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2

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The Cyclical Timing of Labor Market Indicators in Great Britain and the United States

ABSTRACT: This paper presents some results of recent research on British labor market indicators and compares them with results for corresponding labor market time series for the United States. The indicators discussed are those measuring cyclical change in such labor market variables as unfilled vacancies, marginal employment adjustments, employment, and unemployment. ¶ To provide a framework for the subsequent analysis of the British indicators, peak and trough dates in the postwar cycle have to be identified. For this paper this is done by locating the peaks and troughs in unemployment (a peak in unemployment representing a trough in the general cycle, and vice versa). Peaks and troughs in the individual indicators are then matched against the "reference" peak and trough dates obtained from the unemployment series. The results of this analysis of the British postwar cycle are set out in some detail in this paper. ¶ There is a considera-

ble amount of published material available on the cyclical behavior of those United States indicators which correspond to the British labor market series. Most of this material, however, is based on the "general reference cycle" determined by the National Bureau of Economic Research. Before a comparison can be made with the British series, it is necessary to recompute average leads, etc., in terms of turning points in the U.S. rate of unemployment. ¶ Because of differences in concept and coverage, it is possible to compare only a limited number of British and United States labor market indicators. Also such factors as differing trend in the two labor markets, and the effect of sampling error on the estimation of average leads and lags could be expected to cause some differences between the results for the two economies. Nevertheless, the degree of agreement between the two sets of labor market indicators is impressive. Only one comparison, that of the series measuring labor separations in the two countries, gives particularly poor results. In most other instances, however, the two series agree on the direction and the approximate magnitude of the average timing differences. This result implies, although of course does not prove, that similar cyclical timing patterns can be expected to apply generally in the labor markets of these two major western economies.

FOREWORD

The origin of the National Bureau's study of international economic indicators to which the present report contributes can be traced back to 1967. In April of that year a conference was held in London on the subject Is the Business Cycle Obsolete? As Martin Bronfenbrenner says in the preface to the proceedings volume: "From the papers and discussion it became clear that the answer to the basic question. . .would be in the negative except in the sense of strict tidal-type periodicity. At the same time it was suggested that the cycle's character had changed in a number of ways; for example, both the period and amplitude seemed to be decreasing. . . . Also, in many countries the cycle was taking the form of a 'growth cycle,' meaning that recessions were largely, if not entirely, limited to decelerations in the rates of economic growth. . . . A third novelty, discussed in relation to several countries, was the alleged 'political cycle'. . . . Such a cycle may result when exclusive concern with checking inflation (during booms) produces recessions and when exclusive concern with increasing employment (during recessions) produces inflationary booms. More generally, it arises from the alternation between undue delay in taking appropriate action and undue severity in whatever action is finally taken."[1]

The conference discussion persuaded me and some other participants that a new effort to assemble and analyze business cycle indicators on an international scale, and to make them generally accessible on a prompt publication schedule was warranted. The National Bureau's business cycle studies over the years had led to wider knowledge of the kinds of economic developments that can be expected to anticipate recessions and recoveries, and indicators selected on the basis of this knowledge were being made available in more useful form and more promptly by such publications as the U.S. Commerce Department's *Business Conditions Digest*. Similar knowledge and similar media for applying such knowledge to current events could be developed for other countries. The work needed to be oriented toward the "growth cycle," and I was glad to be able, at the conference, to point to the work that Ilse Mintz was doing at the National Bureau in applying this concept to West Germany—work that she has since completed and extended to the United States. But a far more extensive effort was required.

Fortunately, a good deal of that effort has, in recent years, been forthcoming. Studies of indicators and their cyclical properties have been carried out in Japan, Canada, Great Britain, West Germany, Italy, and Australia. Business cycle or growth cycle chronologies have been established for several countries. Compendia of indicator data are being published. Surveys of anticipated sales, prices, capital investment plans, etc., are being made, and short-term forecasts are constructed for many countries. Nevertheless, there is no single source of current data for the industrialized countries which brings all this information together in a cyclical context. Nor are background analyses on the cyclical performance of various types of early warning indicators readily available in comparable form. At the same time, the importance of research and current data systematically organized along these lines has been underlined by the profound consequences for international monetary relations, exports and imports, capital flows, the balance of payments, and inflation that have evidently resulted from the presence or absence of divergencies among countries in the state of the business cycle in which they find themselves at any given time.

The objective of the National Bureau's international economic indicators project, which was formally launched in August 1973, is to show how selected lists of monthly and quarterly economic indicators for the major developed countries can be effectively organized to throw light on the current state of the business cycle, or growth cycle, in the several countries and around the world. O'Dea's study of British indicators for the National Institute of Economic and Social Research in London fits admirably into this objective, and we are fortunate to be able to take advantage of his work to further our own. At my request he included a comparison of his

results for the British labor market indicators with corresponding data for the United States. The Director of the Institute, Dr. David G. N. Worswick, kindly relinquished its rights to the publication of the study. Hence, O'Dea's report is the first in what I hope will be a series of basic analytical reports growing out of the project.[2]

Geoffrey H. Moore

BACKGROUND AND INTRODUCTION

This paper presents some results of recent research at the National Institute of Economic and Social Research (NIESR), London, on the use of cyclical indicators to analyze the postwar cycle in the British economy. Part of that research concentrated on the identification of turning points in unemployment, and the relationship between unemployment turning points and peaks and troughs in a number of other time series measuring various aspects of the labor market. The early parts of this paper give the derivation of the turning point dates, and tabulate, with some discussion, the average leads or lags of the individual labor market indicators when matched against unemployment.

The remainder of the paper then compares the results obtained for the British labor market series with the results obtained for the corresponding United States labor market series. A considerable amount of published material was already available for the U.S. series. However, this material was based on the "general reference cycle" chronology determined for the U.S. economy by the National Bureau of Economic Research. The unemployment rate is one, but only one, of a number of series examined when determining the location of peaks and troughs in the general reference cycle. In order to make the material for the U.S. labor market comparable to the British material, it was necessary to recompute leads and lags for the U.S. labor market indicators in terms of peaks and troughs in the unemployment rate, rather than in the general cycle. Once this had been done, a valid comparison could be made between a British indicator and the corresponding U.S. series, provided of course that the two series were reasonably comparable in their concept and coverage.

Readers should particularly note two limitations of this paper. The first is that the analysis, both of the cyclical behavior of the British series and of the comparison between the two countries, does not go very far beyond setting out the empirical findings. Some indication is given of the reasons for expecting particular cyclical sequences, but the reasoning is not particularly detailed. Ideally a longer paper should be written exploring in more detail the implications of the tabulated results, but for the present, this comparatively brief survey must suffice.

For those who require a more analytical treatment there are a number of excellent references on cyclical indicator analysis of particular aspects of the U.S. labor market.[3] Similar material is not available for the U.K. although there are of course many analyses based on other approaches.

The second limitation is that there are very considerable differences in the statistical coverage of the two labor markets. These differences exist both in the concept of what is being measured and in the methods of measurement used by the respective statistical agencies of the two countries. Some of the detailed differences are mentioned during the course of this paper. The basic differences are worth outlining at this point. These are that the British statistical series on unemployment and vacancies are derived by means of a "register" system, with monthly counts taken at local offices of the Department of Employment of persons registered as unemployed and of vacancies notified to them by employers. Other labor market indicators are either obtained from the same registers or from sample surveys of establishments. The more important United States series, on the other hand, are commonly obtained from labor force surveys in which the individual or household is the sampling unit, rather than the employer's establishment. This leads to a much broader definition of unemployment. On the other hand, there is no United States series as comprehensive as the notified vacancies series for Britain.

Another point to be noted concerns the treatment of series such as numbers unemployed, numbers on short time, etc., which move contra-cyclically. That is, when the economy as a whole is expanding these series are contracting, and when the economy is contracting they are in general expanding. The simplest means of analyzing such series is to proceed as though the series had been inverted. The inverted series would of course move in accordance with the general cycle. Peaks in the inverted series would correspond to troughs in the original series and vice versa. Series analyzed thus are for convenience labeled "inverted" and are so labeled at appropriate points in the tables. A final detail is that peaks and troughs in both countries are considered to be identified from the "inverted" unemployment series, so that a peak in one or other reference chronology is actually derived from a trough in the unemployment series.

It should be mentioned that this is not the first study comparing the leads and lags of cyclical indicators in different countries. Several other studies reach conclusions broadly similar to those in this paper.[4]

CONCEPTS AND METHODOLOGY OF CYCLICAL INDICATOR ANALYSIS

This section gives a brief outline, for readers who may not be well acquainted with the subject, of the basic concepts and methodology of indicator analysis.

The approach in its entirety was developed over several decades by a number of economists and statisticians associated with the National Bureau.[5] Very briefly, indicator analysis involves examining the cyclical behavior of selected "indicator series" and especially the timing of their turning points in relation to peaks and troughs in the economy as a whole. Regularity of this timing relationship is the most important quality of an indicator although other requirements also must be met. Indicators are classified as "leading," "coincident," or "lagging" according to the timing of their turns relative to the general cycle. They are particularly helpful in diagnosing the current state of the economy and a useful tool in forecasting its future course.

The technique of indicator analysis has subsequently been employed in a number of other countries, including one earlier attempt in the early 1960's by Drakatos[6] at an analysis of the British cycle.

Although the methods used for this study are closely based on NBER work, there are some differences in approach. The most important, mentioned in the introductory section, is that the analysis of both British and United States labor market indicators in this paper is related to peaks and troughs in unemployment, rather than peaks and troughs in a general reference cycle. For the United States, the reference series is the unemployment rate, for Britain the total number of wholly unemployed (excluding school-leavers and adult students) in Great Britain.[7]

For a complete discussion of indicator analysis, the reader may consult the publications cited in footnote 5. The following are the most important points:

(i) *Statistical requirements*

The series must normally be seasonally adjusted and cover a reasonable number of cycles. Also, the analyst must be aware of major economic events (in Britain, the extreme winter of early 1963 and the coal mining dispute in early 1972; in the United States, the steel strike of late 1959) affecting the cyclical path of the series.

