	524.9	520.8	517.2	515.0	512.2	510.1	507.7	505.2	502.6	497.9
AVERAGE	106.0	105.6	104.9	104.2	103.4	103.0	102.4	102.0	101.5	101.0	100.5	99.6
AVE DEVIATION	2.7	2.4	2.6	2.5	2.1	1.4	1.1	1.0	0.8	0.5	0.4	0.4

Output Table 4B-4R

EMPLOYEES IN NONAG ESTABLISHMENTS

HUNDRED THOUSAND PERSONS 8268

REFERENCE ANALYSIS

DATE OF TROUGH	STANDING AT TROUGH	STANDINGS FIRST YEAR AFTER TROUGH +1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	+7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1933 3	230.00	230.	233.	239.	245.	252.	256.	259.	259.	258.	259.	263.	267.
1938 6	287.33	287.	289.	292.	293.	297.	299.	298.	299.	302.	300.	302.	304.
1945 10	385.67	388.	390.	397.	392.	402.	408.	413.	416.	420.	425.	428.	430.
1949 10	432.33	432.	435.	435.	432.	439.	443.	446.	450.	454.	461.	463.	465.
1954 8	487.00	487.	488.	491.	493.	494.	496.	499.	501.	505.	507.	509.	509.
1958 4	509.67	508.	509.	509.	512.	514.	514.	519.	520.	524.	526.	529.	532.

Output Table 4B-5R

DATE OF TROUGH	STANDING AT TROUGH	ABSOLUTE CHANGE FIRST YEAR AFTER TROUGH +1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	+7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1933 3	230.00	0.0	3.0	9.0	15.0	22.0	26.0	29.0	29.0	28.0	29.0	33.0	37.0
1938 6	287.33	-0.3	1.7	4.7	5.7	9.7	11.7	10.7	11.7	14.7	12.7	14.7	16.7
1945 10	385.67	2.3	4.3	11.3	6.3	16.3	22.3	27.3	30.3	34.3	39.3	42.3	44.3
1949 10	432.33	-0.3	2.7	2.7	-0.3	6.7	10.7	13.7	17.7	21.7	28.7	30.7	32.7
1954 8	487.00	0.0	1.0	4.0	6.0	7.0	9.0	12.0	14.0	18.0	20.0	22.0	22.0
1958 4	509.67	-1.7	-0.7	-0.7	2.3	4.3	4.3	9.3	10.3	14.3	16.3	19.3	22.3
TOTAL		0.0	12.0	31.0	35.0	66.0	84.0	102.0	113.0	131.0	146.0	162.0	175.0
AVERAGE		0.0	2.0	5.2	5.8	11.0	14.0	17.0	18.8	21.8	24.3	27.0	29.2
AVE DEVIATION		0.8	1.3	3.3	3.3	5.4	6.8	7.4	7.2	6.2	8.0	8.3	8.8

OMIT THE FOLLOWING CYCLES

1945 10 1948 11 1949 10

TOTAL	-2.3	7.7	19.7	28.7	49.7	61.7	74.7	82.7	96.7	106.7	119.7	130.7
AVERAGE	-0.5	1.5	3.9	5.7	9.9	12.3	14.9	16.5	19.3	21.3	23.9	26.1
AVE DEVIATION	0.5	1.1	2.3	3.8	4.8	5.5	5.6	5.4	4.4	6.0	6.3	7.0

Output Table 4B-6R

DATE OF TROUGH	STANDING AT TROUGH	RELATIVE STANDING FIRST YEAR AFTER TROUGH +1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	+7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1933 3	230.00	100.0	101.3	103.9	106.5	109.6	111.3	112.6	112.6	112.2	112.6	114.3	116.1
1938 6	287.33	99.9	100.6	101.6	102.0	103.4	104.1	103.7	104.1	105.1	104.4	105.1	105.8
1945 10	385.67	100.6	101.1	102.9	101.6	104.2	105.8	107.1	107.9	108.9	110.2	111.0	111.5
1949 10	432.33	99.9	100.6	100.6	99.9	101.5	102.5	103.2	104.1	105.0	106.6	107.1	107.6
1954 8	487.00	100.0	100.2	100.8	101.2	101.4	101.8	102.5	102.9	103.7	104.1	104.5	104.5
1958 4	509.67	99.7	99.9	99.9	100.5	100.9	100.9	101.8	102.0	102.8	103.2	103.8	104.4
TOTAL		600.1	603.7	609.8	611.7	621.0	626.3	630.9	633.5	637.7	641.2	645.8	649.8
AVERAGE		100.0	100.6	101.6	102.0	103.5	104.4	105.1	105.6	106.3	106.9	107.6	108.3
AVE DEVIATION		0.2	0.4	1.2	1.5	2.3	2.8	3.1	3.1	2.8	3.0	3.3	3.7

