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Volume Title: Statistical Indicators of Cyclical Revivals and Recessions

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Volume Publisher: NBER

Volume ISBN: 0-87014-346-8

Volume URL: <http://www.nber.org/books/moor50-1>

Publication Date: 1950

Chapter Title: Aim of the Study and Summary of Findings

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Chapter URL: <http://www.nber.org/chapters/c3228>

Chapter pages in book: (p. 1 - 3)

## AIM OF THE STUDY AND SUMMARY OF FINDINGS

In December 1937, in response to a request by a public agency, the National Bureau undertook a brief study, based upon materials already at hand, of statistical indicators of cyclical revivals. At that time the economy was experiencing a sharp business contraction. For many years the Bureau had been analyzing time series—monthly, quarterly, and annual—on a wide variety of economic processes, in order to achieve a better understanding of how business cycles come about. Consequently, a considerable fund of information was available to answer the question, what statistical series are most likely to give some sign of the approaching end of a business contraction?

Wesley C. Mitchell and Arthur F. Burns proceeded to apply certain objective criteria to approximately 500 monthly or quarterly series, and selected 71 that on the basis of performance promised to be fairly reliable indicators of revival. A closer screening of the 71 yielded 21 series that were deemed the most trustworthy. In May 1938 the series were listed in 'Statistical Indicators of Cyclical Revivals' (*Bulletin 69*), together with an explanation of the criteria of selection and a record of the cyclical behavior of each series.

The measures of behavior upon which the selection was based were for different periods, depending upon when the particular series became available. The longest series went back to 1854 and covered 21 revivals; many began in 1919 and covered only 5 revivals. The measures ended with 1933, the last revival before the study was made. The National Bureau has since added many series to its collection, revised the measures of cyclical behavior, and extended them through the business cycle of 1933-38.<sup>1</sup> Because many series cover only a few cycles, the addition of even a single cycle materially increases our information on cyclical behavior. Also, the numerous political and economic changes after 1933 make it important that the experience of this period be considered. Hence it seems desirable now to revise the list of in-

<sup>1</sup> We have not as yet determined the turning points of any business cycle since 1938; see, however, Sec. 7.

dicators of revivals and to extend the analysis to recessions. That is the immediate aim of this study.

We have also a broader objective: to exhibit some of the differences among economic processes in respect of their role in business cycles. While we cannot undertake to account for the differences here, we can demonstrate their existence and indicate their nature. To know what are the leading and the lagging processes, and to have some measures of their performance in successive cycles, is fundamental to an understanding of business cycles.

This report is preliminary. We have not applied as many objective criteria to the selection of indicators as we plan to, and further work on problems connected with the use and interpretation of indicators is in progress. Nevertheless, the investigation points to certain general conclusions, with which we may acquaint the reader at the outset. These conclusions, and the sections of the report in which they are developed, are:

1) Economic processes, as represented by monthly and quarterly time series, differ widely in the timing of their fluctuations during business cycles. While there is a strong tendency for many processes to expand and contract at about the same time, in every cycle the cyclical turning points of different series are rather widely dispersed. For example, of 400 series especially selected for the regularity of their behavior during business cycles seldom more than 80 percent were undergoing cyclical expansion (or contraction) at any time between 1885 and 1940. Their peaks and troughs clustered around peaks and troughs in aggregate economic activity, but each cluster was spread over a year or two or three. Indeed, by the time the last few series in a cluster reached peaks, the first troughs in the next cluster had usually begun to appear. For examples and evidence see Sections 2 and 3.

2) By the application of objective criteria it is possible to select series whose timing in successive business cycles has been relatively systematic, and which therefore may be of value as indicators of revivals and recessions. That is, one can identify a group of series whose turning points have typically preceded the cyclical turns in aggregate economic activity; another group whose turns have typically coincided (roughly) with the turns in aggregate economic activity; and still another whose turns have typically followed those in aggregate economic activity, in many

cases the reasons for the differences in behavior of different series are apparent, though a thoroughgoing explanation may be lacking. In Section 4 we set forth the criteria so far adopted for selecting indicators, and in Section 5 describe the broad groups of series that appear to have useful indicator characteristics.

3) Series in all three timing groups (leaders, coinciders, and lagers), when interpreted in the light of their past behavior and economic significance, may prove useful in anticipating and identifying cyclical revivals and recessions. The evidence each type of series supplies serves to confirm or qualify that supplied by the others, and together they may be expected to provide helpful signs of an approaching recession or revival, and especially to facilitate prompt recognition of such a development once it occurs. These expectations are based upon study of the behavior of various groups of series in successive business cycles since 1885 (Sec. 2, 6, 7, and App. A). But this study also suggests that the interpretation of statistical indicators is subject to numerous difficulties and will often be attended by considerable uncertainty.

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### AN EXPERIMENT WITH INDICATORS

Our comprehension of, not to say interest in, the problem of selecting and using indicators can be advanced by performing a little experiment with the 21 indicators listed in *Bulletin 69*. As stated above, they were chosen on the basis of their behavior at revivals, the last revival considered being that of 1933. How did they behave at the next revival, in 1938? At the recession in 1937? Here we have a test of the validity of the selection.

One of the first steps in our analysis of a time series, once its seasonal variations have been removed, is to mark off what we call specific cycles. In a chart on which the entire series is plotted we look for broad swings in the data, of a duration (from peak to peak or trough to trough) roughly similar to that of business cycles, that is, two to ten or twelve years. Once we have identified the swings we date their turning points, aided in both processes by certain rules laid down in advance and applied uniformly to all series.<sup>2</sup> In Chart 1 the asterisks identify the specific cycle peaks and troughs of the 21 indicators in 1932-39.

At an early stage of the National Bureau's business cycle

<sup>2</sup> See Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles* (National Bureau of Economic Research, 1946), pp. 56-66.