(ii) *Determining turning points in individual indicators*

The problems here lie initially in distinguishing cyclical turning points from short-term irregular fluctuations, and secondly in determining where a turning point should be located when there is a "double peak" (or trough) or a "plateau" in the graph of the indicator. Again quite detailed rules for settling such points have been set out in the NBER references already cited, and more recently a computer program has been written,[8] based on the NBER guidelines, which automatically locates turning points in a series. This program was used to check the turning points given (see Appendix) for the British labor market indicators and proved valuable for

that purpose, although the dates given by the program were not accepted in every instance.

The operational guidelines used in determining turning point dates, both in the program selection and in the judgmental selection, were as follows:

(a) each cyclical "phase" (expansion or contraction) had to be of minimum length five months,
(b) each complete cycle had to be of minimum length fifteen months,
(c) with equal, or very nearly equal values, at a peak or trough, the latest time period was taken as the date of the peak or trough.

Even applying these rules there are still occasions when a considerable element of judgment enters into selecting the turning point location, most particularly when there is a double peak (or trough) with the two peaks a considerable distance apart, or when some noncyclical economic disturbance, such as a major strike, has affected the cyclical movements of the indicators. Thus some of the turning point dates given in the Appendix to this paper have an element of subjectivity and would not necessarily be chosen by another observer.[9]

(iii) Statistical classification of indicators

The reference cycle turning points in this paper are the cyclical turns in unemployment. It is in most instances a straightforward matter to tabulate the leads and lags shown by an individual series at each cyclical turning point, although some difficulties can arise when the indicator has extra turns.

The statistic best summarizing an indicator series is the average (median) lead or lag shown by the series at peaks and at troughs. Provided the indicator series shows reasonably consistent timing behavior, it can then be characterized as being, with respect to the reference cycle, either a "leading" series, a "lagging" series, or a "roughly coincident" series.[10] (The timing classification at peaks may, of course, well be different from that at troughs.)

(iv) Other desirable properties of an indicator

Desirable properties of indicators, in addition to timing regularity, are:

(a) There should not be too much variability in the length of leads (or lags) at turning points.
(b) The series should conform as closely as possible to the reference cycle, expanding during each trough to peak phase of the reference cycle (after appropriate allowance for any systematic timing difference) and contracting during each peak to trough phase.

(c) The series should be reasonably smooth if turning points are to be recognized quickly, particularly if used for forecasting.

(d) The data should be publicly available within a reasonable time; that is, in addition to a short "recognition lag," a short "reporting lag" is also desirable.

In the remainder of this paper, the analysis concentrates on the average lead/lag pattern shown by each indicator, and the implicit assumption is made that the individual series satisfies reasonably well the criteria outlined above. As a matter of fact, they generally do, but for brevity the various statistical measures showing this are omitted here.

A final point is that the median leads and lags in the tables are given separately for peaks and troughs, as well as for the two combined. This reflects the differences in timing sometimes apparent between peaks and troughs. Of course some part of the differences may be caused by long term upward or downward trends. An upward trend in an indicator, for instance, will tend to reduce lead time at peaks and increase it at troughs. Also, since only a limited number of time points are considered, too much significance should not be attached to peak/trough differences.

POSTWAR CYCLES IN UNEMPLOYMENT

Unemployment Cycles in Great Britain

Figure 1 shows total unemployed in Great Britain (excluding school-leavers and adult students) from July 1948 onwards, seasonally adjusted. In most cases, the dates of peaks and troughs in this series can be determined quite easily. For instance, the peaks in 1950, 1952, 1958, and 1963 are all reasonably clearcut, as are the troughs in 1951, 1955, 1961, and 1966. The peak in early 1963 coincided with severe weather conditions, but this appears to have exaggerated rather than shifted the peak in unemployment.

The difficult problem lies in deciding whether there exists a genuine cycle over the period 1966 to 1969. More precisely, is there a genuine contraction in unemployment from mid–1968 to mid–1969, or should the whole period be regarded simply as a not too long-lived plateau in the general upward trend in unemployment since 1966?

The decision taken here is that there was indeed a genuine cyclical expansion (reduction in unemployment) in 1968–69. The expansion is certainly weak in terms of its effect on unemployment, but is of reasonably long duration. A similar pattern is shown by almost all unemployment, employment, and other labor market time series.

FIGURE 1 Cycles in Unemployment in Great Britain and the U.S., 1948-1972
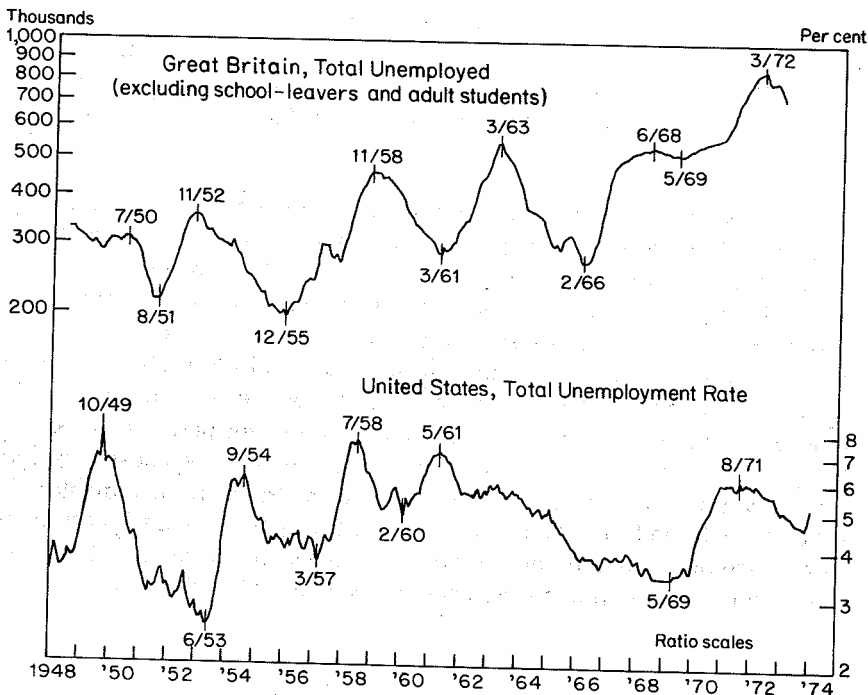
As a final check, the series was tested on the Bry and Boschan program for turning point identification. The program, in addition to confirming all the turns listed earlier, also identified a peak and trough in mid–1968 and mid–1969 respectively. Overall the evidence points fairly conclusively to a cyclical expansion between 1968 and 1969.

Two other fluctuations can be discerned from the chart; a mild expansion (a contraction in terms of unemployment) extending over most of 1957, and a short-lived contraction (increase in unemployment) in mid–1965. Clearly both are of minor amplitude and duration compared with the major postwar cycles in unemployment. Perhaps they can be appropriately labeled "subcycles." In any case, these minor cycles have been excluded from the analysis, which has concentrated on statistical relationships at the major turning points. Occasionally, however, knowledge of the existence of the subcycles has helped in deciding which turning point in a particular indicator should be regarded as corresponding to a particular reference turning point.

Table 1 shows the turning point dates finally selected. The duration of each phase (expansion or contraction) and cycle is also given. Cycle durations in Great Britain average, for the period covered, about four and

TABLE 1 Cyclical Turning Points in Unemployment and Cycle Durations Since 1950, Great Britain and the United States

Troughs[a]	Peaks[a]	Phase Durations (months)		Cycle Durations (months)	
		Peak to Trough	Trough to Peak	Trough to Trough	Peak to Peak
Great Britain (total wholly unemployed, excluding school-leavers and adult students)					
July 1950	Aug. 1951		13		
Nov. 1952	Dec. 1955	15	37	28	52
Nov. 1958	Mar. 1961	35	28	72	63
Mar. 1963	Feb. 1966	24	35	52	59
June 1968	May 1969	28	11	63	39
Mar. 1972		34		45	
Mean duration		27	25	52	53
United States (total unemployment rate)					
Oct. 1949	June 1953		44		
Sept. 1954	Mar. 1957	15	30	59	45
July 1958	Feb. 1960	16	19	46	35
May 1961	May 1969	15	96	34	111
Aug. 1971		27		123	
Mean duration		18	47	66	64

[a]The troughs and peaks in this table are troughs and peaks in the "inverted" unemployment series, corresponding to peaks and troughs respectively in the original unemployment series. This convention is followed here, and throughout this paper, to ensure that a trough corresponds to a recession, and a peak to a period of prosperity.

one-half years, although individual cycle durations range from approximately two and one-half years up to six years.

UNITED STATES UNEMPLOYMENT CYCLES

Average leads or lags of U.S. series have generally been expressed in terms of the general reference cycle chronology determined at the National Bureau. The total rate of unemployment is only one of a number of major series considered before the final selection of the dates of the business cycle turning points is made. Although turning points in unemployment roughly coincide with turns in the business cycle, they do not exactly

coincide, and hence average leads or lags in terms of the business cycle are not exactly comparable to the average leads computed for British indicators in terms of total unemployment.[11] To meet this problem the leads and lags of U.S. indicators have been recomputed, based on turning points in the total rate of unemployment. The computations have also been restricted to the postwar period, again to ensure greater comparability with the British results.