OMIT THE FOLLOWING CYCLES

1945 10 1948 11 1949 10

TOTAL	499.5	502.6	506.8	510.1	516.8	520.5	523.8	525.7	528.8	531.0	534.9	538.3
AVERAGE	99.9	100.5	101.4	102.0	103.4	104.1	104.8	105.1	105.8	106.2	107.0	107.7
AVE DEVIATION	0.1	0.4	1.1	1.8	2.5	2.9	3.1	3.0	2.6	2.7	3.0	3.4

Output Table 4B-4R

EMPLOYEES IN NONAG ESTABLISHMENTS

HUNDRED THOUSAND PERSONS 8268

REFERENCE ANALYSIS

DATE OF TROUGH	STANDING AT PEAK	STANDINGS ONE YEAR BEFORE TROUGH -11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	-5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1933 3	332.00	246.	242.	238.	234.	233.	235.	237.	237.	235.	234.	232.	228.
1938 6	319.33	321.	321.	320.	317.	312.	305.	299.	298.	294.	292.	288.	287.
1945 10	417.67	416.	417.	418.	418.	417.	413.	411.	409.	406.	403.	384.	385.
1949 10	451.00	451.	451.	446.	444.	442.	441.	438.	436.	435.	435.	437.	428.
1954 8	503.67	502.	501.	498.	497.	494.	493.	491.	490.	489.	488.	487.	487.
1958 4	530.00	530.	530.	530.	530.	528.	527.	525.	523.	521.	515.	512.	509.

Output Table 4B-7R

DATE OF TROUGH	STANDING AT PEAK	ABSOLUTE CHANGE ONE YEAR BEFORE TROUGH -11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	-5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1933 3	332.00	-86.0	-90.0	-94.0	-98.0	-99.0	-97.0	-95.0	-95.0	-97.0	-98.0	-100.0	-104.0
1938 6	319.33	1.7	1.7	0.7	-2.3	-7.3	-14.3	-20.3	-23.3	-25.3	-27.3	-31.3	-32.3
1945 10	417.67	-1.7	-0.7	0.3	0.3	-0.7	-4.7	-6.7	-8.7	-11.7	-14.7	-33.7	-32.7
1949 10	451.00	0.0	0.0	-5.0	-7.0	-9.0	-10.0	-13.0	-15.0	-16.0	-16.0	-14.0	-23.0
1954 8	503.67	-1.7	-2.7	-5.7	-6.7	-9.7	-10.7	-12.7	-13.7	-14.7	-15.7	-16.7	-16.7
1958 4	530.00	0.0	0.0	0.0	0.0	-2.0	-3.0	-5.0	-7.0	-9.0	-15.0	-19.0	-21.0
TOTAL		-87.7	-91.7	-103.7	-113.7	-127.7	-139.7	-152.7	-162.7	-173.7	-186.7	-213.7	-229.7
AVERAGE		-14.6	-15.3	-17.3	-18.9	-21.3	-23.3	-25.4	-27.1	-28.9	-31.1	-35.6	-38.3
AVE DEVIATION		23.8	24.9	25.6	26.4	25.9	24.6	23.2	22.6	22.7	22.9	21.5	21.9

OMIT THE FOLLOWING CYCLES

1945 10 1948 11 1949 10

TOTAL	-86.0	-91.0	-104.0	-114.0	-127.0	-135.0	-146.0	-154.0	-162.0	-172.0	-180.0	-197.0
AVERAGE	-17.2	-18.2	-20.8	-22.8	-25.4	-27.0	-29.2	-30.8	-32.4	-34.4	-36.0	-39.4
AVE DEVIATION	27.5	28.7	29.3	30.1	29.4	28.0	26.3	25.7	25.8	25.4	25.6	25.8

Output Table 4B-8R

DATE OF TROUGH	STANDING AT PEAK	RELATIVE STANDING ONE YEAR BEFORE TROUGH -11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	-5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1933 3	332.00	74.1	72.9	71.7	70.5	70.2	70.8	71.4	71.4	70.8	70.5	69.9	68.7
1938 6	319.33	100.5	100.5	100.2	99.3	97.7	95.5	93.6	92.7	92.1	91.4	90.2	89.9
1945 10	417.67	99.6	99.8	100.1	100.1	99.8	98.9	98.4	97.9	97.2	96.5	91.9	92.2
1949 10	451.00	100.0	100.0	98.9	98.4	98.0	97.8	97.1	96.7	96.5	96.5	96.9	94.9
1954 8	503.67	99.7	99.5	98.9	98.7	98.1	97.9	97.5	97.3	97.1	96.9	96.7	96.7
1958 4	530.00	100.0	100.0	100.0	100.0	99.6	99.4	99.1	98.7	98.3	97.2	96.6	96.0
TOTAL		573.9	572.7	569.7	567.0	563.4	560.3	557.1	554.6	551.9	548.9	542.2	538.4
AVERAGE		95.6	95.5	95.0	94.5	93.9	93.4	92.8	92.4	92.0	91.5	90.4	89.7
AVE DEVIATION		7.2	7.5	7.8	8.0	7.9	7.5	7.2	7.0	7.1	7.0	6.9	7.0

