NEW COMPOSITE INDEXES OF COINCIDENT AND LAGGING INDICATORS
by Victor Zarnowitz and Charlotte Boschan

As part of the comprehensive review of cyclical indicators conducted by the Bureau of Economic Analysis (BEA), new composite indexes of coincident, leading, and lagging indicators have been constructed in an effort to improve these tools of current business analysis and forecasting.1 Major changes in the economy and new and revised statistical data and analytical techniques require, from time to time, reappraisals of this as well as other systems of economic intelligence. An article published in this report a few months ago described the historical background, objectives, and methods of the study and provided information on the composition, construction, and record of the leading indexes.2 This paper extends the analysis to the coincident and lagging indexes and their components.

Many economists engaged in the task of interpreting current and predicting near-future business conditions find it useful to know which time series have relatively pronounced and consistent cyclical characteristics, what these characteristics are according to historical measures, and, in particular, what the timing sequences among these series tend to be. Studies of indicators show that the principal leading, coincident, and lagging series represent variables that are important within the economic system, particularly for the business-cycle processes, and that the relationships among them are consistent with general economic reasoning as well as empirical evidence. The preferred indicators are series that are judged to be of high economic significance and that are also well qualified according to other criteria: statistical adequacy, consistency of cyclical timing, conformity to general business expansions and contractions, smoothness, and currency. Various measures are used to quantify these characteristics and the results are combined into component and total scores according to a formal, detailed weighting scheme.3 This method provides a systematic and mostly objective and replicable way to evaluate the usefulness of time series as leading or confirming indicators and to estimate their prognostic or diagnostic significance.

As a result of this scoring and screening, we find many indicators whose past movements tend to show certain recurrent patterns and relationships. These observed regularities are consistent with not one but several plausible and not mutually exclusive hypotheses about why business cycles occur and how they develop. Indeed, there is ample empirical support for the view that each cycle has some causes and aspects that are unique to it, along with many that it shares with other cycles. How individual indicators perform on a particular occasion, therefore, depends not only on the persistent tendencies within the system but also on the then prevailing distinct conditions and events. No single indicator can be depended on all the time; indeed, the need to monitor a large variety of indicators is widely recognized by business analysts and forecasters. Combining selected indicators into composite indexes can help in this task, but the main reason for using such indexes is that they are likely to produce more true and fewer false signals than any of their individual components. This is so not only because business cycles have multiple cases and symptoms, but also because much of the independent measurement errors and other "noise" in the included series are smoothed out in the index as a whole.

PRINCIPAL COINCIDENT INDICATORS

Business cycles have been defined as recurrent sequences of cumulative expansions and contractions in various economic processes which are both sufficiently diffused and sufficiently synchronized to show up as major fluctuations in comprehensive measures of employment, production, income, and sales.4 Accordingly, turning points in these series have served as the primary observations for estimating the reference dates of business cycle peaks and troughs. It is obvious that the series so used are, as a group, necessarily roughly coincident, although occasional deviations from coincident timing do occur for the individual components of the group.

Although we did not decide from the outset that only those indicators which are measures of aggregate economic activity5 should be included in the coincident index, all series actually selected do represent such measures. With the adopted strict requirements of proper cyclical timing at both peaks and troughs and other attributes, it turned out that, of the many indicators examined, only the comprehensive series on production, employment, real income, and real sales qualified as components of the overall coincident index.

Nominal aggregates, such as national income and product, which played a large role in historical business-cycle analysis,6 were excluded from the new composite index. These indicators are, of course, still important and in need of being continually observed. However, it would not be helpful to include current-dollar series in the new index of coincident indicators. Their failure to conform to the recent recessions was widespread, reflecting the intensity and persistence of contemporaneous inflation. And, unfortunately, the possibility that such recessions-cum-inflation might recur cannot be ruled out.

Specifically, nominal GNP did not contract at all in the 1970 recession and had only one short decline during the 1974-75 recession (in the first quarter of 1975). Final sales (GNP minus change in business inventories) also dipped but once, in 1958.

1Major parts of the project were carried out by members of the National Bureau of Economic Research (NBER), and substantial contributions were made by the staff of the Statistical Indicators Division of BEA. This staff is under the immediate direction of Feliks Tamm, Chief of the Division, and is under the general supervision of Beatrice N. Vaccara, Associate Director for National Analysis and Projections. The study benefited from the advice, suggestions, and guidance of the BCD Technical Committee under the chairmanship of Edgar R. Fiedler, U.S. Department of the Treasury. The authors also gratefully acknowledge the helpful advice of Geoffrey H. Moore of NBER and Julius Shiskin of the Bureau of Labor Statistics.


3Zarnowitz and Boschan, op. cit., pp. vi-vii.

4Business cycles of historical experience vary greatly in duration, but as a rule several years are required for the cumulative movements to complete a round from peak to peak or trough to trough. For more detail and references to literature, see V. Zarnowitz, "The Business Cycle Today: An Introduction," in Zarnowitz, ed., The Business Cycle Today, New York: NBER, 1972, p. 2 ff.

5Aggregate economic activity, like so many general concepts in economic analysis, is difficult to define precisely. It is an open concept and can be established only by approximations in empirical research. There is no single time series that measures it adequately, only a variety of statistical data representing some of its different aspects. On the interpretation and uses of that notion in defining and dating business cycles, see Arthur F. Burns and Wesley C. Mitchell, Measuring Business Cycles, New York: NBER, 1947, pp. 3-8, 71-76.

6In fact, they were often cast in the star roles. Thus, Burns and Mitchell, op. cit., pp. 72-73, note that GNP at current prices or, better, the part of GNP that "passes through the market" (i.e., excluding imputations) would be an acceptable measure of aggregate economic activity if a satisfactory monthly or quarterly series of this type were available for a sufficiently long time period.
and not since. Similarly, personal income had its last, mild con-
traction in 1957-58. Its continued rise thereafter, through the
recessions of 1960, 1970, and 1974-75, reflects to a large extent
structural changes in the economy and the labor force as well as
the workings of automatic stabilizers. Manufacturing and trade
sales declined slightly or flattened during the 1970 recession
and fell more decisively but briefly late in 1974. Only the man-
ufacturing components of that series conformed well to the
cyclical movements in the economy after 1960; retail store sales
trended sharply upward throughout. In sum, the current-dollar
aggregates of income and sales have recently been so dominated
by upward trends reflecting the general price and wage increases
and structural and institutional changes (growth of the cyclic-
ally more stable sectors of the economy and massive transfer
payments) that they have become much less sensitive to slow-
downs and declines in aggregate production and employment.
As a result, these series do not rate well on the record of their
recent cyclical performance, and even their overall scores, which
refer to the sample period 1947-70, are reduced, in some cases
seriously.

Four aggregates in real terms definitely qualify as compo-
ents of the coincident index: Number of employees on nonagri-
cultural payrolls, establishment survey; index of industrial
production; personal income, excluding transfer payments, in
1967 dollars; and manufacturing and trade sales in 1967 dollars.
These are, in retrospect and prospect, the best coincident indi-
cators in the following economic-process groups: I. Employ-
ment and Unemployment; II. Production and Income; and III.
Consumption and Distribution. Our analysis and scoring dis-
close no other appropriate choices for the index of indicators
with coincident timing at both peaks and troughs of business
cycles, in either these or other groups. This may seem surprising
in view of the high degree of simultaneity in the system of
economic relationships, the pervasiveness of cyclical move-
ments, and the large number of alternatives considered in our
selection procedure. The explanation lies in the strictness of the
requirements to be met by the component series (nearly coin-
cident timing and high scores for a variety of characteristics)
and by the index as a whole (comprehensive coverage with a
minimum of duplication), plus the fact that the dispersion of
cyclical timing in monthly data is quite pronounced, despite the
strong tendency for many series to move together.

