

Changes to the cyclical indicator system

The article which introduced the cyclical indicator system, (*Economic Trends*, No. 257, March 1975), mentioned that research was continuing and might lead to changes in the analysis and presentation. With the benefit of a year's experience in operating the system, and many helpful comments and criticisms from readers, it has been decided that certain changes are desirable in the composition of the groups of indicators, the method of analysis and the form of presentation. The changes, which are introduced this month, do not radically alter the system; they are seen rather as detailed improvements which are part of an evolutionary process. Further changes will be made when necessary, but normally not more often than once a year.

The changes are grouped under four headings: the reference cycle, the method of forming composite indicators, the choice of component indicators and the form of presentation.

The reference cycle

Some of the series which were used as determinants of the reference cycle have been revised during the past year, and all the detailed evidence has been re-examined. As a result, four of the previously selected turning points have now been moved:

- a The troughs originally dated in October 1958 and December 1966 have been changed to December 1958 and February 1967, as a result of incorporating revised data for these periods.
- b The peak originally dated in March 1960 has been changed to September 1960. The original analysis showed two peaks, in the first quarters of 1960 and 1961, and it was judged that the former was the appropriate one. It now appears that there was a fairly flat peak during the first nine months of 1960; the turning point is taken to be at the end of this period, in September 1960.
- c The trough originally dated in March 1971 has been changed to October 1971. It now appears that not enough allowance was originally made for special factors operating in the early part of 1971, particularly industrial disputes involving postal workers and power engineers. Together with data revisions, these considerations indicate that the trough should be later in the year.

The formation of composite indices

Before the component indicators can be incorporated into a composite index, they must be reduced to a common scale of measurement. This process is described as 'amplitude standardisation', because the scaling is intended to produce standardised series which all display cycles of approximately the same amplitude. The method of scaling used so far, which was based on the methods used in the United States, takes the mean absolute month-to-month change as a measure of cyclical amplitude; the series were scaled to make this measure equal to unity. Experiments have shown that this measure over-states the cyclical amplitude of irregular series, so that after standardisation irregular series have cycles of much smaller amplitude than those in relatively smooth series. Although all the com-

ponent series are smoothed with appropriate moving averages, where necessary, so as to be approximately equally smooth¹, there are still variations in the degree of smoothness, and these are sufficient to produce noticeable differences in the cyclical amplitudes of the standardised series; in effect, the smoother indicators have greater weight in the calculated composite indicators. Although smoothness could be one factor in assigning different weights to components of a composite indicator (and such weighting is one candidate for further research), it was felt that weighting should be arrived at by deliberate choice, rather than being a by-product of the standardisation process. For this reason, an alternative measure of cyclical amplitude was taken, which is the mean absolute deviation from trend (equivalently, the mean absolute value of the trend-eliminated series). The standard value of this measure was set to 5; this value was chosen so that composite indicators would show cycles of about the same amplitude as with the former method.

The definition of the composite index, as a simple average of the amplitude standardised components, is applicable only when all components are available. At the beginning and the end of the total time-span there will usually be periods for which only a sub-set of the components is available, and in these periods the definition must be modified. The method used in effect assumes that series which are not available change by an amount proportional to the mean of the changes in the available series; this can lead to erratic behaviour of the most recent values of the composite indices, if movements of a few quickly-available but irregular series are magnified by being applied to the missing series. In future, values of the composite index will be disregarded if they are based on only one component, as a precaution against such erratic movements; this procedure has in fact been in use for several months.

Changes to the individual indicators

As was foreshadowed in the original article, the composition of the groups of indicators has been under review. The changes which have been made, which are detailed below, are of two kinds. In three cases one indicator has been replaced by another series, from the same sector of the economy, which shows better performance according to the criteria used for judging indicators (these criteria are given in the March 1975 article). In the other two cases extra series have been included, as a result of the continuing process of screening potential indicators. It is worth mentioning that the screening process is now taking in a wider field than that of official published sources; one of the extra series is taken from the CBI (Confederation of British Industry) Industrial Trends Survey.

- a In the longer leading group, the *Financial Times* 30-share index has been replaced by the *Financial Times* - Actuaries 500-share index (Industrial group and oils). The 500-share index, by virtue of its wider coverage and weighting procedures, gives a better reflection of movements in the stock

¹ The appropriate method of smoothing is obtained from a consideration of the Months for Cyclical Dominance (MCD), which indicates the minimum length of moving average necessary to obtain a smoothed series whose \bar{I}/\bar{C} ratio is less than 1. For further details see the notes to the table of measures of variability (page 80 in this issue) and the article 'Measuring variability in economic time series in *Economic Trends*, No. 226, August 1972.

market as a whole. The most notable divergence between the two indices is during the period 1970-71, when the 30-share index was heavily influenced by the events affecting Rolls Royce. The 500-share index is available only from 1962, but this length of series is adequate for cyclical analysis.

