I

Introduction and Summary

The National Bureau of Economic Research published its first list of business cycle indicators in 1938.[1] Compiled by Wesley C. Mitchell and Arthur F. Burns, the list was based upon a study of nearly 500 monthly or quarterly series covering varying historical periods, but ending with the business cycle that reached its trough in 1933. They selected the 21 "most trustworthy" indicators of cyclical revival, and presented a fuller list of 71 series that "have been tolerably consistent in their timing in relation to business cycle revivals and at the same time of sufficiently general interest to warrant some attention by students of current economic conditions."

About a dozen years later a second comprehensive review was made.[2] The new study was based upon a larger number of series, about 800, and utilized measures of cyclical behavior through 1938. This study went beyond the earlier report in several ways: indicators of recession as well as of revival were covered; probability standards against which the historical records of timing and conformity could be judged were introduced; a comprehensive economic classification of the 800 series was used in making the final selection of indicators; and the selected series were classified into three categories reflecting their timing at business cycle peaks and troughs: leading, roughly coincident, and lagging. The final 21

series selected included 8 leading series, 8 roughly coincident series, and 5 lagging series.

This list was again revised in 1960.[3] The new list was based upon a still larger number of series and upon business cycle measures through 1958. Some series in the 1950 list were dropped and some new series were added; as a result 26 indicators were selected, including 12 leading series, 9 roughly coincident, and 5 lagging. A supplementary list of additional series was also shown.

In the fall of 1957, at the request of the chairman of the Council of Economic Advisers, Raymond J. Saulnier, the Bureau of the Census started a research program to develop a monthly report on indicators that would take advantage of new findings about the relations of economic processes over time, the availability of a great many economic time series in seasonally adjusted form, and large-scale electronic computing facilities. Close working relations between the Council of Economic Advisers, the Bureau of the Census, and the National Bureau of Economic Research were maintained throughout the developmental stages of this report. After some four years of experimentation and testing, the Bureau of the Census began publishing the report in October 1961 under the title *Business Cycle Developments*, and a description of its history and methods was published by the National Bureau that same month.[4]

The monthly report has shown the 1960 NBER list of 26 indicators as well as 54 additional U.S. series, or 80 in all. Of these, 30 are

[1] Wesley C. Mitchell and Arthur F. Burns, *Statistical Indicators of Cyclical Revivals*, Bulletin 69, New York, National Bureau of Economic Research, May 28, 1938. Reprinted in Geoffrey H. Moore (ed.), *Business Cycle Indicators*, Princeton University Press for National Bureau of Economic Research, 1961, Vol. I, Chap. 6.

[2] Geoffrey H. Moore, *Statistical Indicators of Cyclical Revivals and Recessions*, Occasional Paper 31, New York, NBER, 1950. Reprinted in *Business Cycle Indicators*, Vol. I, Chap. 7.

[3] *Business Cycle Indicators*, Vol. I, Chap. 3, "Leading and Confirming Indicators of General Business Changes."

[4] Julius Shiskin, *Signals of Recession and Recovery*, Occasional Paper 77, New York, NBER, 1961.

leading series, 15 roughly coincident, and 7 lagging, while 28 are termed "other U.S. series with business cycle significance." In addition, 7 series pertaining to industrial production in countries having important trade relations with the United States have been included.

Several considerations prompted the adoption of this large list. One was that it made it possible to provide a subclassification by economic processes. Thus, the roughly coincident series were divided into four groups: employment and unemployment, production, income and trade, and wholesale prices. The added series provided useful supplementary information about the types of economic process covered by the shorter list. Since up-to-date information was critical, in view of the uses to which the data would be put, indicators that were less adequate in some respects but available more promptly were included. For example, the ratio of wholesale prices to unit labor costs, which provides a rough indication of movements of profit margins in manufacturing and is available promptly on a monthly basis, supplements the quarterly series on profit margins and total profits, which do not appear until the second or third month after the end of the quarter to which they refer. Furthermore, it was believed that with the wider use of the indicators that would come with publication in a governmental report, there would be less likelihood of misinterpretation if judgments were based upon a broader view of the economy than is possible with a small number of series. Since it had always been recognized that leading, coincident, and lagging indicators by themselves comprise an incomplete basis for current business analysis, series representing other economic processes having an important bearing on business conditions in the United States were added. Most of these are factors, such as government expenditures or merchandise exports, that have significant influences on short-term economic fluctuations but have not behaved in a manner sufficiently consistent during business cycles to be readily classified as leading, coincident, or lagging.