Each of the four aggregates has some highly cyclical compo-
ents (e.g., employees in manufacturing: production of durable
goods; wages and salaries in the goods-producing sector, i.e.,
mining, manufacturing, construction; manufacturers' ship-
ments) and other components that are much less cyclical and
would not, by themselves, qualify for inclusion in the index. Using
the more cyclical components alone would unduly re-
strict the coverage and reduce the representativeness of the
index (with manufacturing being overemphasized, and increas-
ingly so over time); also, the components of the index would
then resemble each other rather too closely. On the other hand,
using the more cyclical series along with the corresponding
aggregates would make for too much duplication.

Further discussion of the selected series and some of those
that were screened out will explain our decisions on the make-
up of the index in more detail. Table 1, which shows the aver-
age timing and scores for the new and old indexes of coincident
indicators and their components, sums up an important part of
the underlying evidence and explains, in the notes, some of the
underlying procedures. Chart 1 illustrates the behavior of the
components of the indexes since 1947.

Employment and Unemployment

The employment component in the old coincident indexes,
employees on nonagricultural payrolls (BCD series 41), is with-
out doubt the best indicator in this group and is retained for the
new index. The aggregate from the labor force survey, persons
engaged in nonagricultural activities (BCD series 42), has sub-
stantially lower scores on conformity and smoothness as well as
timing (which lacks consistency because leads are mixed with
rough coincidences at peaks). Similarly, man-hours in nonagri-
cultural establishments (BCD 48) shows too many leads at
peaks (presumably reflecting the early timing of the average
hours of work per week) to score well as a coincider. In addi-
tion, we have analyzed 12 series on the numbers of employees
in production workers in the sectors of the economy that are
particularly sensitive cyclically (manufacturing, mining, con-
struction, transportation, public utilities, and various combina-
ations of these industries) and found that none of these performs
better than BCD 41, which, of course, also has the advantage of
broader coverage.7

The total unemployment rate (BCD 43), a component of the
old coincident indexes, is not included in the new index. This
series is certainly one of the principal and most widely used
measures of the economy's performance.8 However, the overall
unemployment rate, like most of the component rates for indi-
vidual sex, age, and race categories, tends clearly to lead at
peaks and lag at troughs of business cycles, and its timing classi-
fication is L, Lg, U (undefined for both types of turn com-
bined). This is so because employment typically rises slowly in
both the initial and the late stages of a business expansion,
whereas the labor force grows at a fairly steady pace.9

Production and Income

The index of industrial production (BCD 47) reflects largely
changes in manufacturing output, which on the whole remains
highly sensitive to cyclical fluctuations in demand. However,
the relative importance of this sector has for some time now
been declining, whereas the cyclically more stable service indus-
tries have been gaining. Today, a downturn of industrial produc-
tion will not pull the rest of the economy promptly into a
recession given the rising trend in the large services sector. Thus,
structural change in the industrial composition of GNP prob-
alby explains the shift from the closely coincident timing of the
production index at peaks in the pre-World War II period to the
short leads in the 1948-69 period. At troughs, on the other hand,
no change in timing would be expected, and none has occurred.10 Overall, the cyclical timing of the index remains
approximately coincident, as would be expected.

Personal income qualifies for inclusion in the composite
index if and only if it is expressed in constant dollars, as already

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7 Employment in manufacturing and other goods-producing industries
has led at business cycle peaks of the period 1948-69 and, consequently,
so has (by much shorter intervals) total nonagricultural employment
through the 1950's. More recently, however, and particularly in 1974,
nonagricultural employment as a whole lagged at peaks, apparently mainly
because of labor-hoarding in the service industries. (The long lag in 1974
was perhaps induced by the special events and uncertainties of the time-
energy crisis, supply constraints, etc.) Employment in goods-producing
industries started moving down gently at the beginning of 1974, total em-
ployment according to the establishment survey rose, if slowly, through
October 1974.)

8 Unemployment statistics, of course, measure economic inactivity
rather than activity, hence their conformity to business cycles is inverse.

9 The reasons why employment recovers relatively slowly lie in the
initial uncertainties about the prospects for an enduring expansion and
the concurrent rises in the average workweek and labor productivity. The
reasons why employment grows less in late than in mid-expansion stages
lie in either demand slowdowns or supply constraints, or both.

10 In 1920-37, industrial production had roughly coincident timing at
all but one of the five business cycle peaks (median, 0); in 1948-69, it
had three rough coincidences and two longer leads (median, -3 months).
At troughs, roughly coincident timing was the rule in both 1921-38 and
1949-70 (with only one exception, in the earlier period).
Table 1. Average Timing and Scores, New and Old Indexes of Coincident Indicators and Their Components, 1947-1970

<table>
<thead>
<tr>
<th>Line</th>
<th>Number and title of series</th>
<th>Median leads (-) or lags (+) (in months)</th>
<th>Economic significance</th>
<th>Statistical adequacy</th>
<th>Timing</th>
<th>Conformity</th>
<th>Smoothness</th>
<th>Currency</th>
<th>Total</th>
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<td></td>
<td></td>
<td>Peaks</td>
<td>Troughs</td>
<td>All turns</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
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<td>78</td>
<td>89</td>
<td>80</td>
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<td>2</td>
<td>Index of industrial</td>
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<td>-1/2</td>
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<td>72</td>
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<td>74</td>
<td>64</td>
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<td>-3</td>
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<td>-1/2</td>
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<td>90</td>
<td>75</td>
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Components of New Index

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<th>Number and title of series</th>
<th>Median leads (-) or lags (+) (in months)</th>
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<th>Currency</th>
<th>Total</th>
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<td>78</td>
<td>57</td>
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<td></td>
<td>(inverted)</td>
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<tr>
<td>6</td>
<td>Personal income</td>
<td>0</td>
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<td>-1</td>
<td>90</td>
<td>70</td>
<td>41</td>
<td>30</td>
<td>100</td>
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<tr>
<td>7</td>
<td>Personal income, deflated</td>
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<td>-1</td>
<td>-1/2</td>
<td>90</td>
<td>70</td>
<td>76</td>
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<td>8</td>
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<td>-1/2</td>
<td>90</td>
<td>65</td>
<td>92</td>
<td>75</td>
<td>80</td>
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<td>9</td>
<td>Average, 4 series, new</td>
<td>-2 1/2</td>
<td>0</td>
<td>-1/2</td>
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<td>71</td>
<td>86</td>
<td>76</td>
<td>95</td>
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<td>10</td>
<td>Average, 5 series, BCD 820 (lines 1, 2, 5, 6, 8)</td>
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<td>0</td>
<td>-1/2</td>
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<td>73</td>
<td>58</td>
<td>70</td>
<td>92</td>
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<td>11</td>
<td>Average, 5 series, BCD 820 (lines 1, 2, 4, 5, 7)</td>
<td>-3</td>
<td>0</td>
<td>-1/2</td>
<td>92</td>
<td>73</td>
<td>70</td>
<td>74</td>
<td>92</td>
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<td>0</td>
<td>92</td>
<td>71</td>
<td>92</td>
<td>88</td>
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<td>0</td>
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<td>73</td>
<td>91</td>
<td>88</td>
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<td>14</td>
<td>BCD 820</td>
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Components of BCD Indexes