OMIT THE FOLLOWING CYCLES

1945 10 1948 11 1949 10

TOTAL	474.3	472.9	469.7	466.9	463.6	461.4	458.7	456.7	454.7	452.4	450.3	446.2
AVERAGE	94.9	94.6	93.9	93.4	92.7	92.3	91.7	91.3	90.9	90.5	90.1	89.2
AVE DEVIATION	8.3	8.7	8.9	9.2	9.0	8.6	8.1	8.0	8.1	8.0	8.1	8.2

Output Table 4B-4R

EMPLOYEES IN NONAG ESTABLISHMENTS

HUNDRED THOUSAND PERSONS 8268

REFERENCE ANALYSIS

DATE OF TROUGH	STANDING AT PEAK	STANDINGS FIRST YEAR AFTER TROUGH +1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	+7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1933 3	332.00	230.	233.	239.	245.	252.	256.	259.	259.	258.	259.	263.	267.
1938 6	319.33	287.	289.	292.	293.	297.	299.	298.	299.	302.	300.	302.	304.
1945 10	417.67	388.	390.	397.	392.	402.	408.	413.	416.	420.	425.	428.	430.
1949 10	451.00	432.	435.	435.	432.	439.	443.	446.	450.	456.	461.	463.	465.
1954 8	503.67	487.	488.	491.	493.	494.	496.	499.	501.	505.	507.	509.	509.
1958 4	530.00	508.	509.	509.	512.	514.	514.	519.	520.	524.	526.	529.	532.

Output Table 4B-7R

DATE OF TROUGH	STANDING AT PEAK	ABSOLUTE CHANGE FIRST YEAR AFTER TROUGH +1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	+7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1933 3	332.00	-102.0	-99.0	-93.0	-87.0	-80.0	-76.0	-73.0	-73.0	-74.0	-73.0	-69.0	-65.0
1938 6	319.33	-32.3	-30.3	-27.3	-26.3	-22.3	-20.3	-21.3	-20.3	-17.3	-19.3	-17.3	-15.3
1945 10	417.67	-29.7	-27.7	-20.7	-25.7	-15.7	-9.7	-4.7	-1.7	2.3	7.3	10.3	12.3
1949 10	451.00	-19.0	-16.0	-16.0	-19.0	-12.0	-8.0	-5.0	-1.0	3.0	10.0	12.0	14.0
1954 8	503.67	-16.7	-15.7	-12.7	-10.7	-9.7	-7.7	-4.7	-2.7	1.3	3.3	5.3	5.3
1958 4	530.00	-22.0	-21.0	-21.0	-18.0	-16.0	-16.0	-11.0	-10.0	-6.0	-4.0	-1.0	2.0
TOTAL		-221.7	-209.7	-190.7	-186.7	-155.7	-137.7	-119.7	-108.7	-90.7	-75.7	-59.7	-46.7
AVERAGE		-36.9	-34.9	-31.8	-31.1	-25.9	-22.9	-19.9	-18.1	-15.1	-12.6	-9.9	-7.8
AVE DEVIATION		21.7	21.4	20.4	18.6	18.0	17.7	18.1	19.0	20.4	22.4	22.1	21.6
OMIT THE FOLLOWING CYCLES													
1945 10 1948 11 1949 10													
TOTAL		-192.0	-182.0	-170.0	-161.0	-140.0	-128.0	-115.0	-107.0	-93.0	-83.0	-70.0	-59.0
AVERAGE		-38.4	-36.4	-34.0	-32.2	-28.0	-25.6	-23.0	-21.4	-18.6	-16.6	-14.0	-11.8
AVE DEVIATION		25.4	25.0	23.6	21.9	20.8	20.2	20.0	20.6	22.2	23.7	23.3	22.7