Business Cycle Developments was published with the understanding that the list of leading, coincident, and lagging indicators would be selected by the National Bureau. Although some changes in the content of the publication have been made from time to time, with the advice and aid of an advisory committee appointed by the American Economic Association, these changes have been strictly limited in scope. With the passage of time the desirability of another comprehensive and systematic review of the list of indicators became apparent, and that is the purpose of this report. Periodic revisions are required because of the appearance of new economic time series, new findings of business cycle research, and the changing structure of the American economy.

The series that have been included on the lists are cyclical indicators in the broad sense. They are intended to be helpful in anticipating, measuring, and interpreting short-run changes in aggregate economic activity—that is, the complex of activities represented by such concepts as total production, employment, income, consumption, trade, and the flow of funds. Although the indicators have been selected largely with reference to their behavior during periods marked off by a simple chronology of cyclical peaks and troughs in aggregate economic activity (see Appendix F), their uses are by no means restricted to the identification of turning points from expansion to recession and from recession to recovery. The economic relationships and properties embodied in the set of indicators can be turned to account in analyses of various aspects of short-term economic developments, including the timing and magnitude of movements of particular economic aggregates such as the gross national product or nonagricultural employment, acceleration or retardation in growth, inflation or deflation, economic fluctuations in an industry or region, and so on. The merits and limitations of the indicators for such applications, however, are specific to the particular case, and are not necessarily closely related to those to which attention is

given in this report. For example, experience has shown that the properties of the same list of indicators, for another country or for a state within the United States, can be expected to be broadly similar to those for the United States, but often there are differences in detail which need to be recognized to avoid misinterpretation.

SUMMARY

This paper presents the 1966 list of NBER cyclical indicators and a description of an explicit scoring plan that has been developed to help in the evaluation and selection of indicators. More than a hundred series have been evaluated, including those that came out well in previous studies and other series that appear promising for this purpose. This review is concerned chiefly with the series' quality as indicators of business expansions and contractions, and their classification and arrangement for effective use. It is limited to the role of economic time series as indicators of short-run movements in aggregate economic activity, and may not be relevant to their other uses.

The current study has extended the use of explicit criteria and objective standards employed by Mitchell, Burns, and Moore in establishing previous lists. This has been accomplished by a plan for assigning scores to each series within a range of 0 to 100. The scoring of each series, admittedly arbitrary in many respects, reflects our desire not only to make as explicit as possible the criteria for selecting indicators but also to increase the amount of information available to the user to aid in evaluating their current behavior.

The scoring plan includes six major elements: (1) economic significance, (2) statistical adequacy, (3) historical conformity to business cycles, (4) cyclical timing record, (5) smoothness, and (6) promptness of publication. When the subheads under most of these elements are counted, some twenty different properties of series are rated in all. This list of properties provides a view of the many different considerations relevant to an appraisal of the value of a statistical series for current business cycle analysis.

A high score for economic significance is accorded a series that measures a process with an important role in the analysis or forecasting of business cycle movements. In this connection, a series that broadly represents a strategic process is rated higher than one more narrowly defined, not only because the significance of the former for business cycle analysis is likely to be greater but also because its significance is less likely to shift as a result of technological developments, changing consumer tastes, and similar factors.

Statistical adequacy reflects the requirement that a series continue to measure the same economic process during future business cycle fluctuations, when the selected indicators are put to the hard test of current usage. Eight different elements are considered: type of reporting system, coverage of process, coverage of time unit, measure of revisions, measure of error, availability of descriptive material, length of period covered, and comparability throughout the period.