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Notes:
1. Numbers preceded by asterisks (*) refer to series included in the original index (BCD 820). The underlined numbers refer to series included in the deflated index (BCD 825).
2. All scores are listed on the 0-to-100 scale.
3. These are scores for all turns; the separate peak and trough scores are not given. All series are scored on the assumption of roughly coincident timing at peaks and troughs.
4. Weighted averages of scores in columns 4-9. The weights are economic significance, statistical adequacy, and conformity—16.7 percent each; timing, 26.7 percent; smoothness, 13.3 percent; currency, 10 percent. See BCD, May 1975, pp. vi-viii, for further detail.
5. When the unemployment rate is treated as leading at peaks and lagging at troughs (L, Lg), instead of roughly coincident (C) at all turns, its timing score is 75 and its total score is 80.
6. Personal income scores better—34 for timing, 62 overall—when treated as roughly coincident at peaks and leading at troughs (C, L, Lg) for both types of turn combined is undefined.
7. Columns 1-5, medians; columns 4-10, means.
8. Columns 1-3, medians; columns 4-10, means. Crediting series 43 and 52 for noncoincident timing (see footnotes 5 and 6) would raise the timing score (col. 6) to 76 and the total score (col. 10) to 79.
9. Columns 1-3, medians; columns 4-10, means. Crediting series 43 for noncoincident timing (see footnote 5) would raise the timing score (col. 6) to 84 and the total score (col. 10) to 82.
10. Entries in columns 4, 5, and 9 are the same as the corresponding entries in line 9.
11. Entries in columns 4, 5, and 9 are the same as the corresponding entries in line 10.
12. Entries in columns 4, 5, and 9 are the same as the corresponding entries in line 11.

In addition, improved results are obtained by eliminating transfer payments, which contain large countercyclical elements such as unemployment compensation. Exclusion of transfer payments (a) adds to the amplitudes of declines in real personal income during business contractions, which increases the cyclical conformity of the series, and (b) makes the data appreciably smoother. The effects of the deduction of transfer payments on cyclical timing are slight (limited to the single episode of the 1969-70 recession and somewhat uncertain). It can be argued that one should judge the series excluding transfer payments to be of somewhat lower economic significance, since such payments constitute an important source of income to, and an important factor affecting the behavior of, many households. Even if we allowed for this, however, we would still find it advisable to use real personal income excluding transfer payments (series X234) as the component of the coincident index. The question of whether real GNP should be included in the index was carefully examined. GNP in 1958 dollars is the most comprehensive of the widely used measures of aggregate economic activity, and it scores well as a coincident indicator at both peaks and troughs. On the other hand, it is only available quarterly and is subject to considerable revisions. An analysis of experimental indexes that alternatively do and do not include real GNP shows that inclusion of that series would cause frequent revisions in the index, which, though small, are nevertheless apt to be troublesome. Moreover, the alternative indexes (with and without real GNP) are remarkably similar. It
CHART 1. COMPONENTS OF THE COINCIDENT COMPOSITE INDEXES

Components of the new index:

1. Employees on nonagricultural payrolls (millions)
2. Index of industrial production (1967=100)
3. Personal income less transfers, 1967 dollars (ann. rate, bil. dol.)
4. Manufacturing and trade sales, 1967 dollars (bil. dol.)
5. Personal income (ann. rate, bil. dol.)
6. Manufacturing and trade sales (bil. dol.)
7. Unemployment rate, total (percent—inverted scale)

Components of the old index not in the new index:

1. Personal income (ann. rate, bil. dol.)
2. Manufacturing and trade sales (bil. dol.)

NOTE: Circles entered on the chart indicate specific turning points; numbers indicate length of leads (-) and lags (+) in months from reference turning dates.

*This is not necessarily the peak but is the high for the available data.
was therefore concluded that the advantage of keeping the coincident index more current and less affected by data revisions outweighed the advantage of including a component indicator that covered all sectors of the economy.

Consumption and Distribution

The record of manufacturers' sales (shipments) as a cyclical indicator is considerably better than that of trade sales, but it is nevertheless advisable to combine the two since this adds to the breadth and diversity of coverage of the index and the resulting aggregate still has acceptable timing and overall scores.\(^{13}\) Manufacturing and trade sales in current dollars (BCD 56) scores slightly better than the constant-dollar series (56d) in the period 1948-70, due mainly to the superior performance of the former in the 1949 recession when prices fell. However, in the 1970 recession, with prices rising, it was definitely the deflated aggregate that had the better record of cyclical timing, conformity, and amplitude, so the more recent and presumably more relevant experience suggested the use of sales in constant rather than current dollars. Developments in 1973-74 confirm a fortiorti the lesson of 1970.

**COMPOSITE INDEXES OF COINCIDENT INDICATORS**

While all components of the new coincident index have the proper timing characteristics at both peaks and troughs, two series from the old indexes—unemployment rate and personal income—fail to so qualify. (See pp. vi and vii and table I, notes 5 and 6.) Consequently, the components of the new index score, on the average, better than the components of either BCD 820 or BCD 825 (table 1, lines 9-11).

Chart 2 compares the new coincident index with the two old ones (BCD 820 and BCD 825). It shows that the indexes, while generally coincident at troughs, often led by short intervals at business cycle peaks. In fact, BCD 825 had leads at each of the five peaks of the 1948-69 period. However, some of these departures from coincident timing, though they must be accepted for technical reasons and procedural consistency, involve very small differences between values of the series in adjacent months and probably have little significance.\(^{14}\) During the last recession, BCD 820, reflecting in large measure inflation, declined only for the 6 months between September 1974 and March 1975, whereas the new index and BCD 825, neither of which includes any current-dollar series, had contractions beginning in November 1973. Data on real GNP, industrial production, employment in the goods-producing sector, unemployment, etc., indicate that the economy reached its last cyclical peak late in 1973, not almost a year later; so the evidence from the post-sample period (1971-75) is unfavorable to BCD 820 as a coincident index.\(^{15}\)

To sum up, the new index is preferred in the light of (1) the evaluation of the individual series included in table 1, and (2) the events of the years that followed the period to which the listed timing measures and scores refer. The new index also has a more nearly coincident timing, with less dispersion around the means, than either of the old indexes, but these differences are small and have very little effect on the scores of the composites.\(^{16}\)

**PRINCIPAL LAGGING INDICATORS**

Indicators that lag consistently at business downturns as well as upturns are in short supply, since lags were much less frequent at peaks of the recent business cycles than at troughs (whereas leads were much more frequent at peaks than at troughs). Also, lags tended to be shorter (and leads, longer) at the upper than at the lower turning points. These asymmetries which are specific to the post-World War II era—the cyclical timing distributions in earlier periods were more symmetrical—are well documented and are not attributable in any significant measure to errors in the accepted business cycle chronology. Rather, they are related to major changes in the economy that have altered the course of U.S. business cycles.\(^{17}\)

Since the index to be constructed is one that would provide consistent confirmations of both downturns and upturns in general business activity, all of its components must lag at both peaks and troughs and retain most of the characteristics of the old index, with some series in the new index and others not included. The series surveyed are again grouped by economic process. Table 2 provides supporting summary measures for the lagging indexes and their components. Chart 3 shows how the individual series behaved during the expansions and contractions of the period 1947-75.