Output Table 4B-8R

DATE OF TROUGH	STANDING AT PEAK	RELATIVE STANDING FIRST YEAR AFTER TROUGH +1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	+7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1933 3	332.00	69.3	70.2	72.0	73.8	75.9	77.1	78.0	78.0	77.7	78.0	79.2	80.4
1938 6	319.33	89.9	90.5	91.4	91.8	93.0	93.6	93.3	93.6	94.6	93.9	94.6	95.2
1945 10	417.67	92.9	93.4	95.1	93.9	96.2	97.7	98.9	99.6	100.6	101.8	102.5	103.0
1949 10	451.00	95.8	96.5	96.5	95.8	97.3	98.2	98.9	99.8	100.7	102.2	102.7	103.1
1954 8	503.67	96.7	96.9	97.5	97.9	98.1	98.5	99.1	99.5	100.3	100.7	101.1	101.1
1958 4	530.00	95.8	96.0	96.0	96.6	97.0	97.0	97.9	98.1	98.9	99.2	99.8	100.4
TOTAL		540.4	543.4	548.5	549.7	557.6	562.1	566.1	568.6	572.6	575.8	579.8	583.1
AVERAGE		90.1	90.6	91.4	91.6	92.9	93.7	94.4	94.8	95.4	96.0	96.6	97.2
AVE DEVIATION		7.0	6.8	6.5	5.9	5.7	5.5	5.8	6.0	6.2	6.7	6.5	6.3
OMIT THE FOLLOWING CYCLES													
1945 10 1948 11 1949 10													
TOTAL		447.5	450.1	453.4	455.8	461.3	464.4	467.2	469.0	472.1	474.1	477.3	480.2
AVERAGE		89.5	90.0	90.7	91.2	92.3	92.9	93.4	93.8	94.4	94.8	95.5	96.0
AVE DEVIATION		8.1	7.9	7.5	6.9	6.5	6.3	6.2	6.4	6.7	7.1	6.9	6.6

Output Table 4B-4S

EMPLOYEES IN NONAG ESTABLISHMENTS

HUNDRED THOUSAND PERSONS 8268

SPECIFIC ANALYSIS

STANDINGS

DATE OF TROUGH	STANDING AT TROUGH	STANDING -11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	ONE YEAR BEFORE TROUGH -5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1933 3	230.00	246.	242.	238.	234.	233.	235.	237.	237.	235.	234.	232.	228.
1938 6	287.33	321.	321.	320.	317.	312.	305.	299.	296.	294.	292.	288.	287.
1945 9	390.67	416.	416.	417.	418.	418.	417.	413.	411.	409.	406.	403.	384.
1949 10	432.33	451.	451.	446.	444.	442.	441.	438.	436.	433.	435.	437.	428.
1954 8	487.00	502.	501.	498.	497.	494.	493.	491.	490.	489.	488.	487.	487.
1958 5	508.67	530.	530.	530.	528.	527.	525.	523.	521.	515.	512.	509.	508.
1961 2	534.67	544.	546.	544.	543.	542.	542.	541.	540.	539.	536.	535.	534.

Output Table 4B-5S

DATE OF TROUGH	STANDING AT TROUGH	ABSOLUTE CHANGE -11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	ONE YEAR BEFORE TROUGH -5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1933 3	230.00	16.0	12.0	8.0	4.0	3.0	5.0	7.0	7.0	5.0	4.0	2.0	-2.0
1938 6	287.33	33.7	33.7	32.7	29.7	24.7	17.7	11.7	8.7	6.7	4.7	0.7	-0.3
1945 9	390.67	25.3	25.3	26.3	27.3	27.3	26.3	22.3	20.3	18.3	15.3	12.3	-6.7
1949 10	432.33	18.7	18.7	13.7	11.7	9.7	8.7	5.7	3.7	2.7	2.7	4.7	-4.3
1954 8	487.00	15.0	14.0	11.0	10.0	7.0	6.0	4.0	3.0	2.0	1.0	0.0	0.0
1958 5	508.67	21.3	21.3	21.3	19.3	18.3	16.3	14.3	12.3	6.3	3.3	0.3	-0.7
1961 2	534.67	9.3	11.3	9.3	8.3	7.3	7.3	6.3	5.3	4.3	1.3	0.3	-0.7
TOTAL		139.3	136.3	122.3	110.3	97.3	87.3	71.3	60.3	45.3	32.3	20.3	-14.7
AVERAGE		19.9	19.5	17.5	15.8	13.9	12.5	10.2	8.6	6.5	4.6	2.9	-2.1
AVE DEVIATION		5.9	6.3	8.0	8.3	8.2	6.5	5.1	4.4	3.4	3.1	3.2	1.9
OMIT THE FOLLOWING CYCLES													
1945 9 1948 7 1949 10													
TOTAL		114.0	111.0	96.0	83.0	70.0	61.0	49.0	40.0	27.0	17.0	8.0	-8.0
AVERAGE		19.0	18.5	16.0	13.8	11.7	10.2	8.2	6.7	4.5	2.8	1.3	-1.3
AVE DEVIATION		5.7	6.1	7.3	7.1	6.6	4.6	3.2	2.7	1.5	1.2	1.3	1.2