The second part of Table 1 shows postwar (from 1948) turning points in unemployment[12] for the United States while Figure 1 depicts the postwar cycles. There does not appear, at least from casual inspection, to be any obvious connection between unemployment cycles in the two countries. One of the notable differences is the downward drift in the U.S. unemployment rate during the Vietnam war build-up, 1965–69, when British unemployment was generally rising.

An interesting feature of the table is the apparent symmetry of the cycles in the British economy, in contrast to the pattern for the American economy where contractions can be seen to have been of shorter duration than expansions. This holds even if the 1961–69 expansion is omitted from the averages.

BRITISH LABOR MARKET INDICATORS

For presentation the indicators are classified into four groups measuring the following features of the labor market: marginal employment adjustments, notified vacancies, employment, unemployment. Tables 2 to 5 show, for the series making up each of these four groups, the median leads (or lags) of the series at postwar turning points in unemployment in Britain. Appendix Table A shows the individual leads and lags from which these median values have been computed. Every series listed in the tables was analyzed in seasonally adjusted form.

There is one special factor which has affected the British labor market in the postwar period but not the American labor market, and which deserves mention at this point. This was the reduction in normal hours worked in industry (i.e., the "standard" number of hours worked at ordinary time rates) from approximately forty-four hours per week in the 1950's to forty hours per week in the late 1960's. This reduction in normal hours was concentrated in two periods with approximately half the decrease occurring in each; the first period being the calendar year 1960, and the second the period between the end of 1964 and early 1966. As it happens, both these periods are in the neighborhood of cyclical peaks, and it does appear that the change in normal hours at least partially affected some of the

**TABLE 2 Marginal Employment Adjustments, Great Britain
(timing at postwar turning points in unemployment)**

Series	Period Covered	Median[a] Lead (−) or Lag (+) (in months)		
		Peaks	Troughs	Peaks and Troughs
Average weekly hours (manfg.)	1958–1972	−13	−2½	−5
Average weekly hours (manfg.) adjusted for changes in normal hours worked	1958–1972	−1	−5	−4
Total hours overtime (manfg.)	1955–1972	−3	−2½	−2½
Average overtime per operative on overtime (manfg.)	1955–1972	−9½	−3	−6
Temporarily stopped[b] (all industries) (inverse series)	1948–1972	−3	−2½	−3
Operatives on short-time (manfg.) (inverse series)	1955–1972	−8½	−3	−5½
Engagements per 100 employed (manfg.) (Q)	1948–1972	−7	−3½	−6
Discharges per 100 employed (manfg.) (Q)	1948–1972	−4	−1	−1
Engagements less discharges per 100 employed (manfg.) (Q)	1948–1972	−18	−6	−9½

[a]The leads, or lags, shown here are median values, not arithmetic means. It follows that the median for peaks and troughs combined does not always fall between the medians for peaks and troughs separately, as for instance for the total overtime series.
[b]"Temporarily stopped" workers are those with a job on the day of the count, but temporarily suspended from work and registered in order to claim benefits.
[c]Q denotes a quarterly series.

**TABLE 3 Adult Vacancies and Vacancies/Unemployment Ratio,
Great Britain (timing at postwar turning points in
unemployment)**

Series	Period Covered	Median Lead (−) or Lag (+) (in months)		
		Peaks	Troughs	Peaks and Troughs
Total vacancies	1948–1972	−4	−2	−3
Male vacancies	1948–1972	−1	−2	−2
Female vacancies	1948–1972	−5	−2½	−3
Ratio vacancies/ wholly unemployed	1948–1972	−3	0	−1

TABLE 4 Employment Series, Great Britain
(timing at postwar turning points in unemployment)

Series	Period Covered	Median Lead (−) or Lag (+) (in months)		
		Peaks	Troughs	Peaks and Troughs
Total in civil employment (Q)[a] (Employees in employment plus employers and self-employed)	1950–1972	+7	0	+½
Employees in employment— production industries	1952–1972	−½	+1	+1
Employees in employment— manfg. industries	1952–1972	+2½	0	+2
Total weekly hours (manfg.)	1956–1972	−12	−½	−1
Total weekly hours (manfg.) adjusted for changes in normal hours worked	1956–1972	+1	−½	0

[a] Q denotes a quarterly series.

TABLE 5 Unemployment by Duration, Great Britain
(timing at postwar turning points in unemployment, 1948–72)

Wholly Unemployed	Median Lead (−) or Lag (+) (in months)		
	Peaks	Troughs	Peaks and Troughs
Under 2 weeks[a]	−2	−6	−4
Under 4 weeks[a]	−1	−3½	−2
Under 8 weeks[a]	−1	−3½	−2
8 to 26 weeks (Q)[b]	+2	+1	+1
26 to 52 weeks (Q)	+2	+1	+1
Over 8 weeks (Q)	+2	+1	+1
Over 26 weeks (Q)	+3	+2½	+3
Over 52 weeks (Q)	+5	+7	+7

[a] Short duration series (under 2, under 4, and under 8 weeks) are monthly from 1963, quarterly prior to that date.
[b] Q denotes a quarterly series.

timing relationships between unemployment and the labor market indicators, in particular, the average hours and total hours series as discussed below. This means that the timing relationships at peaks established for these two series are unlikely without some adjustment to provide a good guide either to future events in the British labor market or for comparison with United States experience. For this reason both these series were adjusted by dividing them by the normal hours index (a series published by the Department of Employment). The results, as discussed below, look, on the whole, more reasonable.

Marginal Employment Adjustments

The first lead-lag table, Table 2, presents those series reflecting marginal adjustments in the employment market. The series, with the exception of "temporarily stopped,"[13] are restricted in coverage to the manufacturing industries. Unfortunately also, monthly data for most of the series are available from the early 1960's only, and for the engagements and discharges series not at all. For many of the series, quarterly or bi-monthly data for the earlier years have been spliced on to the monthly series. Of course, the use of quarterly data introduces some inexactitude into the estimates of timing relationships.

We would expect employers to adjust labor input by altering average hours worked, increasing overtime or short-time, etc., prior to committing themselves to increasing or decreasing numbers employed.[14] The results fully accord with this expectation, generally showing leads, on average, at both peaks and troughs in unemployment.

Some of the series require special comment. The series on average hours worked in manufacturing industry shows a lengthy lead at peaks, but only a short lead at troughs. This result can be seen, from graphical inspection, as the consequence of a strong downward trend in average hours, this in turn resulting from the just discussed reductions in normal hours (as specified in union-management agreements, legislation, etc.) concentrated particularly in 1960 and 1965–66. Clearly this effect reduces the value of the results as a pointer towards leads at future turning points. In an attempt to overcome this problem, the series was adjusted by dividing them by an index of normal hours worked (see Figure 2). As shown in Table 2, this adjustment virtually eliminates the lead at peaks, but gives a longer lead at troughs. Overall the results look more reasonable. Certainly the individual leads and lags (given in Appendix Table A) show less variation about the average than previously.

The quarterly engagements and "net engagements" series, which represents accessions to employment, show long leads, particularly at peaks. However, their potential forecast value is somewhat lessened by the fact

FIGURE 2 Average Workweek and Overtime Hours, Manufacturing, Great Britain, 1952–1973
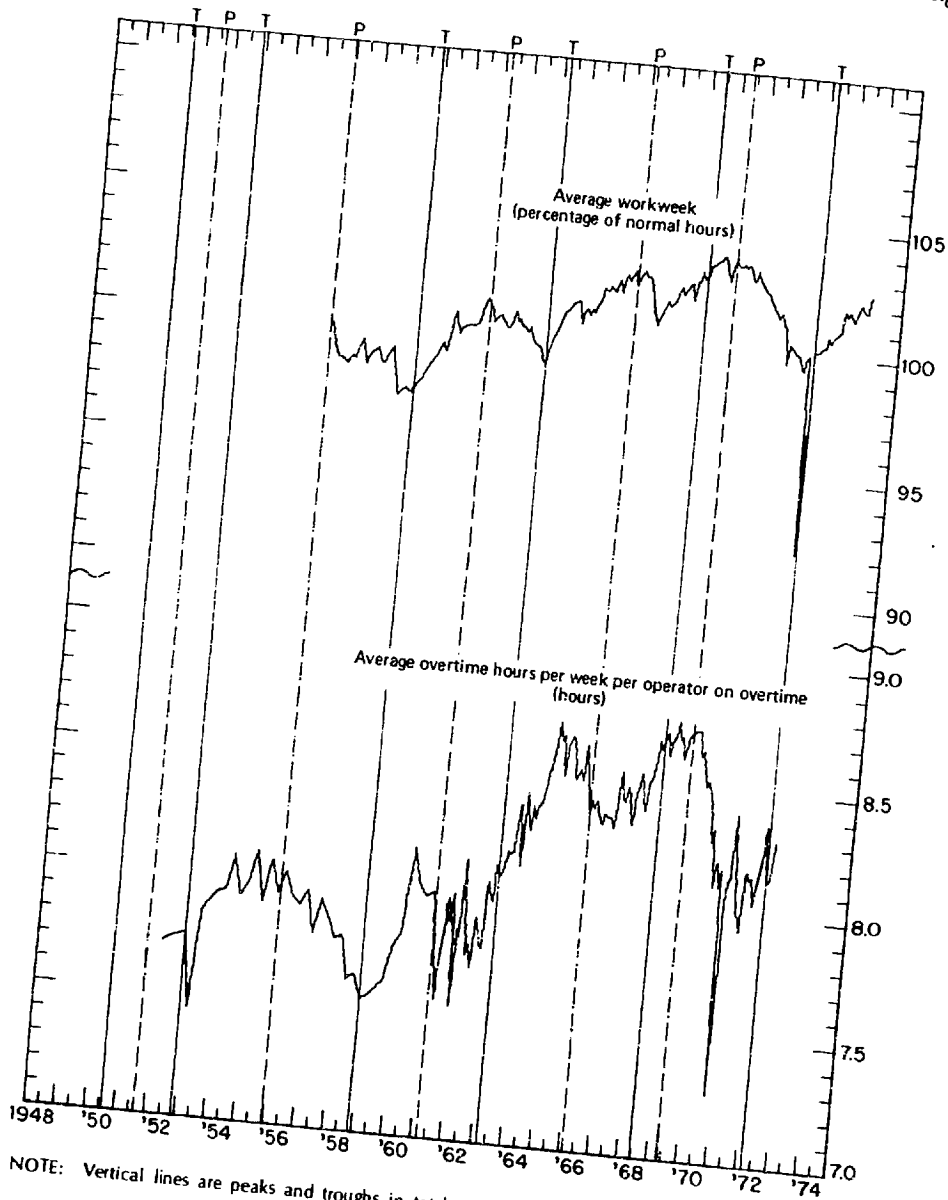
NOTE: Vertical lines are peaks and troughs in total unemployment (inverted). See Table 1.

that the series are quarterly only, and also by the high variability of the leads. The last fact is not, of course, evident from the average lead given in the table, but can be seen on inspection of graphs of the series (see Figure 3), and also from Appendix Table A.