**Employment and Unemployment**

The best lagging indicators in this group are the long-term unemployment rate (BCD 44) and average duration of unemployment (series X1), both used in inverted form. Of the two, the latter is on the whole preferable because it is more comprehensive (referring to all unemployment and not only the long-duration unemployment), has somewhat more consistent timing, and is not affected by rounding in the way the former series is.\(^{18}\) The long-term unemployment rate (persons unemployed 15 weeks and over), a component of the old lagging index, is therefore replaced in the new index by the average duration of unemployment.

Several other indicators in this group were analyzed, such as the number of those unemployed 15 weeks and over, the number of those unemployed 27 weeks and over, and the rate

\(^{13}\)The cyclical behavior of manufacturers' sales in constant dollars resembles closely that of manufacturing production and hence rather well, too, of the total industrial production index. Inclusion in the composite index of both the broad aggregate for real sales and industrial production in effect gives a large weight to manufacturing, and the question arises whether this weight is not in some sense excessive. We have therefore examined the alternative of excluding manufacturers' sales and using total wholesale and retail sales (in 1967 dollars) only. However, the two deflated trade sales series (wholesale and retail) do not score well enough as coincident indicators, separately or jointly, to qualify as components of the index.

\(^{14}\)Note, in particular, the minuscule decline in the index before the business peak in August 1957, which causes the index to show a lead of 5 months.


\(^{16}\)In fact, the direct scores for the performance of each of the three indexes in the sample period are almost identical and would not permit a meaningful discrimination between these constructs (table 1, lines 12-14).

\(^{17}\)On the relative frequencies of leads and lags, see Zarnowitz and Boschan in *BCD*, May 1975, p. viii. A complete account of the evidence will be given in a separate report.

\(^{18}\)As is the corresponding restriction for the index of leading indicators; see Zarnowitz and Boschan, op. cit., note 23 and app. A.

\(^{19}\)The series on unemployment rates often move in steps (appearing to have periods of unchanged values separated by large discrete changes), but this is merely the effect of rounding, the figures being carried only to the first decimal. Because of the adopted convention of locating the specific turning points at the end of the high and low steps, the measured timing of the unemployment rate series is more lagging than that of the corresponding series on the numbers of the unemployed (which, like the unemployment-duration data, have no steps). But this, of course, is merely a statistical artifact (as is the apparent greater smoothness of the rates).
CHART 2. COMPOSITE INDEXES OF COINCIDENT INDICATORS

New index of 4 coincident indicators (series 41, 47, 56D X234)

Old index of 5 coincident indicators, deflate (series 41, 43, 47, 52B, 56B)

Old index of 5 coincident indicators (series 41, 43, 47, 52, 56)

NOTE: Circles entered on the chart indicate specific turning points; numbers indicate length of leads (−) and lags (+) in months from reference turning dates.
TABLE 2. AVERAGE TIMING AND SCORES, NEW AND OLD INDEXES OF LAGGING INDICATORS AND THEIR COMPONENTS, 1947-1970

<table>
<thead>
<tr>
<th>Line</th>
<th>Number and title of series</th>
<th>Median leads (-) or lags (+) (in months)</th>
<th>Economic significance</th>
<th>Statistical adequacy</th>
<th>Timing</th>
<th>Conformity</th>
<th>Smoothness</th>
<th>Currency</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Peaks</td>
<td>Troughs</td>
<td>All turns</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>1</td>
<td>XI. Average duration of unemployment</td>
<td>+1</td>
<td>-8</td>
<td>+3 1/2</td>
<td>90</td>
<td>78</td>
<td>89</td>
<td>95</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>71d. Manufacturing and trade inventories, 1967 dollars...</td>
<td>+2 1/2</td>
<td>+3</td>
<td>+3</td>
<td>90</td>
<td>70</td>
<td>89</td>
<td>64</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>*62. Labor cost per unit of output, n.s.</td>
<td>+8 1/2</td>
<td>+11</td>
<td>+10</td>
<td>80</td>
<td>55</td>
<td>87</td>
<td>51</td>
<td>80</td>
</tr>
<tr>
<td>4</td>
<td>*72. Commercial and industrial loans outstanding, weekly reporting large commercial banks...</td>
<td>+1 1/2</td>
<td>+5</td>
<td>+3 1/2</td>
<td>80</td>
<td>60</td>
<td>86</td>
<td>81</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>X251. Ratio, consumer installment debt to personal income...</td>
<td>+6 1/2</td>
<td>+7</td>
<td>+7</td>
<td>80</td>
<td>70</td>
<td>87</td>
<td>44</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>109. Average prime rate charged by banks...</td>
<td>+3 1/2</td>
<td>+14</td>
<td>+4</td>
<td>90</td>
<td>95</td>
<td>85</td>
<td>62</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Components of New Index (BCD 830)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>*44. Unemployment rate, persons unemployed 15 weeks and over...</td>
<td>+1</td>
<td>+5</td>
<td>+2 1/2</td>
<td>80</td>
<td>78</td>
<td>85</td>
<td>100</td>
<td>80</td>
</tr>
<tr>
<td>8</td>
<td>*61. Business expenditures, new plant and equipment...</td>
<td>+1/2</td>
<td>-2 1/2</td>
<td>+1</td>
<td>90</td>
<td>80</td>
<td>97</td>
<td>56</td>
<td>80</td>
</tr>
<tr>
<td>9</td>
<td>*71. Book value, manufacturing and trade inventories...</td>
<td>+3</td>
<td>-4 1/2</td>
<td>+3 1/2</td>
<td>90</td>
<td>65</td>
<td>93</td>
<td>61</td>
<td>100</td>
</tr>
<tr>
<td>10</td>
<td>*67. Bank rates on short-term business loans...</td>
<td>+3</td>
<td>+9</td>
<td>+4</td>
<td>90</td>
<td>65</td>
<td>86</td>
<td>75</td>
<td>80</td>
</tr>
<tr>
<td>11</td>
<td>Average, 6 series, new index (lines 1-6)</td>
<td>+3</td>
<td>+7 1/2</td>
<td>+4</td>
<td>85</td>
<td>71</td>
<td>87</td>
<td>66</td>
<td>93</td>
</tr>
<tr>
<td>12</td>
<td>Average, 6 series, BCD 830 (lines 3, 4, 7-10)</td>
<td>+2</td>
<td>+5</td>
<td>+3 1/2</td>
<td>85</td>
<td>67</td>
<td>85</td>
<td>72</td>
<td>87</td>
</tr>
<tr>
<td>13</td>
<td>New index*</td>
<td>+3</td>
<td>+5</td>
<td>+4</td>
<td>85</td>
<td>71</td>
<td>92</td>
<td>88</td>
<td>100</td>
</tr>
<tr>
<td>14</td>
<td>BCD 830*</td>
<td>+1</td>
<td>+5</td>
<td>+3</td>
<td>85</td>
<td>67</td>
<td>90</td>
<td>89</td>
<td>100</td>
</tr>
</tbody>
</table>

1Numbers preceded by asterisks (*) refer to series included in the current lagging index (BCD 830).
2All scores are listed on the 0-to-100 scale.
3These are scores for all turns; the separate peak and trough scores are not given. All series are scored on the assumption of lagging timing at peaks and at troughs.
4Weighted averages of scores in columns 4-9. (For weights, see footnote 4 to table 1.)
5When series 61 is treated as roughly coincident at peaks and lagging at troughs (C, Lg), instead of lagging at all turns, its timing score is 82, and its total score is 77.
6Columns 1-3, medians; columns 4-10, means.
7Columns 1-3, medians; columns 4-10, means. Crediting series 61 for nonlagging behavior (see footnote 5) would raise the timing score (col. 6) to 86 and the total score (col. 10) to 79.
8Entries in columns 4, 5, and 9 are the same as the corresponding entries in line 11.
9Entries in columns 4, 5, and 9 are the same as the corresponding entries in line 12.

of unemployment 27 weeks and over. None of these series qualify for inclusion in the index, mainly because their timing at peaks is not well defined. (They all lag consistently at troughs.)

