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## Methods of dating business cycles

If there is agreement on the continued existence of business cycles, the usefulness of dating them will hardly be challenged. Points of reference are indispensable for the measurement and, thus, for the analysis of changes during business cycles. We all have become so used to relying on the NBER chronology for the United States that we take this tool for granted.

A few other countries also fill this need. In Canada, Italy and Japan business cycle turning points are currently identified by official agencies. Two special studies provide dates for Australia, 1948-64; and at least the 1947-59 cycles for Britain have been dated.<sup>12</sup>

It is noteworthy that the NBER methods are used in all five of these chronologies. Those for Britain and Canada are based on the classical concept of the business cycle; the others on modified versions, although this is not stated explicitly. In the Italian and Japanese cases the selection of indicators is adjusted in such a way that a period may be classified as recession despite the absence of decline in aggregate output, income and employment. In Mallyon's analysis of Australian business cycles "an attempt was made to abstract from the trend component" in series with strong trends.

An explicit application of a widened cycle concept is used by Waterhouse in the second, especially ingenious, Australian study. Here various

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<sup>12</sup>Peak and trough dates for Canada are given currently in *Current Statistical Indicators*, Department of Trade and Commerce, Ottawa (restricted).

Italian turning points are published by the Istituto Nazionale per lo Studio della Congiuntura, (ISCO), Rome, in *Rapporto al Consiglio Nazionale dell' Economia e del Lavoro*.

The Japanese chronology is in *Business Cycle Indicators*, Economic Planning Agency, Tokyo, and the trend adjusted chronology in Miyoei Shinohara, *Growth and Cycles in the Japanese Economy*, 1962, p. 153.

For Australia, dates for 1948-64 are provided in J.S. Mallyon, "Statistical Indicators of the Australian Trade Cycle," *Australian Economic Papers*, June 1966. Dates for trend adjusted cycles are in A.M.C. Waterman, "The Timing of Economic Fluctuations in Australia, January 1948 to December 1964," *Australian Economic Papers*, June 1967.

Business Cycle turning points for Great Britain, 1947-59, are found in C. Drakatos, "Leading Indicators for the British Economy," *National Institute Economic Review*, National Institute for Economic and Social Research, London, May 1963.

It should also be noted that British, French, and German business cycles before World War II have been dated at the NBER. See Burns and Mitchell, *Measuring Business Cycles*.

## *Methods of Dating*

ways of dating turning points are explored and peaks and troughs in trend adjusted data are identified. The Bank of Japan also has derived a chronology from trend adjusted data.

For the majority of countries, however, business cycles have not been dated. This goes for Germany although its Economic Research Institute recognizes the desirability of such a tool when it notes: "Business cycle research is concerned with the modes of economic behavior. Comparison of activities requires analogous situations. Analogous situations have to be marked off."<sup>13</sup> One might expect this to be followed by a chronology, or at least the promise of a chronology. But all that follows is a discussion of the merits of different, somewhat vaguely circumscribed dates for the latest downturn.

In attempting to fill this gap the present paper employs, for a considerable part of the way, the methods used by the NBER in dating classical business cycles. First of all, we use the method of basing the reference cycle turns on turns in a considerable number of aggregative time series representing a broad array of economic processes. The alternative would be to rely on a single aggregate or index. One reason for preferring a wide variety of evidence is that this reduces the likelihood of error. Equating reference turns with GNP turns, as has sometimes been suggested, seems undesirable in view of the uncertainties in the measurement of GNP, the frequency of revisions and the quarterly time unit. These arguments are even more cogent for foreign countries than for the United States. Official German national income account data are available only annually. The German Economic Institute prepares quarterly interpolations which are subject to frequent and sizeable revisions. Although these quarterly data are included in our indicators, it does not seem advisable to base a quarterly chronology solely on one such series. A monthly chronology can obviously not be obtained in this fashion.<sup>14</sup>

There is, further, no reason to change the NBER rules that a full business cycle must have a minimum duration of more than a year. In specific series, cycles as short as fifteen months are recognized, though the shortest

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<sup>13</sup>"Konjunkturforschung fragt nach Verhaltensweisen. Ein Vergleich von Verhaltensweisen verlangt analoge Situationen. Analoge Situationen muessen abgesteckt werden." Deutsches Institut fuer Wirtschaftsforschung, p. 254.

<sup>14</sup>For further arguments against reliance upon a single measure of total activity, see Geoffrey H. Moore, "What is a Recession?" *The American Statistician*, October 1967; and two articles by Victor Zarnowitz, "On the Dating of Business Cycles" and "Cloos on Reference Dates and Leading Indicators: A Comment," *The Journal of Business of the University of Chicago*, April and October 1963, respectively.

For a contrary view, see George W. Cloos, "How Good Are the National Bureau's Reference Dates?" *Journal of Business*, January 1963.

business cycle observed historically in the U.S. was seventeen months. While no minimum length for a business cycle phase has been laid down, in practice no phase shorter than six months has been recognized. Regarding amplitudes and diffusion no specific requirements have been set up in the NBER procedure, although the general requirement is imposed that cycles should be widely diffused and not be divisible into shorter cycles of similar character with amplitudes approximating their own.

So far, then, the dating of recent European business cycles encounters the same problems as the dating of classical U.S. business cycles. First, it must be decided whether or not a turning point has occurred; second, the precise month of the turn must be selected.<sup>15</sup> These problems are aggravated when we deal with foreign countries, however, because we are not helped by a long and generally accepted historical chronology. Decisions thus cannot be based on historical comparisons of durations, amplitudes and diffusion.

In addition, new statistical procedures must be devised in order to deal with the revised cycle concept. The two phases of the classical business cycle are distinguished by the *direction* of movement in aggregate economic activity. During an expansion the level of activity is rising and during a contraction it is falling. The revised cycle concept requires revision of this criterion.

Two methods are used in this study to cope with this problem. One is to adjust economic series for their long-run trends and to treat the deviations from these trends (deviation cycles) in the same fashion in which unadjusted data are treated in the analysis of classical cycles.

The second approach treats the percentage rate of change from month to month, or quarter to quarter, rather than the series proper, as the basic object of analysis. This is similar to the first approach in eliminating trends, but differs from it in requiring a special technique, as will be explained. The resulting cycles are termed step cycles.

With either method the turning dates will reflect the business cycle concept used, i.e., they will delimit periods of above and below average growth. Hence, in those instances in which an absolute decline in activity has occurred, they will tend to differ from dates selected on the basis of the classical business cycle concept. Downturns will come earlier, upturns later in trend adjusted series with upward trends than in unadjusted series. Therefore upswings will be shorter and downswings longer than in classical cycles.

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<sup>15</sup> Even when the evidence does not clearly point to a single month, we choose as best we can. Otherwise it would be necessary to work with alternative turns or with turning zones, which would greatly reduce the usefulness of the chronology.