- b In the shorter leading group, Hire purchase total increase in debt has been replaced by New credit extended by finance houses and retailers. The increase in debt is defined as new credit *less* repayments, and so is affected by movements in credit in earlier periods. The new credit series gives a better indication of current credit conditions, and has been found to conform better to the reference cycle.
- c Also in shorter leads, an additional quarterly indicator, Gross trading profits of companies (*less* Stock appreciation), has been included.
- d In the coincident group, Real personal disposable income has been replaced by the income-based measure of Gross domestic product. RPDI has shown rather erratic behaviour in the past, while GDP(I) is smoother and has better conformity to the cycle.
- e Also in the coincident group, an additional indicator has been included, the proportion of respondents to the CBI Industrial Trends Survey who report below capacity working. The indicator takes high values when the economy is at a low level of activity, and so is used in an inverted form. The survey is now conducted quarterly, in January, April, July and October. Prior to 1972 it was conducted three times a year, usually in February, June and October; no survey was conducted in February 1971, due to the postal strike. To produce a continuous indicator series, the available values are taken for the survey months, and the intervening months are obtained by interpolation.

Form of presentation

Apart from the minor changes which have been introduced during the year, which affected the way in which the reference cycle is represented, no change to the graphical presentation is proposed. However, to enable users to follow more precisely the movements of the indicators over the most recent period, which can be difficult to do from the charts, a small table will be published each month showing the values of the composite indicators which are available for recent months, together with the number of component indicators on which each value is based. It must be emphasised that the actual values have no significance, but serve only to indicate the precise shape of the curves; the operation of the trend elimination process will lead to changes from month to month in the levels of the indicators, although experience has shown that such changes do not normally have any effect on the location of turning points. This change will in fact be introduced in the June 1976 issue.

A further point about presentation will be observed in Table 1, which gives an up to date form of the information in Appendix 1 of the March 1975 article. The table shows both mean and median leads for the indicators, instead of medians only. The patterns of leads or lags of some indicators at individual turning points are very scattered, and no single summary measure will provide an entirely adequate description. In assigning indicators to timing groups, the entire pattern of leads was considered. This explains, for example, the apparent anomaly of assigning the FT-Actuaries index, with mean lead 7 months and median 4 months, to the longer leading group; the overall pattern showed that the earlier turns had a lead of 3 or 4 months and the more recent ones were around 12 months; it was felt that the higher value was more representative of current behaviour.

Central Statistical Office

APPENDIX

Selected indicators and their timing characteristics

TABLE 1

Indicator	Frequency	Start date	MCD (QCD)	Timing relative to reference cycle dates (-) leads, (+) lags				
				Median	Mean	Earliest	Latest	Mean deviation
<i>Longer leading indicators</i>								
Rate of interest, 3 months prime bank bills	Monthly	Jan. 1957	2	-17	-18	-26	-11	4
Net acquisition of financial assets, industrial and commercial companies	Quarterly	1st qtr. '63	1	-15	-14	-17	- 8	3
Total dwellings started, Great Britain	Monthly	Jan. 1957	4	-12	-12	-19	- 6	4
<i>Financial Times</i> - Actuaries 500-share index	Monthly	Jan. 1962	2	- 4	- 7	-16	- 3	4
Composite longer leading index				-13	-13	-19	- 6	3
<i>Shorter leading indicators</i>								
New credit extended by finance houses and retailers	Monthly	Jan. 1958	3	- 6	- 7	-14	- 2	3
New car registrations	Monthly	Jan. 1957	4	- 7	- 8	-15	- 3	3
Bankruptcies: total for England and Wales	Quarterly	1st qtr. '60	2	- 3	- 4	-14	+ 5	5
Wages and salaries per unit output, manufacturing industries	Monthly	Jan. 1963	1	- 8	- 5	-10	+ 2	4
Gross trading profits of companies, excluding stock appreciation	Quarterly	1st qtr. '58	2	- 8	- 8	-13	- 5	2
Composite shorter leading index				- 6	- 6	- 8	- 2	2
<i>Roughly coincident indicators</i>								
Gross domestic product (expenditure)	Quarterly	1st qtr. '57	2	- 2	- 2	- 9	+ 5	6
Gross domestic product (output)	Quarterly	1st qtr. '58	1	0	- 1	- 7	+ 4	3
Gross domestic product (income)	Quarterly	1st qtr. '57	2	- 1	- 1	- 9	+ 4	3
Index of volume of retail sales	Monthly	Jan. 1957	4	- 3	- 3	- 6	+ 2	2
Index of production, manufacturing industry	Monthly	Jan. 1957	3	0	0	- 4	+ 3	2
CBI capacity utilisation index	Variable	Jan. 1957	1	+ 1	+ 1	- 3	+ 8	3
Composite coincident index	Quarterly			- 2	- 1	- 6	+ 4	3
<i>Lagging indicators</i>								
Unemployed, excluding school-leavers and adult students, Great Britain	Monthly	Jan. 1957	1	+ 6	+ 6	- 1	+14	3
Vacancies notified to employment offices	Monthly	Jan. 1957	1	+ 3	+ 3	- 2	+ 6	2
Investment in plant and machinery, manufacturing industry	Quarterly	1st qtr. '57	1	+12	+13	+ 8	+18	3
Engineering industries, volume index for orders on hand	Monthly	Jan. 1963	1	+10	+ 9	+ 3	+12	2
Level of manufacturing stocks and work in progress	Quarterly	1st qtr. '63	1	+15	+15	+10	+20	3
Composite lagging index				+12	+12	+ 2	+16	3