Fixed Capital Investment

Business expenditures for new plant and equipment (BCD 61) is a component of the old index not included in the new one. The principal reason is that its timing at business cycle peaks has been coincident rather than lagging. Also, the cyclical conformity of this quarterly series in current dollars has been better in the earlier part of the period covered than in the recent years of strong inflation. BCD 61 had no specific contraction during the 1970 recession, its upward trend having been interrupted for one quarter only, and it rose during the last recession until the last quarter of 1974 when it started a very mild decline.

Deflation strongly reduces the upward trend in these data but has only weak effects upon their cyclical movements, except after 1960. Business fixed investment outlays in constant dollars (61d) declined mildly in 1967, very irregularly in 1970, and decisively after mid-1974. But the timing of series 61d, like that of series 61, must be classified as roughly coincident at peaks and lagging at troughs; it cannot be unambiguously defined for all turns. Several related series have also been found lacking the required consistency of cyclical timing.

The expectation that business expenditures on plant and equipment should be a lagging indicator rests mainly on the presumption that they follow, often with long distributed lags, the corresponding new investment commitments: new capital...
CHART 3. COMPONENTS OF THE LAGGING COMPOSITE INDEXES

A. Components of the new index:

1. Average duration of unemployment (weeks—inverted scale)
2. Manufacturing and trade inventories, 1967 dollars (bill. dol.)
3. Index of labor cost per unit of output, mfg. (1967=100)
4. Commercial and industrial loans outstanding (bill. dol.)
5. Average prime rate (percent)
6. Ratio, consumer installment debt to personal income (percent)

NOTE: Circles entered on the chart indicate specific turning points; numbers indicate length of leads (−) and lags (+) in months from reference turning dates.
CHART 3. COMPONENTS OF THE LAGGING COMPOSITE INDEXES—Continued

B. Components of the old index not in the new index:

44. Unemployment rate, 15 weeks and over (percent—inverted scale)

61. Business expenditures, plant and equipment (annual rate, bil. dol.)

67. Bank rates on short-term business loans (percent)

71. Manufacturing and trade inventories (bil. dol.)

NOTE: Circles entered on the chart indicate specific turning points; numbers indicate length of leads (−) and lags (+) in months from reference turning dates.
appropriations, contracts and orders. This they certainly do, but investment commitments reach their peaks so early relative to business cycle peaks that the outlays that trail behind them often decline along with, and sometimes ahead of, the economy at large. At business cycle troughs, investment commitments have typically much shorter leads and expenditures tend to lag but these lags are mostly short because, in times of low capacity, utilization, orders and contracts for new capital goods are executed more promptly.

**Inventories and Inventory Investment**

Total manufacturing and trade inventories (on hand) tend to lag at both peaks and troughs. This applies to the book-value series (BCD 71) as well as to the corresponding aggregate in constant dollars (71d). During the 1948-70 period, deflation had very little effect on these data. As illustrated by the scores, both series conformed well to the business cycles covered, except that neither declined during the 1970 recession. However, the sharp acceleration of inventory growth in 1973-74 was apparently due chiefly to rising prices; the increases in the constant-dollar series remained fairly steady. Although adjustments of inventories for the effects of inflation are, of course, known to be difficult and of uncertain quality, the new price deflators now available from the Commerce Department are substantially improved and considered adequate. They allow for the appropriate lag patterns and the characteristic LIFO-FIFO proportions in the different industries. The new deflated series 71d is therefore regarded as the proper replacement for the book-value aggregate (BCD 71) used in the old lagging index.

Taking ratios of manufacturing and trade inventories to the corresponding sales figures is a different way in which to express inventories in real terms. The series of simple inventory-to-sales ratios (BCD 851) has much longer lags than deflated inventories but scores about as well on timing; however, BCD 851 is definitely inferior to 71d with regard to smoothness and conformity. Since inventories and sales should be somewhat differently deflated to take account of lags in the pricing process, we have also experimentally constructed and examined a series of ratios of inventories in constant dollars to sales in constant dollars, but the results were not significantly different from those obtained with the simple ratios.

**Prices, Costs, and Profits**

Unit labor cost is one of the central variables in a major hypothesis about the causes of business cycles; it has received much attention in research, which established its historical tendency to lag at business cycle turns and related that tendency to the cyclical behavior of wage rates and productivity of labor. The monthly series included in the old index (BCD

21) For detailed historical evidence, see Zarnowitz, Orders, Production, and Investment, New York: NBER, 1973, pt. III.

22) The record of manufacturers' unfilled orders indicates that inventories on order, i.e., stocks of goods ordered for further processing or resale but not yet received, have earlier timing, leading at peaks and lagging or, less often, coinciding at troughs. This would be expected, since the on-order part of inventories can be adjusted more promptly to desired or, less often, coinciding at troughs. This would be expected, since the on-order part of inventories can be adjusted more promptly to desired or, less often, coinciding at troughs. This would be expected, since the on-order part of inventories can be adjusted more promptly to desired

62) scores reasonably well on the strength of long and regular lags at the three business peaks and four troughs of the period 1949-61. In 1961-65, series 62 drifted downward; since 1966, it has risen strongly, except for a slowdown followed by a brief and shallow decline in 1971-72. Thus, unit labor costs turned down during the first two recessions covered (in 1948-49 and 1953-54), but rose during each of the four following recessions; they declined in each of the four recoveries of the 1950's and 1960's, but merely flattened in the recovery of 1971-72. Finally, BCD 62 increased sharply in 1973-75, particularly during the recession, and gave the first tentative indication of a decline only in August 1975. The two related quarterly series (unit labor cost for the total private economy, BCD 63, and labor cost per unit of real corporate product, BCD 68) behave similarly. Clearly, the historical pattern of cyclical behavior of unit labor costs has recently been distorted by the effects of persistent and rapid inflation, with strong pressures for higher money wage rates continuing even while the productivity of labor (output per man-hour) diminished markedly as in 1973-74. Labor as well as property incomes typically share in the inflationary increases in the value of output, so that major inflations, whatever their causes, will most of the time see money wages rising faster than productivity, which implies rising nominal unit labor costs.