Consistent conformity of an indicator to past business cycles and consistent timing of its turning points relative to those in general business are obviously essential qualities in an indicator. A probability test is used to judge the statistical significance of these measures. In both cases, the recent record is given more weight than the earlier.

Since the beginning of a new cyclical phase can be discerned more promptly in a series which is smooth than in one which is irregular, smooth series are given higher ratings. Finally, for a series to be useful in current analysis, it must be up to date. Series that are released promptly, therefore, are assigned higher scores than those that lag in publication.

The assigned scores must be considered rough rather than precise measures of the relative usefulness of different series in analyzing short-term business conditions and

prospects. Moreover, the scoring plan contains information not revealed by the over-all score alone. Since the scores assigned each of the factors considered indicate particular merits and limitations of series, the detailed results may be of assistance to both producers and users of economic data.

In classifying indicators into groups useful for purposes of business cycle analysis, it is desirable to take account of both their economic interrelationships and their cyclical behavior. The following scheme, designed to accomplish this, reflects the many necessary compromises among the purposes that a classification and presentation of indicators may serve, the varied interests and sophistication of users, and the simple as well as the intricate cyclical relationships among economic series.

1. The major principle of classification is a fourfold grouping by cyclical timing: leading, roughly coincident, and lagging indicators, and other selected series. The first three categories take into account timing at both peaks and troughs, but information is provided to distinguish timing at peaks from timing at troughs, since often there are significant differences. The fourth group includes economic activities that have an important role in business cycles but have displayed a less regular relation to them.

The new list of indicators includes 36 leading series, 25 roughly coincident, 11 lagging, and 16 unclassified by timing, or 88 in all; 72 are monthly and 16 are quarterly. This list includes 13 series not on the present National Bureau list, and omits 5 series. In addition, 14 series previously unclassified by timing are assigned a timing classification.

2. The type of economic process represented by the series is used as a secondary principle of classification, with emphasis on the processes that are important for business cycle analysis. The 88 U.S. series are classified into eight major groups: (1) employment and unemployment [14 series]; (2) production, income, consumption, and trade [8 series]; (3) fixed capital investment [14 series]; (4) in-

ventories and inventory investment [9 series]; (5) prices, costs, and profits [11 series]; (6) money and credit [17 series]; (7) foreign trade and payments [6 series]; (8) federal government activity [9 series]. A ninth group, economic activity in other countries [7 series], is also provided. Each of these major categories is subdivided into economic processes that exhibit rather distinct differences in cyclical behavior. For example, under fixed capital investment, new investment commitments are distinguished from investment expenditures.

3. A short list of 25 series, drawn from the full list, is also presented. This more selective list includes 12 leading, 7 roughly coincident, and 6 lagging series; 21 are monthly and 4 quarterly. All these series have high scores and involve little duplication.

Thirty-four series included in the review are omitted from these lists. Some series with high scores are excluded because they do not seem to contribute sufficiently to warrant displacing others or increasing the length of the list. Some have relatively low scores, indicating that they have important limitations as cyclical indicators, however useful they may be in other respects.

Various composite indexes computed on the basis of the 1966 list are very similar to those based on the 1960 list. The principal contribution of the 1966 list, therefore, is the added information provided by new series and the new classification, especially in facilitating judgments on the performance of the several economic processes represented.

A broad summary of the classifications used for the indicators appears in Table 1: the timing classes, the major economic processes, and the minor economic groups within each timing and major process class. Some information on the characteristic leads or lags of the series in the minor economic groups is also provided. The reader will find this classification system more meaningful as he proceeds through this study, and he may also find Table 1 a convenient reference to help him follow the discussion.