It is worth particular mention that the discharges series is found to have a

FIGURE 3 Hiring and Discharge Rates, Manufacturing, Great Britain, 1949–1972
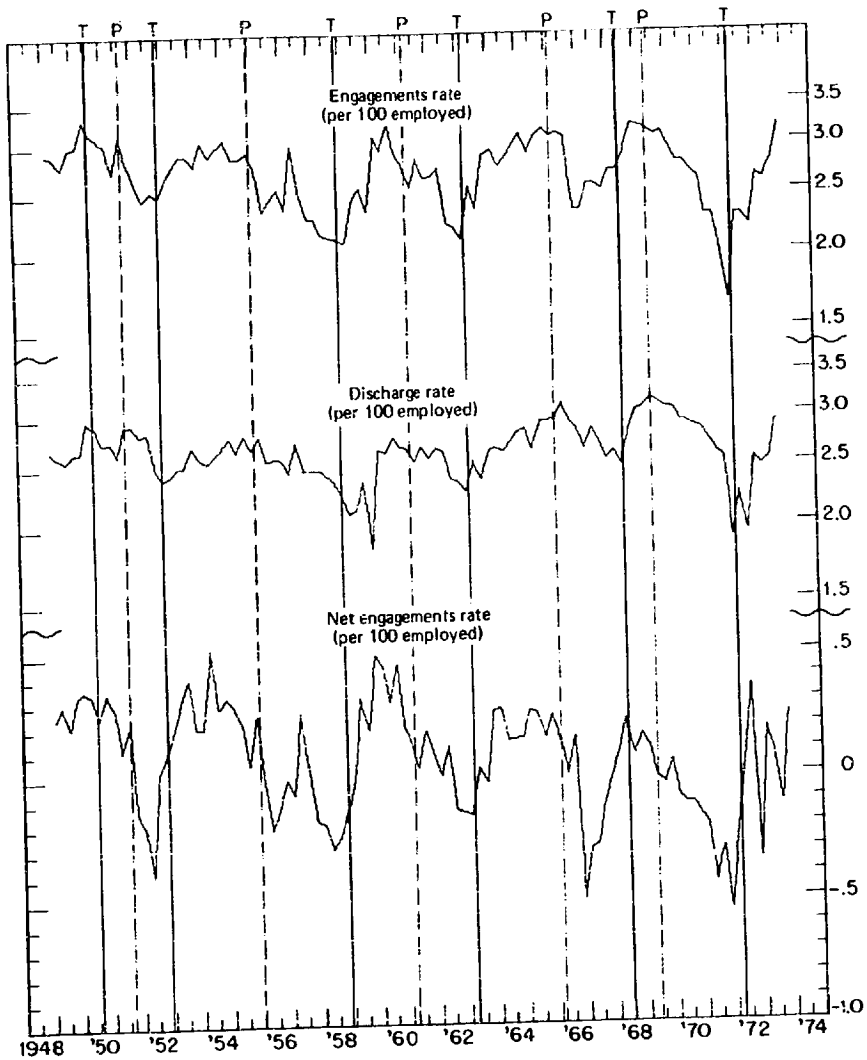
NOTE: Vertical lines are peaks and troughs in total unemployment (inverted). See Table 1.

"positive" relationship to the business cycle, i.e., the discharge rate increases with prosperity and declines in recession. The explanation is that the series includes both voluntary and involuntary discharges. Although no factual evidence is available on the point, it seems that voluntary discharges (quits) are the more important component. The positive relationship to the general cycle results then from cyclical changes in labor turnover, the increases in voluntary discharges during expansion being more than sufficient to outweigh any reduction in involuntary discharges.

Conversely, in the course of a contraction, voluntary discharges contract more rapidly than involuntary discharges expand.

Job Vacancies

Although the statistics of vacancies notified by employers to their local employment exchanges record a proportion only of total vacancies in Great Britain, they provide a valuable measure of demand pressures. Table 3 shows that total vacancies, and also vacancies for males and females separately, on average lead cyclical turning points. The series do not lead by many months, but the leads are fairly consistent over all turns.

In addition to the three vacancies series, a particularly interesting and closely related series is the ratio of vacancies to total unemployment (see Figure 4). The ratio gives a measure of the extent to which "full employment" is being approximated (depending, of course, on the degree of under or overreporting to which vacancies and unemployment are subject). Also the ratio has proved to be a particularly sensitive indicator of the business cycle for a number of countries, apparently with a higher degree of sensitivity at turning points than either of its two components.[15]

Employment Series

In Table 4 only the quarterly series showing total in civil employment covers the whole economy. The monthly series are more restricted in coverage. One of the monthly series covers the production industries (including mining and quarrying, construction, and public utilities, but excluding agriculture, the service industries, and administration). The remaining series cover manufacturing only (see Figure 5).

Two anomalies apparent in Table 4 need explanation. The first is the lag of some months which the quarterly total employment series shows at peaks in the business cycle (troughs in unemployment). This, as a glance at the individual leads and lags (Appendix Table A) shows, is very likely a result of the strong upward trend in employment in the 1950's, which produced lengthy lags at the cyclical peaks. The two monthly series measuring the number of employees in employment would be similarly affected, but to a lesser degree because they do not cover the 1950–51 expansion, and also because growth in employment has not been as rapid in the production industries as in the service industries.[16]

The second problem concerns the series on total hours worked in manufacturing industry (manhours). Not surprisingly, this series is almost as much affected by the changes in "normal hours" as the series on average hours given in Table 2. Division of the series on total hours by an index of

Adult vacancies (thousands)

Ratio, vacancies to unemployment (ratio)
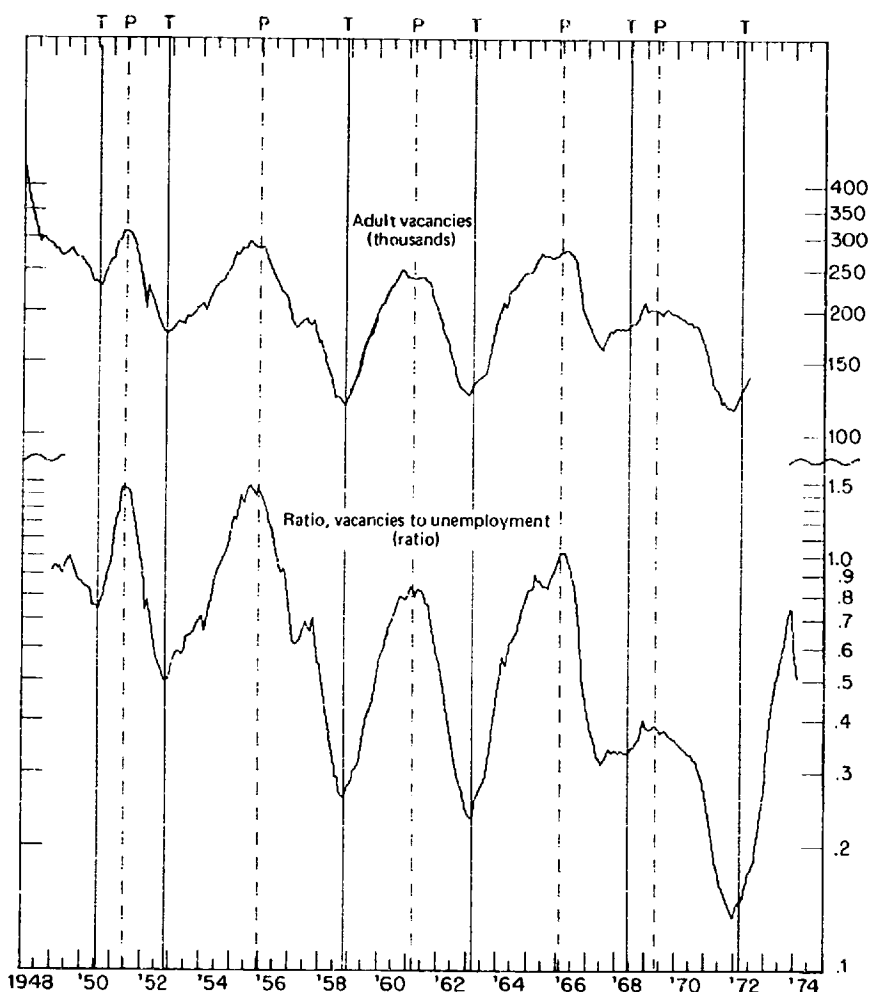
NOTE: Vertical lines are peaks and troughs in total unemployment (inverted). See Table 1.

normal hours gives almost exact coincidence with unemployment turning points at both peaks and troughs—a much more reasonable result.