What happens to real labor cost per unit of output depends on relative changes in prices, wages, and productivity of labor, and on how these changes are perceived by, and influence the decisions of, the employers. The role of the cyclical behavior of this variable is not very regular, though a broad tendency to lag would be expected. Unit labor costs, then, have definitely become less sensitive cyclically in recent years as inflation grew stronger and persisted through periods of deteriorating and poor, as well as improving and good, business conditions. But this important cost factor retains its basic character and function as a lagging indicator, although its reactions to cyclical developments in the 1970's have been considerably more muted and delayed than before. Series 62 still qualifies as a component of the lagging index, and its inclusion broadens the coverage and improves the performance of the index.

**Money and Credit**

We retain unchanged from the old index the aggregate of commercial and industrial loans outstanding (weekly reporting large commercial banks--BCD 72). This series represents the most cyclical component of total bank loans, reflects in large measure the financing of business inventories (itself a lagging indicator), and is available frequently and promptly. It flattened rather than declined with a lag in response to the 1960-61 recession; at other times, it lagged consistently at troughs and also, with one exception (in 1948), at peaks. Its record as
a lagging indicator is good, and it is not bettered by attempts to deflate the loans.\(^2\)\(^6\)

The other important series in the credit group—consumer installment debt (BCD 66)—can be viewed as a cumulation of the net credit changes which equal the differences between credit extensions and repayments. Consumer credit extensions tend to have roughly coincident timing, while repayments show lagging responses (often only retardations) to business recessions.\(^6\) Total installment credit outstanding had a strong upward trend, particularly in the early post-World War II years including the 1948-49 recession, and reacted to the later business contractions sluggishly with very mild declines (in 1970 merely with a slowdown). However, much better results are obtained with the ratio of consumer installment debt to personal income (series X251), which shows definite declines with lagged timing in connection with each of the business recessions since 1953.\(^6\) Using this ratio represents the most satisfactory method we could find of allowing for the trend (reflecting, among other factors, inflation) and bringing out the cyclical element in consumer credit. The inclusion of the ratio of consumer installment debt to personal income in the composite index of lagging indicators significantly improves both the coverage and performance of the index.

The quarterly series of bank rates on short-term business loans (BCD 67), a component of the old index of laggars, is now replaced by the monthly series of the average prime rate charged by banks (BCD 109). The two indicators behave very similar.\(^7\) BCD 109 has the maximum score for currency and BCD 67, being quarterly, rates poorly on this criterion. In the past (before 1966 and notably in the early 1960's), the average prime rate remained unchanged for long periods of time, which accounts for some of its lags that were especially long at troughs; but the bank rates were also approximately constant in the same periods.

Since the late 1940's, interest rates generally have become much more sensitive to cyclical influences, as evidenced by large increases in the amplitudes of their cyclical movements and a gradual reduction in their lags at peaks and troughs in business activity.\(^9\) Interest rates may also be growing increasingly sensitive to price-level changes, reflecting the intensification and greater variability of inflation. It is therefore possible that the tendency of certain interest rates to lag at business-cycle turns will significantly diminish in the future.\(^9\)

## COMPOSITE INDEXES OF LAGGING INDICATORS

Table 2 shows that the components of the new lagging index have, on the average, higher scores than the components of the old lagging index (BCD 830) with respect to statistical adequacy, timing, smoothness, and currency, and hence overall adequacy, timing, smoothness, and currency, and hence overall

\(^{26}\) Moreover, it is not clear how to deflate this series in a meaningful way, i.e., what prices to use, with what timing, etc. Nor is there a monthly business income series to which the loans could be related (as we relate consumer debt to personal income).


\(^{28}\) The ratio series, like BCD 66, failed to decline in 1948-49. The rapid increase in consumer debt during the late 1940's and early 1950's was probably due mainly to the huge backlog of unsatisfied demand for automobiles and other durable consumer goods that originated in the wartime shortages.

\(^{29}\) The lags have decreased much more for long-term than for short-term interest rates, and for the latter primarily at peaks rather than at troughs. See Phillip Cagan, Changes in the Cyclical Behavior of Interest Rates, Occasional Paper 100, New York: NBER, 1968.

\(^{30}\) However, bank loan rates usually turn later than the active open-market rates (such as the Treasury bill and bond rates) which tend to have roughly coincident timing at peaks and lag at troughs. These sequences, in which the rates of negotiated markets turn last, would be expected to persist. See Cagan, op. cit.

производственный индекс, который отражает изменения в удельных показателях. Он состоит из двух частей: промышленных производившихся товаров и услуг, которые характеризуются ростом в экономике.

1. \(^{26}\) Moreover, it is not clear how to deflate this series in a meaningful way, i.e., what prices to use, with what timing, etc. Nor is there a monthly business income series to which the loans could be related (as we relate consumer debt to personal income).


3. \(^{28}\) The ratio series, like BCD 66, failed to decline in 1948-49. The rapid increase in consumer debt during the late 1940's and early 1950's was probably due mainly to the huge backlog of unsatisfied demand for automobiles and other durable consumer goods that originated in the wartime shortages.

4. \(^{29}\) The lags have decreased much more for long-term than for short-term interest rates, and for the latter primarily at peaks rather than at troughs. See Phillip Cagan, Changes in the Cyclical Behavior of Interest Rates, Occasional Paper 100, New York: NBER, 1968.

5. \(^{30}\) However, bank loan rates usually turn later than the active open-market rates (such as the Treasury bill and bond rates) which tend to have roughly coincident timing at peaks and lag at troughs. These sequences, in which the rates of negotiated markets turn last, would be expected to persist. See Cagan, op. cit.
CHART 4. COMPOSITE INDEXES OF LAGGING INDICATORS

New index of 6 lagging indicators (series X1, 710, 62, 72, X251, 109)

Old index of 6 lagging indicators (series 44, 61, 62, 67, 71, 72)

NOTE: Circles entered on the chart indicate specific turning points; numbers indicate length of leads (−) and lags (+) in months from reference turning dates.
CHART 5. NEW COMPOSITE INDEXES OF LEADING, COINCIDENT, AND LAGGING INDICATORS

Ratio, coincident index to lagging index

NOTE: Circles entered on the chart indicate specific turning points; numbers indicate length of leads (-) and lags (+) in months from reference turning dates.

* This is not necessarily the peak but is the high for the available data.
TABLE 3. SEQUENCES OF TURNING POINTS IN THE COMPOSITE INDEXES OF LEADING (L), ROUGHLY COINCIDENT (C), AND LAGGING (Lg) INDICATORS, 1948-75

<table>
<thead>
<tr>
<th>Line</th>
<th>Dates of business cycle turns (peak-trough-peak)</th>
<th>Dates of associated turning points in indexes L, C, and Lg</th>
<th>Time intervals between the successive turning points (in months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>12/69-11/70-11/73</td>
<td>1/69</td>
<td>10/69</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line</th>
<th>Dates of business cycle turns (peak-trough-peak)</th>
<th>Dates of associated turning points in indexes L, C, and Lg</th>
<th>Time intervals between the successive turning points (in months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>11/48-10/49-7/53</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>7/53-5/48-5/7</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>8/57-5/48-6/60</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>4/59-2/61-12/66</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>11/69-11/70-11/73</td>
<td>9</td>
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</tr>
<tr>
<td>12</td>
<td>11/73-3/75,2</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>13</td>
<td>Mean .......................... 9.5</td>
<td>5.8</td>
<td>3.8</td>
</tr>
<tr>
<td>14</td>
<td>Median .......................... 9</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td>Standard deviation .......... 4.6</td>
<td>3.9</td>
<td>2.2</td>
</tr>
</tbody>
</table>

1 This is not necessarily the peak but is the high for the available data (which began in 1948).
2 Official business cycle peak and trough dates for the current cycle have not yet been designated. The tentative dates of November 1973 (peak) and March 1975 (trough) used in this table are based on the turning points in the composite index of coincident indicators.
3 Tentative, subject to revisions in recent data.
4 This is not necessarily the peak but is the high for the available data (which began in 1948).
5 Disregards the extra decline in the leading index from March 1966 through January 1967.
6 Disregards the extra decline in the leading index from March 1966 through January 1967.

the troughs of the lagging index (Lg) to the peaks of the leading index (L), whose great variability in length reflect the variability in length of business expansions (table 3, col. 6). Thus, it is apparent that the lagging index functions well as a confirmer of the coinciders at both peaks and troughs, but its value as a forecaster of the opposite turn of the leaders is essentially confined to its peaks.