TABLE 1

Cross-Classification of 88 Business Cycle Indicators by Cyclical Timing and Economic Process

Major Economic Group	Leading Indicators	
	Minor Economic Group	Series on Short List
1. Employment and unemployment	*Marginal employment adjustments* 5 series; 80% L; −5 mos.	Average workweek, manufacturing Nonagricultural placements
2. Production, income, consumption, and trade		
3. Fixed capital investment	*Formation of business enterprises* 2 series; 68% L; −6 mos.	Index of net business formation
	New investment commitments 8 series; 74% L; −6 mos.	New orders, durable goods Contracts and orders, plant and equipment Housing permits
4. Inventories and inventory investment	*Inventory investment and purchasing* 7 series; 80% L; −6 mos.	Change in manufacturing and trade inventories
5. Prices, costs, and profits	*Sensitive commodity price indexes* 1 series; 62% L; −2 mos.	Industrial materials prices
	Stock price indexes 1 series; 75% L; −4 mos.	Stock prices
	Profits and profit margins 4 series; 77% L; −5 mos.	Corporate profits after taxes Price/unit labor cost
6. Money and credit	*Flows of money and credit* 6 series; 79% L; −9 mos.	Change in consumer instalment debt
	Credit difficulties 2 series; 73% L; −5 mos.	
7. Foreign trade and payments		
8. Federal government activities		
All series	36 series; 76% L; −6 mos.	12 series; 75% L; −6 mos.

TABLE 1 (Continued)

	Roughly Coincident Indicators	
Major Economic Group	Minor Economic Group	Series on Short List
1. Employment and unemployment	*Job vacancies* 2 series; 62% C; 0 mos.	
	Comprehensive employment series 3 series; 79% C; −1 mo.	Employees in nonagricultural establishments
	Comprehensive unemployment series 3 series; 60% C; 0 mos.	Unemployment rate, total (inv.)
2. Production, income, consumption, and trade	*Comprehensive production series* 3 series; 63% C; 0 mos.	GNP in constant dollars Industrial production
	Comprehensive income series 2 series; 73% C; 0 mos.	Personal income
	Comprehensive consumption and trade series 3 series; 42% C; 0 mos.	Manufacturing and trade sales Retail sales
3. Fixed capital investment	*Backlog of investment commitments* 2 series; 38% C; 0 mos.	
4. Inventories and inventory investment		
5. Prices, costs, and profits	*Comprehensive wholesale price indexes* 2 series; 35% C; 0 mos.	
6. Money and credit	*Money market interest rates* 4 series; 44% C; 0 mos.	
	Bank reserves 1 series; 43% C; −1 mo.	
7. Foreign trade and payments		
8. Federal government activities		
All series	25 series; 53% C; 0 mos.	7 series; 59% C; 0 mos.

TABLE 1 (Concluded)

Major Economic Group	Lagging Indicators		Other Selected Series
	Minor Economic Group	Series on Short List	Minor Economic Group
1. Employment and unemployment	*Long-duration unemployment* 1 series; 75% Lg; +2 mos.	Unemployment rate, 15+ weeks (inv.)	
2. Production, income, consumption, and trade			
3. Fixed capital investment	*Investment expenditures* 2 series; 68% Lg; +2 mos.	Business expenditures, new plant and equipment	
4. Inventories and inventory investment	*Inventories* 2 series; 81% Lg; +4 mos.	Manufacturing and trade inventories	
5. Prices, costs, and profits	*Unit labor costs* 2 series; 72% Lg; +8 mos.	Labor cost per unit of output, manufacturing	*Comprehensive retail price indexes* 1 series
6. Money and credit	*Outstanding debt* 2 series; 62% Lg; +3 mos.	Commercial and industrial loans outstanding	
	Interest rates on business loans and mortgages 2 series; 72% Lg; +4 mos.	Bank rates on business loans	
7. Foreign trade and payments			Foreign trade and payments 6 series
8. Federal government activities			Federal government activities 9 series
All series	11 series; 71% Lg; +4 mos.	6 series; 68% Lg; +2 mos.	16 series

Note: The first figure below each minor economic group is the number of series in that group; the second figure is the number of leads (L), rough coincidences (C), or lags (Lg) as a percentage of the number of business cycle peaks and troughs covered by the series; the third is the median number of months that the series in the group lead (−) or lag (+) business cycle turns. See Table 6.