Returning to the monthly employment series, we find that turning points in employment are roughly synchronous with turns in unemployment. Rather surprisingly, though, manufacturing employment appears to lag a little behind the broader production employment series. It is worth repeating that both of these "employees in employment" series have strong trend components relative to their cyclical movements. In the postwar period the trend for both series has generally been upward, but within the last few

FIGURE 5 Employment and Manhours, Great Britain, 1950–1973
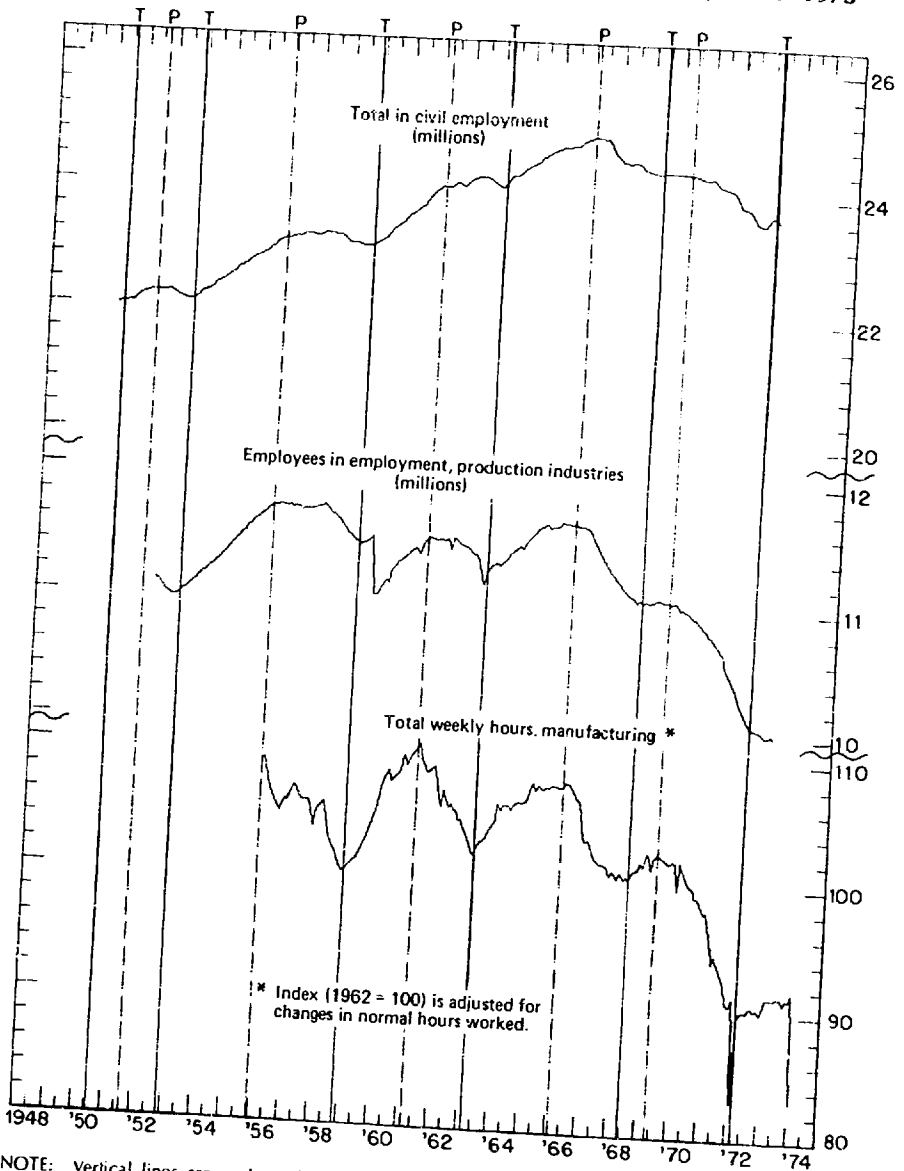
NOTE: Vertical lines are peaks and troughs in total unemployment (inverted). See Table 1.

years the trend has been consistently downward. This has made it difficult to determine the exact time relationship between unemployment and employment. but it is assumed here that the downward movement in the latter period has, in a rough and ready way, counterbalanced the earlier upward trend.

Unemployment by Duration

Quarterly series on unemployment by duration are available for Great Britain from 1948 with, for the shorter duration series, monthly data published from mid-1963. Table 5 shows leads for the shorter duration series gradually swinging to lags for longer durations (see also Figure 6). This progression from the short duration series to the long duration series is explainable by the more immediate impact on the short duration series of cyclical changes in the numbers added to the unemployment registers. Also there is evidence that the employment prospects of short duration unemployed are more sensitive to prevailing economic conditions than those of the long duration unemployed.[17]

A point which might pass unnoticed in the use of these series is that their coverage is not quite the same as the main series on total number wholly unemployed. The total series excludes unemployed school-leavers and adult students. These series include them. The effect is negligible for the long duration series, but is quite marked in, and contributes considerably to, the irregularity of the short duration series (up to eight weeks).

LABOR MARKET INDICATORS—A COMPARISON BETWEEN BRITISH AND UNITED STATES SERIES

A Uniform Basis of Comparison

As discussed earlier, the leads and lags of indicators for the U.S. economy are customarily given relative to turning points in a "general cycle," determined after consideration of movements in all major sectors of economic activity. In contrast, the British series refer to turning points in only one economic variable—unemployment. Although unemployment generally resembles the general cycle—at least such has been the U.S. experience—it has been necessary to recompute the leads and lags of the U.S. series in terms of turns in the total unemployment rate. rather than general cycle turning points. These turning points in unemployment are listed in Table 1.

The published leads and lags for the U.S. series are in some cases based on data collected prior to World War II.[18] Again, to get a valid comparison with the British data, it was necessary when computing the average leads and lags for the U.S. series shown in the tables to restrict the computations to the postwar period, or more exactly, the period from 1949 onwards. (See Appendix Table B for details.)

FIGURE 6 Unemployment by Duration, Great Britain, 1948–1973
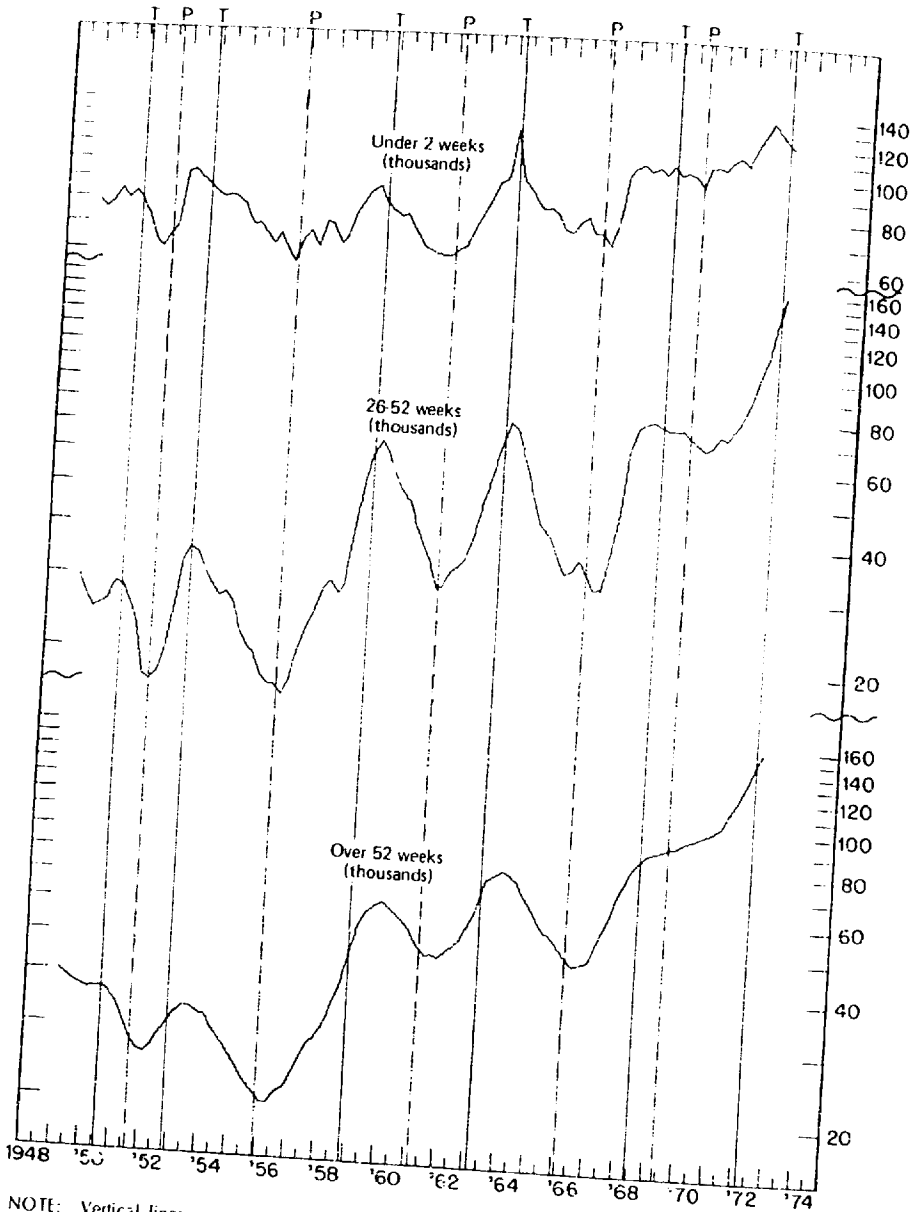
NOTE: Vertical lines are peaks and troughs in total unemployment (inverted). See Table 1.