Output Table 4B-6S

DATE OF TROUGH	STANDING AT TROUGH	RELATIVE STANDING -11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	ONE YEAR BEFORE TROUGH -5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1933 3	230.00	107.0	105.2	103.5	101.7	101.3	102.2	103.0	103.0	102.2	101.7	100.9	99.1
1938 6	287.33	111.7	111.7	111.4	110.3	108.6	106.1	104.1	103.0	102.3	101.6	100.2	99.9
1945 9	390.67	106.5	106.5	106.7	107.0	107.0	106.7	105.7	105.2	104.7	103.9	103.2	98.3
1949 10	432.33	104.3	104.3	103.2	102.7	102.2	102.0	101.3	100.8	100.6	100.6	101.1	99.0
1954 8	487.00	103.1	102.9	102.3	102.1	101.4	101.2	100.8	100.6	100.4	100.2	100.0	100.0
1958 5	508.67	104.2	104.2	104.2	103.8	103.6	103.2	102.8	102.4	101.2	100.7	100.1	99.9
1961 2	534.67	101.7	102.1	101.7	101.6	101.4	101.4	101.2	101.0	100.8	100.2	100.1	99.9
TOTAL		738.5	736.9	732.9	729.2	725.5	722.9	719.0	716.2	712.3	709.0	705.5	696.1
AVERAGE		105.5	105.3	104.7	104.2	103.6	103.3	102.7	102.3	101.8	101.3	100.8	99.4
AVE DEVIATION		2.5	2.2	2.5	2.6	2.4	1.8	1.4	1.3	1.1	1.0	0.8	0.5
OMIT THE FOLLOWING CYCLES													
1945 9 1948 7 1949 10													
TOTAL		632.0	630.4	626.2	622.2	618.5	616.1	613.2	610.9	607.6	603.1	602.3	597.8
AVERAGE		105.3	105.1	104.4	103.7	103.1	102.7	102.2	101.8	101.3	100.8	100.4	99.6
AVE DEVIATION		2.7	2.3	2.3	2.2	2.0	1.3	1.1	1.0	0.7	0.6	0.4	0.4

Output Table 4B-4S

EMPLOYEES IN NONAG ESTABLISHMENTS

HUNDRED THOUSAND PERSONS 8268

SPECIFIC ANALYSIS

DATE OF TROUGH	STANDING AT TROUGH	STANDINGS FIRST YEAR AFTER TROUGH +1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	+7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1933 3	230.00	230.	233.	239.	245.	252.	256.	259.	259.	258.	259.	263.	267.
1938 6	287.33	287.	289.	292.	293.	297.	299.	298.	299.	302.	300.	302.	304.
1945 9	390.67	385.	388.	390.	397.	392.	402.	408.	413.	416.	420.	425.	428.
1949 10	432.33	432.	435.	435.	432.	439.	443.	446.	450.	454.	461.	463.	465.
1954 8	487.00	487.	488.	491.	493.	494.	496.	499.	501.	505.	507.	509.	509.
1958 5	508.67	509.	509.	512.	514.	514.	519.	520.	524.	526.	529.	532.	535.
1961 2	534.67	535.	535.	537.	539.	541.	542.	542.	543.	546.	547.	547.	550.

Output Table 4B-5S

DATE OF TROUGH	STANDING AT TROUGH	ABSOLUTE CHANGE FIRST YEAR AFTER TROUGH +1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	+7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1933 3	230.00	0.0	3.0	9.0	15.0	22.0	26.0	29.0	29.0	28.0	29.0	33.0	37.0
1938 6	287.33	-0.3	1.7	4.7	5.7	9.7	11.7	10.7	11.7	14.7	12.7	14.7	16.7
1945 9	390.67	-5.7	-2.7	-0.7	6.3	1.3	11.3	17.3	22.3	25.3	29.3	34.3	37.3
1949 10	432.33	-0.3	2.7	2.7	-0.3	6.7	10.7	13.7	17.7	21.7	28.7	30.7	32.7
1954 8	487.00	0.0	1.0	4.0	6.0	7.0	9.0	12.0	14.0	18.0	20.0	22.0	22.0
1958 5	508.67	0.3	0.3	3.3	5.3	5.3	10.3	11.3	15.3	17.3	20.3	23.3	26.3
1961 2	534.67	0.3	0.3	2.3	4.3	6.3	7.3	7.3	8.3	11.3	12.3	12.3	15.3
TOTAL		-5.7	6.3	25.3	42.3	58.3	86.3	101.3	118.3	136.3	152.3	170.3	187.3
AVERAGE		-0.8	0.9	3.6	6.0	8.3	12.3	14.5	16.9	19.5	21.8	24.3	26.8
AVE DEVIATION		1.4	1.3	1.9	2.6	4.3	3.9	5.0	5.2	4.7	6.2	7.1	7.6