A measure likely to produce more stable and predictively useful relationships than the inverted lagging index is the ratio of the index of roughly coincident indicators to the index of lagging indicators (C/Lg), suggested by Geoffrey Moore. The turning points in the C/Lg ratio will lead those of the coincident index if the movement of the latter decelerates before its turning point while the lagging index continues to move at a faster rate. In addition, there are some economic reasons for expecting the C/Lg ratio to have early cyclical timing. For example, a downturn in the ratio of sales (C) to inventories (Lg) should have an adverse effect on, and may anticipate the downturn in, new orders (L). Similarly, a slowdown in the rise of output (C) combined with a continuing strong rise in unit labor cost and other costs (such as those associated with growing inventories and business indebtedness, which all lag) will depress profits and new investment commitments (L).

The advantage of the derived C/Lg index as a forecasting tool is twofold. First, it provides an additional comprehensive leading series, based on series which are entirely different from those included in the composite index of leaders. Second, if its turning points do indeed precede those in the composite leading index, the ratio has considerable supplementary forecasting value. Chart 5 shows that the cyclical turns in the C/Lg ratio preceded the turns in general business activity on all but one occasion. The leads of the C/Lg ratio at business cycle peaks were long, varying from 12 to 35 months; the leads at troughs were much shorter, varying from 0 to 5 months. Thus, the C/Lg index can be useful as an independent leading indicator. However, the C/Lg ratio does not give reliable early signals anticipating the movements of the leading index (L): in 1948-70, C/Lg led the leading index at only four turns and lagged at two. Also, the scores of the C/Lg ratio are significantly lower than those of the leading index, although they are on the whole as high as the average scores of the individual components of leading index.

In summary, it should be pointed out again that, for the period 1948-70, the turning points of the revised indexes are very similar in timing to those of the old indexes. The decisive advantage of the revised indexes is that they do not lose their indicator characteristics during periods of pronounced inflation and that their behavior is somewhat improved by the exclusion of indicators with mixed timing, i.e., indicators which have different timing characteristics at peaks and at troughs of business cycles.

We hope and expect that continuous research as well as careful and perceptive monitoring of the indicator system will lead to further improvements in the behavioral characteristics and the forecasting usefulness of that system.

33 The scores being compared are tabulated below. The scores for economic significance, statistical adequacy, and currency are based in each case on the mean scores of the individual series used in the computation of the particular index (C/Lg or L).

<table>
<thead>
<tr>
<th>Economic</th>
<th>Statistical</th>
<th>Timing</th>
<th>Conformity</th>
<th>Smoothness</th>
<th>Currency</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>C/Lg ......</td>
<td>88</td>
<td>71</td>
<td>79</td>
<td>29</td>
<td>100</td>
<td>76</td>
</tr>
<tr>
<td>L ..........</td>
<td>81</td>
<td>73</td>
<td>84</td>
<td>78</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>Average, 12 leading series</td>
<td>81</td>
<td>73</td>
<td>82</td>
<td>58</td>
<td>70</td>
<td>76</td>
</tr>
</tbody>
</table>

APPENDIXES

A. Titles, Sources, and Descriptions of Component Series


Data for this series are collected from a sample of establishments in all nonagricultural activities, including government. The data relate to the payroll period which includes the 12th of the month and include full-time, part-time, temporary, and permanent workers. Also included are workers who are on paid leave (sick, holiday, vacation, etc.) and persons who worked only a part of the specified pay period. Persons on the payroll of more than one establishment are counted each time they are reported. Excluded from the statistics are persons in a nonpay status for the entire period due to layoff, strike, leave without pay, etc.; proprietors; self-employed and unpaid family workers; domestic household workers; and noncivilian government workers.

An establishment is defined as an economic unit which produces goods or services—such as a factory, mine, or store. It is generally at a single physical location and is engaged predominantly in one type of economic activity. Where a single physical location encompasses two or more distinct and separate activities, these activities are treated as separate establishments provided that separate payroll records are available.

The data are seasonally adjusted.

47. Index of Industrial Production—Board of Governors of the Federal Reserve System.

This series measures changes in the physical volume or quantity of output of manufacturers, mineral industries, and electric and gas utilities. It reflects output changes at all stages within manufacturing and mining industries (including intermediate and final products). The production of farms, the construction industry, transportation, and various trade and service industries are excluded. The index includes production at government-owned and operated plants and shipyards and atomic energy manufacturing activity. The data are seasonally adjusted.


This series measures the monthly volume, in 1967 dollars, of sales of manufacturing, merchant wholesalers', and retail trade establishments. It differs from final sales in that no allowance is made for the fact that the same items are sold successively by manufacturers, wholesalers, and retailers.

Manufacturers' sales (shipments) include receipts, billings, or the value (less discounts, returns, and allowances) of products shipped; shipments for export, for domestic use, and to foreign subsidiaries of domestic firms; and shipments from one establishment to another in the same company. Shipments of foreign subsidiaries are excluded.

Sales of merchant wholesalers include: (1) Sales of merchandise and receipts from repairs or other services to customers after deducting returns, allowances, and discounts; (2) sales of merchandise for others on a commission basis; and (3) local and State sales taxes and Federal excise taxes. These data are collected from the same sample of merchant wholesale establishments and in the same survey as are data on merchant wholesalers' inventories. (See description for manufacturing and trade inventories, series 71d.)

Retail sales include total receipts from customers after deductions of refunds and allowances for merchandise returned by customers. Receipts from repairs and from other services to customers, sales for resale, and sales taxes and excise taxes are also included.

Data for all sectors are adjusted for trading days, length of calendar month, and seasonal variation.

The deflation of manufacturing and trade sales is performed by the National Income and Wealth Division of BEA. The individual 3- and 4-digit components of manufacturers' shipments are deflated separately using appropriate wholesale price indexes combined with 1972 product class shipment weights. Wholesale sales are deflated by kind of business using appropriate wholesale price indexes combined with 1967 Census sales weights. Retail sales by kind of business are deflated separately using a combination of wholesale price indexes, consumer price indexes, and prices paid by farmers. The selection of price data and the weights for the component price indexes are based on sales by product line from the 1967 Census.


This series measures personal income (in 1967 dollars) received by individuals, unincorporated businesses, and nonprofit institutions, excluding transfer payments.