Thus we have allowed for two factors which might otherwise have invalidated any comparisons between the two countries. There remain, however, two further possible sources of error. The first, and lesser of the two, is the possibility that quite different trend rates in otherwise comparable series might upset the comparison. The likelihood of this can normally

be seen quite easily from graphical inspection, and those cases where the problem seems most likely to arise are examined in the text. The more serious problem is in ensuring that the matched series are truly comparable both in what they are attempting to measure, and in the methods of measurement being used. As will become evident, it is not in fact always possible to match British and U.S. series this closely. Differences in both concept and coverage are sometimes substantial, and conclusions drawn from the comparison must be heavily qualified. In Table 6 are shown those British series (titles somewhat abbreviated) from Tables 2 to 5 which can be matched to U.S. series. Alongside are ranged the most closely corresponding of the U.S. series. Data for computation on the U.S. series were largely taken from the *Business Conditions Digest* (BCD), published by the U.S. Department of Commerce. For ease of reference, their code number as given in *BCD* is shown in these tables.

Marginal Employment Adjustments and Vacancies

Of the thirteen series displayed in Tables 2 and 3, it is possible to match seven with roughly comparable U.S. series (two series for vacancies). In coverage the series are reasonably comparable, the greatest difference being in the respective "vacancy" series. The only U.S. series covering the whole period (a series on vacancies in manufacturing replaced that on nonagricultural job openings a few years back) is for help wanted advertising in newspapers—only roughly comparable in coverage. However, the average leads shown by the British and American series do correspond very well. The two "ratio" (vacancies/unemployed) series also match, although not quite so well.

The two average hours series have much the same coverage, and their leads at troughs match, but they differ quite markedly in their average leads at peaks. A possibility here is that the adjustment of the British series for changes in normal hours has overcompensated. Following reductions in normal hours, employers would seek a new cost minimizing equilibrium position which, at least in the short term, would for many firms involve some increase in overtime, with the consequence that average hours actually worked would not decrease to the same extent as normal hours. The adjustment by the normal hours index would in these circumstances be an overcompensation. However, the adjustment seems justified by the reduced variability of the leads and lags at the reference cycle peaks, as can be seen from Appendix Table A.

It should also be noted that in the U.S. column the series matched to the U.K. discharges series is the one on total separations from the manufacturing labor force, rather than the more accessible data on the layoff rate (Series No. 3 in *Business Conditions Digest*). The reason is that the total separations series includes "voluntary quits" as well as "layoffs" (and also

TABLE 6 British-U.S. Comparison of Leads and Lags of Labor Market Series at Peaks and Troughs in Unemployment, 1949–72

British Series		Median Lead (–) or Lag (+) (in months)		United States Series
		Marginal Employment Adjustment Series		
Average hours (manfg.) (adjusted for normal hours changes)	P	–1	–8½	[a]1 Average workweek (manfg.)
	T	–5	–5	
	P+T	–4	–6	
Average overtime (manfg.)	P	–9½	–6	21 Average weekly overtime (manfg.)
	T	–3	–5	
	P+T	–6	–6	
Engagements rate (manfg.) (Q)[b]	P	–7	–7	2 Accession rate (manfg.)
	T	–3½	–7	
	P+T	–6	–7	
Discharge rate (manfg.) (Q)	P	–4	+10	Total separation rate (manfg.)
	T	–1	+6	
	P+T	–1	+8	
Net accession rate (manfg.) (Q)	P	–18	–8½	Net accession rate (manfg.)
Engagements less discharges	T	–6	–7	
	P+T	–9½	–7	Accessions less separations

Vacancies Series

Adult vacancies	P	−4	−5	49 Nonagricultural job openings (not including 1969–70 construction)
	T	−2	−2	
	P+T	−3	−4	
	P		−4	46 Index of help wanted advertising in newspapers
	T		−2	
	P+T		−3	
Ratio vacancies to wholly unemployed	P	−3	−1½	860 Ratio help wanted advertising to number unemployed
	T	0	−2	
	P+T	−1	−2	

Employment Series

Total in civil employment (Q)	P	+7	+5½	842 Total civilian employment—labor force survey
	T	0	−3	
	P+T	+½	−2	
Employees in employment—production industries	P	−½	+1	ᵃ41 Employees on nonagricultural payrolls
	T	+1	−2	
	P+T	+1	−1	
Total weekly hours (manfg.) (after adjustment for changes in normal hours)	P	+1	+½	48 Manhours—nonagricultural establishments
	T	−½	−3	
	P+T	0	−1	

TABLE 6 (concluded)

British Series	Median Lead (−) or Lag (+) (in months)			United States Series
	Unemployment Series (wholly unemployed)			
Under 2 weeks	P	−2	−9½	a5 Average initial claims, unemployment insurance
	T	−6	−3	
	P+T	−4	−4	
Under 4 weeks	P	−1	−7	Persons unemployed less than 5 weeks
	T	−3½	−5	
	P+T	−2	−5	
Over 8 weeks (Q)	P	+2		
	T	+1		
	P+T	+1		
	P		+3½	a44 Unemployment rate, 15 weeks and over
	T		+1	
	P+T		+2	
Over 26 weeks (Q)	P	+3		
	T	+2½		
	P+T	+3		

aSeries number as given in *Business Conditions Digest*, U.S. Department of Commerce. These series are included in the 1966 NBER "short list" of cyclical indicators. The separation rate, net accession rate, and the unemployed under 5 weeks series are not tabulated in *Business Conditions Digest*. Current data are shown in *Employment and*

Earnings, U.S. Bureau of Labor Statistics.

bQ denotes a quarterly series.

discharges and other separations) and so is the appropriate series to match against the British data on discharges. The latter, as explained earlier, include voluntary as well as involuntary discharges, with the voluntary discharges clearly dominating the series.[19]

Unfortunately this success in obtaining comparability in coverage (both series apparently derive from an establishment survey) is not matched by comparability in the results. The British series is approximately coincident with unemployment turns; the United States series lags by several months, on average.

Although it is tempting to speculate on the relative proportion of voluntary to involuntary discharges in the two countries, the necessary data are not available to explain this discrepancy conclusively.[20]

Of the three remaining series—overtime, engagements, and net accessions—both of the engagements series and the average overtime series match reasonably well overall. The remaining series—net accessions—also matches well overall, but the comparison reveals a considerable difference in the average lead at peaks. The British series has a significantly longer lead, but there is no discernible reason for the difference.

To sum up, of the seven pairs of series, one comparison (discharges) yields very poor results. Two of the other six series show significant differences, well beyond a reasonable allowance for sampling error, in the average leads at peaks (average hours and net accessions). But these two series at troughs, and the other four series at both peaks and troughs, can be seen to match well, and some very well.

Comparison of Employment and Unemployment Series

The worst problems of comparability of coverage, and also of trend domination of the cyclical pattern, appear with the series on employment (including also the total hours series under this heading). Considering particularly the differences between the trend patterns in the two countries (the U.S. steadily upwards; the U.K. switching to a downward trend in employment from about 1966), the three pairs of series give surprisingly closely matched results. The correspondence between the total hours series for the two countries is, it should be noted, obtained only after appropriate adjustment for the quite large decreases in normal hours in Britain during the 1960's. The quarterly U.K. series on civil employment is closely comparable in coverage to the U.S. series listed opposite it. The bi-monthly U.K. series on employees and total hours are, on the other hand, much more restrictive in coverage than the U.S. series listed alongside them, which omit only the agricultural sector. It follows that not too much should be read into the comparisons between the series. On the other hand, the

differences between the U.K. and the U.S. series are not large, despite the differences in coverage. Therefore, it seems a plausible conclusion that, if the series were comparable in coverage, the average leads and lags would be reasonably in agreement with each other. An interesting point is that whereas the more narrowly defined series are approximately coincident with turns in unemployment, the series broadest in coverage for each country shows a long lag at peaks. In Britain, this can be explained, as already discussed, as a result of the inclusion of the large, and steadily growing, services sector. For the U.S. series, the increase in coverage over the more narrowly defined series is proportionally much smaller, being the addition of the agriculture sector, plus employers and self-employed. (There is, of course, some overlap.) However, neither of these sectors is very sensitive cyclically, and this apparently suffices to produce a lag, on average, at cyclical peaks.

For the series on unemployment, the four British series shown in Table 6 are based on a "register" system, that is, the counts of unemployed are totals of those unemployed persons registering themselves as such with the Department of Employment.

The "initial claims" series for the United States is derived from a similar source. However, the U.S. series by duration of unemployment are more comprehensive, being obtained by means of a monthly sample survey of households. Despite this difference in coverage, the series on the two sides of the table appear to fit reasonably well into a progression from leads, for the shortest duration series, to lags for the longer durations.

The regularity of this progression, however, is more noticeable for the longer duration series. The shortest duration series for the two countries match more closely at troughs than at peaks, while the U.S. series on unemployed less than five weeks has rather lengthy average leads in comparison to the other series. An explanation which would account for most of the differences is the fairly high irregularity of these short duration unemployment series.

SUMMARY AND CONCLUSIONS

This paper has set out the average leads (or lags) which turning points in a number of British labor market indicators have over turning points in unemployment. Corresponding series for the United States of America have then been sought, so that average lead-lag patterns for the two countries can be compared.

This has required the computation of the timing patterns for the U.S. series in terms of turning points in unemployment rather than the "general business cycle" and also a further restriction of the computations to the

postwar period—or, to be exact, from 1949 onward. Further, it has been necessary to consider only those series which, in coverage, are reasonably close to the nearest British counterpart.