OMIT THE FOLLOWING CYCLES

1945 9 1948 7 1949 10

TOTAL	0.0	9.0	26.0	36.0	57.0	75.0	84.0	96.0	111.0	123.0	136.0	150.0
AVERAGE	0.0	1.5	4.3	6.0	9.5	12.5	14.0	16.0	18.5	20.5	22.7	25.0
AVE DEVIATION	0.2	0.9	1.7	3.0	4.2	4.5	5.0	4.9	4.2	5.6	6.3	7.0

Output Table 4B-6S

DATE OF TROUGH	STANDING AT TROUGH	RELATIVE STANDING FIRST YEAR AFTER TROUGH +1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	+7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1933 3	230.00	100.0	101.3	103.9	106.5	109.6	111.3	112.6	112.6	112.2	112.6	114.3	116.1
1938 6	287.33	99.9	100.6	101.6	102.0	103.4	104.1	103.7	104.1	105.1	104.4	105.1	105.8
1945 9	390.67	98.5	99.3	99.8	101.6	100.3	102.9	104.4	105.7	106.5	107.5	108.8	109.6
1949 10	432.33	99.9	100.6	100.6	99.9	101.5	102.5	103.2	104.1	105.0	106.6	107.1	107.6
1954 8	487.00	100.0	100.2	100.8	101.2	101.4	101.8	102.5	102.9	103.7	104.1	104.5	104.5
1958 5	508.67	100.1	100.1	100.7	101.0	101.0	102.0	102.2	103.0	103.4	104.0	104.6	105.2
1961 2	534.67	100.1	100.1	100.4	100.8	101.2	101.4	101.4	101.6	102.1	102.3	102.3	102.9
TOTAL		698.5	702.2	707.9	713.1	718.5	726.0	730.0	733.9	738.0	741.6	746.7	751.6
AVERAGE		99.8	100.3	101.1	101.9	102.6	103.7	104.3	104.8	105.4	105.9	106.7	107.4
AVE DEVIATION		0.4	0.5	0.9	1.4	2.2	2.3	2.4	2.5	2.2	2.6	2.9	3.2

OMIT THE FOLLOWING CYCLES

1945 9 1948 7 1949 10

TOTAL	599.9	602.8	608.1	611.5	618.1	623.1	625.5	628.2	631.5	634.1	638.0	642.0
AVERAGE	100.0	100.5	101.3	101.9	103.0	103.8	104.3	104.7	105.3	105.7	106.3	107.0
AVE DEVIATION	0.1	0.4	0.9	1.6	2.3	2.6	2.8	2.6	2.3	2.6	2.9	3.2

Output Table 48-4S

EMPLOYEES IN NONAG ESTABLISHMENTS

HUNDRED THOUSAND PERSONS 8268

SPECIFIC ANALYSIS

STANDINGS

DATE OF TROUGH	STANDING AT PEAK	STANDING -11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	ONE YEAR BEFORE TROUGH -5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1933 3	332.00	246.	242.	238.	234.	233.	235.	237.	237.	235.	234.	232.	228.
1938 6	320.67	321.	321.	320.	317.	312.	305.	299.	296.	294.	292.	288.	287.
1945 9	426.33	416.	416.	417.	418.	418.	417.	413.	411.	409.	406.	403.	384.
1949 10	450.00	451.	451.	446.	444.	442.	441.	438.	436.	435.	435.	437.	428.
1954 8	503.67	502.	501.	498.	497.	494.	493.	491.	490.	489.	488.	487.	487.
1958 5	531.00	530.	530.	530.	528.	527.	525.	523.	521.	515.	512.	509.	508.
1961 2	544.66	544.	546.	544.	543.	542.	542.	541.	540.	539.	536.	535.	534.