Personal income represents the sum of labor income, proprietors’ income, rental income of persons, dividends, personal interest, and transfer payments, minus contributions to social insurance. Capital gains and losses are excluded. Most of the income is in monetary form, but there are important exceptions chiefly the net rental value of owner-occupied homes, the value of food produced and consumed on farms, and the value of financial services received by individuals and nonprofit institutions without explicit payment.

Transfer payments consist of income received by persons, generally in monetary form, for which no services are rendered currently. It includes government transfer payments and business transfer payments. Government transfer payments consist of payments under social security (including Medicare), State unemployment insurance, railroad retirement and unemployment insurance, government retirement programs, veterans' benefits (including veterans' life insurance proceeds), direct relief, food stamps, payments to nonprofit institutions other than for work done under research and development contracts, and a few other minor items. Business transfer payments comprise corporate gifts to nonprofit institutions, consumer bad debts, and a few other minor payments.

This series is computed from seasonally adjusted components and is deflated by the National Income and Wealth Division of BEA using the implicit price deflator for personal consumption expenditure (PCE). The deflator is available monthly (unpublished) from 1968 to date. Prior to 1968, the monthly values are obtained by interpolating the quarterly implicit PCE deflator by the movements in the consumer price index.

X1. Average (Mean) Duration of Unemployment in Weeks—Department of Labor, Bureau of Labor Statistics.

This series measures the average length of time, in weeks during which persons classified as unemployed had been continuously looking for work or, in the case of persons on layoff,
since the termination of the most recent employment. A period of 2 or more weeks during which a person was employed or ceased looking for work is considered to break the continuity of the present period of seeking work. Average duration of unemployment is an arithmetic mean computed from a distribution by single weeks of unemployment. The data are seasonally adjusted by the source agency.

62. Index of Labor Cost Per Unit of Output, Total Manufacturing (Ratio of index of compensation of employees in manufacturing to index of industrial production, manufacturing)—Department of Commerce, Bureau of Economic Analysis; and Board of Governors of the Federal Reserve System.

This series measures the relationship between the volume of production of manufactured goods and the cost of the labor involved in that production.

The compensation of employees, manufacturing, component (labor cost) measures the income received by persons in an employee status as remuneration for their work, including (1) wage and salary disbursements—the compensation of employees commonly regarded as wages and salaries, including compensation of executives, commissions, payment in kind, bonuses, and tips; and (2) supplements to wages and salaries—or fringe benefits, including supplements such as employers’ contributions to social insurance; private pension, health, and welfare funds; compensation for injuries; military reserve pay; etc.

Industrial production index, manufacturing, is a measure of the changes in physical output of manufacturing in the United States. It includes 11 major groups of durable goods and 10 major groups of nondurable goods. It also includes measures of the manufacturing activity of the Department of Defense (durable goods) and the Atomic Energy Commission (nondurable goods).

In computing labor cost per unit of output, seasonally adjusted data on compensation of employees (wage and salary disbursements plus supplements to wages and salaries) are converted to an index (1967=100) and divided by the index of manufacturing production (1967=100) to yield the index of labor cost per unit of output. This index is seasonally adjusted by the X-11 version of the Census seasonal adjustment program.


This series measures the end-of-month value, in 1967 dollars, of stocks on hand in manufacturing, retail, and merchant wholesalers’ establishments. For the manufacturing sector, inventories are reported as valued by the manufacturers. All manufacturing-associated inventories, regardless of stage of fabrication, are included. The inventories of retailers and merchant wholesalers are valued at cost. Goods held on a consignment basis by wholesalers are excluded.

For the period since January 1958, each of the components of manufacturing and trade inventories is deflated separately. Manufacturers’ inventories are deflated at the 2-digit SIC level, and wholesalers’ inventories of durable and nondurable goods are deflated separately, as are durable and nondurable goods inventories of retailers. The deflators are based on combinations of wholesale price indexes with appropriate lag structures developed from information on stock/sales ratios and on inventory accounting practices. The deflation is done by the National Income and Wealth Division of BEA. (Prior to 1958, deflation was performed at the aggregate level using a lagged 4-month moving average of the wholesale price index for industrial commodities.) The components are seasonally adjusted prior to the application of their individual deflators.


This series measures the average weekly (Wednesdays) dollar amount of business loans outstanding each month. Included are data on all loans for commercial and industrial purposes except those secured by real estate. Loans to financial institutions and loans for the purpose of purchasing or carrying securities are excluded.

The data are based on reports to the Federal Reserve System by approximately 330 banks. Included in the reports are data on the amount of commercial and industrial loans outstanding as of Wednesday of each week and the amount of loans sold outright during each week to their own subsidiaries, foreign branches, holding companies, other affiliates, and to other institutions except banks.

For BCD, a weekly series is derived by summing the amount of commercial and industrial loans and the amount of loans sold outright as reported to the Federal Reserve System. The monthly series is the arithmetic mean of weekly data. The data beginning with November 1968 are seasonally adjusted by means of the Census X-11 seasonal adjustment program. Prior to that date, the National Bureau of Economic Research seasonally adjusted the data.

109. Average Prime Rate Charged by Banks—Board of Governors of the Federal Reserve System.

This series indicates the interest rate that banks charge their most credit-worthy business customers on short-term loans. The prime rate is the base from which rates charged on loans to other business customers are scaled upward. The prime rate is not a sensitive rate that fluctuates daily in response to short-term changes in supply and demand as measured by a national market. Rather, its movements tend to be infrequent and to lag appreciably behind changes in the general business situation and in open market money rates.

The data for this series are monthly averages computed by multiplying each prime rate in effect during a month by the number of days it was in effect, summing these products, and dividing by the total number of days. If two prime rates are reported for a single day, the rate indicating initial movement is disregarded due to the usually small number of banks participating. Data are not seasonally adjusted.

X251. Ratio, Consumer Installment Debt to Personal Income—Department of Commerce, Bureau of Economic Analysis; and Board of Governors of the Federal Reserve System.

This series measures the dollar volume of consumer installment credit outstanding at the end of each month per dollar (and/or dollar value) of monthly personal income.

Consumer installment credit measures all short- and intermediate-term credit used to finance the purchase of commodities and services for personal consumption or to refinance debts originally incurred for such purposes. Included is all consumer credit (including revolving credit and budget and coupon accounts) held by financial institutions and retail outlets that is scheduled to be repaid in two or more installments. Credit extended to governmental agencies and nonprofit or charitable organizations, as well as credit extended to businesses or individuals exclusively for business purposes, is excluded.

The term “credit” refers to an advance of purchasing power that could be used to obtain goods and services, or an advance of goods and services in exchange for a promise to pay later. Consumption refers to the process of using up goods and services as an end in itself rather than as a stage in production. Basic data for this component are compiled by the Federal Reserve System and seasonally adjusted by the Department of Commerce, Bureau of Economic Analysis.
Personal income measures the income received by individuals, unincorporated businesses, and nonprofit institutions (including pension, health, welfare, and trust funds). This income represents the sum of labor income, proprietors' income, rental income of persons, dividends, personal interest, and transfer payments, minus personal contributions to social insurance. Capital gains and losses are excluded. Most personal income is in monetary form; however, there are important exceptions—chiefly the net rental value of owner-occupied homes, the value of food produced and consumed on farms, and the value of financial services received by individuals and nonprofit institutions without explicit payment.

The components of personal income are seasonally adjusted separately (except where seasonal patterns do not exist or are not well defined) and when aggregated yield a seasonally adjusted total.