This last restriction has reduced the number of possible comparisons to those shown in Table 6. We find that in one instance—the comparison of those series measuring separations from the labor force in the two countries—the timing patterns compare very badly. In three other instances—short-duration unemployment, net accessions, and average hours—although the indicators lead in both countries, there appears to be a significant difference in the size of the average leads at peaks. In the remaining cases, after reasonable allowance for sampling error and possible trend effects, the results do match reasonably well. Table 7 summarizes the results, showing that the average sequences among the series are similar in the two countries, with the major exception of the separation

TABLE 7   Cyclical Timing of Labor Market Indicators at Peaks and Troughs in Unemployment, U.S. and Great Britain, 1949–72

Indicator[a]	Average Lead (−) or Lag (+) (in months)	
	United States	Great Britain
Net accession rate, manfg.	−7	−9½
Gross accession rate, manfg.	−7	−6
Overtime hours, manfg.	−6	−6
Average workweek, manfg.	−6	−4
Unemployed under 5 (4) weeks	−5	−2
Initial claims, unemployment insurance (unemployed under 2 weeks)	−4	−4
Job openings (vacancies, adult)	−4	−3
Help wanted ads (vacancies, adult)	−3	−3
Ratio, help wanted ads (vacancies) to unemployment	−2	−1
Total civilian employment	−2	+½
Nonfarm employment (nonfarm goods producing industries)	−1	+1
Manhours, nonfarm (manfg.)	−1	0
Unemployment, 15 weeks and over (26 weeks and over)	+2	+3
Separation rate, manfg.	+8	−1

[a]U.S. titles; the British indicator is shown in parentheses where the concept differs.

rate. The correlation coefficient between the median leads and lags in the two countries is $+.69$ including the separation rate, $+.92$ excluding it. This, if not very surprising, is still useful knowledge. The fairly close correspondence does, in the first place, provide evidence supporting the validity of the NBER indicator technique as a useful method of business cycle analysis. Also, confirmatory evidence obtained from other countries strengthens confidence in the direction, significance, and approximate magnitude of the timing sequences estimated for one particular economy. Finally, the results, even though restricted to a comparison between only two economies, argue in favor of the hypothesis that the sequence of changes in the labor market at business cycle turning points is essentially the same for developed market economies in general.

TABLE A Leads (−) and Lags (+) at Postwar Turning Points in U.K. Unemployment

Series[a]	T July 1950	P Aug. 1951	T Nov. 1952	P Dec. 1955	T Nov. 1958	P Mar. 1961	T Mar. 1963	P Feb. 1966	T June 1968	P May 1969	T Mar. 1972	Median P	Median T	All Turns
Average weekly hours (manfg.)					−1	−13	0	−23	−19	−5	−4	−13	−2½	−5
Average weekly hours (manfg.) (adjusted for change in normal hours worked)					−6	−1	0	+3	−19	−5	−4	−1	−5	−4
Total hours overtime (manfg.)				−1	−3	−7	−1	−2	−17	−4	−2	−3	−2½	−2½
Average overtime (manfg.)				−10	0	−10	−3	−9	−12	0	−3	−9½	−3	−6
Temporarily stopped (all industries)	0	−4	−5	0	−2	−14	−1	−3	−19	−1	−3	−3	−2½	−3
Operatives on short-time (manfg.)				−10	0	−13	−2	−3	−19	−7	−4	−8½	−3	−5½
Engagements (manfg.) (Q)	−11	−15	−6	−10	+3	−7	−1	−3	−16	−6	−1	−7	−3½	−6
Discharges (manfg.) (Q)	−11	−15	0	−4	+3	−7	−1	+3	−1	0	−1	−4	−1	−1
Engagements less discharges (manfg.) (Q)		−18	−6	−19	−6	−7	−1	−24	−19	−12	−4	−18	−6	−9½
Total vacancies	−2	−3	0	−4	−2	−5	−2	+2	−11	−5	−3	−4	−2	−3
Male vacancies	+1	−1	+2	−4	−2	−4	−2	+2	−11	+7	−3	−1	−2	−1
Female vacancies	+1	−6	−3	−4	0	−5	−2	+2	−11	−5	−3	−5	−2½	−3
Ratio—vacancies to wholly unemployed	0	−3	0	−3	0	−1	0	+2	−11	−5	−3	−3	0	−1
Total in civil employment (Q)		+7	+1	+9	−2	+15	0	+1	0	−2	−3	+7	0	+½

TABLE A (concluded)

Series[a]	Reference Dates (P = peak; T = trough)											Median Lead or Lag		
	T July 1950	P Aug. 1951	T Nov. 1952	P Dec. 1955	T Nov. 1958	P Mar. 1961	T Mar. 1963	P Feb. 1966	T June 1968	P May 1969	T Mar. 1972	P	T	All Turns
Employees in employment—production industries			−3	+3	+2	+11	−1	−5	+1	−4	+6	−½	+1	+1
Employees in employment—manfg. industries			−3	+2	0	+3	+5	−2	−2	+7	+9	+2½	0	+2
Total weekly hours (manfg.)					−1	−13	0	−12	0	−4	−1	−12	−½	−1
Total weekly hours (manfg.) (adjusted for changes in normal hours worked)														
Wholly unemployed—under 2 weeks					−1	+1	0	+1	0	0	−1	+1	−½	0
Under 4 weeks	−7	−2	−5	0	−2	0	−2	−4	−17	−8	−8	−2	−6	−4
Under 8 weeks	−7	−2	−5	0	−2	0	−2	−1	−1	−5	−7	−1	−3½	−2
8 to 26 weeks (Q)	−7	−2	−5	0	−2	0	−2	−1	0	−5	−7	−1	−3½	−2
26 to 52 weeks (Q)	−4	−2	+1	+3	+1	0	+1	+2	+1	+2	−2	+2	−1	+1
Over 52 weeks (Q)	−1	+1	+1	+3	+4	0	+1	+2	−5	+5	+7	+2	−1	+1
Over 26 weeks (Q)	−1	+7	+7	+3	+13	+9	+7	+2	n.c.[b]	n.c.[b]	+7	+5	−7	+7
Over 8 weeks (Q)	−4	+4	+4	+3	+7	+3	+1	+2	+7	+2	+1	+3	−2½	+3

NOTE: Troughs and peaks are defined in terms of "inverted" unemployment in order to correspond approximately to peaks and troughs in general economic conditions. Hence such series as unemployed, temporarily stopped, and short-time will reach peak values near the trough dates given here, and trough values near the peak dates.

[a] Q denotes a quarterly series.

[b] n.c. indicates not computed.

TABLE B Leads (−) and Lags (+) at Postwar Turning Points in U.S. Unemployment Rate

Series[a]	Reference Dates (P = peak; T = trough)									Median Lead or Lag		
	T Oct. 1949	P June 1953	T Sept. 1954	P Mar. 1957	T July 1958	P Feb. 1960	T May 1961	P May 1969	T Aug. 1971	P	T	All Turns
1* Average workweek (manfg.)	−6	−3	−5	−16	−3	−10	−5	−7	−11	−8½	−5	−6
21 Average weekly overtime (manfg.)		−9	−5	−5	−3	−6	−5	−6	−8	−6	−5	−6
2 Accession rate (manfg.)	−8	+6	+5	+10	−5	−11	−7	+1	−10	−7	−7	−7
Total separation rate (manfg.)	+6	−7	−8	−16	+8	+10	−1	+11	+8	+10	+6	+8
3 Layoff rate (manfg.) (inverted)	−5	−7	−8	−16	−4	−9	−3	−1	−10	−8	−5	−7
Net accession rate (manfg.) (accessions less separations)	−7	−6	−8	−24	−6	−11	−5	−5	−10	−8½	−7	−7
49 Nonagricultural job openings (unfilled)	0	−8	0	−5	−4	−2	−4			−5	−2	−4
46 Index of help wanted advertising in newspapers	+2	−3	+1	−5	−2	−7	−3	+4	−6	−4	−2	−3
860 Ratio help wanted advertising to number unemployed	0	−3	0	−5	−2	0	−3	0	−7	−1½	−2	−2
Business cycle dates	0	+1	−1	+4	−3	+3	−3	+6	−9	+3½	−3	0
47* Index of industrial production	0	+2	−5	−1	−3	−1	−3	+4	−9	+½	−3	−1
842 Total civilian employment— labor force survey	−4	−3	−2	+4	−3	+7	−1	+11	−8	+5½	−3	−2
41* Employees on nonagricultural payrolls	0	−2	−1	0	−2	+2	−3	+10	−9	+1	−2	−1
48 Manhours—nonagricultural establishments	0	−3	−1	−1	−3	+2	−5	+7	−9	+½	−3	−1

TABLE B (concluded)

Series[a]	Reference Dates (P = peak; T = trough)									Median Lead or Lag		
	T Oct. 1949	P June 1953	T Sept. 1954	P Mar. 1957	T July 1958	P Feb. 1960	T May 1961	P May 1969	T Aug. 1971	P	T	All Turns
5* Average initial claims, unemployment insurance (inverted)	0	−9	0	−18	−3	−10	−3	−4	−10	−9½	−3	−4
Persons unemployed less than 5 weeks (inverted)	0	−1	−9	−24	−4	−11	−5	−3	−8	−7	−5	−5
44* Unemployment rate—5 weeks and over (inverted)	+1	+4	−1	+6	+1	+3	+2	−2	+6	+3½	+1	+2

NOTE: Troughs and peaks are defined in terms of "inverted" unemployment in order to correspond approximately to peaks and troughs in general economic conditions. Hence such series as unemployment by duration will reach peak values near the trough dates, and trough values near the peak dates.

[a] Series numbers as given in *Business Conditions Digest*. An asterisk indicates those series included in the 1966 NBER "short-list" of cyclical indicators, and whose turning points are accordingly listed in (BCD), Appendix F. Turns in other series have been determined from graphical inspection and are not necessarily those which another observer would choose.