Output Table 48-7S

ABSOLUTE CHANGE

DATE OF TROUGH	STANDING AT PEAK	-11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	ONE YEAR BEFORE TROUGH -5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1933 3	332.00	-86.0	-90.0	-94.0	-98.0	-99.0	-97.0	-95.0	-95.0	-97.0	-98.0	-100.0	-104.0
1938 6	320.67	0.3	0.3	-0.7	-3.7	-8.7	-15.7	-21.7	-24.7	-26.7	-28.7	-32.7	-33.7
1945 9	426.33	-10.3	-10.3	-9.3	-8.3	-8.3	-9.3	-13.3	-15.3	-17.3	-20.3	-23.3	-42.3
1949 10	450.00	1.0	1.0	-4.0	-6.0	-8.0	-9.0	-12.0	-14.0	-15.0	-15.0	-13.0	-22.0
1954 8	503.67	-1.7	-2.7	-5.7	-6.7	-9.7	-10.7	-12.7	-13.7	-14.7	-15.7	-16.7	-16.7
1958 5	531.00	-1.0	-1.0	-1.0	-3.0	-4.0	-6.0	-8.0	-10.0	-16.0	-19.0	-22.0	-23.0
1961 2	544.66	-0.7	1.3	-0.7	-1.7	-2.7	-2.7	-3.7	-4.7	-5.7	-8.7	-9.7	-10.7
TOTAL		-98.3	-101.3	-115.3	-127.3	-140.3	-150.3	-166.3	-177.3	-192.3	-205.3	-217.3	-252.3
AVERAGE		-14.0	-14.5	-16.5	-18.2	-20.0	-21.5	-23.8	-25.3	-27.5	-29.3	-31.0	-36.0
AVE DEVIATION		20.6	21.6	22.1	22.8	22.6	21.6	20.4	19.9	19.9	19.6	20.2	21.2

OMIT THE FOLLOWING CYCLES

1945 9 1948 7 1949 10

TOTAL		-88.0	-91.0	-106.0	-119.0	-132.0	-141.0	-153.0	-162.0	-175.0	-185.0	-194.0	-210.0
AVERAGE		-14.7	-15.2	-17.7	-19.8	-22.0	-23.5	-25.5	-27.0	-29.2	-30.8	-32.3	-35.0
AVE DEVIATION		23.8	24.9	25.4	26.1	25.7	24.5	23.2	22.7	22.6	22.4	22.7	23.0

Output Table 48-8S

RELATIVE STANDING

DATE OF TROUGH	STANDING AT PEAK	-11 MO	-10 MO	-9 MO	-8 MO	-7 MO	-6 MO	ONE YEAR BEFORE TROUGH -5 MO	-4 MO	-3 MO	-2 MO	-1 MO	0 MO
1933 3	332.00	74.1	72.9	71.7	70.5	70.2	70.8	71.4	71.4	70.8	70.5	69.9	68.7
1938 6	320.67	100.1	100.1	99.8	98.9	97.3	95.1	93.2	92.3	91.7	91.1	89.8	89.5
1945 9	426.33	97.6	97.6	97.8	98.0	98.0	97.8	96.9	96.4	95.9	95.2	94.5	90.1
1949 10	450.00	100.2	100.2	99.1	98.7	98.2	98.0	97.3	96.9	96.7	96.7	97.1	95.1
1954 8	503.67	99.7	99.5	98.9	98.7	98.1	97.9	97.5	97.3	97.1	96.9	96.7	96.7
1958 5	531.00	99.8	99.8	99.8	99.4	99.2	98.9	98.5	98.1	97.0	96.4	95.9	95.7
1961 2	544.66	99.9	100.2	99.9	99.7	99.5	99.5	99.3	99.1	99.0	98.4	98.2	98.0
TOTAL		671.4	670.3	667.0	663.9	660.6	658.0	654.1	651.5	648.1	645.2	642.1	633.8
AVERAGE		95.9	95.8	95.3	94.8	94.4	94.0	93.4	93.1	92.6	92.2	91.7	90.5
AVE DEVIATION		6.2	6.5	6.7	7.0	6.9	6.6	6.4	6.4	6.5	6.5	6.8	6.7

OMIT THE FOLLOWING CYCLES

1945 9 1948 7 1949 10

TOTAL		573.8	572.7	569.2	565.8	562.5	560.2	557.3	555.1	552.2	549.9	547.6	543.7
AVERAGE		95.6	95.5	94.9	94.3	93.8	93.4	92.9	92.5	92.0	91.7	91.3	90.6
AVE DEVIATION		7.2	7.5	7.7	7.9	7.9	7.9	7.2	7.1	7.2	7.3	7.6	7.7

Output Table 48-4S

EMPLOYEES IN NONAG ESTABLISHMENTS

HUNDRED THOUSAND PERSONS 8268

SPECIFIC ANALYSIS

DATE OF TROUGH	STANDING AT PEAK	STANDINGS +1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	FIRST YEAR AFTER TROUGH +7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1933 3	332.00	230.	233.	239.	245.	252.	256.	259.	259.	258.	259.	263.	267.
1938 6	320.67	287.	289.	292.	293.	297.	299.	298.	299.	302.	300.	302.	304.
1945 9	426.33	385.	388.	390.	397.	392.	402.	408.	413.	416.	420.	425.	428.
1949 10	450.00	432.	435.	435.	432.	439.	443.	446.	450.	454.	461.	463.	465.
1954 8	503.67	487.	488.	491.	493.	494.	496.	499.	501.	505.	507.	509.	509.
1958 5	531.00	509.	509.	512.	514.	514.	519.	520.	524.	526.	529.	532.	535.
1961 2	544.66	535.	535.	537.	539.	541.	542.	542.	543.	546.	547.	547.	550.

Output Table 48-7S

DATE OF TROUGH	STANDING AT PEAK	ABSOLUTE CHANGE +1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	FIRST YEAR AFTER TROUGH +7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1933 3	332.00	-102.0	-99.0	-93.0	-87.0	-80.0	-76.0	-73.0	-73.0	-74.0	-73.0	-69.0	-65.0
1938 6	320.67	-33.7	-31.7	-28.7	-27.7	-23.7	-21.7	-22.7	-21.7	-18.7	-20.7	-18.7	-16.7
1945 9	426.33	-41.3	-38.3	-36.3	-29.3	-34.3	-24.3	-18.3	-13.3	-10.3	-6.3	-1.3	1.7
1949 10	450.00	-18.0	-15.0	-15.0	-18.0	-11.0	-7.0	-4.0	0.0	4.0	11.0	13.0	15.0
1954 8	503.67	-16.7	-15.7	-12.7	-10.7	-9.7	-7.7	-4.7	-2.7	1.3	3.3	5.3	5.3
1958 5	531.00	-22.0	-22.0	-19.0	-17.0	-17.0	-12.0	-11.0	-7.0	-5.0	-2.0	1.0	4.0
1961 2	544.66	-9.7	-9.7	-7.7	-5.7	-3.7	-2.7	-2.7	-1.7	1.3	2.3	2.3	5.3
TOTAL		-243.3	-231.3	-212.3	-195.3	-179.3	-151.3	-136.3	-119.3	-101.3	-85.3	-67.3	-50.3
AVERAGE		-34.8	-33.0	-30.3	-27.9	-25.6	-21.6	-19.5	-17.0	-14.5	-12.2	-9.6	-7.2
AVE DEVIATION		21.1	20.4	19.6	17.3	18.0	16.3	16.2	17.3	18.2	19.8	19.6	19.2

OMIT THE FOLLOWING CYCLES

1945 9 1948 7 1949 10

TOTAL	-202.0	-193.0	-176.0	-166.0	-145.0	-127.0	-118.0	-106.0	-91.0	-79.0	-66.0	-52.0
AVERAGE	-33.7	-32.2	-29.3	-27.7	-24.2	-21.2	-19.7	-17.7	-15.2	-13.2	-11.0	-8.7
AVE DEVIATION	22.8	22.3	21.2	19.8	18.6	18.4	18.8	19.8	20.8	22.4	21.9	21.4

Output Table 48-8S

DATE OF TROUGH	STANDING AT PEAK	RELATIVE STANDING +1 MO	+2 MO	+3 MO	+4 MO	+5 MO	+6 MO	FIRST YEAR AFTER TROUGH +7 MO	+8 MO	+9 MO	+10 MO	+11 MO	+12 MO
1933 3	332.00	69.3	70.2	72.0	73.8	75.9	77.1	78.0	78.0	77.7	78.0	79.2	80.4
1938 6	320.67	89.5	90.1	91.1	91.4	92.6	93.2	92.9	93.2	94.2	93.6	94.2	94.8
1945 9	426.33	90.3	91.0	91.5	93.1	91.9	94.3	95.7	96.9	97.6	98.5	99.7	100.4
1949 10	450.00	96.0	96.7	96.7	96.0	97.6	98.4	99.1	100.0	100.9	102.4	102.9	103.3
1954 8	503.67	96.7	96.9	97.5	97.9	98.1	98.5	99.1	99.5	100.3	100.7	101.1	101.1
1958 5	531.00	95.9	95.9	96.4	96.8	96.8	97.7	97.9	98.7	99.1	99.6	100.2	100.8
1961 2	544.66	98.2	98.2	98.6	99.0	99.3	99.5	99.5	99.7	100.2	100.4	100.4	101.0
TOTAL		635.9	639.0	643.7	647.9	652.2	658.8	662.3	666.0	669.9	673.2	677.6	681.7
AVERAGE		90.8	91.3	92.0	92.6	93.2	94.1	94.6	95.1	95.7	96.2	96.8	97.4
AVE DEVIATION		6.7	6.4	6.1	5.7	5.4	5.1	5.2	5.4	5.6	5.9	5.8	5.6

OMIT THE FOLLOWING CYCLES

1945 9 1948 7 1949 10

TOTAL	545.6	547.9	552.2	554.8	560.3	564.5	566.6	569.1	572.3	574.7	578.0	581.4
AVERAGE	90.9	91.3	92.0	92.5	93.4	94.1	94.4	94.9	95.4	95.8	96.3	96.9
AVE DEVIATION	7.7	7.4	7.0	6.6	6.1	5.9	6.0	6.1	6.3	6.7	6.4	6.2