NOTES AND REFERENCES

1. Martin Bronfenbrenner, ed., *Is the Business Cycle Obsolete?* (New York: Wiley, 1969), pp. vi–vii.

2. A progress report on the project, outlining the general plan and indicating the status of work in various countries as of June 30, 1974, is available from the National Bureau on request.

3. See, for example, Gerhard Bry, "The Timing of Cyclical Changes in the Average Workweek" and Geoffrey H. Moore, "Business Cycles and the Labor Market," both contributed papers to *Business Cycle Indicators*, Volume I, Geoffrey H. Moore, editor (New York: National Bureau of Economic Research, 1961). Also the more recent paper by Paul Armknecht and John Early cited in footnote 19 of this paper.

4. For instance, Kathleen H. Moore finds in her paper, "The Comparative Performance of Economic Indicators in the United States, Canada and Japan," *Western Economic Journal*, Volume IX, No. 4 (December 1971), pp. 419–428, that there is "a broad similarity among the three countries in the length of leads at peaks and at troughs, respectively." The paper reports only a comparison of composite indexes for the three countries, but the conclusions were based also on unpublished material comparing individual indicators. National Bureau studies comparing the cyclical behavior of U.K. and U.S. indicators include: Thor Hultgren, *Transport and the State of Trade in Britain* (New York: National Bureau of Economic Research, 1953); Ilse Mintz, *Trade Balances during Business Cycles: U.S. and Britain since 1880* (New York: National Bureau of Economic Research, 1959); Oskar Morgenstern, *International Financial Transactions and Business Cycles* (New York: National Bureau of Economic Research, 1959); and an unpublished manuscript by Charlotte Boschan, "Fluctuations in Job Vacancies—An Analysis of Available Measures" (May 1969).

5. In particular, see Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles* (New York: National Bureau of Economic Research, 1946); Geoffrey H. Moore, editor, *Business Cycle Indicators*, Volumes I and II (New York: National Bureau of Economic Research, 1961); Geoffrey H. Moore and Julius Shiskin, *Indicators of Business Expansions and Contractions* (New York: National Bureau of Economic Research, 1967). Among the more recent contributions on the subject are the following: Ilse Mintz, *Dating Postwar Business Cycles: Methods and Their Application to Western Germany, 1950–67* (New York: National Bureau of Economic Research, 1969), "Dating U.S. Growth Cycles," *Explorations in Economic Research* Volume 1, No. 1 (Summer, 1974); contributed papers to *The Business Cycle Today*, Victor Zarnowitz, editor (New York: National Bureau of Economic Research, 1972); Geoffrey H. Moore, "The Analysis of Economic Indicators," *Scientific American*, Vol. 232, No. 1, January 1975, pp. 17–23.

6. C. Drakatos, "Leading Indicators for the British Economy," *National Institute Economic Review* No. 24 (May 1963), pp. 42–49.

7. This series was first published by the Department of Employment in 1972, replacing an earlier series which excluded unemployed school-leavers from the total of wholly unemployed, but not adult students registered as unemployed. The latter were of negligible importance until recently. Over the period considered, 1948 to 1972, the two series differ by one month on the date of only two turning points, February 1966 for March 1966, and March 1972 for April 1972. Otherwise turning point dates for the two series are identical.
This change is mentioned because a previous paper by me, "Leading Indicators of Cycles in Unemployment: An Interim Report," presented at the Conference on Modeling of the U.K. Economy, was based on the earlier series. Also, in the earlier paper the turning points covered did not include the 1972 trough.

8. The program is one of those described in Gerhard Bry and Charlotte Boschan, *Cyclical*

Analysis of Time Series: Selected Procedures and Computer Programs (New York: National Bureau of Economic Research, 1971).

9. For example, a number of the American series have a "doublepeak" situation in 1959–60, partly caused by the steel strike lasting from July to November of 1959. The peaks in four series (Nos. 21, 2, and 3, and the "net accessions" series) occurring in early 1960 have been assumed to be poststrike "extremes" with the true peak being located in mid- or early 1959. However, another observer might well reach a different conclusion.

10. For rules for determining which, if any, timing classification an indicator should be placed in, see Geoffrey H. Moore and Julius Shiskin, *Indicators of Business Expansions and Contractions* (New York: National Bureau of Economic Research, 1967), pp. 19 and 91.

11. For the United States the total rate of unemployment, while roughly coincident over all turning points, does tend to lead at peaks in the general reference cycle and to lag at troughs in the general cycle. In part, at least, this is because the series is relatively trendless, whereas other series used in determining reference cycle turns are not trend-free. Thus, for the postwar (or post–1948) period the total rate of unemployment is, on average over all turns, exactly coincident. At general cycle peaks, however, the series leads on average by three to four months, while at troughs it lags by three months on average. (See Appendix Table B.)

12. The measures of unemployment used for the two countries are quite different in concept and coverage. The series for Great Britain excludes, for instance, those "temporarily stopped," i.e., temporarily laid off, but waiting to be called back to their jobs. More fundamentally the British series is based on a register system while the United States data are obtained from a monthly household survey and generally use a wider concept of unemployment. An article in the June 1972 *Monthly Labor Review*, "Unemployment in Nine Industrialized Countries," gives unemployment rates for Britain, and a number of other countries, adjusted to U.S. definitions. In this paper the rate of unemployment, rather than total number unemployed, is used to define turning points in unemployment in the United States, the former series being much more widely used. In practice the two series coincide almost exactly, except at the mid-1969 peak where the number unemployed leads the rate by some months. This difference is insufficient to seriously affect the average leads (lags) shown by the various indicators. Data revisions, changes in seasonal adjustments, etc., could yet alter turning point dates in these two series for the period 1968–71. This pinpoints a weakness in the use of a single series to determine reference turning points, rather than following the NBER approach of basing the reference cycle on the evidence provided by a number of series of major economic significance.

13. "Temporarily stopped" workers are those employed on the day of the count, but temporarily suspended from work and registered in order to claim benefits.

14. For a recent analysis, see M. Ishaq Nadiri and Sherwin Rosen, *A Disequilibrium Model of Demand for Factors of Production* (New York: National Bureau of Economic Research, 1974).

15. See, for example, pp. 34 and 40–41 of William D. Nordhaus and James Tobin, *Economic Growth* (New York: National Bureau of Economic Research, 1972) and the paper by J.C.R. Dow and L.A. Dicks-Mireaux, "Excess Demand for Labour" (Oxford Economic Papers, February 1958), where this ratio is used as an index of the pressure of demand for labor, although with allowances for estimated deficiencies in coverage. A comprehensive examination of the timing and other aspects of cyclical behavior of job vacancies vis-à-vis unemployment in Britain, United States, Germany, and the Netherlands is contained in the unpublished NBER manuscript by Charlotte Boschan cited in footnote 4.

16. Total number of employees in employment increased by approximately 1,400,000 (from 21 million to 22.4 million) over the period 1951 to 1961, but between 1961 and 1971 fell by 350,000. In the earlier period the number of employees in the service industries (i.e., outside the production industries) grew only slightly faster than the number in the production industries, and the proportion of employees in services remained roughly constant at about 49 per cent. From 1961 to 1971, however, the number employed in services continued to grow, whereas the production industries showed an absolute decline. The result was to send the proportion of employees in the services or industries up to a record 53 per cent by 1971. (Figures here taken from the British Labour Statistics Historical Abstract and the Department of Employment Gazette. The percentages are for the 1958-based industrial classification, the 1951 and 1971 data being made approximately comparable to the 1961 data by taking ratios over breaks in the series.)

17. See R. F. Fowler, "Duration of Unemployment on the Register of Wholly Unemployed," CSO Studies in Official Statistics, Research Series No. 1 (London: Her Majesty's Statistical Office, 1968). This study shows that the turnover rate is much higher for those who have been only a short time on the unemployment register, and also that these turnover rates are apparently more sensitive to changes in the level of total unemployment than those for longer duration unemployed. This, together with the greater proportionate impact on the short duration series of a change in additions to the register, would explain why the short duration series generally "turn round" prior to the turn in total unemployed.

18. The Bureau of the Census Business Conditions Digest is the source for almost all the U.S. series listed in this paper. In particular, peak and trough dates for a number of the series are taken from Appendix F of the Digest.
    The labor force survey data on persons unemployed less than five weeks, and the data on total labor force separations (voluntary as well as involuntary discharges) are given in "Employment and Earnings," issued monthly by the Bureau of Labor Statistics. Appendix Table B lists the leads and lags of turning points in all these series over the turns in the unemployment rate.

19. Ideally one would use the British series corresponding to the U.S. series on "voluntary quits." Unfortunately this series does not exist. Note that a recent study by Paul Armknecht and John F. Early, "The Manufacturing Quit Rate: Trends, Cycles, and Inter-industry Variations," U.S. Bureau of Labor Statistics Staff Paper 7, Washington, D.C., 1973, found the American series to be a well-behaved positively conforming indicator with a lengthy lead at peaks.

20. We know that layoffs in the United States move, as expected, inversely to the cycle, and on average lead at both peaks and troughs. Also that quits conform positively to the cycle and have a lengthy lead at cyclical peaks (see footnote 19). Of these two major components of total separations, the quits series has frequently been dominant, in which case the total separations series has conformed positively to the business cycle. However, the "layoffs" component is sufficiently strong to introduce considerable irregularities into total separations, and sometimes, as in 1957–58, make separations conform inversely. Quits start falling off before the cyclical peak, but then near the peak, the surge upwards in layoffs can be sufficient to create a second peak in the total separations series, and hence the overall lag apparent for the separations series. Similarly, at the cyclical trough, the decline in layoffs is sufficiently strong to prolong the decline in the total.
    Overall, the total separation series for the United States is not a satisfactory indicator, and attention should rather be focused on its components. The series is given here only to match the British discharges series, in which the voluntary turnover component seems, although this is not testable, to be much more dominant.